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INCH-POUND

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PERFORMANCE SPECIFICATION

TRAILER, TANK: POTABLE WATER, 400-GALLON, 2-WHEEL, M149A2

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

1. SCOPE

1.1 Scope. This specification covers 1-1/2-ton, 2-wheel, 400-gallon (1514 liters (L)) capacity water trailer for transporting potable (drinkable) water (see 6.1).

2. APPLICABLE DOCUMENTS

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

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Tank-automotive and Armaments Command, ATTN: AMSTA-TR-E/BLUE, Warren, MI 48397-5000 by using the Standardization Document Improvement Proposal (DD Form 1426), appearing at the end of this document, or by letter.

AMSC N/A FSC 2330

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2.2 Government documents.

2.2.1 Specifications and standards. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

VV-L-800 - Lubricating Oil, General Purpose, Preservative (Water-Displacing, Low Temperature).

DEPARTMENT OF DEFENSE

MIL-P-514 - Plate, Identification, Instruction and Marking Blank.
MIL-L-3150 - Lubricating Oil, Preservative, Medium.
MIL-G-10924 - Grease, Automotive and Artillery.
MIL-G-23827 - Grease, Aircraft and Instrument, Gear and Actuator Screw.
MIL-B-46176 - Brake Fluid, Silicone Automotive, All Weather.
MIL-C-46168 - Coating, Aliphatic Polyrethane, Chemical Agent Resistant.

STANDARDS

FEDERAL

FED-STD-595 - Colors.

DEPARTMENT OF DEFENSE

MIL-STD-193 - Paint Procedure and Marking for Vehicles.
MIL-STD-209 - Slinging and Tiedown Provisions for Lifting and Tying Down Military Equipment.
MIL-STD-642 - Identification Marking of Combat and Tactical Transport Vehicles.
MIL-STD-1791 - Designing for Internal Aerial Delivery in Fixed Wing Aircraft.

(Unless otherwise indicated, copies of the above specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DRAWINGS

ARMY

8736769	- M756A2, 2-1/2 Ton, 6x6 Cargo Truck.
8750052	- Trailer, Tank.
12269886	- Tank, Water.

(Copies of these drawings are available from the U.S. Army Tank-automotive and Armaments Command, AMSTA-TR-E/BLUE, Warren, MI 48397-5000.)

FEDERAL MOTOR CARRIERS SAFETY REGULATIONS (FMCSR)

393.70 - Department of Transportation and Regulations.

(Application for copies should be addressed to the Department of Transportation (DOT), Federal Highway Administration, Washington, D.C. 20420.)

2.3 Non-Government publications. The following document forms a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR QUALITY CONTROL (ASQC)

ASQC Z1.4 - Sampling Procedures and Tables for Inspection by Attributes.

(Application for copies should be addressed to the American Society for Quality Control, 611 E. Wisconsin Avenue, Milwaukee, WI 53202-4606.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D2000 - Rubber Products in Automotive Applications.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

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AMERICAN WELDING SOCIETY (AWS)

AWS B2.1 - Standard for Welding Procedures and Performance Qualification.

(Application for copies should be addressed to American Welding Society, 550 N.W. LeJeune, P.O. Box 351040, Miami, FL 33135.)

SOCIETY OF AUTOMOTIVE ENGINEERS, INC. (SAE)

SAE J585 - Tail Lamps (Rear Position Lamps).
SAE J594 - Reflectors, Standard.
SAE J1398 - Stop Lamps for Use on Motor Vehicles 80 Inches or More in Overall Width, Standard.

(Application for copies should be addressed to the Society of Automotive Engineers, Inc., Commonwealth Drive, Warrendale, PA 15096-0001.)

TIRE AND RIM ASSOCIATION, INC.

Yearbook.

(Application for copies should be addressed to the Tire and Rim Association, Inc., 175 Montrose West Avenue, Copley, OH 44321.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 4.3 and 6.2), a first article sample shall be subjected to first article inspection in accordance with 4.4. First article inspection samples, properly marked with identifying information shall be representative of the unit to be furnished to the Government. All subsequent trailers delivered to the Government shall conform to these samples in all of their pertinent physical and performance attributes.

3.2 Reliability. Trailers shall have a specified value of 3000 mean miles (4830 kilometers (km)) between failure (MMBF) which shall be demonstrated during testing. For calculation of MMBF (see 4.4.7.2), a failure shall be defined as a condition which:

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a. Prevents operation.
b. Reduces performance below essential levels.
c. Further operation would be unsafe.
d. Further operation might result in extensive damage to the equipment.

Any of the above conditions which cannot be corrected in 30 minutes using tools or parts normally carried on the trailer or towing vehicle constitutes a failure. Maintenance and human induced failures are excluded.

3.2.1 Operational profile. Apportioned test mileage shall be as follows:

a. 40 percent hard surfaced road
b. 27 percent gravel and dirt roads
c. 25 percent level cross-country road
d. 6 percent hilly cross-country road
e. 2 percent Belgian block road.

3.2.2 Failure. A failure is any malfunction of an end item requiring overhaul, replacement, rebuild, salvage, or other corrective action as prescribed by maintenance manual which cannot be deferred for the remainder of the 3000 miles.

3.2.3 Corrective action. Corrective action is not deferred if malfunction causes (or would cause if not corrected):

a. Inability to commence operation, or cessation of operation.
b. Inability to conform to requirements of specification.
c. Critical or catastrophic hazard.

3.2.4 Malfunction. Any malfunction which the operator or crew can remedy will not be considered a failure provided that the repair is authorized or prescribed as an operator function and can be accomplished within 15 minutes using controls, tools, or spare parts incorporated in, or carried with the end item or its prime mover.

3.3 Maintainability. Total maintenance, excluding driver and crew checks and services, shall not exceed 3 man-hours during 3,000 miles of operation. This equates to a maintenance ratio of 0.02 at 20 operational miles (32.2 km); equivalent to one operational hour. The scheduled maintenance interval shall be 3 months or 3,000 miles, whichever comes first (see 4.4.7.3).

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3.4 Materials. Materials used shall be in accordance with the manufacturer's materials specifications for trailer chassis and water tank. The materials shall be capable of meeting all of the operational and environmental requirements specified herein. Recovered materials shall be used to the maximum extent practicable (see 4.2, 6.7, and 6.8).

3.4.1 Ozone resistance. All rubber components which are under tension or which may be flexed shall be ozone resistant as specified in ASTM D2000.

3.4.2 Dissimilar metals. Dissimilar metals which could cause galvanic action shall be protected using the manufacturer's standard process.

3.5 Design and construction. The trailer design and construction shall be in accordance with applicable Drawings 8750052 and 12269886. The trailer shall be equipped with a bracket to allow heating with the standard M67 immersion heater (see 6.2). The water trailer braking, towing and electrical systems shall interface with the M756A2, 2-1/2 ton, 6x6, towing vehicle, Drawing Number 8736769, to insure full compatibility. If more than one unit of a particular component is used in the water tank design, the component used shall be identical in make, material and quality. Riveting, welding practices and quality shall be the same on each unit. Asbestos materials shall not be used in any form in any part of the water trailer.

3.5.1 Seals. Seals shall restrict leaking of lubricants from bearings when fording or operating in mud, sand or snow and prevent entrance of contaminants into bearings (see 4.6.1.1).

3.5.2 Electrical.

3.5.2.1 Electrical circuits. Electrical circuits shall maintain continuity without evidence of internal or external shorts during all trailer operating conditions (see 4.6.1.2).

3.5.2.2 Tail lamps and stop lamps. Tail lamps and stop lamps shall be capable of operation throughout all trailer operating conditions and shall meet the requirements of SAE J585 and J1398, respectively (see 4.6.1.3).

3.5.3 Controls. Electrical, mechanical, and hydraulic controls shall operate without malfunction, throughout all ranges of operation (see 4.6.1.4).

3.5.4 Adjustment mechanisms. Adjustment mechanisms shall function properly and maintain adjustment settings during all trailer operating conditions (see 4.6.1.5).

3.5.5 Welding. Welding shall conform to AWS B2.1 practices. The welds shall be in accordance with good commercial practices (see 4.6.1.6).

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3.5.5.1 Welding repairs. Welding repairs of any type or class shall be made only when specifically authorized by the acquisition activity (see 4.6.1.6).

3.5.6 Wheels, rims, tires and inner tubes. The trailer shall be equipped with single wheels. Rim and tire ratings shall conform to Tire and Rim Association recommendations for the type, size and ply of the tires furnished.

3.5.6.1 Tires. Tube type, bias ply, standard profile tires with sufficient load carrying capacity for the trailer gross vehicle weight (GVW) shall be furnished. Tires shall have nondirectional mud and snow tread design and shall withstand the extreme environment temperatures as specified in 3.8 (see 4.6.1.7).

3.5.6.2 Inner tubes. Inner tubes shall be of the heavy duty type and shall be of the proper size for tire furnished. Tire flaps shall be provided in accordance with Tire and Rim Association recommendations (see 4.6.1.7).

3.5.7 Air, hydraulic lines, and fittings. Air, hydraulic lines, and fittings shall be free from leaks and mounted in such a manner to prevent damage during vehicle operating conditions (see 4.6.1.8).

3.5.8 Water tank construction. The water tank shall be fabricated in accordance with the applicable drawings and specifications. The water tank shall have a useable capacity of not less than 400 gallons. The water tank shall be free from leakage during all conditions of trailer operations (see 4.6.1.9).

3.5.9 Tank fittings, piping and faucets. The water tank fittings, piping and faucet hardware shall be equivalent to the hardware offered by manufacturer on similar commercial truck or trailer mounted water tank vehicles. The tank fittings, piping and faucet hardware shall be free from leakage during all conditions of trailer operation (see 4.6.1.10).

3.5.10 Tank insulation. There shall be no voids in the tank insulation (see 4.6.1.11).

3.5.11 Reflectors. The rear of the trailer shall be equipped with reflectors in accordance with SAE J594 (see 4.6.1.25).

3.5.12 Repair/spare parts interchangeability. All trailer repair/spare parts listed in the M149A2 maintenance manuals shall be used by the current manufacturer and shall be assigned the same military part numbers.

3.6 Performance. The trailer shall meet the performance requirements of this specification when equipped as specified herein, loaded with rated payload, serviced with

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products specified in table I, and towed by a tactical cargo truck, 2-1/2 ton, 6x6, carrying rated payloads (see 4.6.1.12).

3.6.1 Highway operation. The trailer shall provide satisfactory operation over relatively smooth, hard-surfaced roads when loaded with 400 gallons (1514 liters (L)) of water, at a sustained speed of 50 miles per hour (80.5 km/h) (see 4.6.1.12).

3.6.2 Cross-country operation. The trailer shall provide satisfactory operation over unimproved roads, open, rolling, or hilly terrains when loaded with 400 gallons (1514 L) of water at a sustained speed of 20 mph (32.2 km/h) (see 4.6.1.12).

3.6.3 Longitudinal grades. The trailer, when loaded with 400 gallons of water, shall follow a towing vehicle at a sustained speed of 20 mph without sliding, shifting, or deviating more than 3 inches (7.62 centimeters (cm)) to either side of the towing vehicle. The vehicle combination shall be capable of ascending or descending longitudinal grades up to 40 percent (see 4.6.1.13.1).

3.6.4 Side slopes. The trailer shall follow the towing vehicle without slipping or upsetting. The trailer shall be operated alternately on side slopes having a 20 percent grade to the left and right (see 4.6.1.13.2).

3.6.5 Tracking ability. The trailer shall be loaded with 400 gallons of water and operated at applicable rated speeds specified herein. When operated in a straight line on a level, smooth, paved surface, the path of the vehicle shall not deviate more than 3 inches on either side of the towing vehicle (see 4.6.1.12).

3.6.6 Brakes.

3.6.6.1 Service brakes. Combined service brakes of the loaded trailer and towing vehicle shall be capable of bringing the combination to a stop within a distance of 30 feet (9.14 m), from a speed of 20 miles per hour on dry, smooth and level road, free from loose material. Application of brakes on both wheels of trailer shall be concurrent (see 4.6.1.14).

3.6.6.2 Automatic brake actuator. The trailer shall be equipped with an automatic actuating device to apply the trailer brakes upon breakaway from the towing vehicle, maintain application of the brakes, and hold the trailer stationary on a 20-percent grade for not less than 15 minutes (see 4.6.1.15).

3.6.6.3 Parking brake. The manually operated parking brake shall be capable of restraining the loaded trailer on a 30-percent grade when coupled to the prime mover in an ascending or descendant mode (see 4.6.1.16).

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3.6.7 Landing device. The manually operated, swing-up, vertically adjustable landing wheel shall have adequate capacity to support the fully loaded trailer and shall withstand, without damage, the strains imposed upon it when coupling or uncoupling the towing vehicle (see 4.6.1.17).

3.6.8 Turning ability. When coupled to the prime mover operating in its minimum turning circle, the trailer shall follow without cramping and damage to the towed trailer or prime mover, and without interference between the towed trailer and prime mover (see 4.6.1.18).

3.6.9 Fording. The trailer shall ford hard-bottomed salt or fresh water crossings up to 30 inches (76.2 cm) deep for a period of not less than 15 minutes. All components subject to water damage shall be sealed or protected from adverse effects due to immersion (see 4.6.1.19).

3.7 Safety chains. The trailer shall be equipped with two safety chains conforming to Federal Motor Carrier Safety Regulation 393.70.

3.8 Environmental. The trailer shall be capable of operating, with 400 gallons of water, under extreme weather conditions and altitudes in ambient air temperature from 135 degrees Fahrenheit (°F) (57.2 degrees Celsius (°C)) down to -65°F (-53.9°C), without deterioration. When in storage, the trailer shall withstand these extremes, without deterioration that may cause failure of any component of the trailer (see 4.6.1.20).

3.9 Service products. Servicing and lubrication shall be performed using service products listed in table I.

TABLE I. Service products.

Product use	Ambient air temperature	
	-65°F to 0°F (-53.9°C to -17.8°C)	-10°F to 135°F (-23.3°C to 57.2°C)
Oil: for hydraulic brakes for general purpose lubrication	MIL-B-46176 VV-L-800	MIL-B-46176 MIL-L-3150
Grease: for sealed bearing for general chassis lubrication including wheel bearings	MIL-G-23827 MIL-G-10924	MIL-G-23827 MIL-G-10924

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3.10 Painting and rustproofing.

3.10.1 Painting. Except as otherwise specified (see 6.2), all conditioning, priming, and painting shall conform to MIL-STD-193. Colors shall conform to appropriate color chip in accordance with FED-STD-595. The exterior of the trailer shall be painted using chemical agent resistant coating (CARC) conforming to MIL-C-46168 (see 4.6.1.21).

3.10.2 Rustproofing. The trailer shall be rustproofed in the areas shown on applicable trailer drawings using the manufacturer's standard process (see 4.6.1.22).

3.11 Marking.

3.11.1 Trailer. Unless otherwise specified (see 6.2), trailer marking shall be in accordance with MIL-STD-642 (see 4.6.1.23).

3.11.2 Components. All parts, assemblies and sub-assemblies requiring identification shall include data plates (see 3.11.3) containing the following information:

a. Part number
b. Manufacturer's identification
c. Serial number
d. Military part number
e. Federal stock number
f. Manufacturer's part number
g. Date of manufacture
h. Contract number
i. U.S.

3.11.3 Name, shipping and service data plates. Unless otherwise specified (see 6.2), data plates shall conform to MIL-P-514 (see 4.6.1.24).

3.12 Safety. Conditions shall not exist that may create a hazard to operating or maintenance personnel (see 4.6.1.25).

3.13 Servicing and adjusting. Prior to acceptance of trailers by the Government, the contractor shall adjust and service each trailer for immediate operational use including the following: adjust braking system, check electrical system, inflate tires, and completely lubricate trailer and all running gear with grades of lubricants recommended for ambient temperature at the delivery point (see table I) (see 4.6.1.26).

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3.14 Lifting and tiedown attachments. When specified (see 6.2), the unit shall be equipped with lifting and tiedown attachments. Lifting and tiedown attachments shall conform to type II or type III of MIL-STD-209. A nonferrous transportation plate shall be provided and mechanically attached to the unit. Transportation plates shall be inscribed with a diagram showing the lifting attachments and lifting slings, the capacity of each attachment, and the required length and size of each sling cable. A silhouette of the item furnished showing the center of gravity shall be provided on the transportation plate. Tiedown attachments may be identified by stenciling or other suitable marking. Tiedown marking shall clearly indicate that the attachments are intended for the tiedown of the unit on the carrier when shipped (see 4.6.1.27).

3.15 Air transportability. When specified (see 6.2), the unit shall meet the air transportability requirements in accordance with MIL-STD-1791 (see 4.6.1.27).

3.16 Workmanship. Quality of workmanship shall assure the trailer and all components are free from defects that compromise, limit, or reduce capability. In addition to appearance, defects listed in tables III and IV shall be considered cause for failure. Defective components. parts, and assemblies which have been repaired or modified shall not be furnished (see 4.6.1.28).

4. VERIFICATION

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

a. First article inspection (see 4.3).
b. Conformance inspection (see 4.5).
   1. Acceptance tests (see 4.5.3.1).
   2. Control tests (see 4.5.3.2).
   3. Comparison tests (see 4.5.3.3).

4.2 Materials. The contractor records shall be reviewed to determine conformance with 3.4 through 3.4.2.

4.2.1 Interchangeable repair/spare parts. The repair/spare parts specified (see 3.5.12) shall be inspected for conformance to the requirements of their respective drawings contained in the M149A2 trailer technical data package, drawing number 8750052.

4.3 First article inspection. First article inspections are categorized as preproduction inspection or initial production inspection. Approval of the first article sample by the Government shall not relieve the contractor of the obligation to supply trailers that are fully representative of those inspected as a first article sample. Any changes or deviation of the

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production units from the first article sample shall be subject to the approval of the contracting officer.

4.3.1 Preproduction inspection. When specified (see 6.2), the preproduction sample shall consist of one trailer. Preproduction inspection shall consist of examinations as specified in table IV and tests specified in table III.

4.3.2 Initial production inspection. Unless otherwise specified (see 6.2 and 6.3.1) on beginning production, three vehicles shall undergo, and shall pass, initial production inspection. One vehicle shall undergo first production vehicle inspection, and the second and third vehicles will be subjected to initial production test.

4.3.3 First article inspection failure. Failure of any first article sample to pass specified examinations or tests shall be cause for refusal to grant first article approval until corrective action by the contractor has been approved by the Government.

4.4 First production vehicle inspection.

4.4.1 In-process examination. During fabrication of the first production vehicle, an in-process examination will be conducted by representatives of TACOM Product Assurance Directorate to evaluate conformance of materials and workmanship to specified requirements. Examination will be made at the contractor's facility prior to application of primer and paint. Processing and welding procedures, quality system, and inspection records will be evaluated during this examination.

4.4.2 Completed first production vehicle contractor inspection. The first completed production vehicle shall be road tested and inspected by the contractor as specified in 4.5.3.2 to determine conformance to contract and specifications. After inspection, the contractor shall submit the vehicle (and all inspection, records and certifications) to the responsible Government inspection element at contractor's facility for preliminary examination.

4.4.3 Preliminary examination. The responsible Government inspection element will conduct a preliminary examination, as specified in 4.4.7.3 and 4.4.7.4, of the first completed production vehicle.

4.4.4 Provisional inspection. Provisional inspection of the first completed production vehicle shall be conducted jointly by representatives of TACOM Product Assurance Directorate and the responsible Government inspection element. Contractor shall provide any required assistance. Testing shall be as specified in 4.5.3.2. Contractor shall make available his inspection plan, records, and certifications pertinent to the vehicle and components.

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

4.4.6 Vehicle disposition. On completion of first production vehicle inspection, the vehicle shall remain at the manufacturing facility as a production sample and shall be the last vehicle shipped on contract. Vehicle may be released sooner at the discretion of the Government. The contractor shall service and maintain vehicle during this period.

4.4.7 Final approval and acceptance. Final approval and acceptance by the Government of the first vehicle of a specific model shall be withheld until completion of the initial production test and a final determination has been made regarding conformity of the vehicle to requirements. This shall include, but not be limited, to workmanship and materials.

4.4.7.1 Initial production test. Unless otherwise specified to determine conformance to section 3 (inclusive) after completion of the first production trailer inspection, two trailers selected from the first month's production or two of the first ten trailers shall be subjected to the examinations specified in table IV and all tests specified in table III. Subsequent to examination and tests, the selected vehicles shall be subjected to a test of 3000 miles as specified in table II, at a site approved by the Government, which will require a maximum of 90 days. These test 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.

4.4.7.2 Reliability verification. To determine conformance to 3.2, reliability shall be verified at a 60-percent confidence level while vehicles are subjected to 3000-mile initial production road test (see 4.4.7.1).

4.4.7.3 Maintainability verification. To determine conformance to 3.3, maintainability shall be verified during 3000-mile initial production road test (see 4.4.7.1). Maintenance shall be performed by the Government at a Government approved test site.

4.4.7.4 Failure. Failure of vehicles to conform to requirements during, or after 3000-mile initial production road test, shall be cause for rejection of vehicles. The Government may refuse to accept further production vehicles until evidence is provided by the contractor that corrective action has been taken. Defects found during, or after 3000-mile road test, shall be cause for rejection until evidence to the contrary is provided by the contractor and approved by the Government. All defects shall be corrected on all vehicles by the contractor at no cost to the Government.

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TABLE II. Three thousand mile test.

Course	Mileage and speeds	Trailer payload
Hard paved surface	1,200 miles @ variable speeds up to 50 mph (80.7 km/h)	Rated payload
Gravel and dirt roads	810 miles @ variable speeds up to 30 mph (48.3 km/h)	Rated payload
Level cross-country	750 miles @ variable speeds up to required cross-country speed	Rated payload
Hilly cross-country	180 miles @ variable speeds up to required cross-country speed	Rated payload
Belgian block	60 miles @ speeds applicable to semitrailer characteristics	Rated payload

TABLE III. Tests.

Title	Paragraph number	Place of manufacture	Government proving grounds
Acceptance tests:	4.5.3.1		
Five mile road test	4.5.3.1.2	X	X
Seals	4.6.1.1	X	X
Electric circuits	4.6.1.2	X	X
Lights	4.6.1.3	X	X
Welding	4.6.1.6	X	X
Tires & tubes	4.6.1.7	X	X
Air, hydraulic lines and fittings	4.6.1.8	X	X
Inner tank construction	4.6.1.9	X	X
Tank insulation	4.6.1.11	X	X
Service brake	4.6.1.14	X	X
Landing device	4.6.1.17	X	X
Turning check	4.6.1.18	X	X
Treatment and painting	4.6.1.21	X	X
Rustproofing	4.6.1.22	X	X
Marking	4.6.1.23	X	X
Data plates	4.6.1.24	X	X

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TABLE III. Tests - Continued.

Title	Paragraph number	Place of manufacture	Government proving grounds
Control tests:	4.5.3.2	X	X
Tank and pipe leakage	4.6.1.10	X	X
Automatic brake actuation	4.6.1.15	X	X
Parking brake	4.6.1.16	X	X
Comparison tests:	4.5.3.3		X
Gradeability	4.6.1.13		X
Ambient conditions	4.6.1.20		X
Fording	4.6.1.19		X
Safety	4.6.1.25		X

TABLE IV. Classification of defects.

Category	Defect	Method of examination
Major:		
101	Structural, welding, riveting or sheet metal defects to frame (see 3.5).	Visual
102	Malfunction, improper locking action, raised or lowered to landing device (see 3.6.7).	Functional
103	Improper assembly and mounting; welding defects to axles (see 3.5 and 3.5.5).	Visual and functional
104	Structural defects; improper fabrication, leaks and insulation voids to tank and components (see 3.5.8 thru 3.5.10).	Visual and functional
105	Malfunction; leaks; nonconformance to stopping distance of service brakes (see 3.6.6.1).	Visual and functional
106	Malfunction; nonconformance to holding automatic brake actuation (see 3.6.6.2).	Visual and functional
107	Malfunction; nonconformance to holding parking brake (see 3.6.6.3).	Visual and functional
108	Malfunction; improper fabrication; leaks to tank valve and control operation (3.5.9).	Visual and functional
109	Malfunction; inoperative; damaged electrical system components (see 3.5.2).	Visual and functional

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TABLE IV. Classification of defects - Continued.

Category	Defect	Method of examination
110	Damage; leaks to suspension system components (see 3.5).	Visual and functional
111	Damage and malfunction to wheels and tires (see 3.5.6).	Visual and functional
112	Damage; improper lengths to intervehicle hose, cables or tubing (see 3.5).	Visual and functional
113	Casting defects; improper size and installation of lunette eye (see 3.5).	Visual and functional
114	Nonconformance to trailing ability (see 3.6.5).	Functional
115	Nonconformance to turning ability (see 3.6.8).	Functional
116	Nonconformance to towing speed, highway (see 3.6.1).	Functional
117	Damage; missing accessories (see 3.5).	Functional
118	Overheating operating units (see 3.8).	Functional touch
119	Improper paint, compounding, or curing of paint (see 3.10.1).	Visual and functional
120	Nonconformance to lifting and tiedown attachments (see 3.14).	Visual and functional
121	Nonconformance to air transportability requirements (see 3.15).	Visual and functional
Minor:		
201	Mounting, balance, inflation or improper size type of wheels and tires (see 3.5.6 and 3.13).	Visual
202	Improperly mounted, coded, or protected defective wiring or tubing (see 3.5).	Visual and functional
203	Improper assembly or installation of brake system, clearance inadequate (see 3.6.6).	Visual and functional
204	Improper assembly or installation of electrical system components (see 3.5.2).	Visual and functional
205	Improper assembly or installation of suspension system components (see 3.5).	Visual
206	Improper assembly or installation of landing device (see 3.5).	Visual
207	Missing; defective; improper assembly or installation of reflectors (see 3.5.11).	Visual

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TABLE IV. Classification of defects - Continued.

Category	Defect	Method of examination
208	Nonconformance or incomplete servicing and adjusting (see 3.13).	Visual
209	Application or color improper paint (see 3.10.1).	Visual and functional
210	Defective; missing; improper installation of lubrication fitting (see 3.5).	Visual and functional
211	Incomplete date; missing; improper location or size of decal markings, data and instruction plates (see 3.11).	Visual and functional
212	Improper lubrication (see 3.9).	Visual
213	Application, coverage or materials improper of protective coating (see 3.10).	Visual
214	Missing; improperly processed or secured tools (see 3.5.12).	Visual
215	Missing; improperly processed record forms and publications (see 4.2).	Visual

4.5 Conformance inspection.

4.5.1 Lot size. An inspection lot shall consist of trailers of a specific model, of one type, from an identifiable production period submitted at one-time for inspection.

4.5.2 Conformance examination.

4.5.2.1 Sampling for conformance examination. The contractor shall 100 percent examine the first 20 trailers of each model excluding first article and initial production samples. Thereafter, samples shall be selected from each lot in accordance with ASQC Z1.4.

4.5.2.2 Service and adjustments. Prior to examination, the contractor shall service and adjust each trailer for immediate operational use as specified herein (see 3.13 and table I).

4.5.2.3 Classification of defects. For examination purposes, defects shall be classified as specified in table IV. Visual, dimensional, and primary functional examination shall consist of examination of vehicles for conformance to applicable drawings and specifications. Examination shall be performed during all phases of manufacturing and road tests. The following constitutes a part of the classification of defects (see 6.5).

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4.5.2.4 Major defects. Major defects shall be cause for the entire lot or lots to be inspected for the defects.

4.5.2.5 Minor defects. Minor defects shall be cause for the entire lot or lots to be inspected for the defects.

4.5.2.6 Unclassified defects. Defects considered to be departures from good workmanship, but having no bearing on function, safety, interchangeability, or life shall be noted in writing. Unclassified defects shall be cause for the entire lot or lots to be inspected for the unclassified defect.

4.5.3 Conformance tests.

4.5.3.1 Acceptance tests.

4.5.3.1.1 Sampling for acceptance testing. Samples for acceptance testing shall be selected in accordance with ASQC Z1.4.

4.5.3.1.2 Acceptance testing. Sample trailers selected in accordance with 4.5.3.1.1 shall be examined as specified in 4.5.2, and tested in accordance with the acceptance tests of table III. Trailers shall be assembled and serviced with lubricants and fluids of table I and shall be connected to a prime mover and towed 5 miles (8.05 km) without payload over highway or unpaved roads.

4.5.3.1.3 Failure. Failure to pass acceptance tests specified herein shall be cause for the Government to withhold acceptance until evidence of corrective action has been taken by the contractor and approved by the Government.

4.5.3.2 Control tests.

4.5.3.2.1 Sampling for control testing. Unless otherwise specified (see 6.2), the Government shall select one of each 100 trailers produced, but not more than two in any 30-day period.

4.5.3.2.2 Control testing. The Government shall select, at random for road test by the contractor, one out of each 100 vehicles submitted, but not more than two vehicles in any given 30-day period, for a distance of 50 miles with full or simulated payload. Vehicles shall be subjected to tests in table III.

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4.5.3.2.3 Failure. Failure to pass control test specified herein shall be cause for the Government to withhold acceptance until evidence of corrective action has been taken by the contractor and approved by the Government.

4.5.3.3 Comparison tests.

4.5.3.3.1 Sampling for comparison testing. Trailers shall be selected by the Government at any time during contract production periods.

4.5.3.3.2 Comparison testing. The Government may select vehicles at any time during the contract production period for testing in accordance with table III. Tests shall be conducted by the Government at a site selected or approved by the Government.

4.5.3.3.3 Failure. Failure to pass comparison test specified herein shall be cause for the Government to withhold acceptance until evidence of corrective action taken has been provided by the contractor and approved by the Government.

4.6 Method of inspection.

4.6.1 Examinations. The following examinations shall be performed during and after road tests and after fording tests.

4.6.1.1 Seals examination. To determine conformance to 3.5.1, the trailer shall be examined for lubricant leakage. After the 3000-mile road test, the seals shall be examined for leakage and the lubricant examined for contamination.

4.6.1.2 Electrical circuit examination. To determine conformance to 3.5.2.1, current and voltage output levels of circuits supplying trailer electrical system shall be examined.

4.6.1.3 Light examination. To determine conformance to 3.5.2.2, lights shall be operated and examined during and after the 5-mile test.

4.6.1.4 Controls examination. To determine conformance to 3.5.3, all controls shall be actuated and their effects observed.

4.6.1.5 Adjustment mechanisms examination. To determine conformance to 3.5.4, mechanisms shall be adjusted and set before tests. During and after tests, settings shall be examined for changes.

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4.6.1.6 Welding, repairs and burning examination. To determine conformance to 3.5.5 and 3.5.5.1, all welding, welding repairs and burning operations shall be examined to determine that slag has been removed and approved procedures have been followed.

4.6.1.7 Tire and tube examination. To determine conformance to 3.5.6.1 and 3.5.6.2, tires and tubes shall be examined.

4.6.1.8 Air, hydraulic lines and fitting test. To determine conformance to 3.5.7, all air, hydraulic lines and fittings shall be examined for proper installation and leaks.

4.6.1.9 Inner tank construction. To determine conformance to 3.5.8, all inner tanks shall be tested for leaks at a pressure of at least 3 psi (20.68 kPa) by the air pressure, soap bubble method. All welded seams, joints and piping shall be coated with a soap and water solution and inspected for leaks. Units prepared to correct leaks shall be retested in accordance with the above procedure.

4.6.1.10 Tank fitting, piping and faucet leakage test. To determine conformance to 3.5.9, with 400 gallons of water in the tank, the trailer shall be operated on a highway type roadway. During or after test, no visible liquid leakage shall be in evidence. Should leaks or defects be noted, they shall be repaired or reported, respectively, and the test repeated. The tank must be approved by the U.S. Army Tank-automotive and Armaments Command to guarantee compliance with the specified requirements.

4.6.1.11 Tank insulation test. To determine conformance to 3.5.10, the following test for voids in the foam insulation shall be performed. The tank shall be filled with potable anti-freeze, which has been chilled to 4° to 8°F (-15.6° to -13.3°C). The tank is then to be examined in a room controlled at 95° to 105°F (35° to 40.6°C), 65 to 75 percent relative humidity. Sweating (dew spots), or frost formation is evidence of voids in the insulation. Voids must be repaired by adding foam by a method other than puncturing the skin.

4.6.1.12 Performance testing. Trailers shall be tested, as specified in 3.6.1 through 3.6.5, for conformance to requirements in 3.6. Prior to tests, vehicles shall be equipped, serviced, loaded, and coupled to a prime mover as specified herein.

4.6.1.13 Gradeability test.

4.6.1.13.1 Longitudinal grade test. To determine conformance to 3.6.3 the trailer shall be towed up and down longitudinal grades at required speed.

4.6.1.13.2 Side slope test. To determine conformance to 3.6.4 the trailer shall be operated on side slopes, as required, at 20 mph.

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4.6.1.14 Service brake test. To determine conformance to 3.6.6.1, the vehicle combination shall be operated as specified and the stopping distance measured.

4.6.1.15 Automatic brake holding test. To determine conformance to 3.6.6.2, a fully loaded trailer, coupled to a prime mover, shall be parked on a 20-percent grade. With the prime mover brakes applied, disconnect the air brake lines to the trailer allowing the automatic brake actuator to engage the trailer brakes. The prime mover shall be moved to provide clearance between the pintle and lunette so that trailer movement is possible. Reset the prime mover brakes; trailer shall remain stationary for 15 minutes. Any movement prior to the 15 minutes shall constitute a test failure. This test shall be performed on both the up and the down grade.

4.6.1.16 Parking brake test. To determine conformance to 3.6.6.3, the prime mover with coupled trailer shall be placed on the specified grade, ascending or descending, and the parking brake actuated. The prime mover is to be moved to provide clearance between the pintle and lunette so that trailer movement is possible. The trailer shall remain stationary.

4.6.1.17 Landing device test. To determine conformance to 3.6.7, the trailer shall be placed on a firm surface and the landing wheel shall be operated. The towing vehicle shall be coupled and uncoupled and the landing wheel raised and lowered.

4.6.1.18 Turning check. To determine conformance to 3.6.8, during the road test the combination of towing vehicle and trailer shall be checked for turning ability.

4.6.1.19 Fording test. To determine conformance to 3.6.9, the trailer shall be towed through water crossings at the depth and for the time period specified.

4.6.1.20 Environmental test. To determine conformance to 3.8, the trailer shall be operated for a minimum of one hour in conditions to simulate ambient weather conditions of +135°F (57.2°C) and -65°F (-53.9°C) without deterioration or adverse affects.

4.6.1.21 Painting procedures. Preparation and painting procedures shall be examined during and after application to determine conformance to applicable provisions of 3.10.1.

4.6.1.21.1 Film thickness and scribe tape tests. To determine conformance to 3.10.1, perform the film thickness and scribe tape tests specified in MIL-STD-193.

4.6.1.22 Rustproofing. To determine compliance with 3.10.2, each trailer selected shall be inspected to assure complete coverage of applicable vehicle areas.

4.6.1.23 Marking. Trailer markings shall be examined to determine conformance to 3.11.1.

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4.6.1.24 Name, shipping and service data plates. Location, installation and information on name, shipping, and service data plates shall be examined to determine conformance to 3.11.3.

4.6.1.25 Safety evaluation. To determine conformance to 3.12, the trailer shall be examined to assure that hazards to operating and maintenance personnel have been eliminated or controlled. Equipment which creates hazards shall be considered to be failures. The rear reflectors shall be examined to determine conformance to 3.5.11.

4.6.1.26 Servicing and adjusting. Servicing and adjustment of trailers shall be examined to determine conformance to 3.13.

4.6.1.27 Lifting, tiedown attachments and air transportability inspection. Conformance to 3.14 and 3.15 shall be determined by inspection of contractor records providing proof that lifting, tiedown attachments and air transportability conform to requirements. Applicable records shall include drawings, design data, receiving inspection records and test reports.

4.6.1.28 Workmanship. The trailers shall be examined and the contractor's inspection records reviewed to determine conformance to 3.16.

5. PACKAGING

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

6. NOTES

6.1 Intended use. The trailers covered by this specification are intended for use by the armed services for transporting potable water and liquid foods.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number and date of this specification.
b. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2.1 and 2.3).

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c. If first article inspection is required (see 3.1).
d. Whether immersion heater is required (see 3.5).
e. Whether welding repair is authorized, and extent allowed (see 3.5.5.1).
f. Painting procedure, if other than specified (see 3.10.1).
g. If trailer marking should be other than as specified (see 3.11.1).
h. Data plates, if other than specified (see 3.11.3).
i. When lifting and tiedown attachments are required (see 3.14).
j. When air transportability is required (see 3.15).
k. Preproduction inspection, if required (see 4.3.1).
l. Initial production inspection, if required (see 4.3.2).
m. If control test sample size should be other than as specified (see 4.5.3.2.1).
n. Selection of level of processing and packaging required (see 5.1).

6.3 First article. When a first article is required, it should be tested and approved under the appropriate provisions of 7-104.55 of the armed services procurement regulation. The contracting officer should include specific instructions in all procurement instruments regarding arrangements for examination, tests and approval of the first article (see 3.1).

6.3.1 Waiver of first article inspection. Products manufactured under this specification by one manufacturer for delivery to the Government not more than 12 months after first article approval has been granted, may qualify for waiver of first article inspection.

6.4 Sampling. Sampling may be initiated if defects are found in the first twenty trailers inspected to the requirements of table IV, in the classification of defects for major and minor defects.

6.5 Deficiency sheet. The Government inspector should verify that a thorough inspection of each trailer is performed by the contractor for the listed characteristics, and for any departures from good workmanship. The Government inspector should assure that all deficiencies encountered during inspection are enumerated on deficiency sheet for the trailer. Defects noted on a Deficiency Sheet should contain sufficient description to enable the Government inspector and the contractor's representative to classify the deficiency in accordance with the classification of defects (see table IV). Corrective action should be taken for recurring deficiencies.

6.5.1 Recurring major deficiencies. A major deficiency is recurring when the same defect occurs more than once in the same sample, or when the defect occurs in two successive samples. Major defect may be considered recurring when the historical inspection records ("P" chart or approved equivalent) reflect such a condition. Recurring major deficiencies should be cause for the entire lot or lots to be inspected for the recurring deficiencies.

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6.5.2 Recurring minor deficiencies. A minor deficiency is recurring if it occurs more than twice in the same sample or when the defect occurs in four successive samples. Recurring minor deficiencies should be cause for the entire lot or lots to be inspected for the recurring deficiency.

6.6 International standardization agreement. Certain provisions of this specification (see 3.6.9) are the subject of international standardization agreement NATO STANAG 2805 (edition 3). When amendment, revision or cancellation of this specification is proposed which will affect or violate the international agreement concerned, the preparing activity should take appropriate reconciliation action through international standardization channels, including departmental standardization offices, if required.

6.7 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

6.8 Candidate tank material. The use of stainless steel alloy 316L is suggested for the construction of the tank, as it is least susceptible to corrosion, especially microbial attack. The use of stainless steel alloy 305 or 305L is discouraged, as it is susceptible to microbial induced corrosion.

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

6.10 Subject term (key word) listing.

Drinkable H_2O
Transporting liquid food

Custodians:
Army - AT
Navy - MC
Air Force - 99

Review activities:
Navy - YD-1
Air Force - 84

Preparing activity:
Army - AT

(Project 2330-0205)

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

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1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
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I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER: MIL-PRF-45316H
2. DOCUMENT DATE (YYMMDD): 951214
3. DOCUMENT TITLE: TRAILER, TANK: POTABLE WATER, 400-GALLON, 2-WHEEL
4. NATURE OF CHANGE (*Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.*)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (*Last, First, Middle Initial*)

b. ORGANIZATION

c. ADDRESS (*Include Zip Code*)

d. TELEPHONE (*Include Area Code*)
(1) Commercial
(2) AUTOVON (*If applicable*)

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8. PREPARING ACTIVITY

a. NAME

b. TELEPHONE (*Include Area Code*)
(1) Commercial: (810) 574-8745
(2) AUTOVON: 786-8745

c. ADDRESS (*Include Zip Code*)
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