

MIL-S-62344(AT)
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 SUPERSEDING
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MILITARY SPECIFICATION

SEMITRAILER, LOWBED: MISSILE ROUND TRANSPORTER (MRT) AND LARGE REPAIR PARTS TRANSPORTER (LRPT), XM974

This specification is approved for use by US Army Tank-Automotive Command, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers a 4-wheeled, low-bed semitrailer, with a maximum payload of 30,000 lbs, for use as an equipment transporter in the Air Defense System, Guided Missile, PATRIOT.

1.1.1 General description. The vehicle configuration and principal dimensions are shown on drawing 8750023. When coupled to an M819, 5 ton, 6 x 6 tractor wrecker, or suitable substitute, the semitrailer shall serve either of the following purposes in the PATRIOT System:

- a. Missile Round Transporter (MRT).
- b. Large Repair Parts Transporter (LRPT).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation, form a part of this specification to the extent specified herein.

SPECIFICATIONS

MILITARY

MIL-P-514 - Plates: Identification, Instruction and Marking, Blank.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: US Army Tank-Automotive Command, ATTN: DRSTA-GSS, Warren, MI 48090, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document, or by letter.

MIL-S-62344(AT)

- MIL-T-12459 - Tire Pneumatic: for Military Ground Vehicles.
- MIL-E-52798 - Enamel, Alkyd, Camouflage.
- MIL-E-52835 - Enamel, Modified Alkyd, Camouflage, Lusterless.
- MIL-L-52909 - Lacquer, Acrylic, Camouflage, Lusterless.
- MIL-L-52926 - Lacquer, Camouflage, Lusterless, Hot Spray, Forest Green.
- MIL-E-52929 - Enamel, Alkyd, Camouflage, Flash Dry.
- MIL-C-0046164 - Coating Application, Corrosion Preventative Compound (for Production Automobiles, Trucks and Trailers).

STANDARDS

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-130 - Identification Marking of US Military Property.
- MIL-STD-209 - Slings, Eyes and Attachments for Lifting and Tying Down Military Equipment.
- MIL-STD-454 - Standard General Requirements for Electronic Equipment.
- MIL-STD-642 - Identification Marking of Combat, and Tactical Transport Vehicles.
- MIL-STD-1179 - Lamps, Reflectors and Associated Signaling Equipment for Military Vehicles.
- MIL-STD-1261 - Welding Procedure for Structural Steels.

2.1.2 Other Government documents, and Government drawings and publications. The following documents, drawings, and publications form a part of this specification to the extent specified herein.

DRAWINGS

ARMY

- 8750023 - Semitrailer, Lowbed, PATRIOT, XM974

(Copies of specifications, standards, handbooks, drawings, and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity, or as directed by the contracting officer.)

MIL-S-62344(AT)

2.2 Other publications. The following document(s) form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

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, NY 10017.)

AMERICAN WELDING SOCIETY (AWS)

D1.1 - Structural Welding Code, Section 5,
Qualification.

(Application for copies should be addressed to the American Welding Society, 2501 North West Seventh Street, Miami, FL 33125.)

(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Preproduction model(s). When specified (see 6.2), a preproduction model(s) of the complete semitrailer to be furnished under this specification shall be produced prior to manufacture or fabrication of semitrailers in quantity. Semitrailer(s) submitted by the contractor shall be fully representative of semitrailers proposed to be supplied from production facilities and tooling under the supply contract. The semitrailer(s) shall be submitted to the Government for examination and tests to determine conformance to the requirements of this specification. Preproduction model(s) of the complete semitrailers shall not establish the acceptance criteria of the remainder of the semitrailers under contract.

3.2 Initial production semitrailer(s). The semitrailer(s) selected as initial production semitrailer(s) shall be fully representative of the semitrailers proposed to be furnished under the contract with all current modifications included in and on the selected semitrailer(s). The semitrailer(s) shall be submitted for examination and tests to determine conformance to the contract and this specification. If submitted semitrailer(s) meets all requirements of the contract and this specification, no modifications shall be

MIL-S-62344(AT)

applied to subsequent semitrailers to be produced under the contract without prior approval by the Government. The initial production model of the complete semitrailer shall not establish the acceptance criteria for the remainder of the semitrailers produced under the contract.

3.2.1 Reliability. The XM974 semitrailer shall meet a reliability requirement of 6,000 Mean Miles Between Failure (MMBF) to be demonstrated in accordance with the operational profile during test (see 6.5).

3.2.1.1 Operational profile. The 6,000 mile test shall be apportioned in accordance with table II.

3.2.2 Maintainability. Total maintenance, excluding driver/crew checks and services, shall not exceed eight man-hours during 6,000 miles of specified operation. This equates to a maintenance ratio (MR) of 0.027 at 20 operational miles, equivalent to one operational hour. The scheduled maintenance interval shall be six months or 6,000 miles, whichever comes first.

3.3 Materials. Materials shall be as specified herein and in referenced specifications and drawings. Material shall be free of defects and imperfections that might affect serviceability and appearance of the finished product (see 6.7).

3.3.1 Qualified products. The contractor shall be responsible for using parts and assemblies from Qualified Products Lists (QPL's) whenever available. Contractor's inspection records shall specifically list all QPL items by number and date of the QPL, name of contractor and part or drawing number(s). When parts and assemblies are approved as qualified products, but not yet listed on the QPL, the contractor shall list the products by number and date of the approved document, and name of supplier(s).

3.3.2 Fungus resistance. Materials required to be fungus resistant, shall meet the requirements of MIL-STD-454.

3.3.3 Flammable materials. Flammable materials, when used shall be provided with suitable protection to prevent hazard.

3.3.4 Ozone resistance. When rubber components are required to be ozone resistant, the degree of resistance shall be as specified in applicable specifications, or drawings.

3.4 Construction. Semitrailer components, subassemblies and assemblies shall be fabricated and assembled into a complete semitrailer in accordance with drawing 8750023 and subordinate drawings. All parts, assemblies, and subassemblies requiring identification shall be identified in accordance with MIL-STD-130. The fabrication and manufacture of equipment shall be executed in a manner commensurate with the intended use of the end item and standards and specifications specified herein.

MIL-S-62344(AT)

3.4.1 Seals. When fording or operating in mud, sand or snow, seals shall prevent entrance of foreign matter into the bearings, which are exposed to contamination during these operations. All bearing seals shall restrict the leaking of lubricants from bearings.

3.4.2 Electrical system. The semitrailer shall be equipped with a 24-volt lighting and signaling system in accordance with applicable drawings.

3.4.2.1 Electrical circuits. Electrical circuits shall maintain continuity from end to end without evidence of internal or external shorts during all semitrailer operating conditions.

3.4.2.2 Lights. All lights specified on applicable drawings shall operate throughout all semitrailer operating conditions and shall meet the requirements of MIL-STD-1179.

3.4.3 Controls. All electrical, mechanical, and hydraulic controls shall operate without malfunction, throughout all ranges of operation, under all operating conditions.

3.4.4 Adjustment mechanisms. All adjustment mechanisms shall function properly and maintain adjustment during all semitrailer operating conditions.

3.4.5 Welding. Metal-arc welding of structural steels, and the procedures required for documentation prior to production welding, shall be in accordance with MIL-STD-1261. The contractor shall have an accepted welding procedure and accepted workmanship samples in accordance with MIL-STD-1261 for each type of weld, before any production welding can be accomplished.

3.4.5.1 Welder and welding operator certification. Before assigning any welder to manual welding work, the contractor shall provide the contracting officer with certification that the welder has passed qualification tests as prescribed by either of the following listed codes for the type of welding operations to be performed and that such qualification is effective as defined by the particular code:

AMERICAN WELDING SOCIETY (AWS)

D1.1 - Structural Welding Code, Section 5,
Qualification.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

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

If only flat or horizontal welds are required, the contractor need not qualify welders for "all position welding". Subject to approval by the Government, the contractor's standard welder certification may be substituted in lieu of

MIL-S-62344(AT)

the above codes provided that the contractor's procedure is equivalent to the above codes. The contractor shall be responsible for determining that automatic welding equipment operators are capable of producing quality welds in accordance with the contractor's or manufacturer's welding procedure.

3.4.5.2 Welding repairs and burning operations. Welding repairs and burning operations of any kind shall be made only when and to the extent specifically authorized by the procuring activity.

3.4.6 Lifting attachments. Semitrailers shall be provided with lifting attachments, in accordance with applicable drawings, that are structurally adequate to lift the semitrailer when loaded with maximum payload (see table I). Lifting slings, with spreader bar, shall conform to MIL-STD-209.

3.4.7 Tie down devices. Semitrailers shall be provided with tie down devices in accordance with applicable drawings and MIL-STD-209, of sufficient number and structural strength, adequate for transport by rail, sea, and air.

3.4.8 Tires. Tires shall be 11.00-20, 12 ply rating, class CC, in accordance with drawing 8750023, and conforming to MIL-T-12459. When mounted, inflation pressure shall be 50 psi.

3.4.9 Brakes. The semitrailer braking system shall consist of air actuated brakes, equipped with failsafe units, to provide parking and emergency braking.

3.4.9.1 Failsafe brakes. The failsafe unit shall be a spring powered brake actuator. When air pressure is supplied, the spring shall be held in a compressed position. When the air pressure is removed, the spring shall apply the brake.

3.4.9.2 Brake actuator seals. The brake actuator shall be completely sealed to preclude leakage of lubricants and entrance of water, sand or other foreign matter into the actuator during normal operation, including fording to a minimum depth of 30 inches as specified in 3.5.7.

3.4.9.3 Air lines and fittings. All air lines and fittings shall be internally clean prior to, and after, making connections and shall be free of leaks. All lines and fittings shall be secured in such a manner as to prevent rubbing on adjacent lines or vehicle appendages. Air system leakage shall not cause a pressure drop of more than 5 psi, in a one hour period, with 100 ± 5 psi initially in air supply tanks, and ambient temperature of $70^{\circ}\text{F} \pm 10^{\circ}\text{F}$.

3.5 Performance. The semitrailer; fully equipped and serviced as specified in applicable lubrication drawings, coupled to the M819 or suitable substitute tractor, and loaded with actual or simulated payload of 30,000 lbs; shall meet all requirements specified herein without failure or damage to vehicle or payload. Performance shall be demonstrated on dry, smooth, relatively level, hard-surfaced roads, free of loose material, except as specified herein.

MIL-S-62344(AT)

3.5.1 Environmental conditions. Semitrailer shall operate under extreme conditions of weather and altitude in ambient temperatures ranging from minus 50°F to plus 120°F. The complete semitrailer, when in storage shall withstand a temperature of minus 50°F to plus 160°F without deterioration that may cause failure of any component part of the semitrailer.

3.5.2 Payload and speeds.

3.5.2.1 Highway operation. The semitrailer, loaded with highway rated payload or with a simulated load of equal weight uniformly distributed over load area, shall be towed over relatively level, smooth, improved and prepared hard-surfaced roads at average speeds specified in table I, without damage to semitrailer or prime mover. When loaded and towed at speeds specified, the path of the towed semitrailer shall not deviate more than 3 inches to either side of the path of the towing vehicle.

TABLE I. Load and speeds.

Vehicle weight	Payload			Max. sustained speed (mph)	
	Highway	Cross country	Gross weight	Highway	Cross country
13,500	30,000	30,000	43,500	50	20

3.5.2.2 Cross country operation. The semitrailer, loaded with cross country rated payload uniformly distributed over the load area, shall be towable over unimproved roads, trails, open fields, rolling hills, and cross country terrain, at sustained speeds specified in table I, without damage to semitrailer or the prime mover.

3.5.3 Gradeability. When towed over a dry, hard surface free of loose material, the semitrailer shall exhibit gradeability and stability specified herein.

3.5.3.1 Longitudinal inclines. The semitrailer shall follow the towing vehicle, without weaving to an extent affecting the controllability of the vehicle combination, when ascending and descending longitudinal inclines having a 20 percent grade.

3.5.3.2 Side slopes. The semitrailer shall follow the towing vehicle, without slipping or upsetting, when operating on side slopes up to 20 percent with each side of the vehicle up-slope.

3.5.4 Braking ability.

3.5.4.1 Service brakes. The service brakes of the semitrailer and towing vehicle shall decelerate and stop the vehicle combination, with simulated payload, on dry, smooth, level, hard-surfaced roads free of loose material. The stopping distance shall be not more than 50 ft at 20 mph.

MIL-S-62344(AT)

3.5.4.2 Automatic actuation. The semitrailer shall be equipped with an automatic actuating device to apply the semitrailer brakes upon breakaway from the towing vehicle. When loaded with simulated payload, breakaway device shall maintain application of the brakes, and hold the semitrailer stationary on a 30 percent grade, for not less than 15 minutes.

3.5.4.3 Fail safe brakes. With the service brakes in proper adjustment, the failsafe brake system, when activated, shall hold the prime mover and semitrailer combination stationary, with simulated payload, on a dry, hard surfaced 30 percent grade in both ascending and descending directions.

3.5.5 Landing legs. Landing legs shall support the fully loaded semitrailer and withstand, without damage, the strains imposed when coupling and uncoupling the semitrailer from the towing vehicle, and raising and lowering the loaded semitrailer. The landing gear shall operate freely when vehicle is loaded or unloaded and shall operate without interference.

3.5.6 Turning ability. The semitrailer-towing vehicle combination shall make complete turns to the right or left, with the semitrailer assuming a 90 degree angle, without cramping, side-slipping, or damage to either the towing vehicle or the semitrailer.

3.5.7 Fording ability. The semitrailer shall ford salt or fresh water to a minimum depth of 30 inches for periods up to 30 minutes duration without damage to the semitrailer or its components. Semitrailer, without special preparation or servicing before and after fording operations, shall meet the requirements of 3.4.1 and 3.4.9.2.

3.6 Painting, marking and data instruction plates.

3.6.1 Painting. Paints and paint colors shall be as specified on applicable drawings. For field painting application, all equipment exterior surfaces shall be alkyd enamel forest green paint in accordance with MIL-E-52798. For production painting application of all exterior equipment, surfaces shall require one of the following forest green paints:

- | | |
|--|-------------|
| a. Forest green alkyd enamel (bake type) | MIL-E-52835 |
| b. Forest green acrylic lacquer | MIL-L-52909 |
| c. Forest green hot spray lacquer | MIL-L-52926 |
| d. Forest green alkyd enamel | MIL-E-52929 |

3.6.2 Marking. Identification marking shall be as specified in MIL-STD-642. Exterior markings shall be black, lusterless paint having the equivalent infrared reflectance of MIL-E-52798 or MIL-E-52835 and be as follows:

a. National symbol (star). A three-inch star shall be centered on the front and rear of the vehicle.

MIL-S-62344(AT)

b. Registration numbers. Registration numbers shall be placed on both sides in uniform Gothic characters. Characters shall optionally be three or four inches in height.

c. Safety and instructional markings. Markings, such as tire pressure, tie down and center of gravity, shall be black, lusterless letters or numbers no larger than one inch in height.

3.6.3 Name, shipping and service data plates. The information to be included on data plates shall be in accordance with applicable drawings, or as specified by the procuring activity (see 6.2). The plates shall meet the requirements of MIL-P-514.

3.7 Rustproofing. Corrosion preventive compound shall be in accordance with MIL-C-0046164.

3.8 Safety. All exposed parts which are energized electrically shall be located, insulated, fully enclosed or guarded so as to prevent hazards to operating personnel, or equipment malfunction. All moving parts which are of such nature, or so located, as to be a hazard to operating or maintenance personnel shall be enclosed or guarded. Protective devices shall not impair operating functions.

3.9 Servicing and adjusting. Semitrailer shall be adjusted for immediate operation, and shall be serviced for the climatic conditions prevailing at the delivery point. Servicing shall be compatible with processing for shipment as specified by the procuring activity (see 5.1).

3.10 Workmanship. Workmanship shall be of such quality as to assure that the semitrailer and its components are free of defects that compromise, limit or reduce the capability of the semitrailer in the performance of its intended use. In addition to general appearance, the defects listed in tables IV and V, in excess of the allowed AQL, shall be considered to be cause for failure.

MIL-S-62344(AT)

4. QUALITY ASSURANCE PROVISIONS

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

4.1.1 Contractor's quality assurance system. The contractor shall provide and maintain an effective inspection and quality assurance system, acceptable to the Government, covering the supplies under the contract. A current written description of the system shall be submitted to the contracting officer prior to initiation of production. The contractor will not be restricted to the inspection station or to the method of inspection listed, provided that an equivalent control is included in the approved quality assurance procedure. The contractor shall notify the Government of and obtain approval for any change to the submitted procedure that might affect the degree of control required by this specification, or other applicable documents referenced herein.

4.1.2 Government verification. All quality assurance operations performed by the contractor will be subject to Government verification at unscheduled intervals. Verification will consist of surveillance of the operations to determine that practices, methods, and procedures of the written inspection plan are being properly applied, and Government product inspection to measure quality of product offered for acceptance. Deviation from prescribed or agreed-upon procedures, or instances of poor practices which might have an adverse effect upon the quality of the product, will immediately be called to the attention of the contractor. Failure of the contractor to promptly correct deficiencies shall be cause for suspension of acceptance until corrective action has been made, or until conformance of product to prescribed criteria has been demonstrated.

4.1.3 Materials and qualified products. The contractor's inspection records shall be examined to determine conformance to 3.3 through 3.3.4.

4.1.4 Parts and components. Parts, components and assemblies shall be inspected in accordance with applicable drawings and Master List of Supplementary Quality Assurance Provisions (SQAP'S) or Quality Assurance Requirements (QAR's).

MIL-S-62344(AT)

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows (see table III):

- a. Preproduction and first production vehicle inspection (see 4.3).
- b. Initial production tests (see 4.4).
- c. Quality conformance inspection (see 4.5).
- d. Control tests (see 4.6).
- e. Comparison tests (see 4.7).

4.3 Preproduction and first production vehicle inspection.

4.3.1 Preproduction vehicle inspection. A preproduction semitrailer (see 3.1) shall be inspected to determine conformance to the requirements of this specification. Inspection shall be performed at a location approved by the Government. Failure of the preproduction model to comply with any of the requirements specified, shall be cause for refusal of acceptance by the Government, until corrective measures satisfactory to the Government have been taken and a successful reinspection has been conducted.

4.3.2 First production vehicle inspection.

4.3.2.1 In-process inspection. During fabrication of the first production semitrailer (see 3.2), an in-process inspection will be conducted by the Government to evaluate conformance of materials and workmanship to requirements of specified documents. The semitrailer, suspension and electrical components shall be available for inspection. These inspections shall be made at the contractor or subcontractor's facility prior to application of primer and paint. Processing and welding procedures, quality system and inspection records will be reviewed and evaluated during this inspection.

4.3.2.2 Completed first vehicle inspection. The first production semitrailer shall be road tested and completely inspected by the contractor for conformance to the requirements specified herein. The applicable road test shall be that specified in 4.6.2. Upon completion, the contractor shall submit the vehicle (and make available all inspection records and certifications) to the responsible Government inspection element at contractor's plant for preliminary inspection.

4.3.2.2.1 Preliminary inspection. The vehicle shall receive a preliminary inspection by the responsible Government inspection element. The preliminary inspection shall be complete, except for road test requirements of 4.6.2 which will be conducted in conjunction with the provisional inspection to be accomplished by representatives of the procuring agency as specified in 4.3.2.2.2.

4.3.2.2.2 Provisional inspection. The first completed production vehicle shall be subject to provisional inspection at the contractor's plant by representatives of the procuring agency. At the time of this inspection the contractor shall make available his inspection plan, inspection records, and certifications pertinent to the vehicle and components, and render any required inspection assistance.

MIL-S-62344(AT)

4.3.2.3 Repair of defects. Defects found as a result of foregoing inspections shall be corrected by the contractor at no cost to the Government. Failure of the contractor to promptly correct defects shall be cause for suspension of acceptance of vehicles until corrective action has been accomplished.

4.3.2.4 Semitrailer disposition. After completion of inspection, the first production semitrailer shall remain at the manufacturing facility, as a production sample, and be the last semitrailer shipped on the contract. The semitrailer may be released sooner at the discretion of the contracting officer. The contractor shall service and maintain the semitrailer during this period.

4.3.3 Final approval and acceptance. Final approval and acceptance by the Government of the first production semitrailer shall be withheld until the 6,000 mile initial production test has been completed, and a final determination has been made regarding conformity of the semitrailer to requirements. This shall include, but not be limited to, workmanship and materials.

4.4 Initial production test. To determine conformance to Section 3 (inclusive), after completion of the first semitrailer production, two additional semitrailers shall be selected from the first month's production, or from the first 10 produced, and subjected to examination specified in 4.5.4 and all tests specified in table III. Subsequent to examination and tests, the selected semitrailers shall be subjected to a test of 6,000 miles as specified in table II, which will require a maximum of 120 days. These tests are to be performed by the Government. The contractor shall furnish repair parts, as required, to support the tests at no cost to the Government. Delays caused by semitrailer breakdown due to poor quality of workmanship or material, or failure of the contractor to comply with a specification or drawing requirement, shall not be the basis for adjustment of the contract delivery schedule or the contract price. When specified (see 6.2), the contractor shall recondition the test vehicles, at company facilities, to like new condition after test completion (see 6.6).

TABLE II. 6000 Mile test.

Course	Mileage and speeds <u>2/</u>	Payload (pounds) (actual or simulated) <u>1/</u>
High-speed paved road	1,875 miles at varying speeds up to maximum highway speeds	30,000
Improved gravel road	1,125 miles at varying speeds up to minimum cross-country speed	30,000
Level, substantial road bed, moderate cross country <u>4/</u>	750 miles at varying speeds up to maximum cross country	30,000

MIL-S-62344(AT)

TABLE II. 6000 Mile test. - Continued

Course	Mileage and speeds <u>2/</u>	Payload (pounds) (actual or simulated) <u>1/</u>
Hilly secondary road	1,500 miles at varying speeds up to maximum cross country speed	30,000
Belgian block <u>3/</u>	750 miles at varying speeds up to maximum cross country speed	30,000

1/ Simulated payload of 30,000 pounds shall be securely fastened to the semitrailer in the following position. The center of gravity of the simulated load shall be located centrally across the vehicle, 48 3/8 inches above the loading deck, and 239 inches to the rear of the kingpin center line.

2/ Semitrailer shall be towed at speeds varying up to the maximum safe speed depending on the condition of the test course (see table I).

3/ The first and last 50 miles shall be run without payload.

4/ Tires shall be inflated to 35 psi for cross country operation.

4.4.1 Reliability verification. To determine conformance to 3.2.1, a Mean Miles Between Failure (MMBF) of not less than 6000 miles shall be demonstrated as a point estimate during the initial production test (IPT) specified in paragraph 4.4. The point estimate of the MMBF shall be computed by dividing the total test miles accumulated on all test vehicles by the total number of failures experienced on the vehicles.

4.4.2 Maintainability. To determine conformance to paragraph 3.2.2, the maintainability requirements shall be verified during the 6,000 mile initial production test, over terrain and mileage specified in table II. The test vehicle shall meet specified scheduled and unscheduled maintenance man-hours at required maintenance intervals.

MIL-S-62344(AT)

4.4.3 Test failure. Failure of vehicle as a result of any defect of a workmanship or materials nature during, or as a result of, the 6,000 mile test, shall be cause for rejection of the vehicle. Further, the Government may refuse to continue acceptance of production vehicles until evidence has been provided by the contractor that corrective action has been taken to eliminate the defect. Any defect found during, or as a result of, the 6,000 mile test, shall be prima facie evidence that all vehicles already accepted prior to completion of the 6,000 mile test are similarly defective unless evidence satisfactory to the contracting officer is furnished by the contractor that they are not similarly defective. Such defects on all vehicles shall be corrected by the contractor at no cost to the Government.

MIL-S-62344(AT)

TABLE III. Classification and location of inspections and tests.

Title	Requirements	Initial prod. test - 1/	Quality conformance inspection - 2/	Control test place of - 2/	Comparison test - 1/
Initial production test (IPT)					
Reliability	3.1	4.4			
Maintainability	3.2.1	4.4.1			
Construction	3.2.2	4.4.2			
Seals	3.4	4.8.1	4.8.1	4.8.1	4.8.1
	3.4.1 and	4.8.2			4.8.2
	3.4.2 and		4.8.3	4.8.3	
Electrical circuits	3.4.2.1				
Lights	3.4.2.2	4.8.4	4.8.4	4.8.4	4.8.4
Controls	3.4.3	4.8.5	4.8.5	4.8.5	4.8.5
Adjustment mechanisms	3.4.4	4.8.6	4.8.6	4.8.6	4.8.6
Welding and welding repairs	3.4.5,	4.8.7	4.8.7	4.8.7	
	3.4.5.1 and				
	3.4.5.2				
Lifting attachments	3.4.6	4.8.8	4.8.8	4.8.8	4.8.8
Tie down devices	3.4.7	4.8.9	4.8.9	4.8.9	4.8.9
Tires	3.4.8	4.8.10	4.8.10	4.8.10	4.8.10
Brakes	3.4.9	4.8.11	4.8.11	4.8.11	4.8.11
Fail safe brakes	3.4.9.1	4.8.12	4.8.12	4.8.12	4.8.12
Air lines and fittings	3.4.9.3	4.8.13	4.8.13	4.8.13	4.8.13
Environmental	3.5.1	4.8.14.1			
Highway operations	3.5.2.1	4.8.14.2		4.8.14.2	4.8.14.2
Cross-country operations	3.5.2.2	4.8.14.3			4.8.14.3
Longitudinal inclines	3.5.3.1	4.8.14.4			4.8.14.4
Side slopes	3.5.3.2	4.8.14.5			4.8.14.5
Service brakes	3.5.4.1	4.8.14.6	4.8.14.6	4.8.14.6	4.8.14.6
Automatic actuation	3.5.4.2	4.8.14.7	4.8.14.7	4.8.14.7	4.8.14.7
Fail safe brakes	3.5.4.3	4.8.14.8	4.8.14.8	4.8.14.8	4.8.14.8
Landing legs	3.5.5	4.8.14.9	4.8.14.9	4.8.14.9	4.8.14.9
Turning ability	3.5.6	4.8.14.10	4.8.14.10	4.8.14.10	4.8.14.10
Fording ability	3.5.7	4.8.14.11			4.8.14.11

MIL-S-62344(AT)

TABLE III. Classification and location of inspections and tests . - Continued

Title	Requirements	Initial prod. test - 1/	Quality conformance inspection - 2/	Control test place of - 2/	Comparison test - 1/
Painting	3.6.1		4.8.15.1	4.8.15.1	
Marking	3.6.2		4.8.15.2	4.8.15.2	
Identification plates	3.6.3		4.8.15.3	4.8.15.3	
Rustproofing	3.7		4.8.16	4.8.16	
Safety	3.8	4.8.17			4.8.17
Servicing and adjustment	3.9	4.8.18	4.8.18	4.8.18	4.8.18
Workmanship	3.10	4.8.19	4.8.19	4.8.19	4.8.19
Preservation, packaging and vehicle processing	Section 5		4.8.20	4.8.20	

1/ Government proving grounds.

2/ Place of manufacture.

MIL-S-62344(AT)

4.5 Quality conformance inspection.

4.5.1 One-hundred percent (100 percent) final inspection. Each vehicle produced shall be subject to a complete final inspection by the contractor, in accordance with 4.5.1.1 and 4.5.1.2.

4.5.1.1 Quality conformance examination. Each vehicle shall be inspected by the contractor for the characteristics/defects listed in tables IV and V, utilizing the final inspection record or its equivalent applicable to this vehicle to verify conformance of produced vehicles to the requirements of this specification and applicable drawings.

4.5.1.2 Quality conformance testing. Each vehicle after final inspection, shall be operated for a distance of not less than 10 miles by the contractor and subjected to all quality conformance tests specified in table III. Vehicles shall be completely assembled and serviced prior to road test. Performance of vehicles shall be demonstrated without payload at the place of manufacture, on a smooth, relatively level, hard-surfaced road.

4.5.2 Examination or test failure. If any vehicle fails to pass any examinations or tests specified herein (see 4.5.1.1 and 4.5.1.2), the Government shall withhold acceptance until evidence has been provided by the contractor that corrective action has been taken to correct vehicle deficiencies.

4.5.3 Sampling. When authorized by the Government procuring activity (see 6.2); the contractor may perform final inspection of vehicles on a sampling basis rather than 100 percent inspection as stated in 4.5.1. Sampling and inspection procedures shall be in accordance with 4.5.3.1 through 4.5.6.

4.5.3.1 Lot size. An inspection lot shall consist of all semitrailers from one day's production submitted at one time for acceptance inspection.

4.5.3.2 Sampling for inspection. For the purpose of visual, dimensional, and primary functional inspection, a representative sample shall be selected from each inspection lot, in accordance with inspection level II of MIL-STD-105. Before sampling may be accomplished by the contractor, the contractor shall 100 percent inspect the first 20 semitrailers to establish a process average (see 6.3), to allow normal sampling in accordance with MIL-STD-105.

4.5.4 Quality conformance examination by sampling. Each semitrailer selected by sampling for final inspection shall be inspected by the contractor utilizing the final inspection record or its equivalent applicable to this vehicle to verify conformance of produced semitrailers to the requirements of this specification (see table III) and applicable drawings. Examinations shall be performed against the classification of defects and the acceptable quality levels (AQLs) specified in tables IV and V.

MIL-S-62344(AT)

4.5.5 Quality conformance testing by sampling. Each semitrailer selected by sampling for final inspection shall be operated for a distance of not less than 10 miles by the contractor. Semitrailers, shall be completely assembled and serviced prior to road test. Performance of semitrailers shall be demonstrated without payload at the place of manufacture on a smooth, relatively level, hard-surfaced road to determine conformance to the requirements of table III.

4.5.6 Unclassified defects. All defects that have no effect on function, safety, interchangeability, or life, but that are considered departures from good workmanship will be noted in writing. Workmanship deficiencies falling within this category and recurring in five consecutive lots, or ten lots or more within a thirty-day period, will be added to the minor defects classification with no increase in AQL's.

4.5.7 Recurring deficiencies.

4.5.7.1 Recurring major deficiencies. A major deficiency (see 6.4) is recurring when the same defect occurs more than once in the same sample, or when the defect occurs in two successive samples. A major defect may be considered recurring when the historical inspection records ("P" chart or equivalent) reflects such a condition. Recurring major deficiencies shall be cause for the entire lot or lots to be inspected for the recurring deficiencies. The deficiencies shall be corrected by the contractor when found.

4.5.7.2 Recurring minor deficiencies. A minor deficiency (see 6.4) is recurring if it occurs more than twice in the same sample, or when the defect occurs in four successive samples. Recurring minor deficiencies shall be cause for the entire lot or lots to be inspected for the recurring deficiencies and correction shall be accomplished prior to acceptance.

4.5.8 Examination or test failure. If any semitrailer fails to pass any examination or test (see 4.5.4 and 4.5.5), the Government shall withhold acceptance of all semitrailers until evidence has been provided by the contractor that corrective action has been taken to correct such deficiencies and the conditions that caused the deficiencies. The contractor shall revert to 100 percent inspection, as defined in 4.5.1, until such evidence, deemed satisfactory by the Government, has been provided by the contractor.

MIL-S-62344(AT)

TABLE IV. Major defects AQL - 25 defects/100 units.

Def. no.	Characteristics	Major defects	Method of inspection
101	Frame and gooseneck	Structural and welding defects	Visual
102	Landing gear	Malfunction; extended, restricted, or stowed	Functional
103	Axle	Improper assembly or installation, welding defects	Visual
104	Service brakes	Malfunction; leaks, component damage, nonconformance to stopping distance, breakaway action	Visual and functional
105	Fail safe brakes	Malfunction, nonconformance	Functional
106	Fifth wheel plate and kingpin	Improper mounting and assembly, welding defects	Visual
107	Electrical system components	Malfunction, inoperative; damage	Visual and functional
108	Suspension system components	Damage; malfunction	Visual and functional
109	Wheels and tires	Tire damage, malfunction	Visual and functional

TABLE V. Minor defects AQL - 150 defects/100 units.

Def. no.	Characteristics	Minor defects	Method of inspection
201	Wheels and tires	Improper size, type, or mounting	Visual
202	Wiring, tubing and hose	Improperly coded, protected, assembled, or installed	Visual
203	Brake system components	Improper assembly, installation or adjustment	Visual and functional
204	Electrical system components	Improper assembly or installation	Visual
205	Suspension system components	Improper assembly or installation	Visual
206	Landing gear	Improper assembly or installation	Visual
207	Tiedowns, lashing hooks and lifting devices	Missing, improperly located, welding defects	Visual
208	Platform, stake pockets, lifting eyes, lashing rings, stowage compartments, and tool boxes	Missing, defective wood parts, improper installation, fit or location, welding or rivet defects, sheet metal defects	Visual
209	Paint	Improper application or color	Visual
210	Accessories	Improper assembly, installation or fit, defective	Visual

MIL-S-62344(AT)

TABLE V. Minor defects AQL - 150 defects/100 units. - Continued

Def. no.	Characteristics	Minor defects	Method of inspection
211	Lube fittings	Defective, missing, improperly installed	Visual
212	Decals, data and instruction plates	Missing; incomplete data; improper size or installation	Visual
213	Lubrication	Improper application	Visual
214	Protective coatings	Improper application, materials or coverage	Visual
215	Record forms and publications	Missing, improperly processed	Visual
216	Workmanship	Improper manufacture or assembly, defective material	Visual and functional

4.6 Control tests.

4.6.1 Frequency. The Government shall select at random one semitrailer per month, or one out of each 50 semitrailers submitted, but not more than two in any given 30 day period, for a 50 mile road test by the contractor.

4.6.2 Fifty mile test. Each semitrailer selected, loaded with full or simulated payload and all OVE items, shall be operated for a distance of 50 miles, and subjected to all control tests specified in table III. These tests shall be performed at the place of manufacture by the contractor. The test course shall be relatively smooth, approximately level, hard-surfaced roads.

4.6.2.1 Test failure. If the semitrailer fails to pass any control test, the Government shall stop acceptance examination and testing on subsequent semitrailers until conditions causing the failure have been remedied. Any defect found during, or as a result of, the test shall be prima facie evidence that semitrailers accepted subsequent to the previously accepted control test semitrailer are similarly defective, unless evidence satisfactory to the contracting officer is furnished by the contractor that they are not similarly defective. Such defects on all semitrailers shall be corrected by the contractor at no cost to the Government. Another semitrailer, with corrective actions implemented, shall be subjected to the control test.

4.7 Comparison tests. The Government may select semitrailers at any time during the contract production period and subject them to all applicable tests listed in tables II and III to reveal defects of a workmanship or materials nature that may reduce their effective operation in the field, and to compare existing quality with previous standards. These tests shall be conducted at Government proving grounds designated by the contracting officer. Selection of semitrailers shall be on a spot check basis. Comparison test semitrailers shall be loaded as specified in table I. Semitrailers selected shall not

MIL-S-62344(AT)

include any semitrailer previously tested for conformance to 4.6.2. When specified (see 6.2), the contractor shall recondition test vehicle to like-new condition after test completion.

4.7.1 Test failure. Failure of any semitrailer to comply with specified requirements, or any defects of a workmanship or materials nature, may be cause for refusal to continue acceptance of semitrailers until objective evidence has been provided that corrective action has been taken. Any defects found during, or as a result of, the test shall be prima facie evidence that semitrailers accepted subsequent to the previously accepted comparison test vehicles are similarly defective unless evidence is furnished by the contractor that they are not similarly defective. Such defects on all semitrailers shall be corrected by the contractor at no cost to the Government.

4.8 Methods of examinations and tests.

4.8.1 Frame examination. To determine conformance to 3.4, each semitrailer frame shall be examined for proper assembly. Prior to welding of the top and bottom cover plates, semitrailer frame welds shall be inspected. All frame inspections shall be accomplished prior to application of primer and paint.

4.8.2 Seals examination. To determine conformance to 3.4.1 and 3.4.9.2, during normal and after fording operation (see 4.8.14.11), all bearings and seals as applicable, shall be checked for lubricant leakage.

4.8.3 Electrical circuit examination. To determine conformance to 3.4.2 and 3.4.2.1, current and voltage levels, and continuity of the electrical system shall be examined.

4.8.4 Lighting system examination. To determine conformance to 3.4.2.2, lights shall be operated and examined for functional requirements.

4.8.5 Controls examination. To determine conformance to 3.4.3, all controls shall be operated and examined for functional requirements.

4.8.6 Adjustment mechanism examination. To determine conformance to 3.4.4, all adjustment mechanisms shall be examined for required adjustment and function.

4.8.7 Welding and burning examination. To determine conformance to 3.4.5, 3.4.5.1, and 3.4.5.2, all welding, welding repairs, and burning operations shall be visually inspected for removal of slag, and to determine if approved procedures have been followed.

4.8.8 Lifting attachments examination. To determine conformance to 3.4.6, the fully loaded semitrailer shall be lifted a minimum of 12 inches, held for 15 minutes, and examined for damage to semitrailer and lifting devices.

4.8.9 Tie down device examination. To determine conformance to 3.4.7, all semitrailer tie down devices shall be examined for specification requirements.

MIL-S-62344(AT)

4.8.10 Tire examination. Tires shall be examined to determine conformance to 3.4.8.

4.8.11 Brake examination. To determine conformance to 3.4.9, air brakes shall be operated to determine that the brake on each wheel is operational.

4.8.12 Failsafe brake examination. To determine conformance to 3.4.9.1, the air brake system shall be operated to determine if the failsafe mechanism is functioning on each wheel.

4.8.13 Air lines and fittings examination. To determine conformance to 3.4.9.3, the air lines, fittings, and air system shall be inspected for cleanliness and leakage not exceeding that specified. The installation shall be examined to insure that fittings are properly assembled, and that air lines are not chafing each other or adjacent parts of the vehicle.

4.8.14 Performance. Conditions for performance shall be as specified in 3.5.

4.8.14.1 Environmental operation test. To determine conformance to 3.5.1, chassis shall be operated and stored at specified temperatures. The semitrailer shall evidence no damage as a result of such operation or storage.

4.8.14.2 Highway operation test. To determine conformance to 3.5.2.1, the semitrailer shall be operated as specified on paved and gravel roads, and observed for towing and performance requirements.

4.8.14.3 Cross country operation test. To determine conformance to 3.5.2.2, the semitrailer shall be operated over cross country terrain as specified without damage to the semitrailer or the towing vehicle.

4.8.14.4 Longitudinal grade test. To determine conformance to 3.5.3.1, the semitrailer shall be towed up and down longitudinal grades at cross country speed, and shall meet specified requirements.

4.8.14.5 Side slope test. To determine conformance to 3.5.3.2, the semitrailer shall be towed on side slopes at cross-country speed, and shall meet specified requirements.

4.8.14.6 Service brakes test. To determine conformance to 3.5.4.1, the vehicle combination shall be operated as specified and observed for stopping distance. Stopping distance shall not exceed that specified.

4.8.14.7 Automatic actuation brake test. To determine conformance to 3.5.4.2, the semitrailer and towing vehicle shall be placed on 30 percent grade, and the automatic breakaway device actuated. The brakes shall hold the vehicle stationary for time specified.

MIL-S-62344(AT)

4.8.14.8 Fail safe brake test. To determine conformance to 3.5.4.3, the air brake system shall be operated to determine that the fail safe mechanism is functioning on each wheel.

4.8.14.9 Landing legs test. To determine conformance to 3.5.5, semi-trailer shall be placed on a firm surface and the landing device operated. The towing vehicle shall be coupled and uncoupled, and the landing legs raised and lowered. Landing legs shall perform as specified.

4.8.14.10 Turning and tracking ability test. To determine conformance to 3.5.6, the prime mover shall be coupled to the semitrailer and driven to the prime mover's minimum turning circle to the right and to the left without interference between the prime mover and the towed semitrailer. During road test, tracking ability shall be observed.

4.8.14.11 Fording ability. To determine conformance to 3.5.7, the semi-trailer shall be placed in, or towed through, water crossings at the depth, and for time, specified. All sealed items and bearings shall be examined for water contamination.

4.8.15 Painting, marking and identification plates.

4.8.15.1 Painting. To determine conformance to 3.6.1, preparation and painting shall be examined during and after application.

4.8.15.2 Marking. To determine conformance to 3.6.2, vehicle markings shall be examined.

4.8.15.3 Identification plates. To determine conformance to 3.6.3, all identification plates shall be examined.

4.8.16 Rustproofing. To determine conformance to 3.7, the semitrailer shall be inspected for proper application of rustproofing compound.

4.8.17 Safety. To determine conformance to 3.8, vehicle shall be examined.

4.8.18 Servicing and adjustment. To determine conformance to 3.9, servicing and adjusting of specified systems shall be examined.

4.8.19 Workmanship. To determine conformance to 3.10, each semitrailer shall be examined for evidence of poor workmanship.

4.8.20 Preservation, packaging, and vehicle processing inspection. Material and equipment shall be inspected, prior to shipment, to determine conformance to the applicable requirements in Section 5 of this specification.

MIL-S-62344(AT)

5. PACKAGING

5.1 Vehicle processing. Vehicles shall be preserved and processed for shipment and storage in accordance with the applicable equipment preservation data sheet (EPDS) for the level(s) of protection specified by the procuring activity (see 6.2).

6. NOTES

6.1 Intended use. The XM974 semitrailer towed by the 5 ton tractor wrecker XM819, or other acceptable prime mover, is intended for use in the PATRIOT Air Defense System as the Missile Round Transporter (MRT) or as the Large Repair Parts Transporter (LRPT). The XM974, as manufactured in accordance with this specification, is not completely prepared to accept payloads. The frame must be machined (holes drilled) and the associated adaptor kit(s) mounted for each role the semitrailer has to play. The MRT and LRPT are Missile System Support Equipment vehicles which provide respectively; a capability to deliver and load resupplied missile rounds (MRs), and a means to transport and store large, heavy repair parts. The MRT has a capacity of four missile rounds, and the integral crane on the tractor-wrecker has the capability of transferring the MRs from one semitrailer to a missile launcher. Stowage space is also provided on the LRPT for items of handling equipment needed to move heavy repair parts.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. Preproduction model, if required (see 3.1).
- c. Data plate information, if different (see 3.6.3).
- d. When sampling for acceptance inspection is authorized (see 4.5.3).
- e. If recondition of test vehicle is required (see 4.4 and 4.7).
- f. Selection of level(s) of protection (see 5.1).

6.3 Process average. Sampling may be initiated if the process average value for the first twenty vehicles inspected is less than the AQL specified in the classification of defects for major and minor defects.

$$\text{Process average} = \frac{\text{Number of defects}}{\text{Number of vehicles inspected}} \times 100$$

If the computed process average exceeds the specified AQL, 100 percent inspection shall be performed and continued until such time that the process average for twenty consecutive vehicles is less than the specified AQL.

6.4 Deficiency sheet. The Government inspector shall verify that a thorough inspection of each semitrailer is performed by the contractor for the listed characteristics, and for any departures from good workmanship. The Government inspector shall assure that all defects encountered during

MIL-S-62344(AT)

inspection are enumerated on deficiency sheet for the semitrailer. Defects noted on a Deficiency Sheet shall contain sufficient description to enable the Government inspector and the contractor's representative to classify the defects in accordance with the classification of defects (see tables IV and V) and definitions contained in MIL-STD-105. Corrective action shall be taken for recurring defects.

6.5 Failure definition. Failure of the semitrailer is defined as inability to perform its specified operational functions during emplacement or mobile events. Accordingly, semitrailer failure is a function of the PATRIOT Air Defense System Missile Round Transporter (MRT), and Large Repair Parts Transporter (LRPT), mission events; that is, air defense mission, march order, road march, and emplacement.

6.5.1 Failure classifications. Failure incidents shall be classified for reliability assessment purposes as:

a. Chargeable failures (relevant).

- (1) Mission essential.
- (2) Non-mission essential.

6.5.2 Scoring criteria. Scoring criteria shall be as follows:

a. Chargeable failures (relevant).

- (1) Failures resulting from workmanship defects.
- (2) Failures which occur during maintenance action, and are not induced by the maintenance action.
- (3) Failures which require component replacement or adjustment at other than prescribed intervals.
- (4) Failures which are caused by poor human factors design.
- (5) All independent, chargeable, simultaneous failures.
- (6) All semitrailer incidents which would result in the inability of the MRT and LRPT to complete air defense mission events, even though there is "no evidence of hardware failure", shall be scored.
- (7) Semitrailer failures which are functionally redundant, or do not singularly prohibit completion of air defense mission events; that is, "relevant (non-mission essential)", shall be scored in determining the MTBF of the semitrailer.

MIL-S-62344(AT)

b. Non-chargeable failures (non-relevant).

- (1) Secondary failures induced by chargeable primary failures.
- (2) Failures which occur as a result of incorrect test or peculiar maintenance activities.
- (3) Failures which occur as a result of misuse or abuse.
- (4) Failures resulting from the failure to perform prescribed preventive maintenance.
- (5) Failures resulting from system operation outside established requirements.
- (6) Failures occurring during a prescribed maintenance action, and induced by the maintenance action.

6.6 Like-new condition. A "like-new condition" is when the test vehicles, upon completion of contractor reconditioning, conform to all requirements of the final inspection record (FIR); and component wear tolerances specified in the vehicle technical manual are not exceeded.

6.7 Recycled materials. The use of recycled materials, which meet the requirements of the applicable material specifications without jeopardizing the intended use of the item, shall be encouraged (see 3.3).

6.8 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

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