

INCH-POUNDMIL-T-83817(84)
06 NOV 1990

MILITARY SPECIFICATION

TRUCK, LIFT, FORK, 4,000 POUND CAPACITY at 23.5 Feet of
Reach , Rough Terrain

This specification is approved for use by (Code 84) ,
Department of the Air Force, and is available
for use by all Department and Agencies of the
Department of Defense

1.0 SCOPE

1.1 Scope. This specification covers Truck, Lift, Fork,
Variable Reach, 4,000 Pound Capacity at 23.5 Feet reach, Rough
Terrain, Diesel Engine.

2.0 APPLICABLE DOCUMENTS2.1 Government documents.

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

SPECIFICATIONSFederal

A-A-1108

Fire Extinguishers, Halon 1211

Beneficial comments (recommendations, additions, deletions) and
any pertinent data which may be of use in improving this docu-
ment should be addressed to: WR-ALC/MMDETb, Robins AFB GA
31098-5609 by using the self-addressed Standardization Document
Improvement Proposal (DD Form 1426) appearing at the end of
this document or by letter.

AMSC N/A

FSC 3\$30

'DISTRIBUTION STATEMENT A. Approved for public release;
distribution is unlimited. "

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TT-C-494	Coating Compound, Bituminous, Solvent Type, Acid Resistant
<u>Military</u>	
MIL-T-5624	Turbine Fuel Aviation Grades JP-4 and JP-5
MIL-A-11755	Antifreeze , Arctic-Type
MIL-A-46153	Antifreeze , Ethylene Glycol, Inhibited, Heavy Duty
MIL-C-46168	Coating, Aliphatic Polyurethane, Chemical Agent Resistant
MIL-C-53039	Coating, Aliphatic Polyurethane, Single Component, Chemical Agent Resistant
MIL-T-83133	Turbine Fuel Aviation Kerosene Type, Grade JP-8 Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Aircraft
MIL-H-83282	Hydraulic Fluid, Fire Resistant Synthetic Hydrocarbon Base, Aircraft, Metric, NATO code number H-537
MIL-C-83286	Coating, Urethane, Aliphatic, Isocyanate , for Aerospace Applications

STANDARDSFederal

FED-STD-595	Colors
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Military

MIL-STD-130	Identification Marking of US Military Property
MIL-STD-209	Slings and Tiedown Provisions for Lifting and Tying Down Military Equipment
MIL-STD-461	Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference
MIL-STD-889	Dissimilar Metals
MIL-STD-1472	Human Engineering Design Criteria for Military Systems, Equipment, and Facilities!
MIL-STD-1474	Noise Limits for Army Material
MIL-STD-1791	Designing for Internal Aerial Delivery in Fixed Wing Aircraft
MS 51335	Pintle Assembly, Towing, 18,000 LBS Capacity

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from Standardization Documents Order Desk, Building 4D, 700 Robins Ave 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.

DESIGN HANDBOOKS

AFSC DH 1-11 Air Transportability
(Copies of this design handbook are available from HQ AFLC, ASD/ENEC, Wright Patterson AFB, OH 45433-5001)

DEPARTMENT OF AGRICULTURE

5100-1A Spark Arresters for Internal Combustion Engines

(Application for copies should be addressed to Department of Agriculture Forest Service, Equipment Development Center, San Dimas ,California, 91774.)

2.2 Non-Government publications. 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 documents cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE INC (ANSI)

B56.6	Safety Standard for Rough Terrain Fork Lift Trucks
B56.11.3	Load Handling Symbols for Powered Industrial Trucks
Z26.1	Safety Glazing Materials for Glazing Motor Vehicles Operating on Land Highways (Applications for copies are available from, American National Standard Institute 1430 Broadway New York, NY 10018)

UNDERWRITERS LABORATORIES INC (UL)

UL 550
[Applications for copies are available from UL Publication Stock,333 Pfingsten Road, Northbrook IL 60062.]

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE HANDBOOK

J 53 - Minimum Performance Criteria for Emergency Steering of Wheeled Construction Machinery.

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- J 98 - Safety for Industrial Wheeled Equipment.
- J 185 - Access Systems for Off-Road Machines.
- J 231 - Minimum Performance Criteria for Falling Object Protective Structure (FOPS).
- J 386 - Motor Vehicle Seat Belt Anchorage Test Procedures.
- J 560 - Seven-Connector Electrical Connector for Truck-Trailer Jumper Cable.
- J 833 - Human Physical Dimensions Recommended Practice.
- J 890 - Control Locations for Off-Road Work Machines.
- J 925 - Minimum Service Access Dimensions for Off-Road Machines.
- J 1040 - Performance Criteria for Rollover Protective Structures (ROPS).
- J 1176 - External Leakage Classifications for Hydraulic Systems.
- J 1503 - Performance Test for Air Conditioned, Heated and Ventilated Off-Road Selfpropelled Work Machines.

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

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

3. REQUIREMENTS

3.1 Description. The forklift truck {herein called 'truck" or "forklift" shall Toe the manufacturer's standard commercial forklift, modified only as necessary to meet the requirements specified herein. The truck shall be air transportable in the C-130, C-141, and C-5 aircraft in accordance with MIL-STD-1791 and AFSC DH 1-11 Air Transportability design handbook. The trucks shall be identical and all parts interchangeable with the other vehicles supplied under this contract. The truck shall be equipped with, but not limited to, instruments, components, and accessories that are standard with the contractor's forklift, whether stipulated herein or not. It shall be capable of meeting requirements herein without the use of outriggers.

3.2 DS requirements. The truck shall be tested to prove that it meets the UL 558 requirements for DS rated trucks. The results of this testing shall be as specified (ace 6.3) in the First Article Test Report. The truck shall be identified in accordance with UL 558 as a DS vehicle.

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3.3 Rated load capacity. The forklift shall have a rated load capacity of 4,000 pounds with the center-of-gravity of a homogeneous four-foot cube located 23.5 feet forward of the foremost point of the truck (excluding the boom and forks) . This shall be with the cube resting against the load backrest on the " vertical load carrying surface of the forks. Counterweights or any portion of the truck shall not be shifted rearward from the forklift to counterbalance the load on the forks. The overall size of the forklift shall not increase (excluding the boom extension) as the load is moved forward.

3.3.1 Retracted load capacity. With the boom horizontal and fully retracted, the forklift shall be capable of safely handling a homogeneous four-foot cube weighing at least 6,200 pounds.

3.4 Load chart. A permanently marked and installed, corrosion-resistant metal nameplate showing the load capacity at various boom extensions shall be furnished. The chart shall be similar to Chart A in Part III of ANSI B56.6.

3.5 First Article truck. Unless otherwise specified (see 6-3) the contractor shall furnish two complete forklifts; one for First Article inspection IAW 4.3 and 4.4 and the other for operational testing as defined in 4.7. The approved first article trucks shall be rehabilitated to new condition and shall be delivered as specified in the contract.

3.6 Material. Material not specified herein shall be of the quality regularly used by the supplier. Material shall be free from all defects and imperfections that might affect the structural integrity, serviceability and appearance of the finished product.

3.6.1. 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 forklift trucks may be newly fabricated from recovered materials to the maximum extent practicable, provided the forklift trucks produced meets all other requirements of this specification. Used, rebuilt or remanufactured components, pieces and parts shall not be incorporated in the forklift trucks.

3.7 Dissimilar metals. Unless suitably protected against electrolytic corrosion, dissimilar metals shall not be used in intimate contact with each other. Dissimilar metals and methods of protecting them are defined and described in MIL-STD-888.

3.8 Operating environment. The engine shall start without preheating -within 5 minutes in any ambient temperature (with the truck stabilized at the ambient temperature from -25°F to +125°F. The truck shall operate as specified herein within 15 minutes after engine start in any ambient temperature from -40°F to

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+125°F. Engine oil, transmission fluid, drive line fluid, and lubricant temperature shall not exceed 250°F during operations and testing specified herein.

3.9 Safety. The truck shall conform to the applicable requirements of ANSI B56.6, OSHA standards in effect at the time of manufacture, UL 558 for DS type trucks, SAE J98, and any other applicable SAE standards. All rotating and reciprocating parts and parts subject to high temperature shall be guarded when such parts are exposed to contact by operator and maintenance personnel performing daily maintenance functions. Nonfunctional edges shall be pounded, projecting points shall be blunted or pounded, and excessive length of fasteners shall be avoided. Steps and platforms shall have antiskid, ice resistant surfaces.

3.9.1 Seatbelt and operator's restraint. An operator's seatbelt conforming to SAE J386, Type One, shall be installed. Additional restraint devices (e.g. , winged seats, enclosures, etc.) designed to ensure the operator's body remains entirely within the protection of the frame and overhead guard in the event of tipover or lateral roll will also be provided. The restraint system will not interfere with operator access or mobility or the vehicle's operation. A warning decal will be provided advising of the hazards of tipover and the importance of using the restraint system. The installation of the lapbelts alone will not be considered as adequate occupant restraint.

3.10 Design load. The truck shall be designed with a structural design load (based on a 3,000 pound, homogeneous four-foot cube on the forks with the boom and forks fully extended} multiplied by three, or on the dynamic load multiplied by two, whichever is greater. The maximum stress caused by this design load, in any member of the forklift, shall not exceed the yield strength of the material used.

3.11 Engine. The truck shall be powered with a standard commercial diesel engine. Horsepower and torque characteristics shall be sufficient to provide the performance specified herein. Engine torque and horsepower shall be provided at an RPM which will assure performance with an adequate margin of safety. Emergency manual shutdown provisions shall be furnished when recommended by the engine manufacturer. The engine shall be capable of operating on diesel fuel and JP-8 conforming to MIL-T-83133 without detrimental effects on the engine. When operating on JP-8 the truck shall be capable of meeting the performance requirements specified in Section 4 of this document. Engine manufacturer's certification is required and shall be included in the First Article Test Report as specified (see 6.3) .

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3.12 Fuel system. The fuel tank shall be of sufficient capacity to allow a minimum of 10 hours continuous operation without refueling. The filler neck opening shall be at least 3 inches inside diameter. The filler cap shall conform to UL 558 for DS rated trucks. The fuel tank shall be equipped with a hand operated draincock at the lowest point of the tank and located, or a drain line provided, so that a 5-gallon container can be positioned to take the drained fuel without the fuel contacting any components of the truck. The draincock shall have a guard to prevent it from being hit.

3.13 Engine exhaust. The exhaust system shall incorporate a spark arrestor muffler, if a turbocharger is not used, in accordance with USDA Standard 5100-1A, equipped with a cleanout plug of at least 3/4 inch. The exhaust system shall be designed to expel exhaust gases in a manner that is not hazardous to operators or mechanics; the outlet shall not be directed toward the ground. The system shall be protected from damage which could result from traversing rough terrain.

3.14 Transition. The transmission shall be the full-torque, power-shift type in combination with a torque converter. The transmission shall provide at least three forward and three reverse speeds, all of which shall be manually selected. All transmission gears shall be constant mesh. Shifting between gear ratios shall be accomplished by the selective engagement of multiple-disk clutches which shall be actuated by annular hydraulic pistons. Actuation shall be controlled by hydraulic-control-valve body mounted on or in the transmission housing. The transmission shall provide for shifting under the full engine power through all successive gear ratios in each direction. The transmission shall provide controlled application of the clutches to provide smooth shifting without slippage that could damage the clutches. Oil pressure for actuation of the transmission clutches, for torque converter fluid shall be filtered by full-flow filter(s), having replaceable elements. The transmission shall provide for positive inching or declutching operator control of the truck (throughout the entire range of engine speed) in the forward and reverse directions. The inching or declutch control shall permit tilting and full lifting speeds with the rated load while the transmission control is in forward or reverse position without vehicle movement when tested as specified herein. Selective forward and reverse directional controls activated by the operator's foot are not acceptable.

3.15 Axles. The front and rear axles shall be rated at sufficient capacity to sustain the imposed loads. The front axle (the axle in front of the seated operator) shall be the no-spin or operator controlled locking type that ensures power is transmitted to the wheel having traction when the opposite wheel loses traction is off the ground. If an operator controlled

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locking type is furnished, an engaged warning light shall be installed on the instrument panel and labeled "FRONT DIFFERENTIAL IS LOCKED."

3.16 Tires. All tires shall be pneumatic, tubeless, off-road, tires with traction-type tread. They shall have capacity rating at least equal to the axle with the greater axle rating. All tires shall be the same size, type, and rating.

3.17 Steering. The steering system shall be the Ackerman type. Either selective 2-wheel/4-wheel, or 2-wheel rear pivot steering is acceptable. If 2-wheel/4-wheel is furnished, the seated operator shall be able to select the required steering mode. If 2-wheel rear pivot steering is supplied, the two rear wheels must pivot at least 80° in both directions from fore and aft. The steering shall be the full hydraulic type with emergency capability described in 3.18. The effort required to turn the steering wheel with the truck standing still, under all conditions, unloaded to fully loaded, shall not exceed 10 pounds in a tangential direction on the rim of the steering wheel. The steering must be capable of safely controlling the truck at all speeds from slowest to its maximum, while under any load condition, from unloaded to fully loaded.

3.18 Emergency steering. A system shall be furnished that will provide adequate hydraulic pressure and capacity to meet the performance criteria of SAE J53 in the event of engine or hydraulic pump failure.

3.19 Service brakes. Power assisted, either full-air, air-over-hydraulic, or hydraulic-over-hydraulic, foot-actuated, all-wheel service brakes shall be provided. Full-air or air-over-hydraulic systems shall have an automatic moisture ejector. The brakes shall be the automatic adjusting type. The brake system shall be capable of withstanding a brake pedal force of at least 300 pounds without failure of any component. If air-over-hydraulic or hydraulic-over-hydraulic brakes are furnished, they shall be the dual master cylinder, dual system type.

3.20 Parking brake. The parking brake actuator shall be within reach of the seated operator and shall not interfere with entry or exit. If a hand lever is used, the force required to fully set it shall not be greater than 50 pounds or 75 pounds for a foot activated pedal.

3.21 Hydraulic system. The hydraulic system shall consist of all hydraulic components necessary for operation of the forks, boom, frame tilt, etc., but shall not include the transmission.

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Fluid for the system shall conform to MIL-H-83282. All hydraulic component materials shall be compatible with this fluid. A pipe tap or straight thread O-ring boss test point for measuring pressure shall be located at the outlet of each pump. Hydraulic hoses shall have a working pressure which is equal to or greater than the hydraulic system maximum relief valve setting. A system filter shall be furnished in either the pressure or suction line.

3.22 Hydraulic reservoir. The hydraulic reservoir shall have a sight-gauge to determine fluid level without opening the tank. The hydraulic reservoir filler tube shall have an inside diameter of at least 3 inches and a filler cap that is attached to the truck by a chain to prevent loss. The reservoir shall have a hand operated draincock at the bottom of the tank. It shall be located, or a drain line provided, so that a 5-gallon container can be positioned to take the drained fluid without the fluid contacting any components of the truck. The draincock shall have a guard to prevent it from being hit.

3.23 Drain holes. Drain holes shall be provided in the truck where necessary to prevent water entrapment.

3.24 Hydraulic schematic. A corrosion-resistant metal plate containing the hydraulic schematic of the forklift shall be installed in an area where normal usage will cause no damage.

3.25 Fenders. Fenders shall be furnished at all four wheels to prevent material from being thrown toward the operator or onto the forklift. Each fender shall support a 300 pound load concentrated in a one square foot area without visible deformation.

3.26 ROPS and FOPS guard. The forklift shall be equipped with Roll-Over-Protective-Structure (ROPS) and Falling-Object-Protective-Structure (FOPS) conforming to SAE J104 and SAE J231. A vertical clearance of at least 39 inches from the top surface of the seat cushion (with nobody sitting in it) to the lowest point of the underside of the guard shall be furnished.

3.27 Operator's cab. When specified (see 6.2), a rigid watertight cab shall be installed on the outside of, or included, in the ROPS/FOPS. The cab shall have sufficient windows to permit at least 250" horizontal vision by the operator while sitting in the driver's seat. All glass shall be safety type, conforming to ANSI/Z26.1, Type AS1 or AS2. At least one window on each side and one rear window shall be capable of opening and being held in the open position while operating for ventilation. The cab shall have a door furnished with a locking device to hold it in the closed or open position while operating. If the installed cab is lower than the ROPS/FOPS, the vertical clearance above the seat, as specified in 3.26, shall be maintained. If the cab must be removed to meet the weight limits for air transportability (3.43), it shall be made in easily removable

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sections that weigh not more than 70 pounds each. Only common hand tools (wrenches, screwdrivers, etc.) may be used to disassemble and assemble the cab. All electrical wiring (and hoses if supplied) shall have quick disconnect type couplings and shall be color-coded to facilitate cab removal (if required for air transportability). Two electrically powered windshield wipers shall be provided, one for the front windshield and one for the rear window. At least one interior dome light shall be furnished. One side, front or rear window (other than in the door) shall meet the emergency exit requirements of SAE J185.

3.28 Heater and defroster. When a cab is furnished (3.27), an automotive type heater with fan to circulate heated air inside the cab shall be provided. A windshield defroster as part of the heater with separate controls and vents to direct heated air to the windshield shall be provided. The heater shall meet the performance requirements of SAE J1503. The defroster shall clear the entire windshield of a thin coating of ice within 30 minutes after engine start when the forklift and ambient temperature is -25°F.

3.29 Starter switch. The starter switch shall be the keyless type. Interlock shall be provided to prevent the starter from engaging while the engine is running and when the transmission is in gear.

3.30 Alternator. The alternator shall be capable of maintaining battery charge at full electric load on the forklift with the engine operation at 1/2 of governed, maximum RPM. It shall also provide charge at engine idle speed with no lights on.

3.31 Electrical system. The truck shall be equipped with a 12-volt water resistant electrical system. The heavy duty electrical system shall be in accordance with Electrical Equipment and Lighting Section of the SAE Handbook.

3.32 Lighting. The 12-volt lighting system shall include at least two forward and two rearward directed sealed beam floodlights and one hand adjustable (remote adjustability from the cab is not required) floodlight on the carriage or forward end of the boom. Taillights and brake stoplights shall be furnished. All lights shall be protected by guards and/or recessed for protection. Instrument panel lights and switch shall be provided. All light switches shall be controllable by the seated operator,

3.33 Batteries. Except when type A winterization is specified (see 3.49) the batteries shall be of the maintenance free type.

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3.34 Master switch. A master switch and identification plate shall be installed in a convenient location within reach of the seated operator to permit disconnect of the battery from all electrical load.

3.35 Overall height. The overall height fully operational, with not more than ten gallons of fuel and with the boom horizontal, shall not be more than 102 inches.

3.36 Wiring diagram. The wiring diagram on a corrosion - resistant metal plate, showing all wiring on the vehicle shall be mounted in a convenient location for reference by operating or maintenance personnel. The wire and terminal identification on the wiring diagram shall be the same as the wire and terminal identification applied to the vehicle.

3.37 Towing hitch. A pintle type towing hitch in accordance with MS51335-2 shall be provided in the center rear of the truck. The pintle shall be installed to withstand a load of at least 3 times the maximum drawbar pull of the truck. The center line of the hitch opening shall be 22 to 30 inches above the ground.

3.37.1 Electrical connector for trailers. A 7-wire receptacle conforming to SAE J560 shall be installed not more than 18 inches from the pintle hook. The receptacle shall be wired for at least taillights, brakelights, and turn signals, if the forklift is equipped with them.

3.38 Horn. The truck shall be equipped with a horn capable of being heard with the engine operating at maximum RPM. It shall be actuated by a button located in the zone of reach as outlined in SAE J898.

3.3\$ Instruments. The instrument panel shall be located so that the operator can read the instruments from the normal seated position. Gauges shall be furnished instead of warning lights. All gauges shall be flush mounted and provided with switch controlled illumination. Along with the gauges normally supplied by the manufacturer for this type of forklift, the following shall be provided:

- a. Ammeter or voltmeter.
- b. Engine oil pressure gauge and a low pressure warning buzzer.
- c. Engine coolant temperature gauge and a high temperature warning buzzer.
- d. Transmission fluid temperature gauge and a high temperature warning buzzer.

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- e. Air pressure gauge (when a compressed air system is furnished) and an audible alarm to indicate when air pressure is inadequate for proper brake operation.
- f. Hourmeter.
- g. Fuel gauge.
- h. Tachometer .

3.39.1 Parking brake warning buzzer. A buzzer that can be heard by the operator with the engine at maximum RPM shall be furnished. The buzzer shall be activated when the parking brake is engaged and the engine is operating and the transmission is in a forward or reverse gear.

3.39.2 Fire Extinguisher. One 2.5 lb. Halon 1211 Fire Extinguisher (5-B:C) in accordance with A-A-1108 Type B, shall be provided with holding bracket. It shall be mounted in the driver's compartment and be easily accessible.

3.39.3 Special tools. The contractor shall supply any special tools peculiar to, and used on this truck; one set of tools shall be furnished with each truck delivered.

3.40 Emergency towing. The truck with an inoperable engine shall be capable of being towed by another vehicle at speeds less than 15 mph for not more than 5 miles with no damage to the forklift. The drive train shall have a means of disconnecting the wheels from the transmission and the steering wheels shall be free to pivot for towing. Preparation and reassembly for towing shall take not more than one man-hour each using only common hand tools (wrenches, screwdrivers, etc.) . The towing hooks or loops with a combined capacity at least equal to two times the GVW of the forklift shall be installed on the rear of the truck.

3.41 Air transportability. The forklift shall be air transportable in C-130, C-141, and C-5 aircraft. Transportability requirements shall be in accordance with MIL-STD-1791, AFSC Design Handbook DH 1-11, and as specified herein. The truck shall be capable of being driven on and off the aircraft when the truck is in the air transport mode (3.42) .

3.42 Air transport mode. The air transport mode shall be as the truck is configured for full operation, except with 1/4 to 1/2 tank of fuel, the boom fully retracted, and only the following components removed, if necessary, to meet the weight limits of 3.43. The truck shall be capable of being driven on and off aircraft in this configuration.

- a. Cab (3.27)
- b. Counterweights (3.44)

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The tire pressure cannot be reduced from operation level because of the dynamic loads on the truck during flight. Conversion from operational to air transport mode and from air transport to operational mode, using two men and only hand tools (wrenches, screwdrivers, etc.) , shall not take more than 60 minutes with no " damage to truck or components. No other equipment or vehicles (cranes, other forklifts, etc.) shall be used for the conversion to or from the air transport mode. If a winterized cab (3.49.1C and 3.49.2b) is installed, it shall also meet these requirements.

3.43 Weights and dimensions in air transport mode. Limiting truck weights and dimensions in the air transport mode as defined in 3.42 shall be as follows:

- a. Maximum height: 102 inches.
- b. Maximum weight: 13,000 pounds on each axle.
- c. Maximum width: 102 inches.

3.44 Counterweight. If it is necessary to remove counterweights to reduce the maximum axle weight to 13,000 pounds, the individual counterweights shall not weigh more than 500 pounds. The counterweights shall be securely fastened when installed on the truck and shall be easily removable. A hand operated hoist or other means shall be permanently installed on the truck to assist in removing and installing the counterweights.

3.45 Servicing. The following shall be easily accessible for inspection and servicing. They shall be in an open area or shall be covered by a hinged panel that can be opened and closed without the need of tools, by one man within two minutes (for each item) :

- a. Engine oil dipstick, oil filler tube and oil drain plug.
- b. Fuel filter.
- c. Transmission fluid level indicator and filler tube.
- d. Radiator filler cap.
- e. Hydraulic reservoir sight gauge and filler tube.
- f. Batteries for inspection, jumper cable attachment and removal.
- g. Power steering pump level indicator and filler, if applicable.

3.45 Painting. All exterior surfaces and all surfaces normally painted shall be prepared and primed with procedures and materials compatible with the final paint. Unless otherwise specified (see 6.2) , the paint shall be polyurethane paint, color

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number 24052 of FED-STD-595, conforming to MIL-C-46168, MIL-C-53039, MIL-C-83286, or shall be DuPont Imron or equal. Or equal is defined as having performance identical, or superior to, DuPont Imron when subjected to the tests in MIL-C-46168 (4.3.17 and 4.3.23) and MIL-C-83286 (4.8.6, 4.8.10, 4.8.12). All exterior trim (wheels, radiator grill, rims on lights, etc.) shall be the same type and color as the exterior paint.

3.47 Identification marking. A corrosion-resistant metal nameplate permanently and legibly marked with the following information in accordance with MIL-STD-130 shall be securely attached to each machine:

- a. Nomenclature .
- b. Manufacturer's model number.
- c. Manufacturer's serial number.
- d. Special characteristics, HP, RPM, etc.
- e. Manufacturer's name.
- f. Contract number.
- g. Date of manufacture.
- h. Weight .
- i. Cube and center of gravity.
- j. U . S .
- k. Registration number.

1. "Certified for Air Transport by HQ AFLC/ENCA."

3.48 Noise limits. The forklift shall conform to the requirements of MIL-STD-1474 for construction and material handling equipment and will provide adequate warning decals when the noise levels are between 85 and 95 dB (A). Under no conditions shall the noise level exceed 95 dB (A) .

3.49 Winterization. When specified (see 6.2) , the truck shall be winterized as follows:

3.49.1 Type "A" Winterization. Normal winterization shall protect to -65°F and shall consist of the following components:

- a. Power plant heater. Coolant, engine oil, and battery heaters shall be provided. Heaters shall operate on 110 volt/60Hz and shall be wired through a junction block to a single

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three-pronged (male) , weatherproof slave receptacle for receiving external power and grounding vehicle. A three-wire connecting cable, 25-feet long and of adequate line capacity to supply power for heater units simultaneously, shall be furnished. Connecting cable shall include a matching female connector at the vehicle and standard, weatherproof , three pronged (two power plus one ground) male connector at the other end. Electrical insulation of connecting cable shall withstand normal operating stresses in low ambient air temperatures (down to -65°F) without loss of dielectric capacity. All heater lead wires shall be installed without interfering with vehicle component operation and without loose excess wire. A carrier for the connecting cable shall be mounted within the cab or engine compartment and shall provide positive cable retention during vehicle operation. Heaters shall be furnished as follows:

(1) Coolant heater, 1500-watt minimum rating, shall be installed in the engine block or lower coolant inlet hose. A coolant circulation pump driven by an electric motor shall be provided when a coolant hose heater is furnished.

(2) Immersion type engine oil heater, 300 watt minimum rating with 180° to 195° thermostat, shall be installed in oil pan.

b. Battery. Heavy duty (lead-acid) battery shall be furnished. The battery shall be heated by an electrical heater. Battery heater shall have a capacity adequate to maintain the battery electrolyte at a temperature not less than 10°F during vehicle exposure in ambient temperature as low as -65°F and shall embody a thermostat to limit the temperature of the electrolyte to not more than $+80^{\circ}\text{F}$.

Hard top cab. Cab shall conform to the requirements of 3.27 and 3.42. A floor covering is required on thermal and acoustical insulation. Boots are required for installation to close all openings where attachments and controls enter the cab.

d. Thermostat. Install 170° to 180° engine thermostat.

e. Personnel cab heater with defroster. A heater and defroster shall be installed. The heater shall be of sufficient capacity to maintain a temperature of $+20^{\circ}\text{F}$ at cab floor level in an ambient temperature of -40°F . Use may be made of sufficient thermal insulation material in the cab area to insure that the cab heater can meet these temperature conditions.

f. Air dryer, air brake systems only.

E. A starting aid device, such as a measured shot ether injection system or glow plugs.

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h. Arctic type lubricants. Engine, gearboxes, transmissions, and other reservoirs shall be serviced with arctic type lubricating.

Antifreeze. Antifreeze shall comply with either Military Specifications MIL-A-11755, MIL-A-46153 or shall be a standard commercial arctic type. Coolant liquid shall be protected to at least -65°F.

3.49.2 Type "C" Winterization, shall protect to -25°F and shall consist of the following components:

a. A starting aid device, such as a measured shot ether injection system or glow plugs.

b. Hard top cab conforming to 3.27 and 3.42.

Antifreeze shall comply with either Military Specifications MIL-A-11755, MIL-A-46153 or shall be standard commercial type. Coolant liquid shall be protected to -25°F or lower temperature.

d. Thermostat. Install a 170° to 180°F engine thermostat.

e. Air dryer, for air brake systems only.

f. Personnel cab heater with defroster. A heater and defroster shall be installed. The heater shall have sufficient capacity to maintain a temperature of +20°F at cab floor level in an ambient temperature of -25°F. Sufficient thermal insulation material may be used in the cab area to insure that the cab heater can meet these temperature conditions.

3.50 Marking. Each truck shall be marked with color number 37038 of FED-STD-595 unless otherwise specified (see 6.2), for identification in block letters and Arabic numerals as follows:

a. U.S. AIR FORCE and registration numbers shall be applied to each side of the truck in 1-1/2 inch characters.

b. Recommended tire pressure shall be applied (except when foam tires are furnished) adjacent to each tire in 1/2 inch characters.

c. FOR VEHICLE CAPACITY SEE LOAD CHART shall be applied to each side on the front of the truck near the lifting arms and shall be in 2 inch characters.

d. "NO RIDERS" shall be applied to each side of engine hood or other conspicuous location in 2 inch letters.

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e. "---- POUNDS OF COUNTERWEIGHT REQUIRED FOR OPERATION AT RATED CAPACITY" shall be applied in 1-1/2 inch letters on the rear of the truck. The note shall be visible with the counterweights removed or installed.

3.51 Battery area protection. Battery supports, hold downs, and areas around the battery installation which could be affected by dripping or seepage of acids shall be protected with a coating conforming to TT-C-494, Type II.

3.52 Slinging and tiedown provisions . Permanently affixed slinging and tiedown provisions that enable the truck to be lifted in its normal travel position and to be fastened to the floor or deck of a transportation medium shall be provided. Slinging provisions shall conform to MIL-STD-209, and tiedown provisions shall be in accordance with MIL-STD-1791, air transportability requirements. If practical, the slinging and the tiedown points shall be the same. The notation "LIFT HERE" shall be stenciled in 1/2 inch high letters, color number 37038 of FED-STD-595, near each lifting point and "TIE DOWN" near each tiedown point. Center-of-gravity location in the air transport mode and tiedown instructions in the C-130 and C-141 shall be on the forklift in accordance with MIL-STD-1791. See Design Handbook AFSC DH 1-11 or MIL-STD-1791 for location of tiedown points in C-130 and C-141 aircraft.

3.53 Frame tilt. The frame of the machine shall be capable of tilting at least 8° laterally in relation to the axles, in both directions. The tilt control shall be located within reach of the seated operator. The frame tilting is necessary to maintain a level load over uneven terrain or to pick up a load that is inclined with respect to the ground.

3.54 Boom assembly. The boom shall provide fore and aft (horizontal) extension and retraction and vertical movement for the fork carriage. With no load on the forks, the operator shall be able to see the tip of at least one fork tine at any lift height and any carriage position without leaving his seat. The maximum angle that the boom makes with the horizontal, with the forklift level, shall be limited to 45°. This shall be with the rated load (3.3) on the forks.

3.55 Fork tines. The fork tines shall have the following dimensions:

- a. Length: 48 (± 1/2) inches
- b. Width: 4.5 inches maximum
- c. Thickness 2.56 inches maximum

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- d. Taper: Starting 18 to 24 inches from tip of forks, taper to 3/4 inch thick at the tip.

3.56 Side shift. The truck shall be capable of hydraulically "shifting both forks simultaneously, in the same direction, at least 5 inches to either side of their centered position. The forks shall move in synchronization (within 10 percent) when side shifting.

3.57 Fork positioning. The forks shall be hydraulically powered to move laterally (side-to-side) so that the fork spread is not greater than 11 inches in the closed position and not less than 38 inches when in the maximum spread position. Both measurements are to the outside surface of the forks. The forks shall move in synchronization (within 10 percent) when moving laterally.

3.58 Fork tilt.

3.59.1 Forward fork tilt. With no load on the forks and the truck on a horizontal surface, the forward fork tilt shall be at least 12° at any boom extension or lift.

3.59.2 Rearward fork tilt. With no load on the forks, the truck on a horizontal surface, and the boom at any extension or lift angle, the load carrying surfaces of the forks shall tilt rearward (fork tips up) at least 20° from the horizontal. Under the same conditions but with the unloaded forks in the normal retracted carry position (boom and carriage fully retracted, heel of forks 6 to 24 inches above the ground, and a maximum rear tilt), the rearward tilt shall be at least 20° from the horizon.

3.59.3 Constant tilt. Without touching the tilt control lever, the tilt of the load carrying surfaces of the forks shall remain the same within $\pm 2^\circ$ in relation to the horizontal as the forks are moved to any position they are capable of attaining. This applies for any load condition on the forks, from no load to maximum rated load.

3.60 Fork carriage. The fork carriage width shall not be more than 40 inches. An easily removable load backrest, 35 (+0, -1) inches high (measured from the top surface of the tines) and the width of the carriage, shall be furnished. The backrest shall be capable of being removed and installed within five minutes by two people without tools, and provisions shall be furnished for stowing on the truck. The backrest shall have two rings, holes, or other devices with at least a 2 inch inside diameter, with the centerline of the devices located 30 (± 2) inches above the horizontal load bearing surfaces of the forks. These load tiedown devices shall not protrude above the top of the backrest or forward of the vertical load engaging surface of the backrest. The safety factor of the tiedown devices shall be at least 3 to 1 for a 3,000 pound forward, horizontal load, assuming the tiedowns are loaded equally.

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3.61 Load-check system. The truck shall have a load-check hydraulic load handling system which will automatically prevent the fully loaded forks from lowering or tilting, the boom from extending or retracting, and the frame from lowering in the event of any hydraulic line failure. In addition, a means shall be provided to manually override the system to safely and slowly (not more than 10 feet per minute) lower the loaded or unloaded forks after actuation of the load-check system.

3.62 Ceiling clearance. To unload stacked boxes from 20 foot International Standard Organization (ISO) containers, the vertical distance from the top of the boom, or carriage (whichever is highest) to the lowest point of the tines, or carriage (whichever is lowest) shall be not more than 30 inches. This dimension shall be with the backrest (3.60) removed.

3.63 Load handling controls. All controls that direct the movement of the load (raising, tilting, sideshifting, etc.) shall be self-centering (return to neutral when released) and located for right hand operation (in accordance with ANSI B56.6) by a seated operator. Marking for control levers shall conform to ANSI B 56.11.3.

3.63.1 Human factors. The forklift with cab installed shall provide for operation and maintenance by personnel ranging from the small person clothed through the large person arctic clothed in accordance with SAE J833, SAE J925, and MIL-STD-1472. At least the following shall be included in this: accelerator, service and parking brake, inching or declutch control, steering wheel, all travel and load motion control levers, entry into the operator's seat, access to all fluid level checks, switches, door handles, etc.

3.64 Ground clearance. The ground clearance of the forklift shall not be less than 12 inches and shall apply with the forklift fully fueled and serviced with rated capacity load at retracted carry position. The forklift with and without load shall be capable of negotiating a 30 percent ramp of length greater than the truck with level surfaces at both top and bottom of the ramp. No portion of the forklift other than the tires shall come in contact with the ramp when the forklift travels over the ramp and both horizontal surfaces in either direction.

3.65 Width. The-width of the forklift including tire bulge at manufacturer's recommended tire pressure shall not be more than 102 inches.

3.66 Maintainability. Provisions shall be made for adjustment, servicing, or replacement of parts and components. When access openings are used on the exterior of the forklift, the edge of the opening shall be smooth and shall be provided with a removable or hinged cover whenever it is required. Dimensions of

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hand or arm access openings shall be in accordance with MIL-STD-1472 for arctic/ Nuclear Chemical Biological clothing. Scheduled maintenance shall be required not more often than every 50 hours, except for before and after operation checks or lubrication. Each operation in the following maintenance operations list shall be accomplished by one person (except where otherwise specified) in not more than the time specified, using common tools and special tools, if any, furnished with the forklift:

- a. Remove , replace , and adjust all engine driven belts - 3/4 hour.
- b. Remove and replace alternator - 1/2 hour.
- c. Remove and replace all hydraulic system filters, Screens , and strainers - 1 hour.
- d. Remove and replace engine coolant system hoses - 1 hour.
- e. Drain engine lubricating oil, remove and replace oil filter elements, and refill crankcase - 1 hour.
- f. Remove and replace fuel filter elements - 1/2 hour.
- g. Remove , replace and connect battery - 1/2 hour.
- h. Drain transmission oil; remove and replace all transmission 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 (if applicable) , 2 men - 1 hour.
- k. Remove and replace floodlight and taillight bulbs - 1/4 hour each bulb.
- l. Remove and disassemble, service, and install air cleaner - 1/2 hour.
- m. Lubricate all lubrication fittings with 2 strokes per fitting - 1 hour.

3.67 Performance

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3.67.1 Travel speed. Travel speed with a 6,200 pound homogeneous cube, four feet on each side (see 4.4.3) on the forks, the boom fully retracted and with the forks in the travel position, shall be at least 15 mph forward and in reverse.

3.67.2 Gradeability. With the 6,200 pound load (3.67.1) and the boom fully retracted, the truck shall be capable of ascending a 30 percent grade at a speed of at least 2 mph. It shall also be capable of accelerating from a complete stop on this grade.

3.67.3 operation on a slope. The forklift, with and without the 6,200 pound load (3.67.1), and with the forks in the retracted, travel position shall be capable of negotiating a 20 percent grade in full circle operation at maximum steer angle in both directions without any wheel leaving the ground.

3.67.4 Lifting speed. Speed of lifting the rated load (3.3) shall be variable from 0 to at least 55 feet per minute vertical speed at any boom extension. The speed shall be maintained throughout the entire vertical travel range, except for not more than 2 feet above the ground level and 2 feet below maximum lift height, to allow for acceleration and deacceleration of the load. With the engine idling at the engine manufacturer's specified idle speed, the unloaded forks shall be able to raise at a speed of at least 10 feet per minute vertically over the entire lift range and at any boom extension.

3.67.5 Loaded lowering speed. The maximum lowering speed with the rated load (3.3) on the forks shall be 80 feet per minute vertical speed at any boom extension. Immediately before the forks contact the ground, the lowering speed shall not be more than 40 feet per minute. The hydraulic control system shall be damped or metered to reduce shock and prevent the truck from overturning when the rated load is lowered at maximum speed and then suddenly stopped.

3.67.6 Unloaded lowering speed. The lowering speed of the empty forks shall be at least 40 feet per minute vertically at any boom extension over the entire travel range.

3.67.7 Lift height. The truck shall be capable of raising the forks to a height of at least 25 feet. This distance shall be with the forklift on a level surface and measuring from the ground to the horizontal (load carrying) surfaces of the forks with rated load (3.3) on the forks, and the forks horizontal.

3.67.8 Lowest fork position. With no load on the forks, the boom at maximum extension, and the fork tines horizontal, the top surfaces of the forks shall be capable of being at a position at least 6 inches below the level surface that the truck is sitting on.

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3.67.9 Horizontal reach. The boom shall be capable of extending the vertical load bearing surface of the forks or backrest at least 21.5 feet forward of the forwardmost portion of the truck with the boom horizontal.

3.57.10 Boom-extension speed. The forklift shall be capable of extending the boom with the rated load at any angle of the boom from below horizontal to the maximum raised position at a speed of at least 55 feet per minute. With the engine idling at the engine manufacturer's specified idle speed and with no load on the forks, the boom shall extend and retract at a speed of at least 10 feet per minute.

3.67.11 Boom retraction speed. The forklift shall be capable of retracting the boom with no load at any angle of the boom at a speed of at least 55 feet per minute. With rated load on the forks at maximum engine speed and with the boom control lever at the full retract position, the boom shall retract at not more than 100 feet per minute at any boom angle.

3.67.12 Stability. The truck shall meet the "forward stacking," "forward travel," "lateral stacking," and "lateral travel" stability requirements of ANSI B56.6.

3.67.13 Axle weight distribution. With 4,400 pounds on the forks, the rear wheels of the forklift shall weigh at least 500 pounds under all the following conditions:

- a. Forklift on a hard level surface without an operator.
- b. Forks horizontal and centered on the carriage.
- c* Forks at maximum forward position, boom level and fully extended.
- d. Fuel tank not more than 1/4 full.

3.67.14 Service brakes. The service brakes shall be able to meet the stopping distance tests of ANSI B56.6, except the brake pedal force shall not be more than 80 pounds during the test.

3.67.15 Parking brake. The parking brake shall be capable of holding a fully loaded forklift on a 30 percent dry grade in both forward and **reverse** directions.

3.67.16 Turning diameter. The truck shall be capable of turning in a circle of not more than 34.5 feet measured to the outside of the tires. It is allowable to use four-wheel steering to meet this requirement (if applicable).

3.67.17 Drift- The following shall be the maximum allowable drift with the rated load (3.3) for 10 minutes at the locations indicated:

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- a. Fork tip with boom fully extended: 2.53 inches.
- b. Boom extended to one half maximum boom extension: 1.0 inch.
- c. Outer corner of frame: 1/4 inch.

3.67.18 Electromagnetic interference (EMI). The truck shall comply with the EMI requirements of MIL-STD-461B, Group II, Figure 8-1, except the limits for UM03 (Figure 8-1) shall be relaxed by 20 dB for all frequencies.

3.67.19 Truck operation. The truck shall complete at least five circuits per hour for a cumulative total of 40 hours when operated as specified in 4.4.40. The operating periods shall be at least 8 hours each day, not counting time for operator's lunch and breaks. No failure shall occur during the 40 hour period. A failure for this test is defined as any malfunction that cannot be corrected within 30 minutes by adjustment, repair, or replacement, which may cause cessation of operation, degradation of performance capabilities below levels specified in this purchase description, damage to the truck by continued operation, personnel safety hazard, or any condition specified in 4.3.

3.68 Workmanship.

3.69.1 Steel fabrication. Steel used in the fabrication of equipment shall be free of kinks and sharp bends. The straightening of material shall be done by methods that will not cause injury to the metal. Shearing and cutting shall be done neatly and accurately. All bends of a major character shall be made with controlled means in order to ensure uniformity of size and shape.

3.70.2 Bolted connections. Bolt holes shall be accurately punched or drilled and have the burrs removed. Rivets shall be driven with pressure tools and shall completely fill the holes. Rivet threads, when not countersunk or flattened, shall be approved shape and of uniform size for the same diameter of rivets. Rivet heads shall be full, neatly made, concentric with the rivet holes, and in full contact with the surface of member.

3.70.3 Welding. The surface of parts to be welded shall be free from rust, scale, paint, grease, or other foreign matter. Weld penetration shall be such as to provide transference of maximum design stress through the base metal juncture. Fillet welds shall be provided when necessary to reduce stress concentration. Welding shall conform to the procedures as prescribed by either the AWS or ASME for the type of welding operation to be performed.

3.70.4 Machine work. Tolerances and gauges for metals fits shall conform to the limitations specified herein and on the

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applicable drawings and otherwise to the standards of good commercial practice.

3.70.5 Casting. Castings shall be sound and free from defects.

4.0 QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements specified herein. Except as otherwise specified in the contract, 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 are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Component and material inspection. The contractor is responsible for insuring that these trucks meet all the requirements set forth in sections 3 and 5 (see 6.3) .

4.2 Classification of inspections. Inspections shall be classified as follows:

- a. First article truck evaluation and demonstrations (see 4.3 and 4.4).
- b. Production truck inspections (see 4.5).
- c. Inspection of packaging (see 4.6).
- d. Operational test (see 4.?) .

4.3 First article evaluation demonstrations. Prior to delivery, the manufacturer shall make one truck available for first article evaluation and demonstrations. The truck and its components shall be compared with this document and published literature, calculations , and test data to verify compliance with this specification. The truck shall then be subjected to the demonstrations specified herein. Occurrence of any of the following conditions during the testing specified in Section 4 of this Military Specification shall be cause for rejection of the truck:

- a. Inability to meet specified performance requirements or inability to complete any test.
- b. Permanent deformation, overheating, malfunction or leakage of fuel or lubricants, or leakage of hydraulic fluid in excess of Class 3 or 31) in accordance with SAE J1176.

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- c. Any binding, jerking, or uneven operation of any component or system.
- d. Any wearing, galling, gouging, or other removal of material that in the opinion of any authorized Government representative will cause premature failure

4.4 Demonstration

4.4.1 Demonstration condition. Unless otherwise specified herein, demonstrations shall be conducted at the ambient temperature and climatic conditions existing at the place of the demonstration. Only that scheduled maintenance established by the contractor and submitted as a maintenance schedule prior to commencement of the demonstration shall be performed during the demonstration. All tests except Cold Starting (4.4.41) shall be conducted using JP-8, Jet-A or Jet-A1 as the fuel.

4.4.2 Rated load. For test purposes, a cube, four feet on each side, with the center-of-gravity located at the geometrical center, and except as noted shall weigh 4,000 (plus 100, minus 0) pounds.

4.4.3 Alternate rated load. When specified, the test load shall meet paragraph 4.4.2, except it shall weigh 6,200 (plus 100, minus 0) pounds.

4.4.4 Travel speed. The maximum speed of the truck with the 6,200 pound load (4.4.3) in the travel position shall be determined by driving the truck forward and backward for a measure distance. Three runs shall be made in each direction and the speeds averaged. Failure to meet the speed requirements specified in 3.67.1 shall be cause for rejection.

4.4.5 Gradeability. Starting from a complete stop on a 30 percent grade and with the 6,200 pound load (4.4.3) in the travel position, the truck shall be driven forward (the load upslope) up the grade. Failure to meet the speed requirement of 3.67.2 shall be cause for rejection.

4.4.6 Operation on a slope. The truck shall be driven on a 20 percent grade for at least three full circles, at the maximum steering angle (in four-wheel steer, if applicable) in forward and reverse. The forks shall be in the travel position and the test conducted both with no load and with 6,200 pound load (4.4.3) on the forks. Any wheel completely leaving the-ground shall be cause for rejection.

4.4.7 Lifting speed. With the forklift on a level surface, measure the distance from the floor to the top surface of the forks with the boom fully extended and fully lowered. Record time required to raise the rated load (4.4.2) to maximum fork

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height with the boom fully extended. Measure the vertical height to the top surface of the forks. Repeat with boom extended approximately half and again at one quarter of its maximum reach. Failure to meet the lifting speed requirements of 3.67.4 shall be cause for rejection.

4.4.8 Lowering speed. Record time required to lower rated load (4.4.2) at maximum speed from maximum height to approximately 2 to 3 feet above the ground level where the load shall be abruptly stopped. This shall be performed at maximum and one half boom extensions. Measure maximum lift height and height where the forks stopped and determine lowering speed. Repeat with no load on the forks at two boom extensions specified. Failure to meet the requirements of 3.67.5 and 3.67.6 shall be cause for rejection.

4.4.9 Lift height. With rated load (4.4.2) and the boom at maximum extension and maximum lift, measure the angle of the boom with the ground. If the angle exceeds the amount specified in 3.55, this shall be cause for rejection. Measure from level ground to the upper surface of the forks. Failure to meet the requirements of 3.67.7 shall be cause for rejection.

4.4.11 Fork tilt. With no load on the forks and boom fully extended and horizontal, measure the maximum forward and reverse tilt. Repeat with boom at one half extension. Position the boom fully retracted at maximum boom lift angle. Measure forward and rear tilt. Position forks at normal retracted carry position defined in 3.59.2 and measure forward and rear tilt. Raise forks to maximum lift height (with boom fully extended) and measure forward and rearward tilt. Failure to meet the requirements of 3.59.1 or 3.59.2 shall be cause for rejection.

4.4.11.1 Constant tilt. Start with the unloaded forks horizontal and at any boom position. Without touching the tilt control lever, raise, lower, extend, and retract the boom as necessary to position the forks to at least 12 randomly selected positions including the extreme positions of boom lift and travel. Measure fork tilt at each position. Repeat with rated load (4.4.2) on the forks. Nonconformance with 3.59.3 shall be cause for rejection.

4.4.12 Side shift. Center the forks on the carriage or center the carriage on the truck. Shift the forks to the left using the sideshift control level. Measure the amount moved from center. Again, center the forks and shift to the right. Measure the distance from center position. Failure to meet 3.59.4 shall be cause for rejection.

4.4.13 Fork positioning. Move the forks to the minimum spread position and measure the horizontal distance to the outside of

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the forks. Move the forks to the maximum spread position and measure the horizontal distance to the outside of the forks. Failure to meet 3.58 shall be cause for rejection.

"4.4.14 Load-check system. Operate the lift and tilt systems until the hydraulic fluid is at normal operating temperature. Raise the rated load (4.4.2) to maximum lift height at maximum boom extension with the forks tilted back 5 to 10 degrees. Measure the vertical distance of the front tip of one of the forks above the ground level. Disconnect the hydraulic lines that supply pressure to the boom and fork lift system. when fluid stops draining, remeasure the vertical distance to the same point on the fork. A drop of more than one inch shall be cause for rejection. For safety reasons, nobody shall be in front of the truck or under the load when the hydraulic pressure is relieved.

4.4.15 Load-check override, After completion of 4.4.14, lower the forks using the manual override. Ensure the load can be safely and slowly (not more than 10 feet per minute) lowered to ground level.

4.4.16 Ceiling clearance. Remove the load backrest using two people without tools within the timeframe specified in 3.60. Measure the vertical distance from the top of the boom or carriage (whichever is highest) to the lowest point in the forks or carriage (whichever is lowest). Failure to meet the requirements of 3.60 and 3.62 shall be cause for rejection.

4.4.17 Fork visibility. Verify that at least one unloaded fork tip can be seen from the operator's seat at all lift heights, boom extensions, and fork spacings.

4.4.18 Horizontal reach. With the rated load (4.4.2) on the forks and the boom horizontal and fully extended, measure the horizontal distance from the front most part of the truck to the vertical load bearing surface of the forks. Failure to meet 3.67.9 shall be cause for rejection.

4.4.19 Boom extension speed. Determine total boom travel distance (difference between fully extended and fully retracted]. With rated load (4.4.2) on forks, measure the time from fully retracted to fully extended position with boom horizontal, and again at approximately 250. Failure to meet the requirements of 3.67.10 shall be cause for rejection.

4.4.20 Boom retraction speed. With rated load on forks and with the boom horizontal and again at 25", retract the boom at maximum engine speed and the control lever at full retract position. Repeat with no load on the forks. Failure to meet 3.67.11 shall be cause for rejection.

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4.4.21 Fork operation at engine idle. With the engine operating at the engine manufacturer's specified idle speed, the unloaded forks and boom shall be capable of raising and extending as specified in 3.67.4 and 3.67.10.

4.4.22 Stability. Conduct the 'forward stacking, "forward travel, "lateral stacking, " and "lateral travel" tilting platform tests in accordance with ANSI B56.6. Failure to pass any of these tests shall be cause for rejection.

4.4.23 Weight distribution. Weigh the rear wheels of the forklift when configured as described in 3.67.13. Failure to meet the weight specified in 3.67. 13 shall be cause for rejection.

4.4.24 Service brakes. Using the 6,200 pound load (4.4.3), perform the stopping distance test of ANSI B56.6 limiting the pedal force to not more than 80 pounds. Failure to pass the test shall be cause for rejection.

4.4.25 Parking brake. Demonstrate that the parking brake will hold the truck with the 6,200 pound load (4.4.3) on the grade specified in 3.67.15 in both directions and using not more than the force specified in 3.20 to fully activate the brake.

4.4.26 Turning diameter. Demonstrate that the forklift can meet the turning diameter specified in 3.67.16.

4.4.27 Drift. Operate the lift and tilt systems until the hydraulic fluid is at normal operating temperature. Demonstrate that the truck can meet the drift requirements specified in 3.67.17.

4.4.28 Ground clearance. Place the truck with the 6,200 pound load (4.4.3) in the travel position on a level surface. Measure the distance from ground to the lowest point on the truck. Nonconformance with 3.64 shall be cause for rejection. Drive the truck from a horizontal surface onto a 30 percent ramp that is at least five feet longer than the truck and then onto another horizontal surface. Drive the truck backwards over the same route . No portion of the forklift other than the tires shall come in contact with the ramp or either horizontal surface.

4.4.29 Electromagnetic interference (EMI). Test truck in accordance with 3.67.18. Failure to meet 3.67.18 shall be cause for rejection.

4.4.30 Starter switch disconnect. Start the engine and let it run for at least 30 seconds. Move the engine starter switch to 'start" position. Any evidence of starter engagement while engine is running shall be cause for rejection. With the engine not running, place transmission selector in lowest forward gear position and energize engine starter switch. Repeat for all

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forward and reverse gears. Any evidence of starter engagement while transmission is in gear shall be cause for rejection.

4.4.31 Overload. Place truck on a level surface and support it with blocks under the axles or frame to relieve the load on the tires. Secure the truck to the floor in a manner to compensate for the additional test load of 9,000 pounds with a horizontal and vertical load center of 24 inches. Position the boom horizontal and at maximum extension. Gradually apply load to the forks until the total test load of 9,000 pounds is in place. Let the test load remain on the forks for at least 10 minutes. Remove the load and inspect the truck structure, frame, boom, fork carriage assembly and hydraulic system leaks, or any other failures. Inspect forks a minimum of 6 inches each side of heel by magnetic particle or dye penetrate method.

4.4.32 Conversion to air transport mode. Starting with the truck in the operational mode, convert to the air transport mode (3.42) within the time frame and using only the personnel and equipment specified in 3.42. After completing 4.4.33, 4.4.34, and 4.4.35, convert back to operational mode, again meeting the requirements and restrictions of 3.42. Nonconformance with 3.42 shall be cause for rejection.

4.4.33 Air transport mode. Measure overall height and width, and weigh each axle when in the air transport mode (3.42). Nonconformance with 3.43.a., 3.43.b., or 3.43.c shall be cause for rejection.

4.4.34 Loading onto aircraft. With the forklift in the air transport mode (3.42), drive the truck onto and off of an aircraft mock-up. The mock-up shall consist of a level floor 48 to 50 inches above ground level, at least 30 feet long and 10 feet wide. There shall be a ramp with an inclination of at least 15° from the floor to the ground. On the raised floor at the top of the ramp there shall be an opening 111 inches wide by 108 inches high to simulate the aircraft opening. During the loading and unloading, the operator and the truck (except for the tires) shall not contact any portion of the mock-up, ramp, or ground. The mock-up shall have simulated tiedown points located as shown in AFSC DH 1-11 Design Handbook. Verify that the tiedown points on the truck are located for adequate tiedown.

4.4.35 Counterweights. If it is necessary to remove counterweights to meet 3.42.b., weigh each counterweight to verify the maximum weight limit of 3.44 is not exceeded.

4.4.36 Sound level measurement. With the microphone at the operator's station, measure the maximum steady state noise levels in accordance with MIL-STD-1474 while lifting rated load at maximum lift speed and while operating the engine at governed speed with no load.

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4.4.37 Fork lifting mechanism. With 125 percent (5,000 pounds) of the rated load on the forks and with the truck tied down to prevent overturning, the lifting mechanism shall be operated through 100 complete cycles. From ground level to maximum lift height for the boom extension and back to the ground level is one cycle. Half the cycles shall be at maximum boom extension and half at 1/2 maximum boom extension. Side shift the 5,000 pound load from extreme right to extreme left and back to extreme right. This shall be considered one cycle. Perform at least 100 cycles. Occurrence of any condition listed in 4.3 shall be cause for rejection.

4.4.38 Endurance test. The truck shall be driven at least 50 miles on loose gravel, unpaved roads and over potholes and ruts normally found on this type of road. The forklift shall carry the 6,200 pound load (4.4.3) in the travel position throughout the test, and it shall operate as close to its top speed as conditions will allow, keeping safety the prime factor. At least once every mile, the truck shall be brought to a complete stop and accelerated back to operating speed. The failure of any component or engine coolant, oil or fluid overheating shall be cause for rejection.

4.4.39 Rain. Subject the forklift to a simulated rainfall of not less than 4 inches per hour, uniformly hitting the truck at an angle of $45(\pm 10)^{\circ}$, at a speed of at least 30 miles per hour. Expose the top and left side of the forklift to this simulated rainfall for 5 minutes with the engine off. With the water still falling, start the engine and idle for two minutes. Repeat this procedure three more times with the following areas receiving the water: top and right, top and front, top and rear. Stop the rainfall and allow the forklift to stand for not less than 15 minutes with the engine off. Drain a small quantity of fluid from each fluid reservoir (except cooling system), and examine for the presence of water. Check electrical components, gauges, cab and engine air cleaner for water entry.

4.4.40 Truck operations. The truck shall be operated as specified in test method number one. Failure to meet the requirements of 3.67.19 shall be cause for rejection.

4.4.41 Cold starting test. With the truck in an ambient temperature and with all components of the truck stabilized at -25°F , the engine shall start within 5 minutes using only the batteries of the forklift as a source of electrical power. Failure to start within 5 minutes shall be cause for rejection.

4.4.42 Maintainability. Perform the maintenance functions described in 3.66. Failure to complete any task in the specified time shall be cause for rejection.

4.5 Production truck inspection. All trucks shall be subjected to the following tests: 4.5.1 and 4.5.2, and servicing 4.5.3.

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4.5.1 Examination of product. The truck shall be examined to determine compliance with the requirements of this specification. All components shall be moved through their maximum normal displacement and shall exhibit no malfunctioning, leaks, rough operation, or irregular movements. Nonconformance shall be cause for rejection.

4.5.2 Material handling. With rated load on forks, raise the load to maximum lift height, then lower at maximum speed and quickly stop between 2 to 3 feet above floor. Repeat at least 5 times. Malfunction or failure of any part shall be cause for rejection.

4.5.3 Servicing and adjustment. Prior to delivery, the manufacturer shall service and, if necessary, adjust each truck for proper operational use, including at least the following:

- a. Fork assembly.
- b. Engine , transmission , and power train.
- c. Brake system.
- d. Steering system.
- e. Continuity check of the electrical system including charging of battery.
- f. Check torque on all wheel lug nuts and proper inflation of tires.
- g. Service the cooling system with antifreeze, 50 percent by volume, or as required for Type A or C winterization.
- h. Check fluid levels and fill to required level if necessary.

4.6 Inspection of packaging. Each truck, when completely prepared for shipment, shall be inspected for preservation and packaging as specified in the contract.

4.7 Operational (user) test. The user test sample shall be delivered to Nellis AFB NV for 45 available days (seven days a week) of user tests. The 45 available days shall be consecutive except when interrupted for maintenance/repair downtime, as defined herein. The user test will not begin until after completion of the contractor conducted First Article tests, except the EMI and environmental tests, of the contractor test sample as defined by 4.2(a). The production truck inspection (see 4.5) and the comparison of the truck to this specification (see 4.3) shall be performed on the user test sample prior to shipment of the user test sample to Nellis AFB. The user test sample shall not be shipped to Nellis AFB without prior 15 day

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notification to the PCO. The test period shall begin the day after the vehicle arrives at Nellis AFB and shall end when 45 days of availability are complete or 60 calendar days have elapsed, whichever occurs first. If the user test sample has not been available for 45 test days after 60 calendar days have elapsed, the user test shall be considered a failure. The vehicle shall be available for any one period of eight consecutive hours during each day of the 45 day test. The periods shall be provided to the contractor at least 12 hours in advance. Any period of more than four hours of the same day that the vehicle is out of service for maintenance or repair shall not be considered an available day for the test period. The vehicle shall be operated and scheduled maintenance shall be performed by Air Force personnel using the operational and maintenance procedures contained in the preliminary technical data to be supplied with the test sample. The preliminary technical data shall contain procedures for preparation/tiedown of the truck for air shipment. The contractor will provide any special tools/equipment required to perform operator's maintenance/scheduled maintenance. Any parts of corrective actions required shall be provided by the contractor. Any maintenance actions performed by the contractor shall not begin before notification to a Nellis AFB representative, and Government personnel shall be allowed to observe their actions. The contractor shall provide all forklift consumables required in the course of the test except for diesel fuel, water, compressed air, and electrical power which will be furnished by Nellis AFB. The contractor shall provide on-site familiarization to the operators and mechanics as necessary to perform this test. Test operations will be used in or simulate normal Air Force usage and will not exceed any performance requirements defined by Section 3 of this specification. Noncompliance with the performance requirements of this specification shall be cause for rejection. The contractor shall maintain a daily log. The log shall be signed by Nellis AFB representatives and the contractor after each day of activity. The daily log shall document, but not be limited to, the following:

- a. Operating time.
- b. Tasks completed.
- c. Technical manual errors.
- d. All failures and corrective actions taken.
- e. Operational problems encountered.
- f. Nellis AFB representative comments.

The contractor shall include the user test results, including daily logs of activities, in the first article inspection report.

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5.1 Preservation and packaging. Preservation and packaging shall be as specified in the contract.

6.0 NOTES

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

6.1 Intended use. The forklift is intended to be used to load and unload palletized ammunition from 8 feet wide by 20 feet long ISO shipping containers (trailer mounted with the container doors 5 feet from the end of the trailer), with palletized and containerized loads. In addition, the trucks will be used for removal and installation of aircraft engines for the C-130 and C-141. These operations will be conducted on paved runways, gravel surfaces, unprepared surfaces, or cross country terrain in dry and wet conditions,

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number and date of the specification
- b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced.
- c. When first produced trucks shall be other than as specified (see 3.5) .
- d. When operator's cab is required (see 3.27) .
- e. When final color shall be other than specified (see 3.46).
- f. Type of winterization required, if any (see 3.49).
- g. When color marking shall be other than specified (see 3.50).

6.3 First article truck. The First Article trucks shall be preproduction items which meet the requirements of this specification. The trucks shall be identical and all parts interchangeable with the remaining vehicles to be furnished under this contract. Approval of the First Article sample and approval of the First Article Test Report shall not relieve the contractor of the responsibility to furnish equipment in accordance with the requirements of this document. Requirements for testing and test reports along with any technical manuals shall be specified by the contracting officer. (see 3.2, 3.5, 3.11 and Section 4 testing) .

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APPENDIX

TEST METHOD NO. 1 TRUCK OPERATIONS

1. course:

a. The course shall be reasonably level, improved or natural surface laid out in accordance with Figure one. Station 1 shall be at ground level. Station 2 shall be a 5 foot high stand with approximately a 2 foot high barrier placed 15 feet in front. This is to make boom extension necessary when loading or unloading. Station 3 shall be a 20 foot high stand.

b. The obstacles shall be in accordance with Figure 2 with the nearest obstacle located not more than 15 feet from Station 1.

2. Test Apparatus:

a. Two each rated loads.

b. Thermocouples to measure:

- (1) Engine coolant at engine outlet to the radiator.
- (2) Engine coolant from the radiator.
- (3) Transmission sump.
- (4) Engine oil gallery and cooler.
- (5) Drive axle differential.
- (6) Hydraulic oil reservoir.

3. Procedures:

a. Initially place rated loads (4.4.21 on ground at Station 1 and on platform at Station 3.

b. Pick up load from station 1. Back truck over obstacles, turn until facing Station 2. Travel forward to Station 2 and deposit load by extending boom across barrier.

c. Back up, then travel forward to Station 3 and pick up the load.

d. Back up, then travel forward to Station 1, including driving over obstacles, and deposit load.

e. Back up over obstacles and travel forward to Station 2.

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TEST METHOD NO. 1 (continued)

f. Pick up load at Station 2, back up, travel forward to Station 3 and deposit load.

e. While traveling in both forward and reverse with the load on the forks, the load shall be in the carry position (see 3.59.2).

h. Steps 2.a through 2.f shall constitute one cycle. The forklift shall operate at a rate to complete at least 5 cycles per hour.

i. Record total circuits and each temperature (see 2.b) at each hour of operation.

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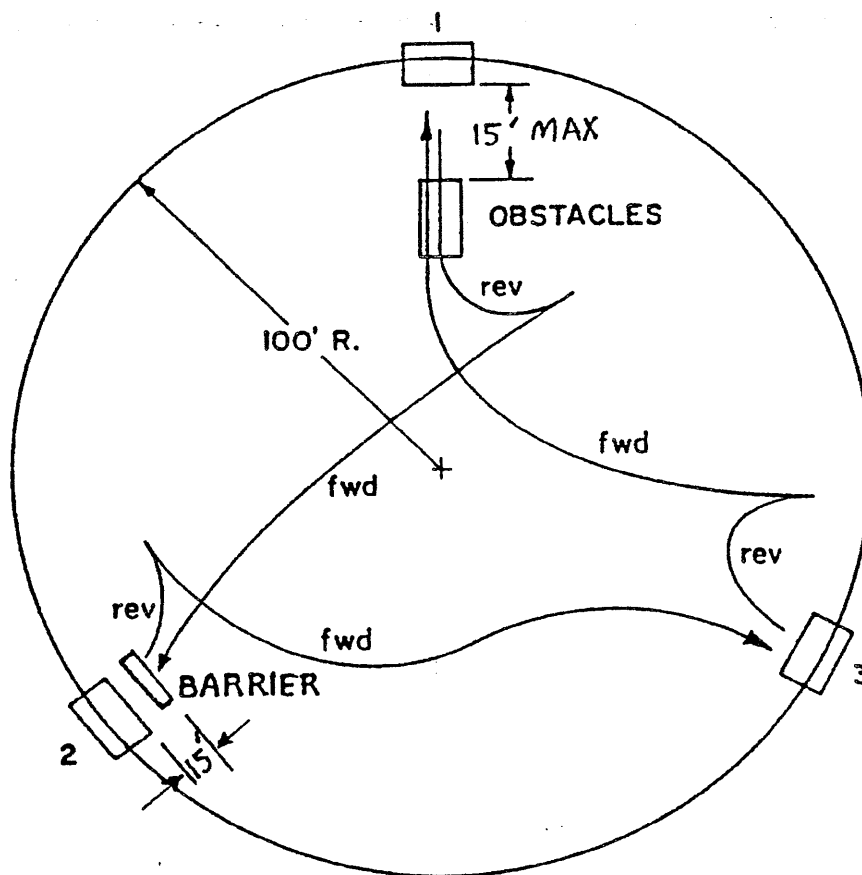
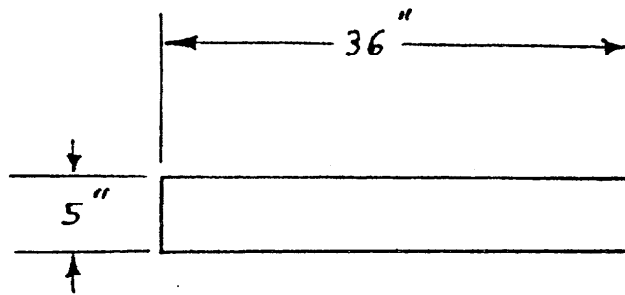
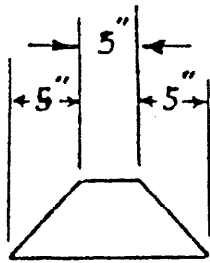
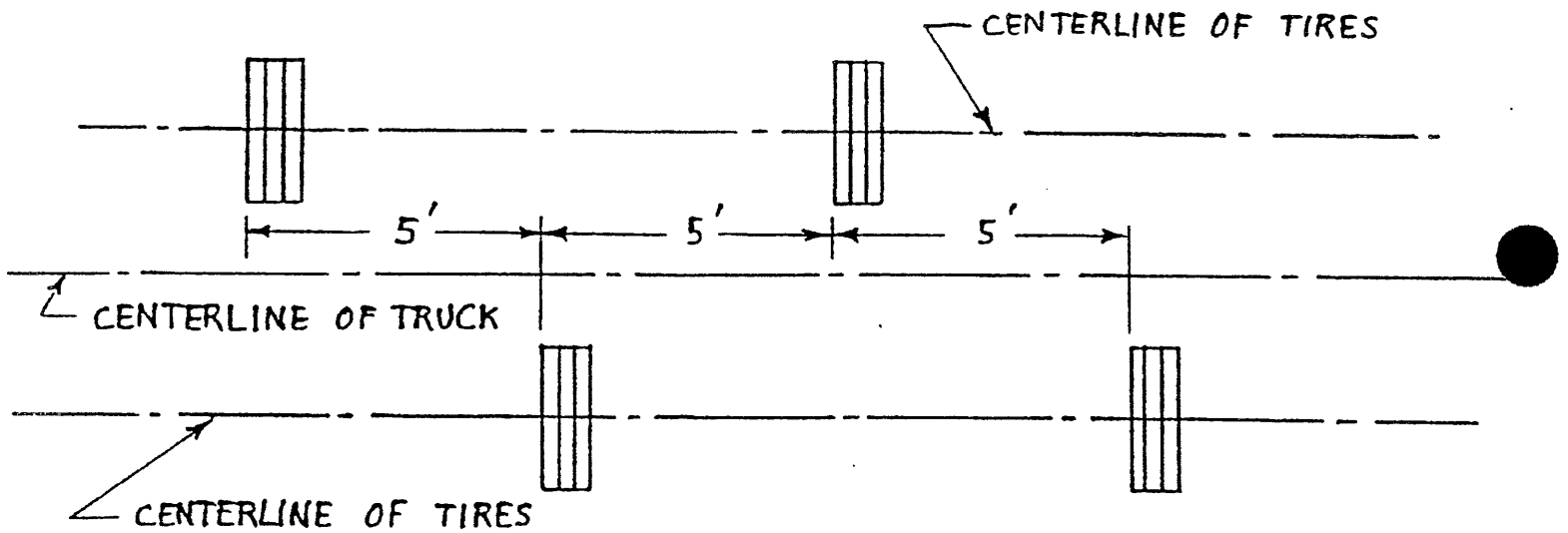


Figure 1 TRUCK OPERATIONS COURSE

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OBSTACLES



LOCATION OF OBSTACLES

FIGURE 2

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

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

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

RECOMMEND A CHANGE:		1. DOCUMENT NUMBER MIL-T-83817 (84)		2. DOCUMENT DATE (YYMMDD) 06 NOV-1990	
3. DOCUMENT TITLE TRUCK, LIFT, Fork, 4000 POUND CAPACITY at 23.5 Feet of Reach Rough Terrain					
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)					
5. REASON FOR RECOMMENDATION					
6. SUBMITTER					
a. NAME (Last, First, Middle Initial)			b. ORGANIZATION		
c. ADDRESS (Include Zip Code)			d. TELEPHONE (Include Area Code)		e. DATE SUBMITTED (YYMMDD)
			(1) Commercial		
			(2) AUTOVON		
			(If applicable)		
8. PREPARING ACTIVITY					
a. NAME George Cyphers			b. TELEPHONE (Include Area Code) (1) Commercial (912) 926-6171 (2) AUTOVON AV 468-6171		
c. ADDRESS (Include Zip Code) WR-ALC/MMVRG Robins AFB, GA 31098-5609			IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340		