

MIL-T-17491H (SA)
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MILITARY SPECIFICATION
TRUCKS, HAND, LIFT, PALLET, MANUAL - HYDRAULIC
F O R
SHIPBOARD USE
(6, 000 Pound Capacity)

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

1. SCOPE

1.1 Scope. This specification covers heavy duty, manually operated industrial-type hand lift pallet trucks for shipboard use.

1.2 Classification. Hand lift pallet trucks shall be of the following size and classes as specified:

Size A	6000-pound (2720 kg) pallet load capacity
Class 1	42-inch (1067 mm) fork length
Class 2	48-inch (1220 nun) fork length

Beneficial comments (recommendations, additions, deletions) and any pertinent date which may be of use in improving this document should be addressed to: Commanding Officer, ATTN: Code 0302, P.O Box 2020, Mechanicsburg, PA 17055-0788 by using the self-addressed standardization document improvement proposal (DD Form 1426) appearing at the end of this document or by letters

AMSC N/A

FSC 3920

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2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein:

SPECIFICATION

Federal

QQ-C-320 Chromium Plating (Electrodeposited).
QQ-P-416 Plating, Cadmium (Electrodeposited).
TT-E-490 Enamel, Silicone Alkyd Copolymer Semigloss
Exterior.
PPP-B-621 Boxes, wind, Nailed and Lock-Corner.

Military

MIL-P-79 Plastic, Rods and Tubes, Thermosetting, Laminated
Preservation, Methods of.
MIL-P-116 Preservation, Methods of.
MIL-P-514 Plates, Identification, Instruction and Marking,
Blank 1
MIL-T-704 Treatment and Painting of Material.
MIL-P-15011 Pallets, Material Handling, Wood, Post
Construction, 4-way Entry.
MIL-M-21861 Manual, Technical, Materials Handling Equipment,
Preparation, Content and Approval.
MIL-D-23003 Deck Covering Compound, Nonslip, Lightweight.

STANDARDS

Federal

FED. STD. NO. 595 - Colors.
FED. STD. NO. 365 - Commercial Packaging of Supplies and Equipment.

Military

MIL-STD-105 - Sampling Procedures and Tables for Inspection by
Attributes.
MIL-STD-129 - Marking for Shipment and Storage.

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

MIL-STD-810 - Environmental Test Methods.

Copies of specifications and standards required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.

2.2 Other publications. The following documents form a part of this specification to the extent specified "herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

NATIONAL BUREAU OF STANDARDS

Handbook H28 - Screw-Thread Standards for Federal Services.

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

AMERICAN WELDING SOCIETY

Standard Qualification Procedure, B3.0
Welding Handbook.

(Application for copies should be addressed to the American Welding Society, 345 East 47th Street, New York, N.Y. 10017.)

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

Boiler and Pressure Vessel Code, Section IX, Welding Qualifications.

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

SOCIETY OF AUTOMOTIVE ENGINEERS

SAE Handbook

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

3. REQUIREMENTS

3.1 Description. The hand lift pallet trucks (hereinafter called "trucks") shall be heavy-duty, manually powered and steered industrial-type. The rated load-carrying capacities of the trucks shall be 6,000 pounds (2720 kg). Components shall consist of a hand propelled and hand operated hydraulic lift, multiple stroke; dual impregnated synthetic manganese, bronze, brass, steel, malleable or cast iron or aluminum front wheels, with cured-on polyurethane tires and impregnated synthetic manganese, bronze, brass, steel, malleable or cast iron or aluminum, rear wheels with cured-on polyurethane tires. Fork lengths range shall be 42 or 48 inches (1067 or 1220 mm) as applicable. The total truck weight shall not exceed 500 pounds (226 kg).

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3.2 Standard Product. The trucks shall be the standard product of the supplier except where modifications are necessary to meet the requirements specified herein. The trucks shall be new and unused except for those units required to perform the tests specified in paragraph 4.3.2.

3.3 First article (reproduction model). The supplier shall furnish a truck for examination and test within the time frame specified, to Prove prior to starting production that -his production methoda and choice of design detail will produce trucks that comply wit-n the requirements of this specification. Examination and tests shall be as specified in section 4 and shall be subject to surveillance and approval by the Government (see 6.3).

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

3.5 Construction.

3.5.1 Chassis and frame. The frame and related structures shall be fabricated from structural steel, heavy gage sheet steel, steel plate, steel castings or forgings. The frame and related structure shall provide a rigid unit structure, and shall afford complete protection for working parts. Overall length of trucks with handle in vertical position shall not exceed a distance equal to the fork length plus 22 inches (559 mm) plus or minus 2 inches (51 mm).

3.5.2 Forks. Forks shall be fabricated of formed steel channel cross sections. Minimum underclearance, with fork lowered, shall be 1 inch (25 mm) except at load wheel mounting. Spacing between forks shall be 8-3/4 inches (222 mm) minimum. Distance between outside edges of the forks shall be 27 inches (686 mm) maximum. At all elevations, forks shall be horizontal within a tolerance of plus 1/16 inch (1.6 mm) and minus 1/8 inch (3 nun) at the ends. Forks shall 'be end tapered on the underside and sides to facilitate entry and withdrawl from standard military pallets conforming to MIL-P-15011. The lower fork height shall not exceed 3-1/4 inches (82 mm). The overall dimensions for forks shall be as specified in table I.

Table I. Dimensions

Truck Class	Fork Length		Spacing between Forks (Min.) (Inches) (mm)	Distance between outer edges of forks (Max.) (Inches) (mm)
	Min (Inches) (mm)	Max. (Inches) (mm)		
1	41-1/2 (1054)	42 (1067)	8-3/4 (222)	27 (686)
2	47-1/2 (1206)	48 (1220)	8-3/4 (222)	27 (686)

3.5.3 Raising and lowering mechanism. Tension or compression members connecting the front and rear linkages shall be made from alloy steel. These shall be provided with means for adjustment to obtain correct fork height when in raised and lowered positions. With the truck fully inserted into a military pallet conforming to MIL-P-15011 perpendicular to the bottom boards of the pallet, the raising and lowering mechanism shall permit the rear wheels to be

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lowered and raised in the bottom boards opening with a minimum clearance of 1/4 inch (6 mm). The mechanism shall be recessed or otherwise protected to prevent damage from impact and abrasion during normal operation. Linkages and wheel supports shall move freely without dragging on pallet boards during raising and lowering operations. The mechanism shall be capable of returning unloaded rear wheels into the recessed position.

3.5.4 Wheels and rollers. When specified, the wheel and roller material shall be of the conductive nonsparking type of impregnated synthetic manganese, bronze or brass for use in hazardous locations.

3.5.4.1 Front wheels. Unless otherwise specified (see 6.2), each truck shall be equipped with dual front wheels, flat faced type. Wheels shall have cured-on polyurethane tires and ball or roller bearings. Wheel castings shall be of impregnated synthetic manganese, bronze, brass, steel, malleable or cast iron or aluminum and shall be equipped with permanent, lifetime grease-sealed bearings or accessible pressure lubrication fittings. Bearings shall have seals or shields to retain grease, and exclude dust and moisture. Tapered roller bearings, when used, shall provide means for adjustment to compensate for wear. Each wheel of dual front wheels shall be 8 inches (203 mm) in diameter minimum by 2 1/2 inches (64 mm) wide minimum.

3.5.4.2 Rear wheels. Unless otherwise specified (see 6.2), rear wheels shall be of impregnated synthetic manganese, bronze, brass, steel, malleable or cast iron or aluminum with cured-on polyurethane tires. Rear wheels shall be concentric within 1 020 total indicated reading. Wheels shall be equipped with ball or roller bearings. Wheels shall be provided with permanent lifetime grease-sealed bearings or accessible pressure lubrication fittings. Bearings shall have seals or shields to retain grease and exclude dust and moisture. Rear wheels may be tandem mounted. Each wheel shall be 3 inches (76 mm) in diameter minimum by 3-3/4 inches (95 mm) in width minimum.

3.5.4.3 Entry and withdrawal devices. Pallet entry and withdrawal devices shall be provided and shall be in accordance with the supplier's standard practice except as specified herein. The entry and withdrawal devices shall have a minimum underclearance of 1/8 inch (3 mm).

3.5.5 Steering. The trucks shall be steered through the dual front wheels by a steering handle. The steering handle shall be fabricated from steel and shall turn the steering assembly a minimum of 90 degrees to the left and 90 degrees to the right of dead center position. The steering assembly shall be mounted on angular contact ball or tapered roller bearings or bushings. The steering assembly shall have permanent lifetime grease-sealed bearings, or provision for lubrication by accessible pressure fittings. Bearings shall have seals or shields to retain grease and exclude dust and moisture. Tapered roller bearings shall provide means of adjustment to compensate for wear. The steering handle shall be removable from the steering mechanism, using common tools. The steering handle shall not exceed a height of 50 inches (1270 mm) when measured vertically from floor level.

3.5.6 Hydraulic system. The hydraulic system of the trucks, including the pump, ram, and reservoir shall be the sealed type unit(s). All sealed type unit(s) shall be demountable and shall automatically hold a rated load in any position upon release of the pump actuator without exceeding a downward drift

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rate of 1/8 inch (3 mm) per hour when tested as specified in 4.5.2.3. Provision shall be made to control lowering speed to prevent jarring. Component mechanisms used in raising and lowering shall be protected from damage. The hydraulic reservoir shall be provided with an accessible filler plug for filling and checking the fluid level, and shall have sufficient capacity to fill the hydraulic system plus 30 percent reserve fluid.

3.5.6.1 Piston rods. Piston rods, including the ram, for the hydraulic system shall be plated with an electrodeposited "hard chrome finish of uniform thickness not less than 0.0005 inch (.0127 mm) in accordance with 3.9.2, or be of stainless Steel. Surfaces shall be thoroughly cleaned prior to any plating. Piston rods shall display no evidence of corrosion when the truck is tested in accordance with 4.5.2.10 and 4.5.2.12.

3.5.6.2 Lifting and lowering mechanism. The lifting mechanism shall be controlled and operated by either the handle of the truck, a lever separate and independent of the handle, or by a foot pedal. Lowering shall be accomplished by means of a pressure-release device that is independent of the lifting mechanism. The mechanism shall be located in a position so that the operator is not endangered when lowering the load, with steer "handle positioned 60 degrees up from horizontal and through a steering arc of 45 degrees on either side of longitudinal axes through the centerline of the truck. All hand-release devices shall withstand a force of 100 pounds (45 kg) and all foot pedal devices shall withstand 250 pounds (113 kg) without damage or malfunction.

3.5.7 Deadman Brake. Truck shall have an adjustable braking system for the steer wheels designed on the deadman principle so that the brake must be manually held off by the truck operator to move the truck with loaded or empty forks. The brake shall be spring applied when the brake handle is released. The deadman braking system shall provide positive braking action as required by 3.6.8.

3.5.8 Lift Points. Four lifting points (eyes) shall be provided and accommodate a hook of 1-5/8 inches (41 mm) inside diameter and 1-5/8 inches (41mm) throat. AU lift positions shall be located within the general outline of the truck.

3.6 Performance.

Lifting operation. The lift mechanism shall be capable of raising and lowering a pallet conforming to MIL-P-15011, carrying the-rated capacity-of the truck. The number of strokes, and the force required to lift the rated load to a position where the top surfaces of the forks are 4 (102 mm) inches minimum above their fully lowered position shall not exceed the values in table II when the truck is tested in accordance with 4.5.2.2.

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Table II. Lifting requirements

Lifting Mechanism	Size A Truck	
	Maximum Number of Strokes	Maximum Force in Pounds (kg)
Handle	17	65 (30)
Lever	38	35 (16)
Foot Pedal	32	120 (54)

3.6.2 Maximum load. The truck frame, forks, and related structures shall be capable of withstanding 200 percent of rated load, with forks elevated to maximum lift height, with no evidence of permanent deformation exceeding 1/16 inch (1.6 mm) or failure when tested as specified in 4.5.2.3.

3.6.3 Shock load. The truck when loaded with 150 percent of rated load and traveling at a speed of 2 miles per hour (mph) (3.2 km/hr) shall show no permanent deformation, failure, or settling in excess of 1/16 inch (1.6mm) when tested as specified in 4.5.2.4.

3.6.4 Pallet entry and withdrawal. The truck shall be capable of complete entry into and withdrawal from an empty double faced, 4-way standard military pallet conforming to MIL-P-15011, without moving the pallet more than 6 inches (152 mm) in either direction or dragging the ends of the forks along the bottom face of the top boards, when tested as specified in 4.5.2.5.

3.6.5 Steering. The truck with rated load and the handle in the towing position shall not require a force in excess of 15 pounds (6.8 kg) for size A trucks to turn the steering assembly when tested as specified in 4.5.2.6.

3.6.5.1 Steer handle. The handle shall withstand a minimum force of 300 pounds (136 kg) applied horizontally to the handle with handle being pulled toward the forks from the handle normal upright position as specified in 3.5.5. No part of the steering assembly shall show any evidence of failure when tested as specified in 4.5.2.6.1.

3.6.6 Hydraulic system. The hydraulic system shall show no evidence of leakage, malfunction, or permanent deformation when tested in accordance with 4.5.2.3, 4.5.2.4 and 4.5.2.7.

3.6.7 Rolling force. The maximum force required to pull the truck shall not be greater than 3 percent of the combined weight of the load and truck when tested as specified in 4.5.2.8.

3.6.8 Stopping distance. The truck brakes shall be capable of stopping and holding the truck on a 6-degree slope with wheels at any attitude and with truck carrying a 6000 lb (2720 kg) load on a pallet and forks raised to maximum height. Tire treads shall not be used as a braking surface. The brake shall prevent uncontrolled movement of the truck when in a stored position. Braking shall be deadman type and shall be controlled by a mechanism in the handle which shall be comfortably operated by a man with a gloved hand. The force required to actuate the mechanism that disengages the brakes shall not exceed

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25 pounds (11.3 kg). The force on the mechanism for keeping the brakes disengaged shall not exceed 5 pounds (2.2.Kg). The brakes shall operate in a wet and saline atmosphere w-hen tested as specified in 4.5.2.10 and 4.5.2.12. Brake cable and conduit assembly shall have a stainless steel cable and the conduit shall be packed at assembly with grease. Conduit shall be run inside the steering handle.

3.6.9 Weight and lifting. The truck shall comply with weight and lifting requirements of 3.1 and 3.5.8 when truck is tested in accordance with 4.5.2.11.

3.6.10. Drop. The truck shall withstand a 3-foot (914 mm) drop to a concrete surface without failure of any component when tested as specified in 4.5.2.11.

3.6.11 Resistance to saline atmosphere. The components of the truck shall withstand the corrosive effects of salt fog w-hen tested as specified in 4.5.2.10 without loss or deterioration of required performance. The above applies to all components including all piston rods, shafts, axles, chains, keys, pins, and other components or parts thereof exposed to the weather and which must be removed, opened, or released for service or repair of the truck or of its components.

3.6.12 Endurance. The truck shall meet the requirements of 3.6.1, 3.6.2, 3.6.4, 3.6.5, 3.6.6, and 3.6.7 after being tested in accordance with 4.5.2.9.

3.7 Bearing. Bearing load capacity, including applicable safety factors, as rated by the bearing manufacturer, shall be equal to or greater than maximum bearing loading under normal truck operation.

3.8 Lubrication. Accessible means shall be provided for applying lubricant, and where necessary, checking the level of lubricant. Oil drain plugs and connections shall provide for instant drainage using common maintenance shop tools.

3.8.1 Grease fittings. Components requiring grease lubrication shall be provided with pressure grease fittings in accordance with SAE J534.

3.9. Finish.

3.9.1 Surface preparation. All exterior surfaces shall be thoroughly clean to provide a surface free from mill scale, oil, grease, dirt, and rust in accordance with the supplier's standard practice.

3.9.1.1 Painting. The cleaned and dried surfaces prepared in accordance with 3.9.1, shall be painted with not less than one coat of metallic base primer and two coats of synthetic enamel. The primer and finish coats shall be applied in accordance with the supplier's standard practice. Unless otherwise specified (see 6.2), the finish coat shall be yellow corresponding to color number 13538 of Fed. Std. NO. 595. The finish coat When dry shall have a smooth, even surface, free from runs, sags, or foreign material. Surfaces of components and assemblies not normally painted with a finish coat shall be cleaned and prepared in accordance with the supplier's standard practice.

3.9.2 Plating. Components of trucks required to be plated shall be treated, and chromium plated in accordance with QQ-C-320, type I, class 2, or zinc

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plated.

3.10 Identification marking. Trucks shall be identified in accordance with MIL-STD-130. The marking shall be applied to the trucks on plates conforming to MIL-P-514, type I, style 1, composition C or type I, grade A, class 1 material. The plate shall be installed in a visible and protected location on the truck with the following information indented or embossed or otherwise permanently marked on the plate:

TRUCK, HAND, LIFT: PALLET, MANUAL-HYDRAULIC

CAPACITY _____ POUNDS (KILOGRAMS)

H OF MANUFACTURER _____

SERIAL NUMBER _____

MODEL NUMBER _____

DELIVERY DATE _____ (month and year)

CONTRACT OR ORDER NUMBER _____

U.S.N REGISTRATION NUMBER

3.11 Maintenance. Provisions shall be made for adjustment, service, and replacement of wheels, axles, wearing parts of lift mechanism, steering assembly, hydraulic pumps and brake system components. There shall be no interference to the servicing and draining of oils and lubricants to or from any assembly or components by frame members or other obstruction.

3.12 Interchangeability. All parts of any one truck shall be so fabricated as to be interchangeable with the like parts of any of any other truck furnished under any one contract.

3.13 Workmanship. The trucks shall withstand any operation specified herein without permanent deformation, breakage of connections, malfunction, or component interference caused by incorrect workmanship. All parts of the trucks before and after painting shall be clean and free from sand, rust, dirt, fins, pits, sprues, scale, flux, and other 'harmful extraneous materials. Edges and surfaces exposed to operating and maintenance personnel shall be smooth and rounded to the extent that a hazardous surface does riot exist.

3.13.1 Castings. Castings shall be of uniform quality and rendition, free from blowholes, porosity, hard spots, shrinkage defects, or cracks. Castings shall be commercially machinable and shall not be repaired, plugged or welded.

3.13.2 Bolts and nuts. Boltholes shall be accurately formed. Washers or lockwashers or a combination of the two shall be provided on all bolts., studs, and capscrews having straight threads. Self-locking nuts are acceptable in lieu of standard nuts and lockwashers. All fasteners shall be correctly torqued and nuts shall have full thread engagements Bolts shall not extend through nuts more than four full threads.

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3.13.2.1 Screw threads. Screw threads shall be in accordance with Handbook H28.

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

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

3.14 Welds. Welded joints shall be sound, smooth, free from pits, holes, fissures, rough projecting edges, and slag and shall be thoroughly fused to the base metal. The surfaces of parts to be welded shall be free from rust, scale, paint, grease, and other foreign matter. Welds shall transmit stress without permanent deformation or failure when the parts connected by the welds are subjected to proof and service loading.

3.15 Vehicle marking. The assigned registration number for each truck shall be painted in black enamel, in block numbers 3 inches (76 mm) high by 1/2 inch (12 mm) line width in a prominent place a truck" body.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified "herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Component and material inspection. . The supplier is responsible for insuring that components and materials used are manufactured, examined, and treated in accordance with referenced specifications and standards

4.2 Classification of inspection. Inspection shall be classified as follows:

- (a) Preproduction inspection {see 4.3}.
- (b) Quality conformance inspection (see 484).

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(c) Inspection of preparation for delivery (see 4.6).

4.3 Preproduction inspection

4.3.1 Examination. The truck shall be examined as specified in 4.5.1. Presence of one or more defects shall be cause for rejection.

4.3.2 Tests. The truck shall be tested as specified in 4.5.2.1 through 4.5.2.13 reapplicable. Failure of any test shall be cause for rejection.

4.4 Quality conformance inspection.

4.4.1 Sampling. When specified (see 6.2). sampling for examination and tests shall be in accordance with MIL-STD-105. A lot shall consist of all trucks offered for acceptance at one time. The sample unit for this inspection shall be one fully assembled truck .

4.4.1.1 Preproduction truck. Unless otherwise specified, a preproduction truck shall be examined in accordance with 4.5.1 and shall be tested in accordance with 4.5.2.1, 4.5.2.2, 4.5.2.5, and 4.5.2.6. In addition, the brakes and hydraulic pressure release, if provided, shall be activated and observed for normal function on a level surface. Failure to meet specified requirements or to function properly shall be cause for rejection.

4.4.2 Examination. Samples selected in accordance with 4.4.1 shall be examined as specified in 4.5.1. Inspection shall be level II with an AQL of 1.5 for major defects and 4.0 for total defects, expressed in terms of defects per hundred units.

4.4.3 Tests. Samples selected in accordance with 4.4.1 shall be tested as specified in 4.5.2.1 through 4.5.2.4 and 4.5.2.6 through 4.5.2.8. inspection level shall be S-1 with an AQL of 4.0 defects expressed in terms of defects per hundred units.

4.5 Inspection procedure

4.5.1 Examination. The trucks shall be examined as specified herein for the following defects:

Major

101. Dimensions not as specified.
102. Any characteristic not in accordance with specified requirements.
103. Part missing or not specified type or size.
104. Assembly or components fractured, split, bowed or malformed.
105. Part misplaced, loose, or not in correct alignment.
106. Sharp burr, sliver, or splinter.

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107. Castings not as specified.
108. Welds not as specified, missing, incomplete, cracked, not correctly fused.
109. Lubrication and fittings not as specified.
110. Truck perceptibly out of square or alinement.
111. Plating not as specified, missing, or evidence of rust or corrosion.
112. Treatment and painting not as specified.

Minor

201. Identification marking missing, incomplete, not legible.
202. equipment manual missing, incomplete, not legible.
203. Threaded fasteners missing, broken, stripped, or loose.
204. Finish not dry, free of runs, sags area of no film wrong color.
205. Identification plate not as specified.

4.5.2 Tests.

4.5.2.1 Test condition. Prior to test, the truck shall be lubricated with oils and greases as recommended by the supplier. Test shall be conducted in the order listed.

4.5.2.2 Rated load. Using a military pallet conforming to MIL-P-15011, with a rated pallet load, insert forks into and raise the loaded pallet until the top surfaces of the forks are elevated 4 inches (102 mm) above their fully lowered position. Record the number of strokes and force required to lift the rated load while raising the forks from the fully lowered position to an elevation 4 inches (102 mm) above their lowered position. Nonconformance to 3.6.1 shall constitute failure of this test.

4.5.2.3 Maximum load. Prior to conducting this test, and the test specified in 4.5.2.4, the pressure-relief valve, if provided, shall be made inoperative and the truck shall be equipped with steel wheels. With the truck placed on a surface plate and with forks at maximum height, the following heights shall be measured, the points of measurement marked on the truck, and recorded:

- (a) Front end of frame.
- (b) Front pivot point of raising and lowering mechanism.
- (c) Top of forks at heel on both sides.

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- (d) Top of forks midway between front and rear pivot points of raising and lowering mechanism on both sides.
- (e) Rear pivot point of raising and lowering mechanism on both sides.
- (e) Rear pivot point of raising and lowering mechanism on both sides.

Then place the truck on a smooth, dry, level concrete surface and elevate the forks to the maximum lift height. Place on the elevated forks a load of 12,000 pounds (5440 kg.). Hold the truck in this position for not less than 1 hour. At the end of 1 hour, measure downward drift, then remove the load and place the truck on the surface plate. Repeat measurements (a) through (e). Examine the truck for damage and permanent deformation. Downward drift exceeding 1/8 inch (3 mm) any variation in height dimensions in excess of 1/16 inch (1.6 mm) or evidence of damage or permanent deformation shall constitute failure of this test.

4.5.2.4 Shock load. Place on the truck a uniformly distributed load of 6,000 pounds (2720 kg) and tighten joints to compensate for settling. Roll the loaded truck off the 1-inch (25 mm) high platform at a speed of 2 mph (3.2 km/hr) 10 times. Measure and record the heights specified above. Examine the truck for damage and permanent deformation. Examine wheel bearings for distortion and binding. Any variation in measurements between the two series of measurement in excess of 1/16 inch (1.6 mm) evidence of damage or permanent deformation, or evidence of distortion or binding of the wheel bearings shall constitute failure of this test.

4.5.2.5 Pallet entry and withdrawal. An empty double faced, 4-way standard military pallet conforming to MIL-P-15011 shall be placed with its front edge on a reference line, on a smooth, dry, concrete floor. Push the truck up to the pallet until its entry device contacts the chamfered surface on the bottom pallet boards. Continue pushing the truck into the pallet until it is fully engaged. Measure the distance from the reference line to the same reference points on the pallet edge. Repeat this procedure 10 times. Then place the pallet edge on a reference line, and chock the pallet in the rear to prevent backward movement. Push the truck into the pallet until it is fully engaged; raise the forks to maximum lift height and then lower the forks completely. Withdraw the truck from the pallet. Measure distance from the reference line to the same reference point on the pallet edge. Repeat this procedure 10 times. Nonconformance to 3.6.4 shall constitute failure of this test.

4.5.2.6 Steering. Place the truck carrying a rated load, on a smooth, dry, level concrete surface. Place the handle in the central pulling position and attach a tension dynamometer to the handle. Apply a force to the tension dynamometer tangent to the arc through which the handle moves. Measure the force required to turn the handle. Nonconformance to 3.6.5 shall constitute failure of this test.

4.5.2.6.1 Steer handle. Place the truck on a level surface with the handle in the released upright position. Block and secure the truck to the floor. Apply a horizontal force of 300 pounds (136 kg) minimum to the top of the handle and pull towards the load end of truck and examine. Nonconformance to 3.6.5.1 shall constitute failure of this test.

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4.5.2.7 Leakage. After successful completion of the above tests, turn the truck on its side on a clean paper surface. Allow the truck to remain in this position for 30 minutes. Examine the actuator reservoir, the hydraulic lines and the paper surface for oil and grease spots. Evidence of any leakage shall constitute failure of this test.

4.5.2.8 Rolling force. Weigh the truck carrying a rated load. Place the truck on a dry, smooth, level concrete surface of sufficient length to conduct the test. Couple the truck to an industrial-type tractor through a tension dynamometer. Accelerate the tractor-truck combination to a minimum speed of 2 mph (3.2 km/hr). Determine the maximum reading of the dynamometer while the truck is being towed at 2 mph (3.2 km/hr). Deactivation of deadman brake is permissible in order to perform this test. Nonconformance to 3.6.7 shall constitute failure of this test.

4.5.2.9 Endurance. The truck shall be pulled or towed at a speed of 1.5 (2.4) to 2 miles per hour (3.2 km/hr) in a 50-foot (15.2 m) diameter circle for a period of 6 hours with the rated load on the forks. The minimum number of times around the circle shall be 50 in 1 hour. The circle shall have two 3/4 inch (19 mm) high by 2 (50 mm) inch wide iron, wood, concrete or steel blocks as obstacles, 180 degrees apart and over which the truck shall be pulled each time around the circle without reduction in speed. At the end of each hour the forks shall be completely raised and lowered 10 times, with the load on the forks. The complete cycle shall be repeated five times with the direction of travel around the circle reversed each hour. There shall be no repair or adjustments allowed during the complete endurance test. The use of steel wheel(s) or replacement of polyurethane tires as required during endurance testing is acceptable. Deactivation of deadman brake is permissible in order to perform this test. Inability of the truck to be fully operational after completion of the test shall constitute failure of this test.

4.5.2.10 Salt fog. The truck shall be tested in accordance with MIL-STD-810, Test Method 509. At the option of the supplier, all the individual components may be tested separately instead of the assembled truck. If the assembled truck is tested, following the start of exposure to salt fog no function or component of the truck shall be operated prior to completion of the exposure and drying periods. The following details required by MIL-STD-810 are designated.

(a) Preparation of the assembled truck prior to exposure to salt fog shall be in accordance with the preparation of test item procedure specified in MIL-STD-810, Test Method 509. All exterior surfaces of the truck, including piston rods which shall be at maximum extension, shall be cleaned and shall be exposed to salt fog throughout the test. Components such as bearings which are normally lubricated shall be lubricated prior to the test. If the truck is tested as unassembled components, those surfaces and assemblies which are normally lubricated may be lubricated prior to test. All other surfaces including piston rods which shall be at maximum extension shall be cleaned and exposed to salt fog as described above. Pretest and post-test data required of the assembled truck, whether assembled 'before or after salt fog exposure, shall be in accordance with 4.5.2.2, 4.5.2.3, 4.5.2.5, 4.5.2.6, 4.5.2.7, 4.5.2.8, 4.5.2.12. Evidence of harmful corrosion or failure to meet performance requirements shall be cause for rejection.

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(b) Salt solution shall be 5 percent.

(c) Assembled truck shall be on its side, supported by 2-inch (50 mm) by 4-inch (100 mm) wood blocks. If truck is tested as unassembled components, larger components shall be in position they would occupy if in assembled truck lying on its side, supported by 2 x 4 (50 X 100 mm) wood blocks or suspended by corrosion-resistant cord; light components shall be suspended by light corrosion-resistant cord, by hooks, or a slotted rack.

(d) Salt fog exposure period shall be 72 hours.

(e) The drying period shall be 168 hours at room temperature while loosely covered with transparent plastic to retard drying and permit visual observation

(f) Visual inspection. No operation after 24 hours.

Visual inspection No operation after 72 hours.

No washing or operation prior to completion of exposure and drying.

4.5.2.10.1 Failure criteria. Nonconformance to 3.6.10 shall constitute failure of this test.

4.5.2.11 Drop. The truck shall be lifted by its lifting points and shall be dropped three times from a height of 3 feet (914 mm) to a level concrete surface. Examine the truck. Then operate the unloaded truck by raising and lowering the forks and move the truck not less than 6 feet (1830 mm) and operate the controls. Evidence of failure of any component, or operational failure shall constitute failure of this test. Prior to first drop, inspect for compliance with 3.1, maximum weight, and with 3.5.8, including hook size.

4.5.2.12 Brake. The truck; with forks at maximum elevation, shall be subjected to a simulated rainfall of not less than 4 inches (102 mm) per hour. The simulated rainfall shall impinge on the truck at an angle of 45 degrees plus or minus 5 degrees with a force equivalent to a 30 mph (48 km/hr) wind. The simulated rainfall shall dispense uniformly over the surface of the truck. The top and left side of the truck shall be exposed to the rainfall for a period of 30 minutes, followed by exposing the top and right side of the truck to the rainfall for a period of 30 minutes. Immediately after exposure to the simulated rainfall the brakes shall be tested as specified herein. The truck, carrying 6000 pounds (2720 kg) on a pallet, shall be positioned on a 6-degree slope with forks downslope. The test shall be conducted on a steel ramp coated with a covering compound conforming to MIL-D-23003, type II, to provide a nonslip surface. In addition, the surface shall be thoroughly wetted. On this slope the brakes shall be set and released a minimum of five times. The truck carrying 6000 pounds (2720 kg) on a pallet, with forks upslope and raised to maximum height, and with brakes applied shall be positioned on the wet ramp while level. The ramp shall be raised to a 15-degree slope or until the truck with steer wheels locked begins to slide, whichever occurs first. The entire test shall be repeated with forks downslope. Non-compliance with 3.6.8 shall be cause for rejection of the truck.

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4.6 Inspection of packaging and preparation for delivery.

4.6.1 Quality conformance inspection of pack.

4.6.1.1 unit of product. For the purpose of inspection, a completed pack prepared for shipment shall be considered a unit of product.

4.6.1.2 Sampling. Sampling for examination shall be in accordance with MIL-STD-105.

4.6.1.3 Examination. Samples selected in accordance with 4.6.1.2 shall be examined for the following defects. AQL shall be 2.5 percent defective, inspection level II.

113. Materials, methods, or containers not as specified for level A or B. Each incorrect material, method or container shall constitute one defect.
114. Disassembly not as specified for level A.
115. Removed components not secured as specified for level A.
116. Lubrication not applied as specified for level A or C.
117. Unpainted surfaces not coated with preservation as specified for level A.
118. Hydraulic system not filled as specified for level A or C.
119. Manual not preserved and secured as specified for level A or C.
120. Blocking, bracing, and anchoring not adequate to prevent movement and damage as specified for level A or B.
121. Strapping not zinc coated for level A.
122. Marking missing, illegible, incorrect, or incomplete.

5. PREPARATION DELIVERY

5.1 Preservation and packaging. Preservation and packaging shall be level A or C as specified.

5.1.1 Level A.

5.1.1.1 Lubrication. All grease fittings and the parts lubricated by the fittings shall be charged to capacity with the lubricant recommended by the equipment manual or as recommended by the supplier.

5.1.1.2 Unprotected surfaces. Unpainted exterior metal surfaces of components requiring the application of a contact preservative shall be coated with-type P-1 preservative. The preservative shall conform to the applicable specification listed in and shall be applied in accordance with MIL-P-116.

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5.1.1.3 Hydraulic system. The hydraulic fluid supply tank shall be filled with the fluid recommended for operation. The piston shall be fully retracted into the cylinders. Any exposed portions of the piston rod shall be coated with preservative specified in 5.1.1.3.

5.1.1.4 Equipment manual. The equipment manual shall be preserved in accordance with MIL-P-116, method IC-1 or IC-3 and secured to the basic unit with tape conforming to PPP-T-97, type and size optional, in a manner to prevent damage.

5.1.2 Level C. Each grease fitting and the hydraulic system shall be charged to capacity with the grease or hydraulic fluid recommended for operation. The equipment manual shall be placed in a waterproof envelope and secured to the truck. Additional preservation and packaging shall be limited to that required to afford protection against corrosion deterioration, and damage from the supplier to the initial destination. The supplier may use his standard commercial packaging when it fulfills these requirements.

5.2 Packing. Packing shall be level A, B, or C as specified.

5.2.1 Level A. Each complete truck shall be packed in a close-fitting box conforming to PPP-B-621, class 2, style 2. The truck shall be blocked, braced, and anchored within the box in a manner to prevent movement or damage. Box closure and strapping shall be in accordance with the appendix to the box specification. Strapping shall be zinc coated and shall be placed adjacent to the skids.

5.2.2 Level B. Each complete truck shall be packed as specified in 5.2.1 for level A except the box shall be class 1 and strapping need not "be zinc coated.

5.2.3 Level C. Each complete truck shall be packed to assure carrier acceptance and safe delivery to destination at lowest ratings in compliance with Uniform Freight Classification rules or National Motor Freight Classification rules.

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

6. NOTES

6.1 intended use. Hand lift pallet trucks described herein are intended for moving single or double faced pallet loads of material over short distances aboard ship, or loading platforms, and shipboard docks, within the military supply system. Plastic rear wheels are intended for use over smooth, trowelled concrete or wooden floors.

6.2 Ordering data. Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Size, and class truck required (see 1.2).
- (c) Time frame required for submission of preproduction model (see 3.3).

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- (d) When wheels and rollers of conductive nonsparking type of impregnated synthetic manganese, bronze or brass material are required (see 3.5.4).
- (e) When front wheels and tire requirements other than specified are required (see 3.5.4.1).
- (f) Type of rear wheels required when other than as specified (see 3.5.4.2).
- (g) When plastic wheels are required for size A trucks (see 3.5.4.2).
- (h) Color of finish if other than specified (see 3.9).
- (i) Finish coat when other than as specified (see 3.9).
- (j) Plating required for components of trucks (see 3.9.2).
- (k) Level of preservation and packaging, and level of packing required (see 5.1 and 5.2).
- (1) When sampling is required (see 4.4.1).

6.3 Preproduction model. Any changes or deviation of production trucks from the approved preproduction model during production will be subject to the approval of the contracting officer. Approval of the preproduction model will not relieve the supplier of his obligation to furnish trucks conforming to this specification.

6.4 Technical manuals. The requirement for technical manuals should be considered when this specification is applied on a contract. If technical manuals are required a contract exhibit must be prepared to fully describe statement of work criteria and delivery instructions, and cite the applicable technical manual specification. The technical manuals must be acquired by separate contract Line Item Number (CLIN) in the contract."

Custodians:

Navy - SA

Review activities:

Navy - OS,SH

Preparing activity:

Navy - SA

User activities:

Navy - OS,SH

Project No. 3920-N170

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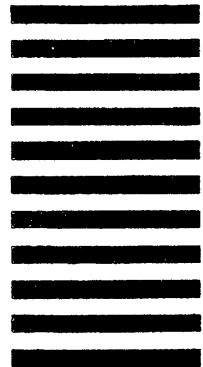
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1. DOCUMENT NUMBER MIL-T-17491A		2. DOCUMENT TITLE	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one)	
b. ADDRESS (Street, City, State, ZIP Code)		<input type="checkbox"/> VENDOR	
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b. Recommended Wording:			
c. Reason/Rationale for Recommendation:			
6. REMARKS			
7a. NAME OF SUBMITTER (Last, First, MI) - Optional		8. WORK TELEPHONE NUMBER (Incl Code) - Optional	
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