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INCH-POUND
MIL-PRF-83817B
15 June 2012
SUPERSEDING
MIL-PRF-83817A
15 June 1997

PERFORMANCE SPECIFICATION

TRUCK, LIFT, FORK, 4,000 POUND CAPACITY, VARIABLE REACH, ROUGH TERRAIN

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

1. SCOPE.

1.1 Scope. This document covers a variable reach, rough terrain forklift truck with a 4,000 pound lift capacity at a reach of 23.5 feet which is air-transportable in C-130, C-17, and C-5 aircraft. The truck will be used primarily to load and unload palletized cargo to and from 8 feet wide by 20 feet long ISO shipping containers. The forklift will operate on hard paved surfaces, soft soil, mud, snow, and sand, on level and hilly terrain.

2. APPLICABLE DOCUMENTS.

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 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 are those cited in the solicitation or contract.

Comments, suggestions, or questions on this document should be addressed to: WR-ALC/GRVEB, Robins AFB GA 31098-1813. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil .

AMSC N/A FSC 3930

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NATO STANDARDIZATION AGREEMENT (STANAG)

STANAG 2828	Military Pallets, Packages, and Containers

FEDERAL STANDARD

FED-STD-595/14052	Green, Gloss
FED-STD-595/26173	Gray, Semi-gloss
FED-STD-595/30313	Brown, Flat or Lusterless

COMMERCIAL ITEM DESCRIPTIONS

A-A-52557	Fuel Oil, Diesel; For Posts, Camps, and Stations.
A-A-59295	Corrosion Preventative Compounds, Cold Application

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-DTL-25959	Tiedown, Tensioners, Cargo, Aircraft
MIL-DTL-6458	Chain Assemblies, Single Leg, Aircraft Cargo Tiedown
MIL-DTL-83133	Turbine Fuel, Aviation, Kerosene Type, JP-8 (NATO F-34), NATO F-35, and JP-8+100 (NATO F-37)
MIL-PRF-83282	Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Metric, NATO Code Number H-537

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-130	Identification Marking of US Military Property
MIL-STD-209	Lifting and Tiedown Provisions
MIL-STD-461	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment
MIL-STD-810	Environmental Engineering Considerations and Laboratory Tests
MIL-STD-1366	Transportability Criteria
MIL-STD-1472	Human Engineering

DEPARTMENT OF DEFENSE HANDBOOKS

MIL-HDBK-1791	Designing For Internal Aerial Delivery in Fixed Wing Aircraft.

(Copies of these documents, except for MIL-HDBK-1791 C-17 Appendix and GOST 10227-86, are available online at https://assist.dla.mil/quicksearch/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094. A copy of MIL-HDBK-1791 C-17 Appendix can be obtained from the Procuring Contracting Officer

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(PCO) or requested by contacting Air Transportability Test Loading Agency (ATTLA) at 937-255-6296. A copy of GOST 10227-86 can be obtained from the PCO.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents are those cited in the solicitation or contract.

AMERICAN WELDING SOCIETY (AWS)

AWS D14.1/D14.1M	Cranes, Welding of Industrial and Mill, and other Material Handling Equipment, Specification for

(AWS documents may be obtained online at www.aws.org or from American Welding Society 550 N.W. LeJeune Rd., Miami, FL 33126)

INDUSTRIAL TRUCK STANDARDS DEVELOPMENT FOUNDATION (ITSDF)

ANSI/ITSDF B56.6-2005	Safety Standard for Rough Terrain Forklift Trucks

(ITSDF documents may be obtained online at http://www.itsdf.org/ or from Industrial Truck Standards Development Foundation, 1750 K Street NW, Suite 460, Washington DC 20009)

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO 3471	Earth-moving Machinery-Roll-Over Protective Structures, Laboratory Tests, and Performance Requirements

(Electronic copies of this document are available online at http://www.iso.org or International Organization for Standardization, American National Standards Institute (ANSI), Inc., P.O. Box 2900, Fairfield, NJ 07007)

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE J98	Personnel Protection for General Purpose Industrial Machines
SAE J185	Access Systems for Off-Road Machines
SAE J386	Operator Restraint System for Off-Road Work Machines
SAE J1176	External Leakage Classifications for Hydraulic Systems

(SAE documents may be obtained online at www.sae.org or from Society of Automotive Engineers Inc., 400 Commonwealth Drive, Warrendale, PA 15096)

TIRE AND RIM ASSOCIATION, INC. (TRA)

Tire and Rim Association Yearbook

(Application for copies of this document should be addressed online at www.us-tra.org or to the Tire and Rim Association, Inc., 175 Montrose West Ave. Suite150, Copley, OH 44321)

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UNDERWRITERS LABORATORIES INC.

UL 299 Dry Chemical Fire Extinguishers
UL 711 Rating and Fire Testing of Fire Extinguishers

(UL documents may be obtained online at http://ulstandardsinfonet.ul.com/catalog or hardcopies and CD's can be found at COMM 2000 1414 Brook Drive, Downers Grove, IL 60515)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, (except for related specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specified exemption has been obtained.

3. REQUIREMENTS.

3.1 First article. When specified (see 6.2), one sample shall be subjected to first article inspection in accordance with 4.2.

3.2 Forklift description. The forklift shall be the supplier's standard, commercial, forklift. The forklift shall meet all requirements specified in this document. Unless otherwise specified herein, or inherently restricted due to a movement capabilities requirement, the use of outriggers to meet these requirements is acceptable. The forklift shall be air transportable in C-130, C-17, and C-5 aircraft, as a reference only, refer to MIL-HDBK-1791. The forklift shall be equipped with, but not limited to, instruments, components, and accessories that are standard on the commercial product, whether specified herein or not.

3.3 Design and construction. The forklift shall be designed and constructed so that no parts will work loose in service. They shall be built to withstand the strains, jars, vibrations, and other conditions incident to shipping, storage, installation, and service. They shall be weatherproof and designed to prevent the intrusion of water and sand into critical operating components. Unless suitably protected against electrolytic corrosion, dissimilar metals shall not be in intimate contact with each other.

3.3.1 Materials, protective coatings, and finish.

3.3.1.1 Protective coatings. Materials that deteriorate when exposed to sunlight, weather, or operational conditions normally encountered during the service life of the forklift shall not be used or shall have means of protection against such deterioration that does not prevent compliance with the performance requirements specified herein. Protective coatings that chip, crack, or scale with age or extremes of climatic conditions or when exposed to heat shall not be used. Fasteners, handles, and fittings used in the assembly of the forklift shall also be primed and painted.

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3.3.1.2 Preparation and primer. All surfaces normally painted by the forklift manufacturer shall be prepared and primed using procedures compatible with the final paint.

3.3.1.3 Finish. The exterior finish color of the forklift shall be a standard, commercially available, polyurethane, closest to gloss green color number 14052 of FED-STD-595. If the manufacturer has a process that is more durable than a polyurethane top coat and is willing to certify the process for the warranty period, it is acceptable. When specified (see 6.2), the final paint shall be a standard, commercially available, polyurethane, closest to no-gloss brown color number 30313 of FED-STD-595, or the final paint shall be a standard, commercially available, polyurethane, closest to semi-gloss gray color number 26173 of FED-STD-595.

3.3.2 Markings. Markings must be made with paint. Markings for green or gray forklifts shall be black paint, and tan forklifts shall be white paint. The following markings shall be applied in the indicated locations:

a. Vehicle capacity in 1-1/2 inch high letters on the lifting arms, mast, or front of forklift

b. "NO RIDERS" in 2 inch high letters on each side of forklift

3.3.3 Identification and information plates.

3.3.3.1 Identification plate. An identification plate in accordance with MIL-STD-130 shall be securely attached to the forklift in a readily accessible location. The identification plate shall contain the following information: nomenclature, make and model, manufacturer's serial number (VIN), registration number, asset NSN number, vehicle curb weight (lbs), maximum payload (lbs), gross vehicle weight (lbs), delivery date, manufacturer's name, Commercial and Government Entity (CAGE) code, date of warranty expiration, contract number, and "US Property".

3.3.3.2 Transportation data plate. A transportation data plate shall be securely attached to the forklift in a readily accessible location. The plate shall contain at least the following information:

a. Side and rear silhouette views of the forklift

b. Horizontal and vertical location of the center of gravity of the forklift in air transportable configuration, marked on the silhouette views

c. Shipping weight (pounds)

d. Loading cubage (inches^3)

e. Overall height, width, and length (inches)

f. Front and rear axle loads (pounds)

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g. Tiedown information

3.3.3.3 Instruction plates. All warning and instruction plates normally installed by the forklift manufacturer, describing procedures or safety items shall be included.

3.3.3.4 Load Chart. A corrosion resistant plate, showing the load capacity of the forklift at all boom extensions and lift heights shall be permanently installed in a location clearly visible to the operator.

3.3.4 Safety. The forklift shall conform to the applicable requirements of ANSI/ITSDF B56.6-2005, SAE J98, and OSHA standards in effect at the time of issue of the solicitation. All surface areas subject to personnel standing or walking shall have a nonskid, tread-plate, or expanded metal surface. A commercial fire extinguisher shall be mounted on the forklift in an easily accessible location. The fire extinguisher shall be a minimum 2-1/2 pound capacity ABC type, or equivalent. The fire extinguisher shall be UL299 listed and UL711 tested.

3.3.4.1 Component protection. All space in which work is performed during operation, service, and maintenance shall be free of hazardous protrusions, sharp edges, or other features which may cause injury to personnel. All rotating and reciprocating parts and all parts subject to high operational temperatures or subject to being electrically energized, that are of such nature or so located as to be hazardous to personnel, shall be guarded or insulated to eliminate the hazard.

3.3.4.2 Foreign object damage (FOD). All loose metal parts, such as pins or connector covers, shall be securely attached to the forklift with wire ropes or chains. "Dog tag" style beaded chains shall not be provided. Removable panels, if provided, shall be attached with captive fasteners. Tire valve stem caps shall be made of plastic.

3.3.4.3 Seatbelts and operator's restraint.

3.3.4.3.1 Seat belt. An operator's seat belt with a retractor shall be installed. The seat belt must conform to SAE J386, Type One. However, the installation of a lap belt alone will not be considered as adequate occupant restraint.

3.3.4.3.2 Additional restraint. Additional restraint devices designed to ensure the operator's body remains entirely within the protection of the frame and overhead guard in the event of tip over will also be provided. The restraint system shall not interfere with operator access or mobility, or the vehicles operation.

3.3.4.3.3 Decal. A warning decal shall be provided advising of the hazards of tip over and the importance of using the restraint system.

3.3.4.4 Sound levels. The sound level measured at the operator's station should not exceed 84 dB(A). If the sound level is above 84 dB(A), the contractor shall provide a hazardous noise warning plate stating that operator's hearing protection is required when operating this forklift. The plate shall be made of a corrosion resistant material and shall be at least 4.0 square inches.

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It shall have black lettering on a yellow background and shall be located to be visible as the operator enters the cab, or is seated. Sound level shall not exceed 93 dB(A).

3.3.4.5 Backup alarm. When specified (see 6.2), a backup alarm conforming to SAE J994, type A, B or C shall be furnished.

3.3.5 Electromagnetic interference (EMI). The forklift shall be in accordance with the following radiated emission and susceptibility requirements of MIL-STD-461: RE102 and RS103.

3.3.6 Human engineering. The forklift shall be designed in accordance with MIL-STD-1472 for ease of operation, inspection, and maintenance, including the use of arctic mittens and Mission-Oriented Protective Posture (MOPP) Level 4 Chemical Warfare Gear.

3.3.7 Fastening devices. All screws, bolts, nuts, pins, and other fastening devices shall be properly designed, manufactured, and installed with adequate means of preventing loss of torque or adjustment. Cotter pins, lock washers, or nylon patches shall not be used for this purpose, except for the attachment of trim items or as provided in commercial components. Tapped threads shall have a minimum thread engagement in accordance with TABLE I.

TABLE I. Minimum thread engagement.

Material	**Minimum Thread Engagement**
Steel	1.0 times the nominal fastener diameter
Cast iron, brass, or bronze	1.5 times the nominal fastener diameter
Aluminum, zinc, or plastic	2.0 times the nominal fastener diameter

3.3.8 Welders and welding. Welding procedures shall be in accordance with a nationally recognized welding code. The surface parts to be welded shall be free from rust, scale, paint, grease, and other foreign matter. Welds shall be of sufficient size and shape to develop the full strength of the welded parts. Welds shall transmit stress without cracking or permanent distortion when the parts connected by the welds are subjected to test, proof, and service loadings.

3.3.9 Design. The forklift shall be designed for safe operation with the rated load capacity (see 3.3.9.1) at all lift heights, reaches, fork tilts, and fork positions that the forklift is capable of achieving. The forklift shall be designed for a safety factor (based on material yield strength) of at least three times the rated load.

3.3.9.1 Rated load. The rated load shall be 4,000 pounds at a horizontal and vertical load center of 24 inches. The fork tines shall be rated for at least 6,000 pounds for use in operations that require little (minimum 10 ft.) or no horizontal reach. The horizontal load center is defined as the horizontal distance from the load carrying surface of the load backrest to the center of gravity of the load. The vertical load center is the vertical distance from the upper (load carrying) surfaces of the forks to the center of gravity of the load.

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3.3.9.2 Fork spacing and side shift. The forks shall be capable of being adjusted laterally by hydraulic power, and meeting the requirements of 3.8.19. Additionally, the forklift shall be capable of side shifting the forks by hydraulic power and meeting the requirements of 3.8.20.

3.3.9.3 Load backrest. An easily removable, capable of being installed or removed by one or two people without tools within five minutes, metal backrest shall be provided. The backrest shall have a stowage location on the forklift once removed. The backrest shall be the same width as the carriage. The top of the backrest shall be 34 to 35 inches above the horizontal load carrying surfaces of the forks. Two ring type devices to restrain the load shall be located on the load backrest at 30.0 inches ±2.0 inches above the load carrying surfaces of the forks. The devices shall have a minimum inside diameter of 2.0 inches, and made of a material not more than 0.63 inches thick. The devices shall have a safety factor of at least 3 when a forward horizontal load, equal to the rated load, is equally applied to both devices. Location of the devices shall not interfere with positioning the load against the backrest.

3.3.9.4 Instruments. In addition to the instruments supplied on the standard commercial forklift, an hour meter shall be installed in the instrument panel. All instruments, except the hour meter shall be lighted when the front floodlights (see 3.10.2) are illuminated.

3.3.9.5 Service brakes. Full air, air-over-hydraulic, or hydraulic-over-hydraulic type, foot controlled, all-wheel, service brakes shall be provided.

3.3.9.6 Parking brake. The parking brake actuation shall be independent from the service brakes. The control shall be located within reach of the seated operator and in a position to permit easy and safe movement on and off the vehicle. An indicator light that illuminates when the parking brake is applied shall be provided.

3.3.9.7 Steering. The forklift shall have power steering. In the event of a power failure the forklift shall be equipped with an emergency power steering mechanism (mechanical or electrical) conforming to SAE J1511. This supplement power steering mechanism shall allow the vehicle to be controlled while moving.

3.3.9.8 Load handling controls. All load motion controls shall be right hand operation and shall be of the self-centering type, i.e. controls shall return to the neutral position when released.

3.3.9.9 Cab. The forklift shall be equipped with an enclosed cab that shall incorporate the overhead protection requirements of ANSI/ITSDF B56.6-2005, and roll over protective structure (ROPS) requirements of ISO 3471. There shall be a door on each side; or one door and one side, front, or rear window that meets the emergency exit requirements of SAE J185. There shall be at least two windows, one on each side, which can be opened for ventilation. The doors and windows shall be capable of securely locking in both the closed and open positions. A minimum clearance of 39 inches from seat to underside of cab, when measured in accordance with ANSI/ITSDF B56.6-2005 shall be provided. The cab shall be equipped with an internal rear view mirror. The cab shall be designed in such a way that removal is not required to meet the air-transport requirements.

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3.3.9.9.1 Adjustable cab. If the vehicle is designed to operate with the cab in only one position, the ROPS/FOPS is only required in that position. If the vehicle is designed to operate with the cab in multiple discrete positions, the ROPS/FOPS is required in each discrete position.

3.3.9.10 Heater and defroster. The heater and defroster normally provided on the contractor's standard, commercial model shall be provided.

3.3.9.11 Towing hitch. A pintle type, towing hitch shall be installed at the center rear of the forklift, with the center of the hitch opening 22 to 30 inches above ground level. The pintle shall be capable of sustaining a rearward, horizontal force of at least three times the gross vehicle weight (GVW) of the forklift. The pintle type, towing hitch shall be designated as a retrieval device only, either by marking on the forklift or in the operator's manual.

3.3.9.12 Towing lugs. Two lugs, one on each side of the towing hitch, used for towing or securing safety chains shall be installed. The lugs shall be of sufficient diameter to accept common chains and hooks three inches in diameter and capable of sustaining a rearward, horizontal force of at least three times the GVW of the forklift for a maximum of 500 feet.

3.3.9.13 Tires. The tires shall be pneumatic, with an off-road tread pattern. Tire loading shall not exceed the tire load limits specified in Tire and Rim Association Yearbook when using the off the road 5 MPH tables.

3.3.9.14 Horn. The manufacturer's standard horn shall be provided.

3.3.9.15 Aircraft loading fork attachment. The forklift shall be equipped with an aircraft loading fork attachment to be used for positioning fixed tongue, rolling stock of one or two fixed axles, at least 2,000 lbs tongue weight, and at least 10,000 lbs gross weight when measured with horizontal tongue. It is acceptable to provide a means of stopping the boom from extending to meet this requirement. If a stop is required, the boom stopper shall be engaged and disengaged by the seated operator.

3.3.9.15.1 Aircraft loading operations. Use of the aircraft loading attachment may be limited to operations that support loading rolling stock into and out of cargo aircraft including but not limited to the C-130, C-17, and C-5. The aircraft loading ramp must be no steeper than the level kneeled, aft ramp of the C-5 with a sufficient loading envelope to allow the forklift to enter the aircraft in operational mode, (see 3.6.1). Operations are limited to hard paved surfaces with level terrain with the forklift in first gear. The operator, without leaving their seat and while maintaining full control of the forklift, shall be able to see the pintle on the ALFA during all operations. The aircraft loading attachment shall be retained using MIL-DTL-25959 qualified tiedown adjusters and the associated MIL-DTL-6458 qualified chain connected to the aircraft loading fork attachment. The Aircraft Loading Fork Attachment must be removed to meet air-transport mode requirements (see 3.6.3.1). The aircraft loading fork attachment is not approved for any other operations. The following features shall be included:

a. Two steel D-ring devices with a minimum inside diameter of 2.0 inches and not more than 0.75 inches thick allowing secure retention on the forks / fork carriage

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and to remain securely attached to the forklift during all aircraft loading operations. The devices shall have a safety factor of at least 2 when the rated load is equally applied to both devices.

b. A pintle type, towing hitch shall be located at the center, end of the aircraft loading attachment opposite the fork insertion pockets.

c. The aircraft loading attachment shall be of adequate length, width, height, and strength to support aircraft loading operations as specified (see 3.3.9.15.1)

d. Unless otherwise specified (see 6.2), the final paint (see 3.3.1.3) and markings (see 3.3.2) shall be consistent with the colors of the forklift on which the aircraft loading attachment is attached. The top of the aircraft loading attachment shall have "XX,XXX LBS" (where XX,XXX equals the final push/pull capacity of the vehicle) stenciled in 1-1/2 inch high letters with paint.

e. Storage devices to allow the aircraft loading fork attachment to be stored on the forklift without modification to the forklift.

3.3.9.16 Wheel guards. The forklift shall be designed so that material is not thrown off the rotating tires onto cab windows or light assemblies. If wheel guards are used, each wheel guard shall be capable of supporting at least 300 pounds in any one square foot area without evidence of damage.

3.3.9.17 Boom assembly. The boom shall be designed to provide fore and aft (horizontal) extension and retraction, and tilting movement for raising and lowering the fork carriage. The maximum angle that the boom can be tilted, with rated load on the forks, shall be limited to 45 degrees. The forklift shall be capable of meeting all requirements of this document with this limitation.

3.3.9.18 Boom attachments. The boom shall be designed to accept multiple attachments as needed. Each attachment shall have its own set of instructions and load chart. Attachments may have up to one standardized hydraulic fitting to allow for hydraulically powered operations by the attachment. When specified (see 6.2), the forklift shall be provided with any combination of an engine installation/removal attachment or a pintle hook attachment. If a pintle hook attachment is required, then aircraft loading forklift attachment (see 3.3.9.15) is not required. Attachments shall be easily installed or removed, requiring at most 2 people, and not more than 15 minutes per attachment.

3.3.9.18.1 Engine installation/removal attachment. When specified (see 6.2), the forklift will be shipped with an engine installation/removal attachment. The engine installation/removal attachment shall have sufficient capacity to remove a C-130 engine and propeller combination weighing up to 5,500 lb. at 16 ft. load center (when measured from the forward most part of the forklift), without the use of outriggers. The attachment shall provide at least 24” of horizontal travel while the vehicle remains stationary. The horizontal travel shall be hydraulically operated by the vehicle operator from the cab. The horizontal travel can also be accomplished with a

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proportionally controlled transmission allowing the entire vehicle to creep forward or backward as needed to set or remove a C-130 engine.

3.3.9.18.2 Pintle hook attachment. When specified (see 6.2), the forklift will be shipped with a pintle hook attachment. The pintle hook attachment shall provide all of the capabilities as described in paragraph 3.3.9.15 and its subparagraphs. If the pintle hook attachment is offered, then a separate fork tine attachment is not necessary.

3.3.9.18.3 Other attachments. Any attachments developed commercially or otherwise which are approved for use by the contractor for this forklift shall be available for purchase by the users.

3.3.9.18.4 Manual supplements. The necessary load charts and guidance supplements shall be provided with all attachments. Use of the attachments as prescribed in the supplements shall be covered under the manufacturer's original vehicle warranty. The use of a newly obtained attachment, which is approved by the manufacturer, for a previously fielded forklift shall not void the manufacturer's warranty.

3.4 Environmental conditions.

3.4.1 Operating temperature range. The forklift shall be capable of operating in ambient temperatures ranging from -25° F to +125° F. When specified (see 6.2), the forklift shall be furnished with type A winterization and shall be capable of operating in ambient temperatures ranging from -40° F to +125° F.

3.4.2 Storage temperature range. The forklift shall be capable of being stored in ambient temperatures ranging from -25° F to +125° F. When specified (see 6.2), the forklift shall be furnished with type A winterization and shall be capable of being stored in ambient temperatures ranging from -65° F to +140° F.

3.4.3 Winterization. (Minimum Requirements)

3.4.3.1 Type C winterization. The forklift, at a minimum, shall be furnished with Type C winterization that shall protect to -25° F. The forklift shall start within 5 minutes using only the engine or other component preheating designated below, and it shall be fully operable within 15 minutes. The forklift with Type C winterization shall consist of the following:

3.4.3.1.1 Starting aid. Glow plug(s) or a measure shot ether injection system shall be furnished.

3.4.3.1.2 Cab. The cab shall meet the requirements of (see 3.3.9.9), and shall also contain thermal insulation, if necessary, to meet the heating requirements of (see 3.4.3.1.3).

3.4.3.1.3 Cab heater and defroster. The heater shall have sufficient capacity to maintain a temperature of at least +40° F at cab floor level in an ambient temperature of -25° F.

3.4.3.1.4 Anti-freeze engine. To protect the engine from freezing, the coolant system shall be protected to -25° F with antifreeze.

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3.4.3.2 Type A winterization. When specified (see 6.2), the forklift shall be furnished with Type A winterization that shall protect to -65° F. If within the operating temperature range, the forklift shall start within 5 minutes using only the engine or other component preheating designated below, and it shall be fully operable within 15 minutes. The forklift with Type A winterization shall consist of the following:

3.4.3.2.1 Power plant heaters. Engine coolant, engine oil and battery heaters shall be provided. All heaters shall operate on 110 volts @ 60 Hz alternating current. A three wire, 25 feet long weatherproof cable of adequate capacity for all heaters being used simultaneously shall be provided. The cable shall be able to connect to NATO and American connectors. A stowage place shall be provided on the forklift to keep the cable when not in use. The heaters shall be as follows:

a. The coolant heater shall be installed in the engine block or lower coolant inlet hose. A coolant circulating pump, driven by a 110 volt alternating current motor shall be provided when a coolant inlet hose heater is furnished. The heater shall have adequate capacity to maintain engine coolant at a temperature of 10° F in an ambient temperature of -65° F. It shall be controlled to limit engine coolant to not more than150° F.

b. An engine oil heater with adequate capacity to maintain engine oil at a temperature of at least +10° F in an ambient temperature of -65° F shall be furnished. It shall be controlled to limit engine oil temperature to not more than 150° F.

c. A battery heater shall be provided. It shall have adequate capacity to maintain battery electrolyte at a temperature of at least +10° F in an ambient temperature of -65° F, and shall have a thermostat to limit temperature of the electrolyte to not more than +80° F.

3.4.3.2.2 Cab. The cab shall meet the requirements of (see 3.3.9.9), and shall also contain thermal insulation, if necessary, to meet the heating requirements of (see 3.4.3.2.3).

3.4.3.2.3 Heater and defroster. The heater shall be of sufficient capacity to maintain temperature of +40° F at cab floor level in an ambient temperature of -40° F.

3.4.3.2.4 Cold starting aid. A measured shot ether system or glow plug(s) shall be provided to assist in engine cold temperature starting.

3.4.3.2.5 Anti-freeze engine. To protect the engine from freezing, the coolant system shall be protected to -65° F with antifreeze.

3.4.4 Precipitation.

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3.4.4.1 Rain. The forklift shall be capable of storage and operation during rainfall of 5-inches per hour for three consecutive hours and 10-inches per hour for 10 consecutive minutes, with winds of up to 35 knots; and with 6-inches of rain per hour impinging on the forklift at angles from vertical to 45°.

3.4.4.2 Snow. The forklift shall be capable of storage and operation during accretion of wet snow up to 2-inches per hour for at least 12 hours.

3.4.4.3 Ice. The forklift shall be capable of storage and operation with ice accretion up to 1.5-inches on exposed horizontal surfaces. An operator may use an ice scraper for five minutes during the start-up process.

3.4.5 Solar radiation. The forklift shall not be adversely affected by full time exposure to solar radiation, such as those conditions encountered in desert environments.

3.4.6 Fungus. All materials used in the forklift shall be fungus resistant or shall be suitably treated to resist fungus. Materials treated for fungus resistance shall retain their original electronic and physical properties, shall not present toxic hazards, and treatment shall last for the entire service life of the part. The forklift shall be suitable for operation and storage in conditions encountered in a tropical environment.

3.4.7 Salt fog. The forklift shall be capable of storage and operation in high temperature, high humidity, salt laden, sea coast environments without damage or deterioration of performance.

3.4.8 Sand and dust. The forklift shall be capable of storage and operation during exposure to wind-blown sand or dust without damage or deterioration of performance.

3.5 Weight and dimensions.

3.5.1 Overall weight and dimensions. Overall forklift weight and dimensions shall be in accordance with TABLE II.

TABLE II. Weight and dimensions.

Weight in air-transport mode	13,000 pounds on each axle
Length, including forks	26.5 feet
Width	102 inches
Height in operational mode	102 inches
Height in air-transport mode	102 inches

3.5.2 Forks and fork carriage assembly. The forks and fork carriage shall have the following dimensions and restrictions and shall be in accordance with TABLE III.

TABLE III. Dimensions and restrictions.

Length of forks	48.0 ± 0.5 inches
Width of forks	4.5 inches (maximum)

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TABLE III. Dimensions and restrictions - Continued.

Thickness of forks	2.56 inches maximum, except bend in forks heel may exceed 2.56 inches.
Fork tip thickness	0.75 inches (maximum)
Bottom taper of forks	18-24 inches, from tip of forks rearward
Fork carrier assembly width	40 inches (maximum)

3.6 Transportability.

3.6.1 Operational mode. The operational mode shall be as the forklift is configured to meet the performance requirements of this document, including counterweights.

3.6.2 Surface transportability. The forklift shall be transportable via all modes of surface shipment (highway, rail, and water) in accordance with MIL-STD-1366, and shall be capable of withstanding the mechanical shock and vibration characteristics of highway, rail, and water transport, except that design for rail impact testing (see 5.2.5 of MIL-STD-1366) is not required.

3.6.3 Air transportability. The forklift shall be transportable on C-130, C-17, and C-5 aircraft. Design criteria can be found in MIL-HDBK-1791. In all air transport configurations, the forklift shall be capable of being restrained and withstanding, without loss of serviceability, 2.0 G up and 4.5 G down accelerations, and shall be capable of being restrained and withstanding, without loss of structural integrity, 3.0 G forward, 1.5 G aft, and 1.5 G lateral accelerations. The forklift shall be equipped with pressure relief devices or configured for air transport to prevent any part from becoming a projectile in the event of catastrophic loss of aircraft cabin pressure. The forklift shall drive on and off the aircraft, negotiating the required maximum ramp angles without shoring.

3.6.3.1 Air-transport mode. The air-transport mode shall be the fully operational forklift with only the following items removed, if necessary. To meet the air transportability requirements, refer to MIL-HDBK-1791 as a guide only:

a. Counterweight(s) (see 3.6.3.6)

b. Aircraft loading fork attachment (see 3.3.9.15)

3.6.3.2 Shoring. The forklift shall be air transportable without shoring.

3.6.3.3 Axle weight. Axle weight shall not exceed 13,000 pounds.

3.6.3.4 Tire pressure. Tire pressure shall not exceed 100 pounds per square inch (psi) and shall not be reduced for air transport.

3.6.3.5 Conversion to and from air-transport mode. Conversion from operational to air-transport and from air-transport to operational mode shall take not more than 60 minutes each, using five

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people and only common hand tools (see 6.3.1) with no damage to forklift or components. No other equipment or vehicle (cranes, other forklifts, etc) shall be required for the conversion to or from the air-transport mode. As a guide only refer to MIL-HDBK-1791.

3.6.3.6 Counterweight(s). If it is necessary to remove counterweight(s) to reduce the axle weights to 13,000 pounds, they shall be removed and installed by a furnished crane or hoist, and individual weights shall weigh not more than 900 pounds. The maximum number of personnel allowed to assist in the removal of the counterweight(s) is five people. Remember, safety should always be the top priority. An optional method shall be to remove and install the counterweights by a system on the forklift that uses its own power to lower and raise counterweight(s) to and from installed position, to and from ground level. In this case, the 900 pound maximum weight does not apply.

3.6.4 Tie downs. The forklift shall be symmetrically restrained during air and ground transport. Tiedown points shall be rated at a minimum of 25,000 pounds, marked for capacity, marked as a "TIEDOWN" in paint in the color specified in 3.3.2, with a clear opening compatible with MIL-DTL-25959 tiedown devices. All tiedown points should be easily accessible and minimize the need to crawl under the vehicle when securing it. The tiedown points shall have a safety factor of 2.3, based on static load. Each end of each tiedown device shall terminate at a tiedown point and not pass through any other tiedown point. There shall be no interference between tiedown devices and the forklift. The tiedown provisions shall be in accordance with 4.1 through 4.12 of MIL-STD-209. There shall be a permanently installed, corrosion resistant, metal plate that shows the center of gravity location in the air-transport mode, and tie-down instructions for all aircraft pertaining to this specification (see 3.3.3.2). Refer to MIL-HDBK-1791 as a guide only.

3.6.5 Lifting provisions. The forklift shall be equipped with sufficient attachment points so located that it can be lifted by crane in its normal travel position. Each attachment point shall be marked "Lift Point" in painted letters in the color specified in 3.3.2. All lift points should be easily accessible and minimize the need to crawl under the vehicle when securing it. The lifting provisions shall be in accordance with 5.1 through 5.1.4 of MIL-STD-209.

3.7 Maintainability. The forklift shall be designed for maintainability in accordance with 5.9 through 5.9.18 of MIL-STD-1472; forces shall not exceed those specified for both males and females. The forklift shall be capable of being mechanically maintained by one person not to exceed 1 hour using common hand tools (see 6.3.1) except where otherwise specified. The following items are provided as examples:

a. Remove, replace and adjust all engine-driven belts - 3/4 hour.

b. Remove and replace alternator - 3/4 hour.

c. Remove and replace all hydraulic system filters, screens, and strainers - 1 hour.

d. Remove and replace engine coolant system hoses - 1 hour.

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e. Drain engine oil, remove and replace engine oil filter, and refill crankcase - 1/2 hour.

f. Remove and replace fuel filter elements - 1/2 hour.

g. Remove, replace and connect battery - 1/2 hour.

h. Drain transmission fluid, remove and replace all transmission filters and refill transmission in 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 floodlights and taillight bulbs - 1/4 hour each bulb.

l. Lubricate all lubrication fittings with 2 strokes per fitting - 1 hour.

3.7.1 Servicing. The following items shall be easily accessible for inspection and servicing with the engine at operating temperature, without subjecting personnel to injury or burns. The items shall be in a covered area(s) that can be accessed (opened and closed) by one person without the need for tools:

a. Engine oil dipstick, oil filler, oil drain plug, and fuel filter.

b. Transmission fluid level indicator and filler tube.

c. Radiator or engine coolant filler cap.

d. Hydraulic fluid reservoir level indicator and filler.

e. Battery for inspection, jumper cable attachment and removal.

f. Power steering reservoir (if provided).

3.7.2 Special tools. The design of the item shall minimize the requirement for special tools (see 6.3.6). All special tools shall be provided with, and stored on, each forklift.

3.7.3 Diagnostic software. A copy of any diagnostic software required or recommended for maintaining the forklift shall be provided with each forklift on CD-ROM or DVD-ROM.

3.8 Performance.

3.8.1 Lifting speed. The forks with rated load shall be able to raise at a speed of not less than 55 feet per minute (fpm) over the entire distance from ground level to maximum lift height. With the engine idling at engine manufacturer's idle speed, the unloaded forks shall be able to raise at a speed of not less than 5 fpm over the entire lift range.

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3.8.2 Lowering speed. The lowering speed of the forks with rated load shall be no less than 40 fpm (not to exceed 80 fpm). The lowering speed of the unloaded forks shall be no less than 20 fpm (not to exceed 80 fpm). The forks, either unloaded or with rated load, shall lower at a controlled rate, that is, no free-fall, uncontrolled operation, jerking, or condition which could cause damage to the lift system or forklift is permitted.

3.8.3 Boom extension and retraction speeds. The forklift shall be capable of extending the boom, with rated load, at maximum lift angle of the boom at a speed of not less than 55 feet per minute (fpm). It shall be capable of retracting the boom at maximum lift angle, from maximum boom extension to retracted boom position at a speed of not less than 55 feet per minute with no load, and not greater than 100 fpm with rated load on the forks. It shall also be capable of extending and retracting rated load when the boom is horizontal, from fully retracted position to maximum extension and from maximum extension to fully retracted position at a speed of not less than 55 fpm.

3.8.4 Travel speed. The travel speed with rated load shall be at least 15 miles per hour (mph) in forward direction, and not less than 7 mph in reverse.

3.8.5 Lift height. The forklift shall be capable of raising the loaded forks to a height of at least 25 feet when measured from ground to top surfaces of horizontal forks.

3.8.6 Lowest fork position. With the load backrest at 6 feet forward reach, the top surface of the forks shall be capable of being positioned at least 6 inches below ground level.

3.8.7 Horizontal reach. With the boom horizontal, it shall be capable of extending the vertical load bearing surface of the load backrest at least 21.5 feet forward of the forward-most portion of the forklift.

3.8.8 Longitudinal slope operation. The forklift, with rated load, shall be capable of ascending and descending a 20% slope (11.3°) at a minimum of 2 mph when the load is in the uphill direction during both ascent and decent. It shall also be capable of accelerating upslope from a complete stop to at least 2 mph on a 20% slope (11.3°).

3.8.9 Lateral slope operation. With rated load on the forks, the forklift shall be capable of full circle operation, in both directions, at maximum steer angle, at a speed of not less than 2 mph, on a 20% slope (11.3°) without any wheel leaving the ground.

3.8.10 Drift. The boom assembly shall be capable of holding the rated load at maximum lift angle and full boom extension for 60 minutes with not more than 0.5 inch of vertical drift, when the hydraulic fluid is initially at ambient temperature.

3.8.11 Turning radius. The maximum turning radius of the forklift, measured to outside of the tires, shall be 17.25 feet.

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3.8.12 Fork tilt. With no load on the forks, the minimum forward tilt (fork tips lowered) shall be 12 degrees from horizontal and the minimum rearward tilt (fork tips raised) shall be 12 degrees from horizontal. The forward tilt shall be with the boom retracted and at the maximum lift angle and the rearward tilt shall be at the retracted carry position.

3.8.13 Constant tilt. The forklift shall be capable of maintaining a constant fork tilt angle (±2°), as the forks are raised (either empty, or loaded with any load up to and including the rated load) from ground level to maximum lift height and lowered back to ground level with no change to the tilt control lever position being necessary. The tilt angle setting at the initiation of fork motion shall be the reference point from which the four degree variation is determined, and can be any tilt angle the forklift is capable of achieving, including the horizontal plane (0 degree tilt).
3.8.14 Ground clearance. When the forklift is fully fueled and serviced, the ground clearance of the forklift shall be not less than 12 inches with the rated load at retracted carry position. The forklift, when empty or fully loaded, shall be able to go from a horizontal surface up a 25 degree ramp, to another horizontal surface with only the tires contacting the ramp.

3.8.15 Ceiling clearance. To unload stacked boxes from 20 foot ISO containers, the vertical distance from the top of the boom, or carriage (whichever is highest) to the lowest point on the forks, or carriage, (whichever is lowest) shall be not more than 30.0 inches. This dimension shall be with the backrest removed.

3.8.16 Stability. The forklift shall meet the “longitudinal stability stacking”, “longitudinal stability travel”, “lateral stability stacking”, and “lateral stability travel” stability requirements of ANSI/ITSDF B56.6-2005.

3.8.17 Service brakes. The service brakes shall stop the forklift with rated load, within the distance specified in the Stopping Distance Method of ANSI/ITSDF B56.6-2005, with not more than 80 pounds of force on the brake pedal. The service brakes shall meet the Drawbar Drag Method of ANSI/ITSDF B56.6-2005, except a drawbar drag equal to 25% of forklift gross weight shall be produced with not more than 80 pounds of force on the brake pedal.

3.8.18 Parking brake. The parking brake shall be capable of holding the fully loaded forklift, on a minimum 20% grade, in both up and down slope directions. The force required to fully set the parking brake shall be not more than 70 pounds, if hand actuated, or 150 pounds if foot actuated.

3.8.19 Fork lateral spacing. The forks shall be capable of spreading to at least 38.0 inches when measured from the outside of the forks. They shall be capable of closing to not more than 10.5 inches, again measured from the outside of the forks.

3.8.20 Fork side shifting. The forks shall be capable of side shifting at least 5.0 inches off center, in both directions, throughout the fork spread specified in 3.8.19.

3.8.21 Fork visibility. The operator, without leaving their seat and while maintaining full control of the forklift, shall be able to see at least one fork tip at any fork height, fork tilt, or fork spacing when there is no load on the forks.

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3.9 Engine and related equipment. The forklift shall be powered by a standard, commercial, diesel engine. Horsepower and torque shall be sufficient to provide the performance specified herein. The engine shall operate on diesel fuel conforming to A-A-52557 without detrimental effect on the engine, or its performance and be able to start within five minutes in any ambient temperature (and with the forklift initially stabilized at ambient temperature) from –25° F to +125° F. Glow plugs or other accessories working off the cranking batteries and auxiliary fluid priming systems which are permanently mounted on the forklift and normally used in starting the vehicle may be used.

3.9.1 Fuel system.

3.9.1.1 Diesel fuel. The engine shall operate on diesel fuel in accordance with A-A-52557 without detrimental effects on the engine, or its performance.

3.9.1.2 Alternate fuel. Either the engine or forklift manufacturer shall certify that the engine is capable of operating on JP-8 conforming to MIL-DTL-83133 for 400 hours, during normal commercial or military situations, without detrimental effect on the engine. Some power loss is expected, but the forklift shall be able to perform normal operations. A certification letter shall be included in the first article test report.

3.9.1.3 Fuel tank. The fuel tank shall be of sufficient capacity to allow a minimum 8 hours of continuous operation without refueling. The tank filler neck shall be designed to operate with an OPW (www.opwglobal.com) fuel nozzle model 295AF. The dimensions for the OPW 295AF are available on their web site, https://www.opwglobal.com/product_detail.aspx?pid=181.

3.9.1.4 Drain plug. The fuel tank shall be equipped with a drain plug at the lowest point of the tank and located, or a drain line provided, so that any 5 gallon container (preferably a container that can be sealed) can be positioned to take the draining fuel. The drain plug shall be protected by its location or by a guard.

3.9.2 Power train.

3.9.2.1 Transmission. The transmission shall be the full torque, power-shift type in combination with a torque converter. The transmission shall provide at least two forward and two reverse speeds. Selective forward and reverse directional controls activated by the operator's foot are not acceptable. A manually shifted transmission or clutch is not acceptable. The transmission shall provide for positive inching or declutch control throughout the entire engine rpm range, in both forward and reverse directions. The inching or declutch control shall permit lifting of rated load, at maximum engine speed, while the transmission is in a forward or reverse gear, with no vehicle motion.

3.9.2.2 Axles. The front and rear axles shall be rated at a capacity equal to or greater than the maximum load each axle will be subjected to. The front axle (the axle in front of the operator) shall ensure that power is transmitted to the wheel having traction when the opposite wheel is off the ground. If an operator-controlled locking type is used, a means to inform the operator that the front axle is locked shall be provided.

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3.9.3 Engine starting system.

3.9.3.1 Engine starting aids. The engine shall start within 15 seconds cranking in any ambient temperature within the required operating range of the forklift. Internal engine starting aids, fluid starting aids, and heat from the winterization system (see 3.4.3) may be used prior to and during the start period to facilitate engine starting under the following conditions and shall be in accordance with TABLE IV:

TABLE IV. Engine starting aids.

Temperature Range	**Starting Aids Permitted**
0° F through 125° F	None
-25° F through -1° F	Glow plugs, fluid starting aids
-65° F through -26° F	Glow plugs, fluid starting aids, and heat from the winterization system

3.9.4 Engine lubrication system. The engine lubrication system shall be designed so that the forklift can be operated on a 20% incline in any plane. Lubrication means shall be provided for all moving parts that require periodic lubrication. Grease lubrication fittings shall conform to SAE J534.

3.9.5 Exhaust system. The exhaust system shall be constructed of stainless steel. The muffler(s) shall be constructed of aluminized steel or stainless steel. Exhaust system outlet(s) shall be directed away from personnel accessing any control panel or equipment compartment and the engine air intake, and shall not be directed toward the ground. The system shall be protected from damage which could result from traversing rough terrain (see 6.3.5). A means shall be furnished to prevent rain water intrusion into the exhaust system.

3.10 Electrical system. The electrical system shall consist of all electrical components necessary for operation of the forklift. The forklift shall have sufficient electrical grounding to prevent static discharge.

3.10.1 Starter switch. The starter switch shall not activate the engine starter while the engine is running, nor when the engine is not running and the transmission is in any forward or reverse gear.

3.10.2 Lighting. There shall be at least one forward and one rearward directed sealed beam floodlights sufficient for night time operation. Tail lights, and brake stop lights shall be installed. All lights shall be protected by location or guards. Individual operator controlled switches shall be provided for the front lights and the rear lights. If a rotary switch provides all possible options that the individual switches provide, then the rotary switch is acceptable. When specified (see 6.2), the forklift shall be equipped with a rotating beacon light. If installed, the rotating beacon light is permitted to be removed for air-transportability.

3.10.3 Batteries and battery compartment.

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3.10.3.1 Batteries. Except when Type A Winterization is specified (see 3.4.3.2), batteries shall be of the commercial maintenance-free sealed lead acid, starved electrolyte, gas recombination, spiral wrapped, absorbent gas mat (AGM), top post type in accordance with MIL-B-18013/1.

3.10.3.2 Battery compartment. The batteries shall be enclosed in a corrosion-resistant, weatherproof box or compartment and shall be readily accessible.

3.10.3.3 Battery cables. The battery cables shall be sized to handle the system voltage and current levels, be clearly identified with "+" and "-" or red and black markings, and shall not be spliced.

3.10.4 Alternator. The alternator shall have sufficient output at normal engine operating RPM to supply full electrical operating load, including all lights, and still provide electrical current to charge the battery. When specified (see 6.2), the forklift shall be equipped with a heavy-duty alternator.

3.10.5 Master switch. A keyless master switch, with a corrosion resistant identification plate, shall be installed in a convenient location to permit disconnect of the battery from all electrical load.

3.10.6 Wiring schematic.

3.10.6.1 Metal plate. A corrosion resistant metal plate containing the electrical schematic of the forklift shall be installed in an area where normal usage will cause it no damage. The plate may be located behind a panel that can be opened without tools.

3.10.6.2 Durable material. If the wiring schematic could be provided on a durable material, it would be acceptable to store it in the cab. For example: A book with hard plastic pages (tear resistant & smear resistant).

3.10.7 Electrical accessories wiring. When specified (see 6.2), the forklift shall be equipped with a 12V converter, an outlet, and all associated wiring.

3.10.8 Radio preparation package. When specified (see 6.2), the forklift shall be equipped with mounting hardware and all associated wiring necessary to install a radio.

3.11 Hydraulic system. The hydraulic system shall consist of all hydraulic components necessary for operation of the forklift, including a filter. All hydraulic hoses shall have a working pressure rating equal to or greater than the hydraulic system maximum relief valve setting. The hydraulic fluid fill point shall be properly labeled. The hydraulic fluid shall comply with the requirements of MIL-PRF-83282.

3.11.1 Hydraulic reservoir. The hydraulic reservoir filler shall be of sufficient inside diameter to accept a filler tube of at least 1.56 inches outside diameter.

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3.11.2 Fail-safe hydraulic lift system. The forklift shall be equipped with a fail-safe hydraulic lift system which will automatically prevent load lowering and fork forward tilting in the event of electrical, hydraulic or pneumatic failure; hydraulic or pneumatic failure includes any component, line or hose. Drift due to hydraulic system failure shall be limited to 0.5 inch per hour. Check valves have been used in the past to prevent load lowering. Pressure relief valves or regulators shall be provided in the hydraulic and pneumatic systems to prevent overpressure. In addition, a means shall be provided to manually override the system to allow safe and slow lowering (not more than 10 feet per minute) of loaded or unloaded forks.
3.11.3 Hydraulic schematic.

3.11.3.1 Metal Plate. A corrosion resistant plate containing the hydraulic schematic of the forklift shall be permanently installed in an area where normal usage will cause it no damage. The plate may be located behind a panel that can be opened without tools.

3.11.3.2 Durable Material. If the hydraulic schematic could be provided on a durable material, it would be acceptable to store it in the cab. For example: A book with hard plastic pages (tear resistant & smear resistant).

3.12 Workmanship. The forklift, including all parts and accessories, shall be constructed and finished in a thoroughly workmanlike manner. Workmanship objectives shall include freedom from blemishes, defects, burrs and sharp corners and edges; accuracy of dimensions, surface finish, and radii of fillets; thoroughness of welding, painting, and riveting; marking of parts and assemblies; and proper alignment of parts and tightness of assembly fasteners. The workmanship shall be high quality when compared to industry standards. All welds shall be smooth and continuous. The contractor's welders and procedures shall be qualified to meet the applicable welding codes of American Welding Society (AWS), especially AWS D14.1/D14.1M,or American Society of Mechanical Engineers (ASME).

3.12.1 Bolted connections. Bolt holes shall be accurately punched or drilled and shall be deburred. Threaded fasteners shall be tight and shall not work loose during testing or service usage.

3.12.2 Riveted connections. Rivet holes shall be accurately punched or drilled and shall be deburred. Rivets shall be driven with pressure tools and shall completely fill the holes. Rivet heads shall be full, neatly made, concentric with the rivet holes, and in full contact with the surface of the component.

3.12.3 Gear and lever assemblies. Gear and lever assemblies shall be properly aligned and meshed and shall be operable without interference, tight spots, loose spots, or other irregularities. Where required for accurate adjustment, gear assemblies shall be free of excessive backlash.

3.12.4 Cleaning. The forklift shall be thoroughly cleaned. Loose, spattered, or excess solder; welding slag; stray bolts, nuts, and washers; rust; metal particles; pipe compound; and other foreign matter shall be removed during and after final assembly.

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4. VERIFICATION

The products provided shall meet the requirements of this specification, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial marketplace only modified to the extent necessary to meet the requirements specified herein. The Government reserves the right to require proof of such conformance.

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

a. First article inspection (see 4.2).

b. Conformance inspection (see 4.3).

4.2 First article inspection. When specified (see 3.1 and 6.2), the first article forklift shall be subjected to the analyses, demonstrations, examinations, and tests described in 4.5.1 through 4.6.28. The contractor shall provide or arrange for all test equipment and facilities. The forklift shall be a pre-production unit that shall be identical to all forklifts produced on this contract. If the contractor determines it is necessary to make configuration changes during production, pre-approval must be obtained from WR-ALC/GRV. All testing shall be observed and approved by Government representatives. The approved first article forklift shall be refurbished to a like new condition and delivered as soon as possible.

4.2.1 First article report. The first article inspection report shall include a detailed description of the inspection (see 4.2). All deficiencies encountered and actions taken to correct the deficiencies shall be included in the report. Approval of the first article test report shall not relieve the contractor of their responsibility to furnish forklifts that meet the requirements of this document.

4.3 Conformance inspection. Each production forklift shall be subjected to the examination described in 4.5.1 and sub paragraphs.

4.4 Inspection requirements.

4.4.1 General inspection requirements. Apparatus used in conjunction with the inspections specified herein shall be laboratory precision type, calibrated at proper intervals to ensure laboratory accuracy.

4.4.2 Data. During all testing specified herein, at least the following data, unless not applicable, shall be recorded at intervals not to exceed 30 minutes. Additional data or shorter intervals shall be provided as appropriate for any specific test.

a. Date.

b. Time started.

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c. Time finished.

d. Ambient temperature.

e. Ambient humidity.

4.4.3 Test rejection criteria. Throughout all tests specified herein, the forklift shall be closely observed for the following conditions, which shall be cause for rejection:

a. Failure to conform to design or performance requirements specified herein or in the contractor's technical proposal.

b. Leakage of water, transmission fluid, engine oil, fuel, lubrications, hydraulic fluid, etc, in excess of Class 3, for dust free conditions and Class 3D for dusty conditions in accordance with SAE J1176.

c. Structural failure of any component, including permanent deformation, or evidence of impending failure.

d. Evidence of excessive wear, galling, gouging, or other material removal. If excessive wear is suspected, the original equipment manufacturer’s (OEM’s) specifications or tolerances shall be utilized for making a determination.

e. Interference between the forklift components or between the forklift, the ground, and all required obstacles, with the exception of normal contact by the tires.

f. Misalignment of components.

g. Evidence of undesirable roadability characteristics, including instability in handling during cornering, braking, and while traversing all required terrain.

h. Conditions that present a safety hazard to personnel during operation, servicing, or maintenance.

i. Evidence of corrosion or deterioration.

j. Malfunctions, including over-heating, binding, jerking, or uneven operation of any component or system.

k. Any wearing, galling, gouging or other material removal.

l. Any unsafe operation that jeopardizes the operator or forklift.

4.5 Test methods.

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4.5.1 Examination of product. Each forklift shall be examined to verify compliance with the requirements herein prior to accomplishing any other demonstrations or tests listed in 4.5. A contractor-generated, Government-approved checklist shall be used to identify each requirement not verified by an analysis, certification, demonstration, or test, and shall be used to document the examination results. Particular attention shall be given to materials, workmanship, dimensions, surface finishes, protective coatings and sealants and their application, welding, fastening, and markings. Proper operation of each function shall be verified. Certifications and analyses shall be provided in accordance with TABLE V. Each production forklift shall be inspected to a Government-approved reduced version of the checklist.

TABLE V. Certifications and analyses.

Paragraph	**Required Certifications and Analyses**
3.4.4.2 Snow.	Contractor analysis of the snow load requirement (see 4.5.4.3.2).
3.4.5 Solar radiation.	Contractor certification that the forklift performance is not adversely affected by full time exposure to solar radiation, such as those conditions encountered in desert environments.
3.4.6 Fungus.	Contractor certification that the materials used in construction of the forklift are fungus resistant or suitably treated to resist fungus.
3.6.2 Surface transportability.	Contractor surface transportability analysis (see 4.5.6.1) and certification that the forklift is transportable via all modes of surface shipment (highway, rail, and water) in accordance with MIL-STD-1366, and shall be capable of withstanding the mechanical shock and vibration characteristics of highway, rail, and water transport.
3.6.3 Air transportability.	Contractor air transportability analysis (see 4.5.6.2).
3.6.4 Tiedowns.	Contractor tiedown provision analysis (see 4.5.6.7.1).
3.6.5 Lifting provisions.	Contractor lifting provision analysis (see 4.5.6.8.1).
3.9.2.2 Axles.	Manufacturer certification of the power transmission system installed on the front axle. Demonstration shall be provided when possible in a safe manner.

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Paragraph	Required Certifications and Analyses
3.9 Engine and related equipment., 3.9.1 Fuel system., and 3.9.4 Engine lubrication system.	Engine manufacturer certification that the engine is in accordance with all applicable requirements, including exhaust emissions standards and fuels. Engine manufacturer application approval for the engine and its installation, including cooling system, lubrication system, and mounting system.

4.5.1.1 Travel. The forklift shall be driven at least 1.0 mile at varying speeds, including maximum speed. At least five right and five left turns shall be made at maximum turn angle, and operate horn, windshield wipers, lights, heater, defroster, and other components during this one mile drive. Additionally, the forks shall be fully lowered and the forklift operated in reverse for at least 0.1 mile. Once placed in reverse, verify that the backup alarm (see 3.3.4.5) is activated. No damage or degradation to the fork tines, their attachment(s), or any other component part of the forklift or load shall result.

4.5.1.2 Material handling. With rated load on forks, raise forks to maximum lift height, then lower at maximum lowering speed and quickly stop at one to two feet above ground level. Repeat at least five times. Side shift rated load from one extreme to the other and back to original position. Repeat at least five times. With no load, move forks from minimum to maximum fork spread, and back to minimum. Repeat at least five times.

4.5.2 Sound level test. Measure the noise level at operator's ear with the engine operating at maximum rpm and while lifting rated load. Nonconformance with 3.3.4.4 shall be cause for rejection. If noise level is between 84 and 94 dB(A), the noise warning plate required by 3.3.4.4 shall be on all forklifts delivered on this contract.

4.5.3 Electromagnetic interference test. A first production forklift shall be tested in accordance with MIL-STD-461: RE 102 and RS 103 to demonstrate compliance with 3.3.5.

4.5.4 Environmental testing.

4.5.4.1 High temperature storage and operation test. A first production forklift shall be tested in accordance with MIL-STD-810, Method 501.5, Procedures I and II, to demonstrate compliance with the high temperature storage and operating requirements of 3.4.1 and 3.4.2. Test duration shall be one 24-hour cycle for each procedure.

4.5.4.2 Low temperature storage and operation test. A first production forklift shall be tested in accordance with MIL-STD-810, Method 502.5, Procedures I and II, to demonstrate compliance with the low temperature storage and operating requirements of 3.4.1 and 3.4.2, as well as the engine starting requirement of 3.9.3.1 and the alternator charging requirement of 3.10.4. Test duration shall be one 24-hour cycle for each procedure. When specified (see 6.2), the low

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temperature storage and operation test shall be performed to meet the Winterization requirements of 3.4.3 and sub paragraphs.

4.5.4.3 Precipitation.

4.5.4.3.1 Rain test. A first production forklift shall be tested in accordance with MIL-STD-810, Method 506.5, Procedure I, to demonstrate compliance with 3.4.4.1.

4.5.4.3.2 Snow load analysis. An engineering analysis shall be performed to demonstrate compliance with the snow load requirement of 3.4.4.2, using a specific gravity of snow of 0.1 (Ref. 5.3 of MIL-STD-810).

4.5.4.3.3 Ice accretion test. A first production forklift shall be tested in accordance with MIL-STD-810, Method 521.3 with an ice thickness of 1.5-inches to demonstrate compliance with the ice accretion requirement of 3.4.4.3. The contractor shall identify those areas of the forklift where ice removal is required prior to operation.

4.5.4.4 Salt fog test. A first production forklift shall be tested in accordance with MIL-STD-810, Method 509.5, to demonstrate compliance with 3.4.7. Test duration shall be alternating 24-hour periods of salt fog exposure and drying conditions for 24-hour periods (two wet and two dry).

4.5.4.5 Sand and dust test. A first production forklift shall be tested in accordance with MIL-STD-810, Method 510.5, Procedures I (12 hours) and II (90 minutes per side), to demonstrate compliance with 3.4.8.

4.5.5 Weight and dimension tests.

4.5.5.1 Weight and center of gravity test. The weight, center of gravity, and axle weights of a first production forklift shall be measured to demonstrate compliance with the weight requirement of 3.5.1 and the axle weight requirement of 3.6.3.3.

4.5.5.2 Dimension measurement. A first production forklift shall be measured to demonstrate compliance with dimensional requirements of 3.5.1.

4.5.5.3 Fork and fork carriage. Measure the length, width, thickness, thickness at tip, and bottom taper of both forks. If applicable, side shift forks to extreme right, and then to extreme left positions, ensuring that the fork carriage does not exceed the overall width of the forklift in either case. Nonconformance with 3.5.2 shall be cause for rejection.

4.5.5.4 Ground clearance. Place the forklift with rated load at load carry position (see 6.3.4) on a level surface. Measure distance from ground to lowest point on the forklift as specified (see 3.8.14). Nonconformance with 3.8.14 shall be cause for rejection.

4.5.5.5 Ceiling clearance. Measure the vertical distance from the top of the boom or carriage (whichever is highest) to the lowest point on the forks or carriage (whichever is lowest) with the backrest removed. Non conformance with 3.8.15 shall be cause for rejection.

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4.5.6 Transportability verification.

4.5.6.1 Surface transportability analysis. An engineering analysis shall be performed to demonstrate compliance with 3.6.2. The engineering analysis shall utilize the data for road transportation in accordance with MIL-STD-810, Method 514.6, Table 514.6C-II.

4.5.6.2 Air transportability analysis. An engineering analysis shall be performed to demonstrate compliance with the air transportability requirements of 3.6.3 and all subparagraphs. The analysis shall include the tie downs and all major components and their ability to withstand the accelerations specified in 3.6.3. The evaluation shall also include a dimensional analysis for the forklift while traversing the ramp and while loaded aboard C-130, C-17, or C-5 aircraft.

4.5.6.3 Equipment removal and reconfiguration demonstration. A first production forklift shall be configured for transport on C-130, C-17, or C-5 aircraft and then reconfigured for operation to demonstrate compliance with 3.6.3.5. It shall be demonstrated that the forces required do not exceed those allowed in MIL-STD-1472.

4.5.6.4 Conversion to air-transport mode. With forklift in operational mode (see 3.6.1), convert to air-transport mode (see 3.6.3.1) within the time frame, and using only the personnel and equipment specified in 3.6.3.5. Verify that the counterweight(s) can be removed, and meet the requirements, as specified in 3.6.3.6. Nonconformance with 3.6.3.5, 3.6.3.6, or 3.3.9.9 shall be cause for rejection.

4.5.6.5 Air transportability verification. With the forklift in the air transport mode, verify that it can meet all air transport requirements. For reference only refer to MIL-HDBK-1791, including all dimensional and weight limitations of 3.5.1. Inability to meet all of these requirements shall be cause for rejection.

4.5.6.6 Conversion to operational mode. With the forklift in air-transport mode, convert to operational mode within the time frame, and using only the personnel and equipment specified in 3.6.3.5. Verify that the counterweight(s) can be reinstalled and meet the requirements, as specified in 3.6.3.6. Nonconformance with 3.6.3.5, 3.6.3.6, or 3.3.9.9 shall be cause for rejection.

4.5.6.7 Tie down provision verification.

4.5.6.7.1 Tie down provision analysis. An engineering analysis shall be performed to demonstrate compliance with the tie down provision requirements of 3.6.4.

4.5.6.7.2 Tie down provision test. A first production forklift shall be tested to demonstrate compliance with the tie down provision requirements of 3.6.4.

4.5.6.8 Lifting provision verification.

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4.5.6.8.1 Lifting provision analysis. An engineering analysis shall be performed to demonstrate compliance with the lifting provision requirements of 3.6.5.

4.5.6.8.2 Lifting provision test. A first article forklift shall be tested to demonstrate compliance with the lifting provision requirements of 3.6.5.

4.5.6.9 Steering. The forklift shall be tested to demonstrate compliance with the emergency power steering requirement of 3.3.9.7.

4.5.7 Maintainability demonstration. All maintenance tasks (see 3.7) shall be performed or ease of access demonstrated. The task times shall be recorded for all tasks determined necessary by the witnessing Government representative. The recommended frequencies of the maintenance tasks and the times recorded to accomplish the tasks shall be used to develop an expected value of maintenance time per measure of use, such as hours of operation. It shall be demonstrated that the forces required do not exceed those allowed in MIL-STD-1472. All maintenance tasks recommended to be performed daily and at the routine PMI shall also be performed by personnel wearing arctic mittens and MOPP Level 4 Chemical Warfare Gear. Additionally, the servicing requirement (see 3.7.1) shall be demonstrated.

4.6 Operational tests.

4.6.1 Test conditions. Unless otherwise specified herein (see 6.2), inspections shall be performed in accordance with the following test conditions:

4.6.1.1 All tests shall be conducted at the ambient temperature and climatic conditions existing at the place of demonstration.

4.6.1.2 Only that maintenance established by the contractor shall be performed during testing.

4.6.1.3 For test purposes, the rated load (see 3.3.9.1) for the forklift shall be a 4,000 pound (+200, -0 pounds) cube, 48 inches on each side, with a center of gravity located at the geometric center of the cube.

4.6.2 Maximum fork lift height. With rated load on the forks, with forks level and at their maximum lift height, measure from ground to top surface of one fork to determine maximum lift height. Nonconformance with 3.8.5 shall be cause for rejection.

4.6.3 Lifting and lowering speed. Measure distance from ground to top surface of forks in fully lowered position. Measure time required to raise rated load from ground to maximum lift height. Subtract distance from ground to top surface of forks from maximum lift height, and calculate lifting speed. Lower rated load, at maximum lowering speed (fully open lowering control) and abruptly stop the load at 1 to 2 foot height. Record this time. Measure distance from ground to top surface of one fork. Subtract this figure from the maximum lift height and calculate loaded lowering speed. Remove load and raise forks to maximum lift height. Measure time required to lower forks to ground level. Calculate the unloaded fork lowering speed. Nonconformance with

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3.8.1 or 3.8.2 shall be cause for rejection. For increased accuracy, an average of multiple lifts or lowering may be used.

4.6.4 Boom extension and retraction speed. Determine distance boom travels from fully extended position to fully retracted position. With rated load on forks, measure the time from fully retracted to fully extended position with the boom horizontal and again at approximately 25 degrees. With rated load on forks, measure the time from fully extended to fully retracted position with the boom horizontal and again at approximately 25 degrees. Failure to meet the requirements of 3.8.3 shall be cause for rejection. For increased accuracy, an average of multiple lifts or lowering may be used.

4.6.5 Travel speed. Operate the forklift on a level surface at maximum speed in both forward and reverse directions with rated load in load carry position (see 6.3.4). Inability to obtain the speeds specified in 3.8.4 shall be cause for rejection.

4.6.6 Lowest fork position. Locate a level surface adjacent to a 12-inch minimum drop-off. Park the forklift on the level surface so that the forks extend over the drop-off. Extend the boom approximately 6 feet from the fully retracted position and with the forks level, lower them to their lowest position. Measure the vertical distance from the top of the forks to the extension of the level surface. Nonconformance with 3.8.6 shall be cause for rejection.

4.6.7 Forward (horizontal) reach. Extend the horizontal boom fully forward, and with the forks level, measure the distance from the foremost point on the forklift to the vertical load backrest. If this dimension is less than as specified in 3.8.7 it shall be cause for rejection.

4.6.8 Fork tilt. On a level surface, retract boom fully, raise forks to maximum lift angle and tilt forks fully forward. Measure angle of tilt. Lower forks to carry position, keeping the boom fully retracted and tilt forks to full rearward position. Measure tilt angle. Nonconformance with 3.8.12 shall be cause for rejection.

4.6.9 Fork tine operation (constant tilt). Extend boom fully, position unloaded forks approximately 2 degrees above horizontal, and 2 to 5 inches above ground level. Measure fork tilt. Without touching the tilt control lever, raise forks to maximum fork height, then lower to original position. Verify that the forks maintain the same tilt, within the tolerances specified in 3.8.13 while being raised and lowered. Repeat with rated load on forks and forks at approximately 7 degrees rear tilt. Again verify that forks maintain the tolerance specified in 3.8.13 throughout total movement. Inability to maintain the fork tilt within tolerance specified in 3.8.13 while raising and lowering empty or loaded forks shall be cause for rejection.

4.6.10 Fork side shifting mechanism. The forks shall be side shifted with the rated load on the forks from extreme left to extreme right position and back to extreme left 50 times. The forklift shall be capable of side shifting at least 5.0 inches off center, in both directions, throughout the fork spread specified in 3.8.19 to allow for interfacing with loaded 463L pallets. With no load on the forks, the forks shall be adjusted from their most closed position to most open position and then returned to most closed. This shall be considered one cycle. Repeat until 100 cycles have been completed. For both fork spacing (see 3.3.9.2 and 3.8.19) and side shifting (see

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3.3.9.2 and 3.8.20), any binding, erratic movements, inability to complete either test, failure of either system, or overheating of the side shift mechanism shall be cause for rejection.

4.6.11 Turning radius. With rated load on forks, operate forklift in low gear at engine idle speed on a dry, flat apron in a clockwise direction, at maximum steering angle. At least two complete circles should be made before taking any measurements. The path of the outside wheel is marked on the pavement by pouring water on the tire while making the complete circle. To determine the turning radius, measure from the midpoint of tire contact on the pavement to a similar point across the diameter of the trace and divide in half. Repeat in counterclockwise direction. Nonconformance with 3.8.11 shall be cause for rejection.

4.6.12 Service brakes. Demonstrate that the service brakes can stop the forklift with rated load, and can meet the drawbar drag test, as specified in 3.8.17. Failure to meet all requirements of 3.3.9.5 and 3.8.17 shall be cause for rejection.

4.6.13 Parking brake. Demonstrate that the parking brake can hold the forklift, with rated load on the forks, in both forward and reverse directions, on the slope specified in 3.8.18, for at least 3 minutes. Measure the force required to apply the parking brake. Nonconformance with any requirement of 3.3.9.6 and 3.8.18 shall be cause for rejection.

4.6.14 Fork visibility. Position unloaded forks at various lift heights, tilts, and spacings to verify that the visibility requirements of 3.8.21 can be met. Failure to meet 3.8.21 shall be cause for rejection.

4.6.15 Stability. Conduct the “longitudinal stability stacking,” “longitudinal stability travel,” ”lateral stability stacking,” and ”lateral stability travel” tilting platform tests of ANSI/ITSDF B56.6-2005. Failure to meet the minimum tilting requirements specified in ANSI/ITSDF B56.6-2005 (see 3.8.16) shall be cause for rejection.

4.6.16 Drift. Raise rated load to maximum lift height, with forklift at ambient temperature. Place forks in horizontal position and shut off engine. Measure from ground to top surface of one fork. Let forklift sit for time specified in 3.8.10. Remeasure same distance to same point on fork. Nonconformance with 3.8.10 shall be cause for rejection.

4.6.17 Starter disconnect switch. Start the engine and let it run for at least 10 seconds. Energize the starter switch (move to “off” then “on” position if applicable) while the engine is running. Any evidence of starter engagement while the engine is running shall be cause for rejection. With the engine not running, place transmission selector in the lowest forward gear and energize the starter switch. Repeat for all forward and reverse gears. Any evidence of starter engagement while transmission is in any gear shall be cause for rejection (see 3.10.1).

4.6.18 Master switch. With the transmission in neutral, turn off the master switch (see 3.10.5), and attempt to engage the starter. Any evidence of starter engagement or other electrical load shall be cause for rejection.

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4.6.19 Overload. Unless otherwise specified in the contract, these procedures will be accomplished only during first article testing. Perform a stress analysis of the forklift to determine all critical stress points (see 6.3.2). The entire stress analysis is not necessary, just the location of the critical stress points, and the cause of these stresses; 3 times static (rated) load or 2 times maximum dynamic load (see 3.3.9). Apply strain gauges or other suitable instrumentation at all these critical stress points to measure stress during this test. Place forklift on level surface and position supports under the frame or front axle to relieve load on front tires. Secure the rear of the forklift to compensate for the additional test load. Fully extend boom, raise forks at least 24 inches above ground level with the forks centered on the carriage. For the test load use the greater of 3 times the static load of 4,000 pounds, or 2 times the maximum dynamic load, as determined in 3.3.9. Apply this test load to the forks. The center of gravity of the test load shall be located 24 inches forward of the front backrest surface. Let this overload remain on the forks for at least 10 minutes. Remove the load and inspect forklift structure, frame, mast or boom assembly, and hydraulic system for deformation, cracks, broken welds, and hydraulic fluid leaks. Inspect forks a minimum of 6 inches on either side of heel by magnetic particle or dye penetrant method. Record readings from strain gauges and convert to, and record, the corresponding stresses. Deformation, cracks, broken welds, or hydraulic fluid leaks shall be cause for rejection.

4.6.20 Fail safe hydraulic lift system. This test shall be accomplished when the lift system is hydraulically operated. Raise the rated load to maximum lift height with forks tilted back about five degrees. Measure vertical distance from ground to top surface of one fork. No personnel shall be under or in front of the load during the next step. Disconnect hydraulic line(s) that supply pressure to the lift system. Remeasure vertical distance from ground to same point on fork surface. A drop of more than 0.5 inch shall be cause for rejection. Measure fork tilt. Disconnect hydraulic line(s) that supply pressure to prevent forward tilting. Remeasure fork tilt. A change of more than 2.0 degrees of tilt shall be cause for rejection. Use the over-ride provided to lower rated load to ground. Failure to meet any part of the Fail-safe hydraulic lift system requirement of 3.11.2 shall be cause for rejection.

4.6.21 Load backrest restraints. Apply a forward, horizontal force of 3.0 times rated load to load restraint devices for 10 minutes. The test load may be applied to all devices at once, or 3.0 times the proportional share of the load may be applied to each device. Additionally, verify the dimensional requirements of 3.3.9.3 are met. Remove load and inspect restraint devices, welds and supporting structure for deformation, cracks, broken welds, etc., which shall be cause for rejection.

4.6.22 Longitudinal slope operation. Traverse a 20% slope (11.3°) at a speed of at least 2 mph both uphill and downhill with rated load as specified in 3.8.8. While on the slope, stop the forklift and accelerate up the hill from a complete stop to a speed of at least 2 mph.

4.6.23 Lateral slope operation. Operate the forklift at clockwise direction, full circle operation, with rated load, on a slope as specified in 3.8.9. Operate the same except in counterclockwise direction. Repeat full circle operation, in both directions, with no load on the forks. Any tire losing contact with the ground, or any unsafe operation shall be cause for rejection.

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4.6.24 Aircraft loading fork attachment. Perform a stress analysis of the forklift and aircraft loading fork attachment to determine all critical stress points (see 6.3.2). Apply strain gauges or other suitable instrumentation to measure critical data during this test. Place instrumented aircraft loading fork attachment on the forks and secure in place using the means specified. Demonstrate operations for aircraft loading of rolling stock as specified (see 3.3.9.15 and 3.3.9.15.1) by

a. connecting to the rolling stock

b. loading it onto the level kneeled, aft ramp of the C-5 aircraft

c. unloading it from the level kneeled, aft ramp of the C-5 aircraft

d. returning it to the original location and disconnecting from the rolling stock.

This shall be considered one cycle. Demonstrating operations includes 2 cycles for C-5 where the second cycle demonstrates positioning a second rolling stock into the aircraft with the initial rolling stock in place. Demonstration to be on hard paved surfaces with level terrain. Remove aircraft loading fork attachment after final operations and inspect attachment. Any deformation, cracks, or other structural failure, or any loosening or separation of components of the attachment shall be cause for rejection. Record instrument readings and convert to the corresponding stresses. Attachment and forklift design should be capable of 2 times factor of safety based on critical data measured.

4.6.25 Boom attachments. Demonstrate that each of the developed attachments approved for use by the manufacturer can meet the specifications for that attachment. Any failure of the attachment to meet the requirements of that attachment (see 3.3.9.18 thru 3.3.9.18.5) shall be cause for rejection of the attachment itself. Any failure by the standard fork attachment shall be cause for rejection of the entire vehicle.

5. PACKAGING.

For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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6. NOTES

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

6.1 Intended Use. The forklift will be used primarily to load and unload palletized cargo to and from ISO containers. It will also be used to handle loads of various sizes and weights. The forklift will operate on hard paved surfaces, soft soil, mud, snow, and sand, on level and hilly terrain.

6.2 Ordering data. Acquisition documents should specify the following:

a. Title, number, and date of this CID.

b. Packaging (see 5.0).

c. First article (see 3.1 and 4.2).

d. Finish (see 3.3.1.3)

e. Backup alarm (see 3.3.4.5)

f. Aircraft loading operations (see 3.3.9.15.1.d)

g. Engine installation/removal attachment (see 3.3.9.18.1 and 3.3.9.18)

h. Pintle hook attachment (see 3.3.9.18.2 and 3.3.9.18)

i. Type A winterization (see 3.4.3.2, 3.4.1, 3.4.2, and 4.5.4.2).

j. Lighting (see 3.10.2)

k. Alternator (see 3.10.4)

l. Electrical accessories wiring (see 3.10.7)

m. Radio preparation package (see 3.10.8)

n. Test conditions (see 4.6.1)

6.3 Definitions.

6.3.1 Common hand tool. A non-powered tool that is likely to be found in a typical mechanic's toolbox. Common hand tools include open end, boxed end, combination, socket (both 6- and 12-point in both standard and deep-well), and hex key wrenches, in SAE sizes up to and including 1-inch and metric sizes up to and including 25-mm; ratchet handles, extensions, and

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swivels; slotted and Phillips-head screwdrivers; regular and snap-ring pliers; and a ball-peen hammer.

6.3.2 Critical Stress Point. A point, or area, where the stress is greater than 50% of the yield strength of the material, when the forklift has the rated load (see 2.2.9 and 4.6.18) on the forks.

6.3.3 ISO shipping container. An intermodal shipping container manufactured according to specifications that is utilized in the transportation of freight which is suitable for multiple transport methods such as air, rail, truck or ship.

6.3.4 Load carry position. The carry position is defined as boom fully retracted, forks at maximum rear tilt, and heel of forks 24 inches above ground.

6.3.5 Rough terrain. Terrain covered in snow, or soft soil, or conditions of mud and sand in irregular, hilly terrain.

6.3.6 Special tool. A tool that is not commercially and readily available from a source other than the forklift contractor.

6.4 Key words.

Diesel engine driven
Material handling
ISO shipping container

6.5 International standardization agreement implementation. This specification implements STANAG 2828, Military Pallets, Packages, and Containers. When amendment, revision, or cancellation of this specification is proposed, the preparing activity must coordinate the action with the U.S. National Point of Contact for the international standardization agreement, as identified in the ASSIST database at https://assist.dla.mil.

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

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