

KKK-T-00685(GSA-FSS)
August 8, 1957

INTERIM FEDERAL SPECIFICATION

KKK-T-00685(GSA-FSS)

TRUCKS; HAND, TWO-WHEELED (BARREL, WAREHOUSE, AND HIGH-PRESSURE, GAS CYLINDER, COMMERCIAL SIZE)

This Interim Federal Specification was developed by General Services Administration, Federal Supply Service, Standardization Division, Washington 25, D. C, based upon currently available technical information. It is recommended that Federal agencies use it in procurement and forward recommendations for changes to the preparing activity at the address shown above.

1. SCOPE AND CLASSIFICATION

1.1 Scope. - This specification covers two-wheeled hand trucks with the various styles of wheels required for general purpose trucking duty in plants, warehouses, offices, hospitals, and other institutions. They are used for trucking barrels; boxes and other flat freight; and high-pressure gas cylinders containing oxygen, hydrogen, or other gases; over various types of floor construction. Two wheeled hand trucks of specific sizes and used for trucking of barrels are covered by Interim Federal Specification KKK-T-00683.

1.1.1 Federal specification coverage. - Federal specifications do not include all types, classes, sizes, etc., of the commodities indicated by the titles of the specifications or which are commercially available, but are intended to cover the types, etc., which are generally used by the Federal Government.

1.2 Classification.

1.2.1 Types, classes and sizes. - The hand trucks covered by this specification shall be of the following types, classes, and sizes, and as specified in the invitation to bid, contract, or order (see 6.3).

Type I - Barrel truck (see figure 1a).

Class A. - Extra heavy duty.

Sizes 1, 2, 3, or 4 (see table I).

Class B. - Heavy duty.

Sizes 1, 2, 3, or 4 (see table I).

Class C. - Medium duty.

Sizes 1, 2, 3, or 4 (see table I).

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Type II - Warehouse truck (see figure 1b).

Class A. - Extra heavy duty.

Sizes 1, 2, 3, or 4 (see table I).

Class B. - Heavy duty.

Sizes 1, 2, 3, or 4 (see table I).

Class C. - Medium duty.

Sizes 1, 2, 3, or 4 (see table I).

Type III - High-pressure gas cylinder truck,
(see figure 2 and table II).

1.2.2 Wheel construction. - Each hand truck covered by this specification shall have two wheels with a total capacity at least equal to the minimum load capacity of the truck except that no truck will require a load capacity over 2400 pounds. Trucks shall be furnished with wheels of capacities not less than those indicated in table I. When a specific style wheel construction is required by the procuring agency, it shall be specified in the invitation to bid, contract, or order (see 6.4), otherwise it may be any of the applicable wheel constructions shown in tables I and II. The following symbols are used in tables I and II to identify the wheel styles and may be used to designate wheel construction in the invitation to bid.

*Style 1a. - Plastic wheels with hard tread (and antifriction bearings).

Style 1b. - Plastic wheels with hard tread (and plain bearings).

*Style 2a. - Metal wheels with soft tread cured-on rubber tires (and antifriction bearings).

Style 2b. - Metal wheels with soft tread cured-on rubber tires (and plain bearings).

*Style 3a. - Separable steel wheels with soft tread demountable rubber tires (and antifriction bearings).

Style 3b. - Separable steel wheels with soft tread demountable rubber tires (and plain bearings).

Style 4. - Note these wheel styles and numbers are specified in.

Style 5. - Federal Specification FF-C-86 but do not apply to this specification.

Style 6a. - All metal wheels with antifriction bearings.

Style 6b. - All metal wheels with plain bearings.

*NOTE: - Styles 1, 2, and 3 wheels used in this specification are in general agreement with the wheels specified in Federal Specification FF-C-88 except that the small letter "a" has been added in this specification to designate antifriction bearings and "b" to designate plain bearings.

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1.2.3 Parallel or tapering frames. - Unless otherwise specified, types I and II hand trucks shall be furnished with either parallel or tapering frames (see 6.4). Type III trucks shall be furnished with parallel frames.

1.2.3.1 Parallel frames. - When specified, the hand trucks shall be furnished with frames having parallel sides and the two wheels shall be mounted between the sides of the frame.

1.2.3.2 Tapering frames. - When specified, the hand trucks shall be furnished with frames tapering from the widest point at the handles to the narrowest point at the nose, and the two wheels shall be mounted outside the sides of the frame.

2. APPLICABLE SPECIFICATIONS AND STANDARDS

2.1 Specifications and standards. - There are no other Federal specifications applicable to this specification. The following standards, of the issues in effect on date of invitation for bids, form a part of this specification:

Federal Standards:

Fed. Std. No. 102 - Preservation, Packaging and Packing Levels.
Fed. Std. No. 601 - Rubber; Sampling and Testing.

(Activities outside the Federal Government may obtain copies of Federal Specifications and Standards as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.)

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, Seattle, and Washington, D.C.)

(Federal Government activities may obtain copies of Federal Specifications and Standards from established distribution points in their agencies.)

Military Standard:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.

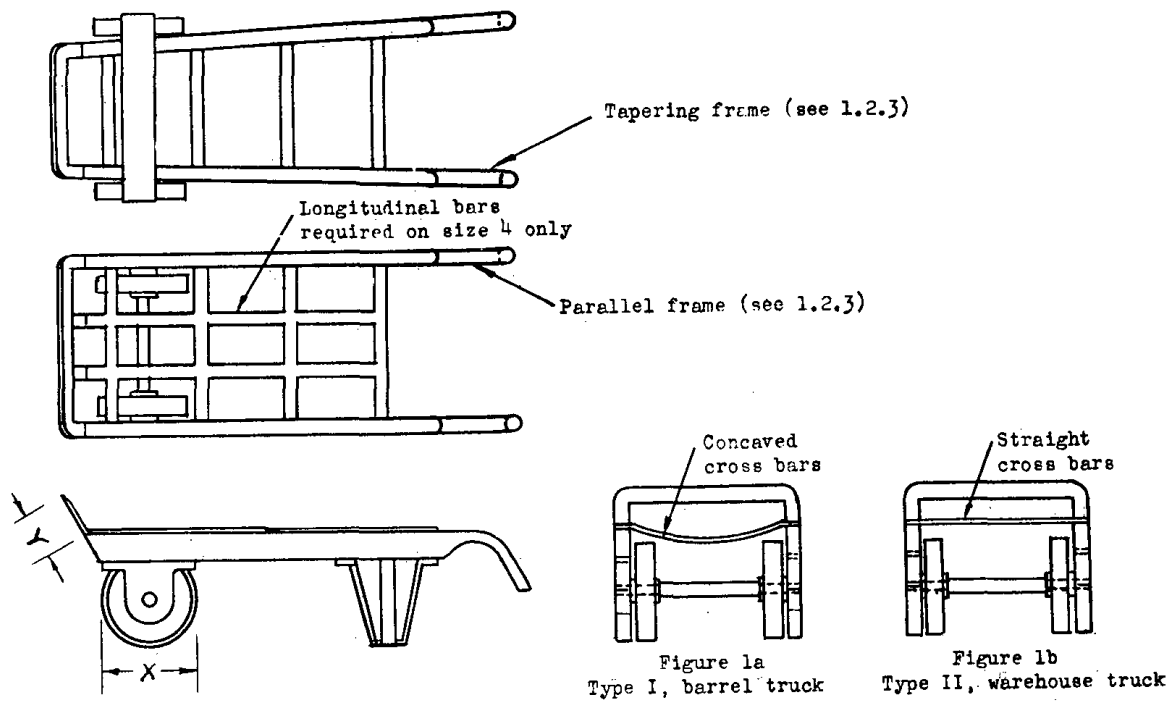
(Copies of the Military standard referenced above, required by contractors in connection with specific procurement functions should be obtained from the procuring agency or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Illustrations. - The illustrations shown herein are for the convenience of identification and are not intended to preclude the purchase of hand trucks which are otherwise in accordance with the requirements of this specification.

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TABLE I

Type I - Barrel trucks -As specified (see 1.2.1).
 Type II - Warehouse trucks

Size	Overall		Class	Rated Capacity of one Wheel Minimum	Truck Capacity Minimum	Wheel Construction Selection (see 1.2.2)	Load "L" for nose test (see 4.3.5)	See Figures 1a and 1b		Cross bars Minimum
	Length ± 2"	Width ±1-1/2"						"X" Range	"Y" ±1".0	
No.	Inches	Inches	Letter	Pounds	Pounds	Symbols	Pounds	Inches	Inches	Quantity
1	48	19-1/2	A	1200	2400	1a, 1b, 6a, 6b	2400	6 to 8	5	3
			B	380	760	2a, 2b, 3a, 3b	760			
			C	340	680	2a, 2b, 3a, 3b	680			
2	52	21-1/2	A	1200	2400	1a, 1b, 6a, 6b	2400	8	5-1/2	4
			B	560	1120	2a, 2b, 3a, 3b	1120			
			C	420	840	2a, 2b, 3a, 3b	840			
3	56	23	A	2000	*2400	1a, 1b, 6a, 6b	2400	8 to 10	6	4
			B	610	1220	2a, 2b, 3a, 3b	1220			
			C	420	840	2a, 2b, 3a, 3b	840			
4	60	24	A	2500	*2400	1a, 1b, 6a, 6b	2400	10 to 12	6-1/2	4
			B	830	1660	2a, 2b, 3a, 3b	1660			
			C	660	1320	2a, 2b, 3a, 3b	1320			

*2400 pounds - Maximum load requirements for hand trucks covered by this specification.

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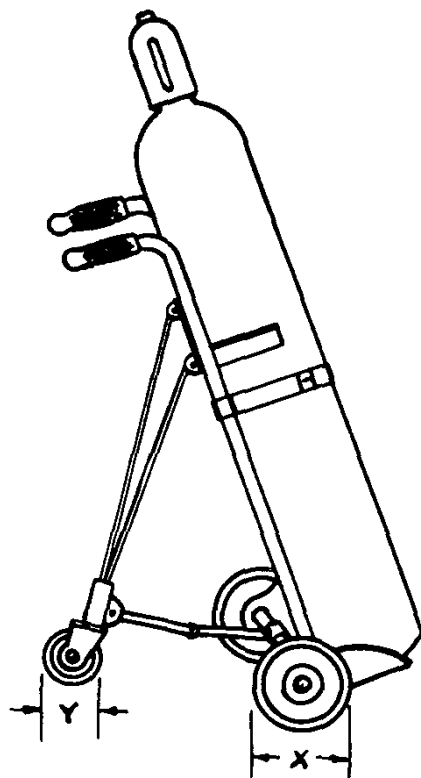


Figure 2
Type III. - High-pressure gas cylinder truck

TABLE II
Type III. - High-pressure gas cylinder truck

Size overall		Rated capacity of one wheel minimum Pounds	Truck capacity minimum Pounds	Wheel construction selection (see 1.2.2) Style 2a, 2b, 3a, 3b, 6a, 6b	(See fig. 2)	
Length ± 2	Width $\pm 1\frac{1}{2}$				X	Y
Inches	Inches				Min. Inches	Min. Inches
40	19	420	840		8	3

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3.2 Material. - Material shall be as specified herein. Material not definitely specified shall be of a good quality used for the purpose in commercial practice. Material shall be free from all defects and imperfections that might affect the serviceability of the finished product.

3.2.1 Lumber. - Lumber, when used in the fabrication of the hand truck, shall be free from decay, loose knots, larval channels, shakes, splits, warps, brashness, or slope of grain exceeding one inch in 10 inches. Lumber shall be dried to a moisture content not to exceed 20 percent. Unless otherwise specified, any of the following species of wood may be used: white ash, yellow birch, rock elm, hickory, locust, hard maple, pecan, red oak, or white oak.

3.2.2 Castings. - Castings when used shall be of uniform quality free of blowholes, porosity, hard spots, shrinkage defects, cracks, or other injurious defects. Strength and other essential physical properties of the castings shall be adequate throughout for the purpose intended.

3.2.3 Welding and brazing. - Welding and brazing, when used, shall be performed in accordance with the best commercial practice. In no event shall such processes be used on castings or forgings for reclaiming any parts of the hand trucks.

3.2.4 Fastening devices. - All screws, bolts, and similar parts shall be installed with an adequate means for preventing loss of proper tightness. All rivets shall be neatly and securely set.

3.3 Marking. - Each hand truck shall be marked in a plain and permanent manner with the manufacturer's name or with a trade-mark of such known character that the source of manufacture may be readily determined.

3.4 Surface finish. - All castings, forgings, or welded parts shall be thoroughly cleaned and free of sand, dirt, fins, sprues, scale, flux, or other harmful or extraneous materials. External surfaces shall be smoothed and all edges shall be rounded or beveled.

3.5 Finish. - All hand trucks covered by this specification shall have a durable and neat finish.

3.5.1 Finish on wood frames. - Unless otherwise specified, each wood frame hand truck covered by this specification shall have at least one primer coat and at least one finish coat of a surface finishing material that will not conceal blemishes, excessive cross grain, or other defects in the wood frame (see 6.4).

3.5.2 Finish on metal frames. - Unless otherwise specified each metal frame hand truck covered by this specification shall have at least one coat of metal primer and one coat of enamel of the types normally used by the manufacturer (see 6.4). Unless otherwise specified the color of the finish shall be the manufacturer's standard (see 6.4). Wood handles on metal frame trucks shall be finished in accordance with paragraph 3.5.1.

3.6 Construction. - The hand trucks covered by this specification shall be well-balanced and capable of standing alone while resting on the wheels and nose end. The truck shall consist essentially of the following parts: frame (see 3.6.1), handles (see 3.6.2), cross bars (see 3.6.3), longitudinal bars (see 3.6.4), nose (see 3.6.5), wheel guards (see 3.6.6), brackets (see 3.6.7), axle (see 3.6.8), wheels and bearings (see 3.6.9).

3.6.1 Frame. - Unless otherwise specified, the frame may be of either all steel construction or of wood construction with a fully covered steel top (see 6.4). The frame shall be rigid in all joints and connections.

3.6.2 Handles. - Each hand truck covered by this specification shall have two handles except type III trucks which may be furnished with only one handle. Metal handles will be acceptable only on class C and type III hand trucks: all other hand trucks shall be furnished with wood handles. The wood handles shall be integral with the wood frame construction or of the attached type on the metal frame construction. Handles shall be of the following styles and as specified by the procuring agency (see 6.3):

Straight handles (see 3.6.2.1).

Bent handles (see 3.6.2.2).

3.6.2.1 Straight handles. - Straight handles shall extend straight out from the frame or have only a slight curve. The handles shall present a firm and smooth hand grip. The cross grain in the wood handles shall not exceed the limits specified in paragraph 3.1.1.

3.6.2.2 Bent handles. - Bent handles shall have a decided bend similar in shape to the handles shown on figures 1 and 2. The handles shall be steam bent. Handles that are band-sawed, shaped or otherwise machined to a decided bend, so as to present a weakened or excessive cross-grained section, will not meet the requirements of this specification.

3.6.3 Cross bars. - The cross bars shall be a part of the frame and shall comply with the frame construction requirements. The minimum number of cross bars shall be as listed in table I for types I and II hand trucks. Type III hand trucks shall have at least two cross bars one of which may be integral with the nose construction.

3.6.3.1 Cross bars for type I hand trucks. - Cross bars for type I hand trucks shall be concaved to provide a suitable cradle for trucking barrels.

3.6.3.2 Cross bars for type II hand trucks. - Cross bars for type II hand trucks shall be straight to provide a flat surface for trucking boxes or other flat containers.

3.6.3.3 Cross bars for type III hand trucks. - Cross bars for type III hand trucks shall be concaved, vee-shaped, or straight with suitable side supports, to provide a suitable cradle for trucking standard high-pressure gas cylinders containing oxygen, hydrogen, or other gases.

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3.6.4 Longitudinal bars. - Two longitudinal bars are required on all size 4 hand trucks and are optional with the manufacturer on all other sizes of hand trucks. The longitudinal bars shall be a part of the frame and shall comply with the requirements of the frame construction.

3.6.5 Nose and nose extension. - The nose and nose extension shall be of steel and so constructed as to withstand the test described in section 4. The front of the nose extension shall present a thin edge for easy insertion under the supplies to be moved, and on types I and II hand trucks the nose piece shall be thicker adjacent to the truck so as to support the load.

3.6.6 Wheel guards. - Wheel guards shall be furnished on trucks with the wheels mounted on the outside of the frame, such as the tapering frame hand trucks described in paragraph 1.2.3.2. Hand trucks with parallel frames as described in paragraph 1.2.3.1 shall have the wheels at least partially protected by placing the cross bars near the wheels or by adding wheel guards. The wheel guards may be integral with the cross bar(s) or separate guards attached to the frame. Wheel guards are not required on type III hand trucks.

3.6.7 Brackets. - Each truck shall be furnished with two brackets for retaining the axle. The brackets shall be of cast or fabricated metal and of sufficient strength and rigidity to withstand the tests specified in section 4 without deformation, cracking, or other defects which might affect the serviceability of the hand truck.

3.6.8 Axle. - Each hand truck covered by this specification shall have an axle with smooth bearing surfaces for the wheel bearings. The axle shall be of such size as to withstand the specified capacity loads without bending or showing any other defects which might affect the serviceability of the hand truck.

3.6.9 Wheels and wheel bearings. - Each hand truck covered by this specification shall have two wheels in accordance with 1.2.2, tables I and II, and the following subparagraphs. Wheels, tires and wheel bearings shall meet the test requirements of section 4. Bearings shall be either of the anti-friction or plain type, as specified (see 6.3).

3.6.9.1 Anti-friction bearings. - When wheels with antifriction bearings are specified, and unless otherwise specified, the bearings shall be of ball or roller type (6.4). The balls or rollers shall be of steel hardened to not less than 50 on the Rockwell C scale and shall be ground. The difference between any two diameters of the same ball or cylindrical roller shall not exceed 0.005 inch. Taper rollers shall conform to the same tolerances as the cylindrical rollers except that the tolerances shall apply to measurements on the common taper.

3.6.9.2 Plain bearings. - When wheels with plain bearings are specified, and unless otherwise specified, the bearings shall be of a plain sleeve type and the wheels provided with ball-check-grease-fittings, or the bearings shall be of a self-lubricating type (see 6.4).

3.6.9.3 Style 1a wheels. - Style 1a plastic wheels with hard tread and antifriction bearings (see 3.6.9.1) shall be of phenol resin compound with macerated fabric and cord filler except that the tread may be laminated canvas in lieu of macerated fabric, at the option of the contractor. The plastic wheel shall have compressive, flexural, and impact strength equal to the best standard practice for the purpose intended. The wheel shall not be affected by organic solvents or metal inserts. Plastic compounds and fillers other than those specified herein, but which are equal thereto, may be furnished if approved by the activity concerned.

3.6.9.4 Style 1b wheels. - Style 1b plastic wheels with hard tread and plain bearings (see 3.6.9.2) shall be in accordance with style 1a wheels except that plain bearings shall be furnished in lieu of antifriction bearings.

3.6.9.5 Style 2a wheels. - Style 2a metal wheels with soft tread cured-on tires and antifriction bearings (see 3.6.9.1), unless otherwise specified, shall be of steel, high strength fine grain cast iron, or a suitable cast aluminum alloy, at the option of the contractor, with a soft rubber tread cured on the metal rim. The tread shall conform to the requirements of 3.7.

3.6.9.6 Style 2b wheels. - Style 2b metal wheels with soft tread cured-on tires and plain bearings (see 3.6.9.2), shall be in accordance with style 2a wheels except that plain bearings shall be furnished in lieu of antifriction bearings.

3.6.9.7 Style 3a wheels. - Style 3a separable steel wheels with soft tread demountable rubber tires and antifriction bearings (see 3.6.9.1) shall have two pressed steel sides, bolted together to hold the rubber tire in place. The tire shall have nonstretchable base of other means to prevent elongation which might cause the tire to become unserviceable prior to its being worn out. The tread as distinguished from the base of the tire shall conform to the requirements of 3.7.

3.6.9.8 Style 3b wheels. - Style 3b separable steel wheels with soft tread demountable rubber tires and plain bearings (see 3.6.9.2) shall be in accordance with style 3a wheels except that plain bearings shall be furnished in lieu of antifriction bearings.

3.6.9.9 Style 4 and 5 wheels are specified in Federal Specification FF-C-86 for caster wheels. These caster wheels are not of the same type construction as the wheels for the hand trucks covered by this specification. (Style numbers 4 and 5 for wheels are not used in this specification because at a future date a Federal Specification may be written to cover wheels only and the intent is to use the same sequence of numbers used in the Federal Specifications on casters plus the addition of metal wheels as specified herein).

3.6.9.10 Style 6a wheels. - Style 6a metal wheels with antifriction bearings (see 3.6.9.1) unless otherwise specified, shall be of steel, high strength fine grain cast iron, or a suitable cast aluminum alloy, at the option of the contractor (see 6.4).

3.6.9.11 Style 6b wheels. - Style 6b metal wheels with plain bearings (see 3.6.9.2) unless otherwise specified, shall be of steel, high strength fine grain cast iron, or a suitable cast aluminum alloy at the option of the contractor (see 6.4).

3.7 Soft rubber treads. - Soft rubber treads shall consist of manufactured or natural rubber or any combination thereof, provided the material meets the requirements specified below.

3.7.1 Hardness. - The hardness of the tread, as received, shall be 75 points plus or minus 5 points as measured on the face of the tread by the Shore Type A durometer. After being subjected to the accelerated aging process described in section 4, the hardness shall not increase by more than 10 points.

3.7.2 Tensile strength. - The tensile strength of the tread, as received, shall be not less than 2,000 pounds per square inch for demountable rubber tires and not less than 1,500 p.s.i. for cured-on soft rubber treads. After being subjected to the accelerated aging process described in section 4, the decrease in tensile strength shall not exceed 25 percent (see 4.3.3.1).

3.7.3 Elongation. - The elongation of the soft rubber tread, as received, shall be not less than 250 percent. After being subjected to the accelerated aging process described in section 4, the decrease in elongation shall not exceed 25 percent (see 4.3.3.2).

3.7.4 Compression set. - The permanent set under a deflection of 25 percent of the original thickness of the test specimen shall be not more than 50 percent (see 4.3.3.3).

3.7.5 Adhesion. - The force necessary to separate the soft tread from its base or wheel rim shall be not less than 50 p.s.i. of tread width at the base of the tread when tested in accordance with 4.4.4.5. Upon examination at the conclusion of the test, the material pulled off and that remaining on the core shall show no indication of blistering or porosity.

3.8 Requirements as to types.

3.8.1 Type I barrel trucks. - Type I barrel trucks shall be in accordance with table I, all requirements of this specification, and any options exercised by the procuring agency. The trucks shall be suitable for trucking barrels.

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3.8.2 Type II warehouse trucks. - Type II warehouse trucks shall be in accordance with table II, all requirements of this specification, and any options exercised by the procuring agency. The trucks shall be suitable for trucking boxes and similar supplies.

3.8.3 Type III high-pressure gas cylinder trucks. - Type III high-pressure gas cylinder trucks shall be of but one class and size in accordance with table III, all requirements of this specification, and any options exercised by the procuring agency. The trucks shall be suitable for trucking high-pressure gas cylinders. The trucks shall be furnished with a strap, chain or other suitable fastener for holding the tank firmly when in motion or when standing in a vertical position. When specified, at least one antifriction bearing retractable caster shall be furnished (see figure 2 and 6.4) for maintaining the truck balance when loaded and in motion.

3.9 Workmanship. - The hand trucks covered by this specification shall be clean, well made, and free from any defects which may affect their appearance or serviceability.

4. SAMPLING, INSPECTION, AND TEST PROCEDURES

4.1 Sampling for lot acceptance.

4.1.1 Inspection lot. - All hand trucks of the same type, class, and size presented at one time shall be considered a lot for purposes of acceptance, inspection, and tests.

4.1.2 Sampling for inspection. - A random sample of hand trucks shall be taken from each lot of material offered for Government inspection of visual and dimensional characteristics with lot acceptance based on the inspection requirements of table I in accordance with Military Standard MIL-STD-105.

Table I. - Sampling for visual and dimensional inspection

A.Q. L. (approx.) = 1.5 percent defective

Number of trucks in inspection lot	Number of trucks in sample	Acceptance number (defectives)	Rejection number (defectives)
15 and under	7	0	1
16 to 40	10	0	1
41 to 110	15	0	1
111 to 300	25	1	2
301 to 500	35	1	2
501 to 800	50	2	3
801 to 1300	75	3	4
1301 and over	110	4	5

4.1.3 Sampling for lot acceptance tests. - A random sample of hand trucks shall be taken from each inspection lot in accordance with table II and shall be subjected to the tests specified in 4.3.

Table II. - Sampling for lot acceptance tests

Number of trucks in inspection lot	Number of trucks in sample	Acceptance number (defectives)	Rejection number (defectives)
15 and under	3	0	1
16 to 40	5	0	1
41 to 110	7	0	1
111 to 300	10	0	1
301 and over	15	1	2

4.2 Inspection.

4.2.1 Visual and dimensional inspection. - Each of the sample trucks taken in accordance with table I shall be visually and dimensionally inspected by the Government inspector to verify compliance with the requirements of this specification. Any truck in the sample containing one or more visual or dimensional defects shall be rejected, and if the number of defective trucks in any sample exceeds the acceptance number for the sample, the lot represented by the sample shall be rejected.

4.3 Lot acceptance test.

4.3.1 Testing of trucks for lot acceptance. - Each of the sample trucks taken in accordance with table II shall be tested in accordance with 4.4 to verify compliance with the requirements of this specification. Any sample truck which does not meet the requirements for any of these characteristics shall be rejected, and if the number of nonconforming trucks in any sample exceeds the acceptance number for that sample, the lot represented by the sample shall be rejected.

4.4 Tests.

4.4.1 Floor marking. - A sample truck shall be loaded with weights equal to the load rating specified in tables I to III inclusive. The loaded truck shall be rolled back and forth and also in a circle on a smooth, clean concrete or hardwood floor for 2 minutes. The tires shall leave no mark on the floor that is visible to the naked eye. The test shall be waived on style 6a and 6b all metal wheels.

4.4.2 Wheel and bearing strength. - A compressive load, equal to four times the wheel load rating of the wheel, shall be applied to the individual mounted wheel, by means of weights or a press, for a period of one minute. The wheel and bearing shall not become deformed or damaged when so tested.

4.4.3 Nose and nose-extension test. - A sample truck (types I and II only) shall be subjected to the following test as shown in figures 3a and 3b. The test load as shown in table I shall be raised several times from a pick-up or vertical position of the truck as shown in figure 3a to a loaded or horizontal position with the truck legs touching the floor as shown in 3b. The nose, nose-extension, or any other component of the truck, shall not show signs of permanent deformation, cracking in the bend or intersection of the nose and nose-extension, or any other defect that would affect the serviceability of the truck.

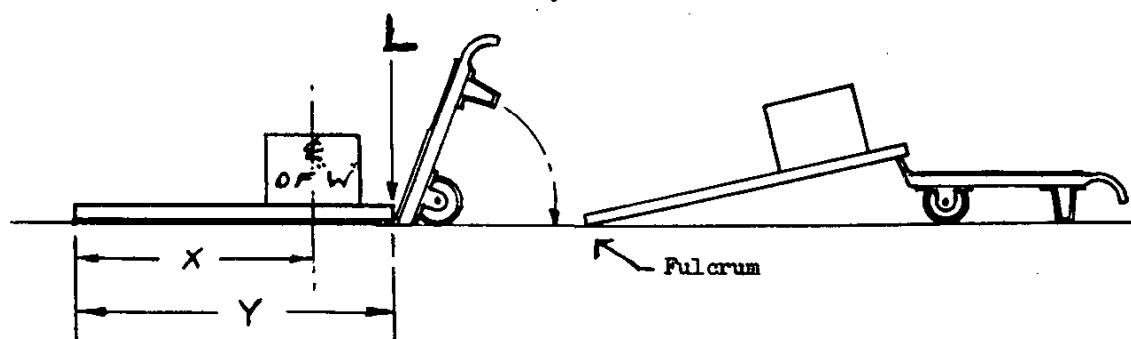


Figure 3a
Pick up position

Figure 3b
Test loaded position

Nose and nose-extension test (see 4.4.3).

The weight "W" shall be calculated as follows:

$$W = \frac{YL}{X}$$

where

- W = Weight to be placed on pallet.
- Y = Length of pallet available.
- X = Length from fulcrum to centerline of W.
- L = Nose test load specified in table I.

Example: For the 2,400 pound test of a size 1, class A truck, determine from table I the weight "W" to be placed on a pallet when using test load "L". Available for the test is a 4-foot long pallet and a container to fill to the desired weight "W". The container (or weight "W") is arbitrarily placed 3-feet (distance "X") from the fulcrum to the centerline of "W".

$$W = \frac{4 \times 2400}{3} \text{ or } 3,200 \text{ lbs.}$$

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4.4.4 Rubber tire tests. - The contractor shall certify that his rubber tires will meet the tests in 4.4.4.1 to 4.4.5, inclusive (see 6.6). The purchasing agency may at its option conduct any or all of the following tests:

4.4.4.1 Rubber tire tests (style 2a, 2b, 3a, and 3b wheels). - For the purpose of this specification, accelerated aging of rubber shall be conducted at 70°C. (158°F.) for 168 hours in the air-oven process described in Federal Test Method Standard No. 601.

4.4.4.2 Tensile strength. - The tensile strength tests shall be conducted in accordance with Federal Test Method Standard No. 601.

4.4.4.3 Elongation. - The elongation test shall be conducted in accordance with Federal Test Method Standard No. 601.

4.4.4.4 Compression set. - A circular specimen, 1.128 to 1.130 inches, inclusive, in diameter shall be punched from the center of the tread face. The thickness of the specimen shall be 0.505 inch, inclusive. The average thickness of the specimen shall be measured to the nearest 0.001 inch, after which the specimen shall be placed between the plates of a compression device which has been heated to approximately 70°C. (158°F.). Spacers shall be placed on each side of the specimen and the pressure plates shall be uniformly drawn together until contact with the spacer is made. The compression device with the specimen shall then be placed in an air oven for 22 hours at 69° to 71°C., inclusive, (156.2° to 159.8°F.). At the end of this period, the specimen shall be removed from the compression device and placed on wood for 30 minutes to cool. The thickness shall then be measured to the nearest 0.001 inch and the percentage of set calculated to determine compliance with the requirements of 3.7.4. The percentage of set shall be calculated as follows:

$$C = \frac{T - t}{T - S} \times 100$$

Where:

C = percent of set.

T = original thickness of specimen.

t = final thickness of specimen.

S = thickness of spacer bar.

4.4.4.5 Adhesion. - Adhesion tests of rubber treads molded to metal or composition bases shall be conducted at room temperature. The tread shall be cut transversely down to its base. The tread may be trimmed down to the base along the flanges to minimize tearing of the tread. With the wheel supported horizontally on free rotating bearings in a suitable fixture, the tread shall be separated circumferentially from the base (by means of a suitable testing machine exerting a radial pull) at the rate of approximately 6 inches per minute. The force necessary to separate the tread from the base shall be measured to determine compliance with the requirements of 3.7.5.

5. PREPARATION FOR DELIVERY

(Nonmilitary agencies. - Federal Standard No. 102 should be referred to for definitions and applications of the various levels of packaging protection for supplies and equipment.)

5.1 Preservation and packaging.

5.1.1 Level A. - Level A preservation and packaging shall afford adequate protection against corrosion, deterioration, and physical damage during shipment, handling, intermediate storage and world-wide distribution.

5.1.2 Level B. - Level B package shall afford a range varying from level A to level C in which preservation and packaging requirements are a modification of level A or a separate entity for use under specific conditions. When level B is specified, the procuring agency should state on procurement documents the conditions under storage, when known (see 6.3).

5.1.3 Level C. - Level C preservation and packaging shall afford adequate protection against corrosion, deterioration, and physical damage during shipment from the supply source to the first receiving activity for immediate use. This level may be the supplier's commercial practice when such meets the requirements. Unless otherwise specified, no packaging is required (see 6.3).

5.2 Packing.

5.2.1 Level A. - Level A packing shall afford adequate protection during shipment, handling, intermediate storage, and world-wide distribution.

5.2.2 Level B. - Level B packing shall afford adequate protection against multiple domestic shipment, handling and storage.

5.2.3 Level C. - Level C packing shall afford protection against damage during direct shipment from the supply source to the first receiving activity for immediate use. This level in general shall conform to applicable carrier rules and regulations and may be the supplier's commercial practice when such meets the requirements. Unless otherwise specified, no packing is required (see 6.3).

5.2.4 Level D. - Level D packing shall be for ocean shipment and covered storage at destination where the end use is to be at the initial receiving activity. This level in general conforms to applicable carrier rules and regulations and may be the supplier's commercial practice when such meets the requirements.

5.3 Marking of shipments.

5.3.1 Military purchases. (To be inserted in later draft.)

5.3.2 Nonmilitary purchases. - Unless otherwise specified, for nonmilitary purchases, shipping containers shall be marked with the name of the commodity, the type, class, size, and the quantity contained therein, as defined by the contract or order under which shipment is made (see 6.4).

6. NOTES

6.1 Intended use. - Hand trucks covered by this specification are intended for general use in and around factories to move supplies of such size as to require only a manually-loaded and pushed two-wheel truck. Class A trucks with all metal or plastic wheels are extra-heavy-duty items which are expected to perform under adverse conditions for long periods of time. In selecting a truck, consideration should be given to the load to be carried by the individual wheel. For use on rough surfaces including sharp door sills and other conditions which cause shocks, consideration should be given to trucks with wheels of a diameter large enough to ride easily over the obstructions. Where quietness of operation is desired or where shock to and vibration of fragile objects should be held to a minimum, consideration should be given to soft treads. In operating in areas where oil, grease, or metal chips are on the floor, style 1a, 1b, 6a, or 6b wheels should be specified. This would also be the case if very heavy loads are to be stored on the trucks. Hard tread wheels can carry heavier loads, give longer service, and are easier to push than soft tread wheels of similar size when subjected to the same operating conditions.

6.2 Ordering data. - The purchasing agency should specify the following on the invitation for bids, contract or order:

- (a) Title, number and date of this specification.
- (b) Type, class, and size required (see 1.2.1).
- (c) Shape of handles (see 3.6.2).
- (d) Plain or antifriction bearings (see 3.6.9).
- (e) State whether the commodity shall be afforded preservation and packaging in accordance with level A, B, or C (see 5.1.1, 5.1.2 and 5.1.3). If level B is specified, state storage conditions.
- (f) State whether the commodity shall be afforded packing in accordance with level A, B, C, or D (see 5.2.1, 5.2.2, 5.2.3, and 5.2.4). If level B is specified, state the storage conditions.

6.3 Optional ordering data. - On procurement documents, the purchaser should exercise any of the following options, if required:

- (a) Wheel construction, if different (see 1.2.2).
- (b) Parallel or tapering frames, if a certain kind is required (see 1.2.3).
- (c) Finish, if different (see 3.5.1 and 3.5.2).
- (d) Color, if different (see 3.5.2).
- (e) Frame, if different (see 3.6.1).
- (f) Antifriction bearings, if different (see 3.6.9.1).
- (g) Plain bearings, if different (see 3.6.9.2).
- (h) Metal wheels, if different (see 3.6.9.10 or 3.6.9.11).
- (i) Retractable caster, if required for type III (see 3.8.3).
- (j) If packaging and packing is required for level C, so state (see 5.1.3 and 5.2.3).
- (k) Marking of nonmilitary purchases, if different (see 5.3.2).
- (l) Samples, if required, and purpose (see 6.5).

6.4 Samples. - It is believed that this specification adequately describes the characteristics necessary to secure the desired material, and that normally no samples will be necessary prior to award to determine compliance with this specification. If, for any particular purpose, samples with bids are necessary, they should be specifically asked for in the invitation for bids, and the particular purpose to be served by the bid sample should be definitely stated. The specification to apply in all other respects.

6.5 Rubber tire certification. - The procuring agency, when purchasing hand trucks with rubber tires, should require the contractor to certify that the tires will meet the test requirements of 4.4.4.1 to 4.4.4.5, inclusive.

Notice. - When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise, as in any manner licensing the holder or any other person or corporation or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.