

MIL-T-53038(ME)  
AMENDMENT 1  
23 November 1984

MILITARY SPECIFICATION

TRUCK, LIFT, FORK, VARIABLE REACH, DIESEL-ENGINE-DRIVEN:

PNEUMATIC-TIRED, ROUGH TERRAIN; 6,000 POUND CAPACITY

AT 24-INCH LOAD CENTER

This amendment forms a part of Military Specification MIL-T-53038(ME), dated 21 March 1984, and is approved for use by the USA Belvoir Research and Development Center, Department of the Army and is available for use by all Departments and Agencies of the Department of Defense.

PAGE 2

2.1.1, under "SPECIFICATIONS, MILITARY", delete:

"MIL-C-21567 - Compound, Silicone, Soft Film."

2.1.1, under "SPECIFICATIONS, MILITARY", add:

"MIL-P-52192 - Primer Coating Epoxy.  
MIL-P-53030 - Primer Coating Epoxy Water Reducible Lead  
and Chromate Free.  
MIL-C-53039 - Coating, Aliphatic Polyurethane, Single  
Component, Chemical Agent Resistant".

PAGE 5

2.2, under "Other publications, ASSOCIATION OF AMERICAN RAILROADS (AAR)" after "Van Buren Street," add "Chicago, IL 60605)."

PAGE 7

3.1.3.1, delete in its entirety and substitute:

"3.1.3.1 Weight. Axle weights shall not exceed the requirements of Air Force Design Handbook DHL-11 for air transport by C-141 aircraft when the forklift is in the air transportable configuration. Counterweight(s), cab, ROPS, FOPS, forktines and carriage may be removed to meet the axle weight requirements."

3.1.3.3, at the end of the sentence, delete the period and add "and shall comply with the axle spacing criteria for C-141 air craft established in Air Force Design Handbook DHL-11 for the appropriate forklift axle weights."

3.1.4.2, delete the third sentence and substitute "Disassembly to achieve the axle weights in the air transportable configuration (3.1.2.1) shall be

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accomplished in not more than three manhours and reassembly shall be accomplished in not more than three manhours using only common tools. The forklift trucks shall be capable of being driven on and off the aircraft in the transportable configuration."

PAGE 8

3.1.4.3, line 2, delete "50-foot" and substitute "50-inch high".

After 3.1.4.4, add new paragraph:

"3.1.5 Forklift structure. Design of the completely assembled forklift shall be such, that the maximum unit stress imposed by the required maximum loadings shall be not more than 60 percent of the yield point for any structural member. Stresses in different parts of the forklift will be evaluated using stress classifications as defined in SAE J1063. Minimum strength margins for class I, II, and III stresses will be 1.67. Tests shall be performed on the model forklift being provided and results will be provided to the Government at time of first article test examination."

PAGE 10

3.5.1, at the end of the paragraph, add "If necessary to meet axle weights for air transport, the ROPS and FOPS shall be bolted on and be removable. A permanent lifting eye conforming to MIL-STD-209 and quick disconnects for electrical wires shall be provided to facilitate removal of the ROPS and FOPS".

3.5.3, line 3, add "The backup alarm shall be disengaged in the blackout mode".

PAGE 11

3.6.1.1, after "4.6.2.27" delete in its entirety.

3.6.1.1, after "with" delete "4.6.2.27" and substitute "4.6.2.27.1".

3.6.1.2, delete the first sentence and substitute "The noise level of the forklift (excluding horns) shall not exceed 88 dB(A) when tested in accordance with SAE J88".

3.6.1.3, add a new paragraph as follows:

"3.6.1.3 Noise hazard. The precautions of MIL-STD-1474 (see 6.5) and noise hazard warning signs shall be provided if the noise level is 85 dB(A) or greater when tested in accordance with 4.6.2.27.3".

3.7, after the first sentence, add "Test points identified for connection of the Simplified Test Equipment for Internal Combustion Engines to measure functions in the Transducer Kit (TK) mode (see 3.41) shall be accessible without the removal of other major assemblies and installed attachments not normally removed".

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PAGE 12

3.8, delete in its entirety and substitute:

"3.8 Reliability. The forklift shall have a mean-time-between-failure (MTBF) of 75 hours when tested as specified in 4.6.2.34".

3.9.1.2.1, lines 2 and 3 after "applied to the MLRS", delete "carry"; after "to the forklift in the MLRS", add "carry".

PAGE 15

3.9.11, line 4, change "40" to "42".

After 3.9.11, add the following new paragraph:

3.9.11.1 Load backrest. A metal backrest, removable without disturbing any other components, shall be provided on the forklift carriage. There shall be no protruding bolts or appendages beyond the side plane of the load backrest. In conjunction with the fork and hanger design, it shall provide a vertical rear guard at least 48 inches high, measured from the load carrying surface of the forks, and equal to the width of the carriage".

PAGE 16

3.9.17, delete first five lines and substitute:

"3.9.17 Endurance. The forklift shall be capable of completing the test specified in 4.6.2.34 with no failures using the failure definition in 4.6.2.34.1 and without ....."

3.10, line 4, after end of second sentence, add "A sleeveless engine is acceptable".

PAGE 19

3.10.2.6.5, at the end of the paragraph, delete "SAE J1034" and substitute "MIL-A-46153".

PAGE 22

3.12, line 12, after "..... straight thread type", delete the comma and add "or 37 degree flare swivel type,".

3.12, line 15, after "1 inch", add the following new sentence "When 37 degree flare fittings are used on a hydraulic line, the mating connection on the component shall also be a 37 degree flare type".

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3.12, line 20, after "..... shall be provided.", add "Means or techniques shall be provided to allow for manual override for retracting and lowering the boom and load not in excess of 10 feet per minute in the event of hydraulic power loss or line failure."

PAGE 24

3.12.3.1, at the end of the second sentence, delete the period and add "and for the duration of Test Methods 31 and 37 of the endurance test (4.6.2.34)".

PAGE 25

3.12.6, line 6, delete "verify" and substitute "present information during first article test".

PAGE 26

3.13, line 6, after "structurally, the", delete "fully extended".

3.13, line 10, after "b. Boom level and at", delete "Maximum extension", and add "21.5 foot reach".

PAGE 27

3.13.1, line 1, delete "attacment" and substitute "attachment".

3.13.2, line 5, delete "cyclinders" and substitute "cylinders".

PAGE 28

3.14.1, lines 11 and 12, after "additional personnel.", delete "The lifting tool/MLRS handling attachment assembly", add "The assembly for MLRS pod handling (lifting tool and forks or lifting tool and MLRS handling attachment, whichever is used)."

PAGE 29

3.18, second sentence, insert a period after "MIL-B-46176" and delete the remainder of the sentence.

3.18, line 7, after "vehicle." delete the period and add "; a relay emergency valve shall also be provided."

PAGE 32

3.23.9, line 8, delete "MS 5113" and substitute "MS51113".

PAGE 35

3.24.4, line 1, delete "area of the boom" and substitute "area of the fully extended boom".

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3.24.4, line 5, insert a period after "15 degrees left". Delete "and shall be capable of being adjusted" and substitute "the front flood lamps excluding the boom mounted floodlamps shall be adjustable".

3.24.4.1, line 11, after "centerline" add "of the truck".

3.24.4.3, lines 2 and 3, after "personnel" delete "The gauges and instruments" and add "and". After "night operation.", delete the rest of the paragraph. Add "Interior lights, gauges and instruments, to include warning lights, shall not emit energy out of the 400-625 nanometer wavelength range".

PAGE 36

3.27.1, line 4, delete "when a glazed roof window is provided, it" and substitute "When a roof window is provided, it shall have safety glazing and".

PAGE 38

3.32, line 5, after "material." add "The forklift shall also be labeled, on or near the data plate, 'CARC month/year' with the month and year the forklift was treated specified."

3.32, line 12, delete "attachments" and substitute "provisions".

3.33, delete in its entirety and substitute:

3.33 Treatment and painting. The portions of the forklift normally painted, both internally and externally, shall be cleaned, treated, and painted in accordance with MIL-T-704, type F for ferrous metals and type G for nonferrous metals and fiberglass top coat camouflage green 383. Primer in accordance with MIL-P-53030 may be used in lieu of MIL-P-52192. Finish coat in accordance with MIL-C-53039 (polyurethane) may be used in lieu of MIL-C-46168. Vendor parts and components received by the prime contractor with either alkyd primer or alkyd paint coating may be coated with above specified primers and paints applied directly over existing alkyd primer or paint without additional service preparation except for cleaning, if the base alkyd primer or paint meets applicable military federal specifications and if the base alkyd primer or paint is allowed to cure for a period of 14 days. This exception for vendor parts and components is not intended to supercede the requirement that the complete truck be primer and painted in accordance with MIL-T-704 using the primers and paints specified above. If another color is specified (see 6.2), the above system shall be overcoated with MIL-C-46168 or MIL-C-53039 of the desired color.

PAGE 42

3.41, delete in its entirety and substitute:

"3.41 Diagnostic connector assembly (DCA) measurement capabilities. Unless otherwise specified (see 6.2), the forklift shall incorporate an easily accessible DCA in the operator's cab for interface with the simplified test

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equipment/internal combustion engine (STE/ICE) test equipment as specified in MIL-T-62314, Appendix B. The DCA shall be in accordance with TACOM drawing No. 12258941. All requirements for DCA shall be in accordance with the STE/ICE design guide for vehicle diagnostic connector assemblies, report No. CR-82-588-003. As a minimum the DCA shall have the capabilities for measuring:

Engine RPM (average).  
Engine power (RPM/SEC).  
Compression unbalance.  
Battery voltage.  
Starter negative cable voltage drop.

A fuel shut-off method shall be provided for running compression unbalance checks. Determination of test mode (either DCA or transducer kit (TK) shall be made by the contractor for the following test parameters:

Fuel Supply Pressure.	Starter Motor Voltage.
Fuel Return Pressure.	Starter Current First Peak.
Fuel Filter Pressure Drop.	Internal Battery Resistance.
Fuel Solenoid Voltage	Battery Resistance Change.
Engine Oil Pressure.	Alt/Gen Output Voltage.
Engine Oil Filter Pressure Drop.	Alt/Gen Field Voltage.
Engine Coolant Temperature.	Alt/Gen Neg Cable Voltage Drop.
Starter Solenoid Voltage.	Starter Circuit Resistance.
Starter Current (Average).	Transmission Oil Pressure.

Test points which are inaccessible for measurement in the TK mode (see 3.7) shall be made in the DCA mode. A separate wiring harness shall be provided for the DCA assembly and include all wiring and necessary hardware to perform required capabilities. The contractor shall also provide vehicle test cards in the format identified on TACOM drawing No. 12258955 addressing both DCA and TK measurements and shall incorporate the test cards into forklift technical manuals. Adaptors required for the interface with the STE/ICE when measuring in the TK mode shall be permanently installed on the forklift."

PAGE 43

4.3.1.1, line 1, delete "one for lift" and substitute "all preproduction forklifts".

PAGE 44

4.3.2, delete the paragraph thru "..... subjected to the EMP tests (see 4.6.2.10.1)" and substitute:

"4.3.2 First article preproduction tests. Upon successful completion of the examination specified in 4.3.1.1 two first article forklifts shall be subject to the productivity test (test method 37), the load placement test (test method 31) and the MLRS productivity test (test method 35, part a) (see 4.6.2.34 for trucks 3 and 4). Another first article forklift shall complete the tests marked "X" in

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column 1 of table IV except for the endurance/reliability tests (see 4.6.2.34). One other first article forklift shall be subjected to the endurance test (Test Method 30), the productivity test (Test Method 37), the load placement test (Test Method 31) and the MLRS productivity test (Test Method 35, part a), (see 4.6.2.34 for truck 2)".

4.3.2, line 8, after "order", delete the period and add "except that the DCA interface test (4.6.2.41.1) shall be conducted as the first test."

PAGE 46

4.6.1, table III, column 3, add "X" for items 114, 116, 117.

PAGE 47

4.6.1, table III, column 3, add "X" for items 134, 148, 150, 158, and 159.

4.6.1, table III, column 2, add "X" for items 148, 150, and 151.

PAGE 48

4.6.1, table III, column 3, add "X" for item 181.

PAGE 49

4.6.1, table III, column 3, add "X" for item 194.

PAGE 50

4.6.1, table III, column 3, delete "X" for item 214.

PAGE 52

4.6.2.1, table IV, for ROPS and FOPS (line 1), for pump inlet pressure (line 10), for pump contaminant tolerance (line 13) and for hydraulic control valves (line 15) add an "x" in column 2.

PAGE 53

4.6.2.1, table IV, for post-test (line 17) add an "x" in column 2.

4.6.2.1, table IV, for reliability (line 13), add an "x" in column 1.

4.6.2.1, table IV, for endurance (line 12), add an "x" in column 2.

4.6.2.1, table IV, column 7, for exterior spectator test, delete "3.6.1.1" and substitute "3.6.1.2".

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PAGE 54

4.6.2.1, table IV, add the following to the table in the appropriate columns.

x	x	-	-	Quick disconnect coupling.	4.6.2.47	3.12.1.5
x	x	-	-	Forklift structure stress.	4.6.2.48	3.1.5
x	x	-	-	Noise hazard.	4.6.2.27.3	3.6.1.3

PAGE 55

4.6.2.13, after the first sentence, add "Overheating of tires during high speed towing operations shall not constitute failure of this test."

PAGE 56

4.6.2.20, after the first sentence, add "obtain length, width, height, overall vehicle weight, and front and rear axle weights of the forklift in the air transportable configuration."

PAGE 57

4.6.2.27.1, at the end of the paragraph, add "Nonconformance to 3.6.1.1 shall constitute failure of this test."

After 4.6.2.27.2, add the following new paragraph:

"4.6.2.27.3 Noise hazard. Measure the noise level at the operator station and a 5-foot perimeter while operating the truck at maximum governed speed, raising rated capacity load. If the noise level is 85 dB(A) or greater at any location, noise hazard warning signs and the appropriate discussion of noise hazard specified in 3.6.1.3 shall be provided."

PAGE 59

4.6.2.34, delete in its entirety and substitute:

"4.6.2.34 Endurance/reliability tests. Three trucks shall be tested for a total of 1330 hours. The testing shall be conducted in accordance with the test hour distribution listed below:

<u>Test</u>	<u>Test time (hours)</u>		
	Truck #2	Truck #3	Truck #4
Reliability			
Load placement (Test Method 31).	210	210	210
Productivity (Test Method 37).	50	100	100
MLRS productivity (Test Method 35, part a).	50	100	100
Endurance			
Durability (Test Method 30)	200		



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Reliability and endurance will be evaluated using this test. More than fifteen reliability failures (see 4.6.2.34.2) shall constitute failure of this test. No endurance failures (see 4.6.2.34.1) are allowed. Relevant failures will be determined by an authorized Government representative. The truck shall perform all tests without exceeding specified temperature limits for the cooling system (see 3.10.2.6), engine oil (see 3.10), transmission oil (see 3.11.1.1 or 3.11.1.2), universal joints (see 3.11), hydraulic system (see 3.12). Nonconformance shall constitute failure of this test."

After 4.6.2.34, add new paragraph:

"4.6.2.34.1 Endurance failure. An endurance failure is any failure which results in permanent structural deformation of the truck or its components; or any failure which is corrected by redesign or by replacement of a failed component with a component of different configuration in order to meet specified performance requirements; or any failure resulting in replacement of the engine, transmission, transfer case, differential, hydraulic pumps or motors, hydrostatic drive pumps or motors, hydraulic cylinders or the drive axle."

4.6.2.35, line 1, change (the paragraph No.) "4.6.2.35" to "4.6.2.34.2".

After "Reliability" add "failure".

Delete "For the cycles within maximum time frame specified in 3.8, the forklift(s) shall be tested in accordance with Test Method No.'s 31 and 37".

4.6.2.35, line 3, after "A", add "reliability"; after "causes", add "degradation of specified operations or"; after "any", add "other".

PAGE 60

4.6.2.40.1, line 3, change "a third preproduction" to "a preproduction".

4.6.2.41.1, after the first sentence, add: "After completion of all first article testing, this test shall be repeated and the results compared to the first test (see 4.3.2)." Delete the second sentence and substitute: "Nonconformance to 3.41 or failure of any componentry or wiring in the DCA harness, which results in inability to obtain the measurements previously recorded with the STE/ICE, shall constitute failure of this test."

PAGE 61

4.6.2.44, line 3, after "3.9.8" add "3.12".

After 4.6.2.4.6, add the following new paragraphs:

"4.6.2.47 Quick disconnect coupling. When quick disconnect couplings are furnished for changing handling attachments, couplings shall be connected and then disconnected 50 times and shall then be inspected for all requirements specified in 3.12.1.5. Nonconformance to 3.12.1.5 shall constitute failure of this test."

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"4.6.2.48 Forklift structure stress. Test procedures identified in SAE J1063 will be adapted to the forklift and conducted on one of the first article forklifts or on a forklift identical to the first article test vehicle. Test results shall be provided to the Government at time of first article test or the tests will be conducted during first article test if not previously conducted. Non-conformance to the requirements of 3.1.5 shall constitute failure of this test."

PAGE 62

6.4, line 1, before "The contracting officer" add "if contractor first article testing is required."

PAGE 64

After 6.8.6, add new paragraph:

"6.8.7 Recovered materials. The term "recovered materials" means materials which have been collected, or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw material. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically authorized."

PAGE 66

Figure 2, change "View 1313" to "View BB"; add "Lift rod diameter is 25.4 mm".

PAGE 67

Figure 3, the depth of the 155 mm pallet should be 13-1/2 inches instead of 3-1/2 inches as indicated.

PAGE 71

Figure 7, change the arrow for "202 7/8" as shown in accompanying figure.

After figure 7 add figures 8 thru 11.

PAGE 72

Test Method No. 1, in the title, delete "FOR" and substitute "FORK".

PAGE 77

Test Method No. 5, paragraph 3d(1), after "maximum lift angle", delete the period and add "with boom fully retracted".

PAGE 85

Test Method No. 13, paragraph 3b, line 2, change "30 mph" to "20 mph".

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PAGE 86

Test Method No. 14, paragraph 3b, delete and substitute "b. Apply three times the rated capacity load on the forks at the specified 24-inch load center distance with boom fully retracted, and hold for 5 minutes."

Test Method No. 14, paragraph 3c, line 3-4, delete everything after "specified" and add "24-inch load center distance with boom fully retracted, and hold for 5 minutes."

PAGE 92

Test Method No. 20, paragraph 2, add subparagraph c as follows: "c. Simplified Test Equipment for Internal Combustion Engines (STE/ICE)." In paragraph 3, add subparagraph f as follows: "f. Connect the STE/ICE to record all parameters which are to be measured in the Transducer Kit (TK) mode."

PAGE 104

Test Method No. 30, paragraph 2, line 2, change the sentence that starts with "A minimum (not average)..." to read "The speed throughout the entire course shall be not less than 3.0 mph or greater than 3.5 mph."

PAGE 109

Test Method No. 33, add the following subparagraph:

"d. Boom lockup and manual override.

- (1) Raise boom to maximum lift angle and maximum extension with rated load.
- (2) Shut off engine.
- (3) Attempt to lower load and retract boom.
- (4) Energize manual override to lower boom. Record devices used if any and method to accomplish override and distance and time to lower the load.
- (5) Repeat step one, two, and three.
- (6) Energize manual override to retract boom. Record devices used, if any, method to accomplish override, and determine distance and time to retract the load."

PAGE 111

Test Method No. 35, line 3a(5), delete the entire line and replace with "Run the forklift through the test course for the specified number of hours."

PAGE 113

Test Method No. 36, in the first line of subparagraph f and j, delete "maximum extension" and substitute "21.5 foot reach".

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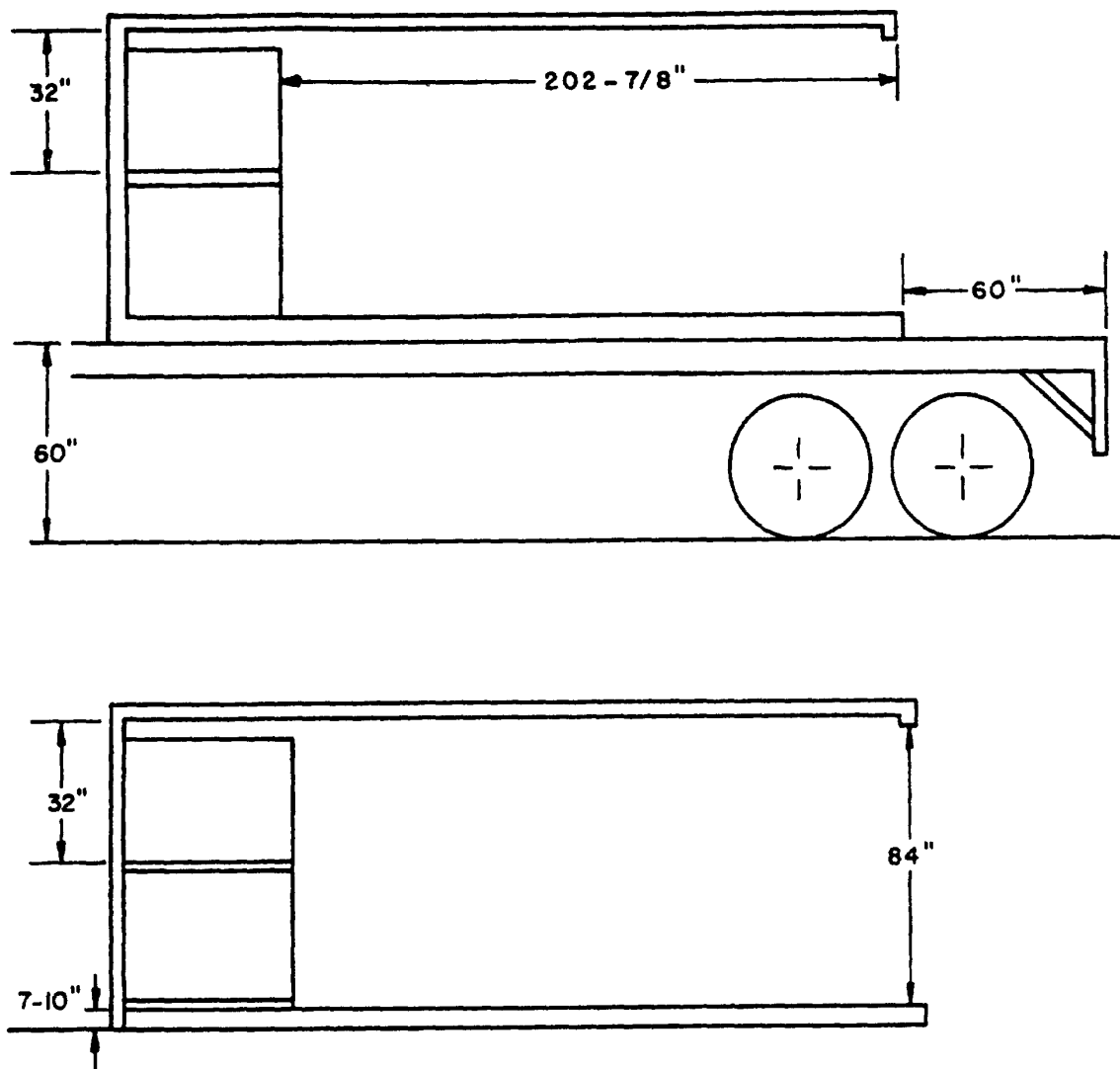
Figure A.1, Note 1, line 2, change "3.9.8" to "3.9.9".

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Preparing activity:  
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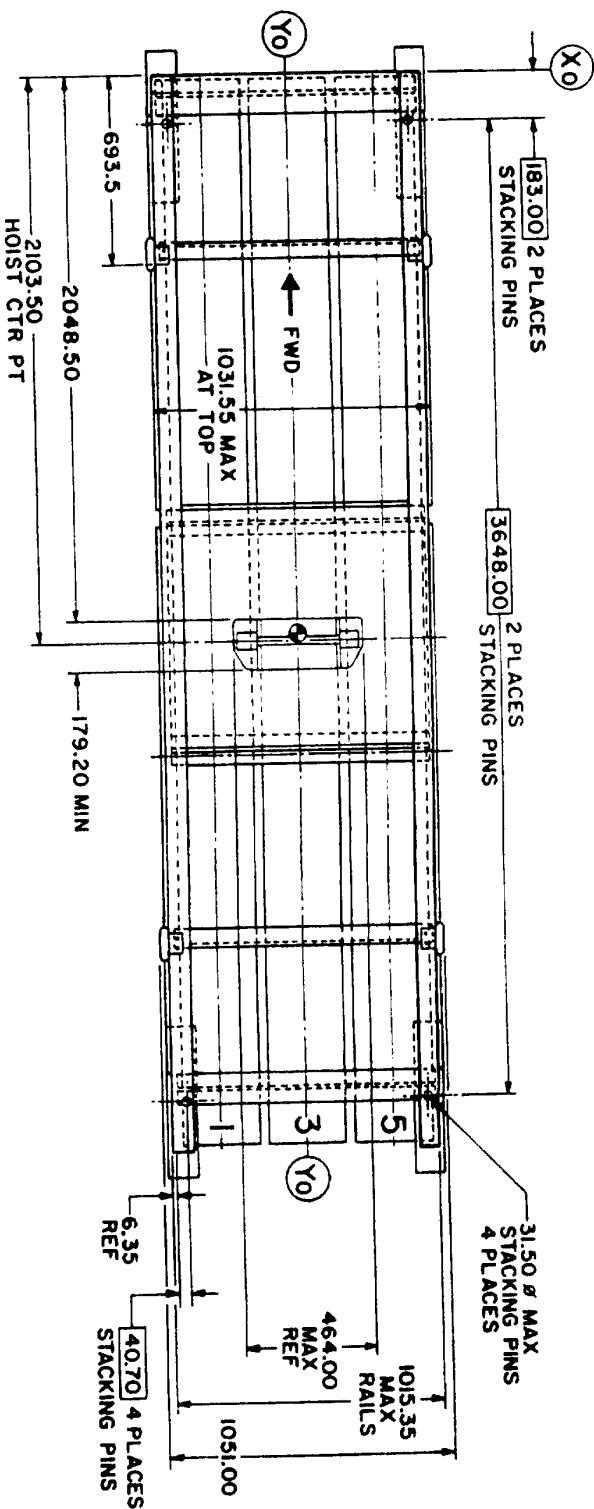
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**FIGURE 7. Palletized loads in trailer mounted and grounded 20 ft. containers.**

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TOP VIEW

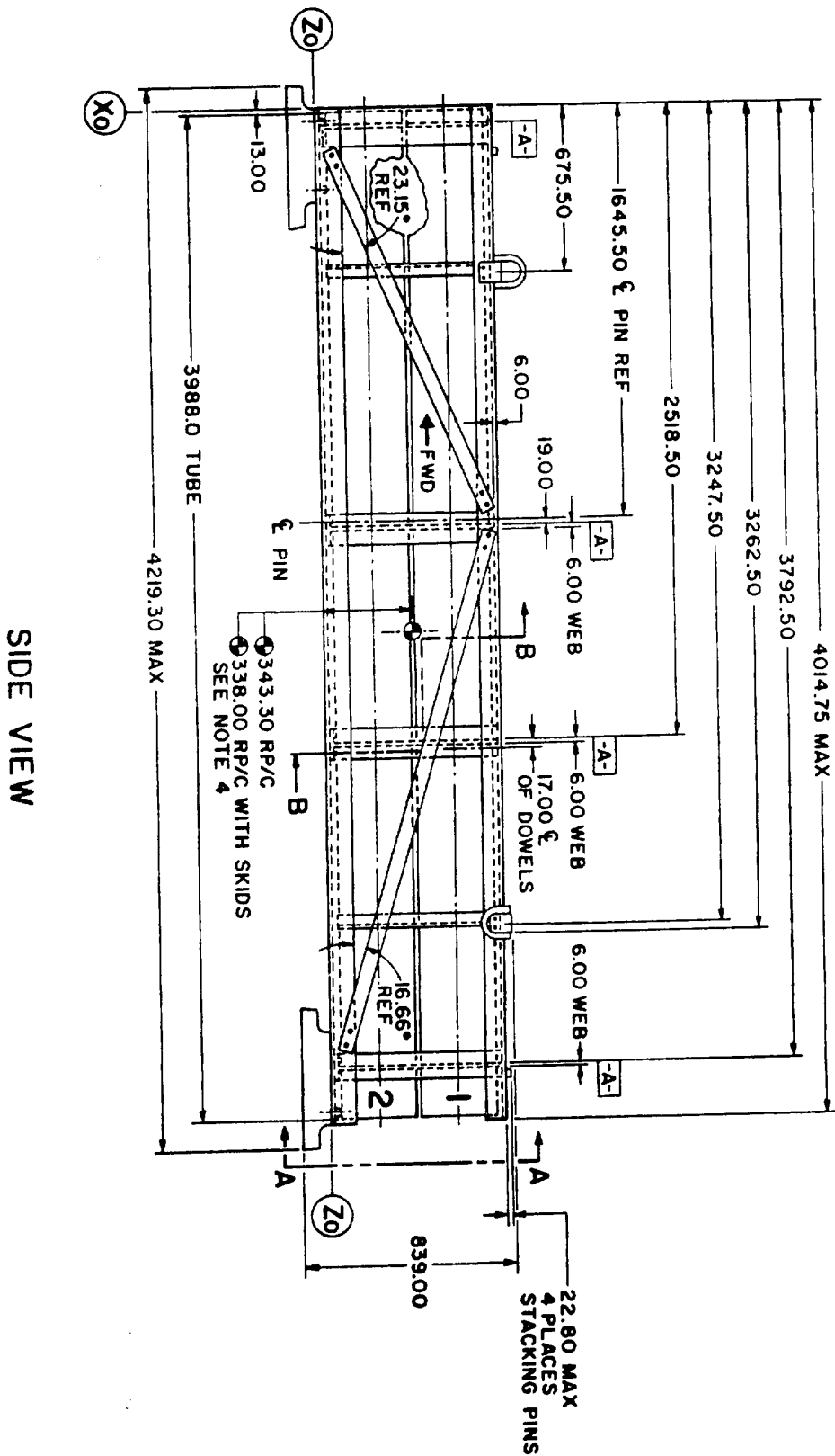
- NOTES:
- 1.0 DIMENSIONS:
  - 1.1 BASIC DIMENSIONS RESULT FROM ONE OR MORE BASIC DRAWING DIMENSIONS. TRUE POSITION TOLERANCES WERE NOT TRANSFERRED TO THIS DRAWING.
  - 1.2 MAX OR MIN DIMENSIONS ARE NOMINAL DIMENSION TOTALS + OR - THE ASSOCIATED TOLERANCE STACK.
  - 1.3 ALL OTHER DIMENSIONS ARE NOMINALS, WITH OR WITHOUT TOLERANCES.
  - 2.0 RAIL HELIX 0.093506° CCW ROTATION PER MILLIMETER ADVANCE.
  - 3.0 FEATURE DEFINITION:
    - (A) BASIC BULKHEAD REFERENCE SURFACE; CASTING AND MACHINING DRAWINGS OF PART.
    - (B) R/P/C SUPPORT PAD MACHINED ON LOWER BULKHEAD FLANGE.

- 3.0 FEATURE DEFINITION (CONTINUED):
- (C) R/P/C SUPPORT PAD WITH SLOT, TO CONSTRAIN SIDE MOTION, (Y DIRECTION), MACHINED ON LOWER BULKHEAD FLANGE.
  - (D) R/P/C LOCATING HOLE CONSTRAINS MOTION IN X & Y DIRECTION.
  - (E) HOLD DOWN PAD LOCATION; DIMENSIONS OF THE HOLD DOWN LOCATION REPRESENT A MACHINED FLAT SURFACE ON THE INSIDE OF THE LOWER BULKHEAD FLANGE.
  - 4.0 LOADED R/P/C WEIGHT 2277.16 Kg.
  - 5.0 LOADED R/P/C WEIGHT INCLUDING SKIDS 2308.0 Kg.
  - 5.0 FOR SIDE VIEW SEE X-4301.
  - 6.0 FOR BOTTOM VIEW SEE X-4302.
  - 7.0 FOR VIEW A-A AND VIEW B-B SEE X-4303.
  - 8.0 ALL LINEAR DIMENSIONS GIVEN IN MILLIMETERS.

FIGURE 8. MLRS Pod dimensions.

X-4300

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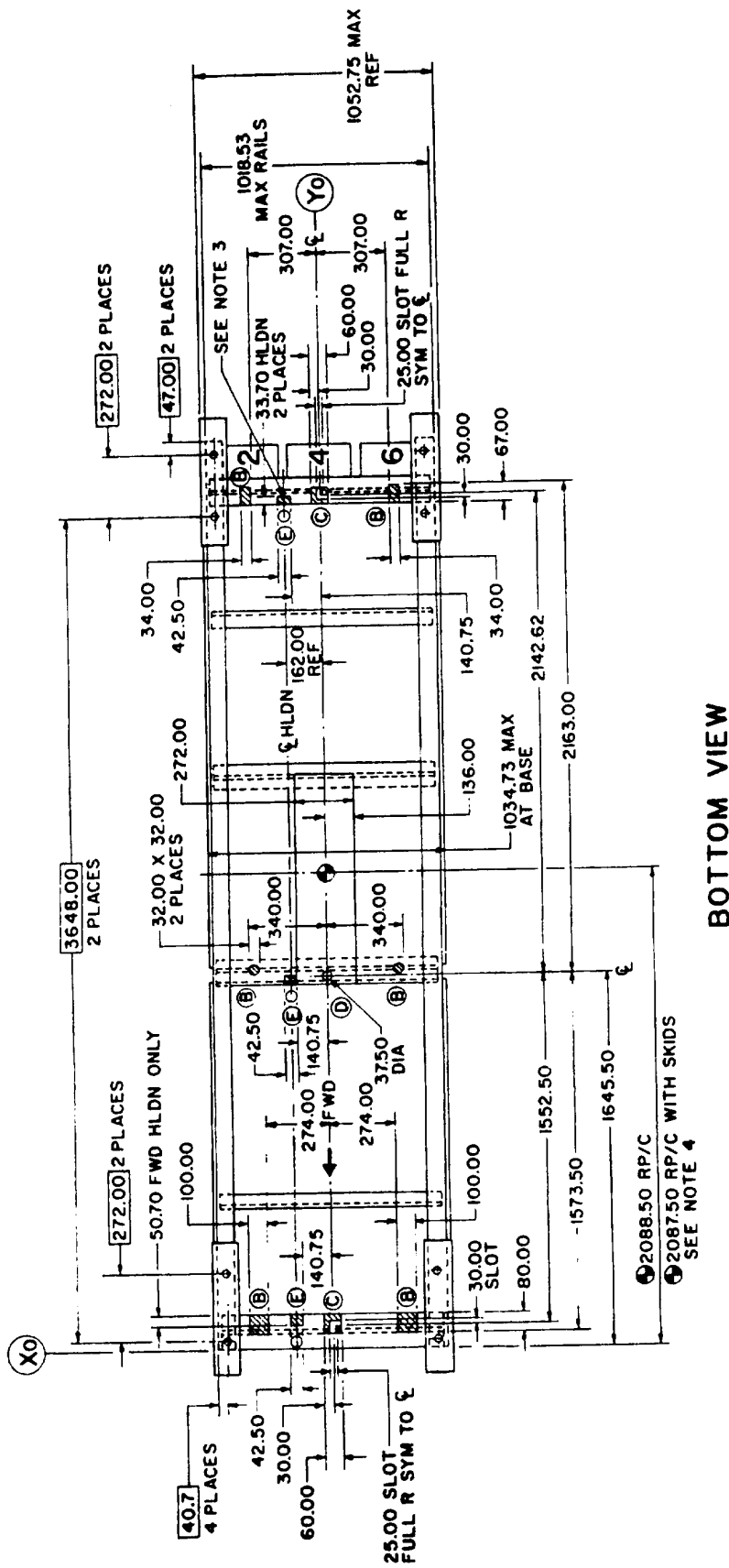


NOTE:  
 1.0 ALL LINEAR DIMENSIONS GIVEN IN MILLIMETERS.

FIGURE 9. MLRS Pod dimensions.

X-4301

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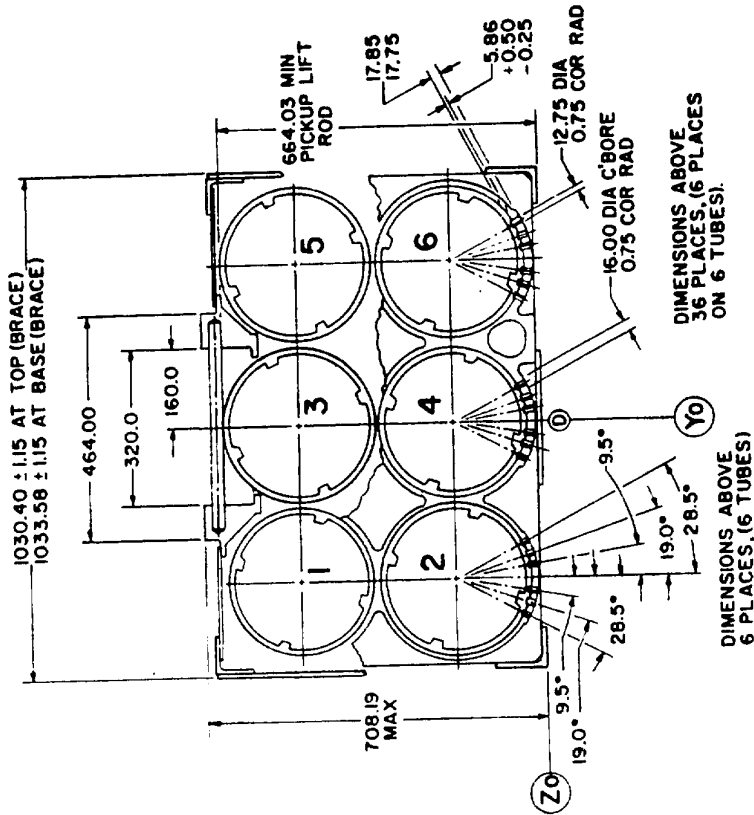
BOTTOM VIEW

NOTE:  
1.0 ALL LINEAR DIMENSIONS GIVEN IN MILLIMETERS.  
**FIGURE 10. MLRS Pod dimensions.**

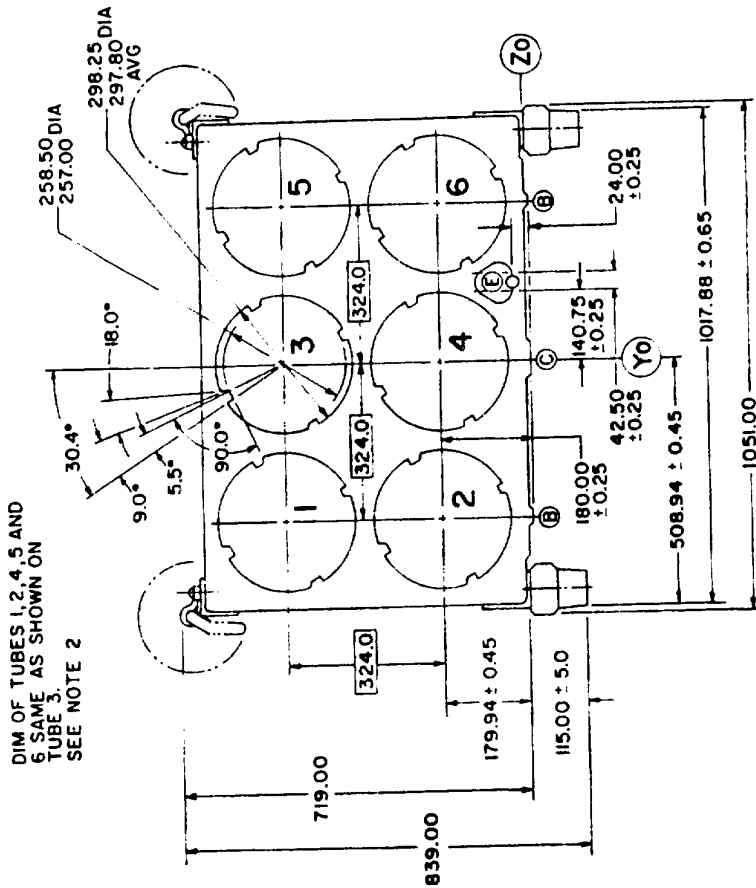
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VIEW B-B



VIEW A-A

NOTE:  
1.0 ALL LINEAR DIMENSIONS GIVEN IN MILLIMETERS.

X-4303

FIGURE 11. MLRS Pod dimensions  
tube and general details.