

INCH-POUND

MIL-T-83808 (84)

30 April 1990**MILITARY SPECIFICATION**

**TRACTOR COMMERCIAL, 4 X 2, DIESEL ENGINE DRIVEN (DED),
SUPPORT EQUIPMENT (SE) TOWING 40,000 POUNDS, AIRCRAFT (AC) TOWING
70,000 POUNDS, 4,500 POUNDS DRAWBAR PULL (DBP)**

This specification is approved for use within the
Department of the Air Force, and is available
for use by all Departments and Agencies of the
Department of Defense.

1. SCOPE.

1.1 Scope. This specification covers a diesel engine drive (DED), 4 wheel, 2 rear wheel drive (four wheel drive when specified, see 6.2), tow tractor with cab for support equipment (SE) and aircraft (AC) towing, having a minimum curb weight of 8,000 pounds and capable of producing 4,500 pounds drawbar pull (DBP). This tractor is capable of pulling SE trailing loads of 40,000 pounds on a level surface and AC trailing loads of 70,000 pounds up a one percent grade.

2. APPLICABLE DOCUMENTS.**2.1 Government documents.**

2.1.1 Specification The following specifications, standards and handbooks form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS**Federal**

W-B- 131	Battery, Storage (Vehicular, Ignition, Lighting and Starting)
QQ-P-416	Plating, Cadmium (Electrodeposited)
VV-F-800	Fuel Oil Diesel

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: WR-ALC/MMVRS, Robins AFB, GA 31098-5609 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 1740

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited

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Military

MIL-P-514	Plates, Identification, Instruction and Markings, Blank
MIL-T-5624	Turbine Fuel, Aviation, Grades JP-4 and JP-5
MIL-B-7883	Brazing of Steels, Copper, Copper Alloys, Nickel Alloys, Aluminum and Aluminum Alloys
MIL-A-8625	Anodic Coatings, for Aluminum and Aluminum Alloys
MIL-P-23377	Primer Coating, Epoxy-Polyamide, Chemical and Solvent Resistant
MIL-P-26915	Primer Coating, Zinc Dust Pigmented, for Steel Surfaces
MIL-I-46058	Insulating Compound, Electrical (for Coating Printed Circuit Boards)
MIL-S-81733	Sealing and Coating Compound, Corrosion Inhibitive
MIL-T-83133	Turbine Fuel, Aviation, Kerosene Type, Grade JP-8
MIL-H-83282	Hydraulic Fluid, Fire Resistant, Synthetic Hydrocarbon Base, Aircraft, NATO Code Number H-537
MIL-C-83286	Coating, Urethane Aliphatic Isocyanate, for Aerospace Applications
MIL-P-85582A	Primer Coatings, Epoxy, Waterborne

STANDARDS

Federal

FED-STD-595	Colors
FED-STD-297D	Rustproofing of Commercial (Nontactical) Vehicles

Military

MIL-STD-12	Abbreviations for use on Drawings and on Specifications, Standards, and Technical Documents
MIL-STD-130	Identification Marking of US Military Property
MIL-STD-143	Standards and Specifications, Order of Precedence for the Selection of
MIL-STD-454	Standard General Requirements for Electronic Equipment
MIL-STD-461	Electromagnetic Emission and Susceptibility Requirements for the Control of Electromagnetic Interference
MIL-STD-462	Measure of Electromagnetic Interference Characteristics
MIL-STD-721	Definitions of Terms of Reliability and Maintainability
MIL-STD-78 1	Reliability Testing for Engineering Development, Qualification, and Production
MIL-STD-808	Finishes, Materials, and Processes for Corrosion Prevention and Control in Support Equipment
MIL-STD-810	Environmental Test Methods and Engineering Guidelines
MIL-STD-831	Test Report, Preparation of
MIL-STD-889	Dissimilar Metals
MIL-STD-965	Parts Control Program
MIL-STD-1223	Nontactical Wheeled Vehicle Treatment, Painting, Identification Marking, and Data Plate Standards
MIL-STD-1472	Human Engineering Design Criteria for Military System, Equipment and Facilities
MIL-STD-1556	Government/ Industry Data Exchange Program (GIDEP) Contractor Participation Requirements
MIL-STD-1568	Material and Processes for Corrosion Preventive and Control in Aerospace Weapons Systems
MIL-STD-1587	Material and Processes Requirements for Air Force Weapons System

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MIL-STD-1595	Qualification of Aircraft, Missile, and Aerospace Fusion Welders
MIL-STD-1791	Designing for Internal Aerial Delivery in Freed Wing Aircraft
MS 51335-2	Pintle Assembly, Towing- 18,000 Pound Capacity, Manual Release
NAS 1281C10	Hook Snap, Spring

DRAWINGS

US Air Force

8838302	Fastener Quality Assurance Requirements for WR-ALC/MMV Vehicle and Support Equipment
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Commercial Item Description

A-A-1108	Extinguisher, Fire Vaporizing Liquid
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(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Naval Publications and Forms Center, (ATTN NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5099)

2.1.2 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

LAWS AND REGULATIONS

49CFR 393	Federal Motor Carrier Safety Regulations (FMCSR)
49CFR 571	Federal Motor Vehicle Safety Regulations (FMVSR)

(The Code of Federal Regulations (CFR) and the Federal Register (FR) are for sale on a subscription basis by the Superintendent of Documents, US Printing Office, Washington DC 20402. When indicated, reprints of certain regulations may be obtained from the Federal agency responsible for issuance thereof)

2.2 Non-Government publications. The following documents form a part of this specification 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)

North Atlantic Treaty Organization (NATO)

AEP-5

American Welding Society Inc. (AWS)

D1.1	Structural Welding Code, Steel
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(Application for copies should be addressed to the American Welding Society, 2501 NW Seventh Street, Miami FL 33125.)

Tire and Rim Association, Inc.

Yearbook

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(Application for copies should be addressed to Tire Rim Association, Incorporated, 3200 West Market Street, Akron OH 44313)

Department of Agriculture

5100-1A Spark Arresters for Internal Combustion Engines

(Application for copies should be addressed to Department of Agriculture Forest Service, Equipment Development Center, San Dimas, California, 91773.)

Environmental Protection Agency (EPA)

Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engine.

[Application for copies should be addressed to Environmental Protection Agency, Waterside Mall, 401 M Street Sw, Washington DC 20460)

Society of Automotive Engineers (SAE)

SAE Standards and Recommended Practices

J53	Minimum Performance Criteria for Emergency Steering of Wheeled Earthmover Construction Machines
J293	Vehicle Grade Parking Performance Requirements
J318	Air Brake Gladhand Service (Control) and Emergency (Supply) Line Couplers - Trucks, Truck-Tractors, and Trailers
J429	Mechanical and Material Requirements for Nonthreaded Fasteners
J534	Lubrication Fittings
J537	Storage Batteries
J560	Seven Conductor Electrical Connectors for Truck Trailer Jumper Cable
J588	Turn Signal Lamps
J683	Tire Chain Clearance - Trucks, Buses and Combinations of Vehicles
J690	Certificates of Maximum Horsepower for Motor Trucks and Tractor Trucks
J695	Turning Ability and Off Tracking Motor Vehicles
J833	USA Human Physical Dimensions
J899	Operator's Seat Dimensions for Off-Road Self-Propelled Work Machines
J992	Brake System Performance Requirements - Truck Bus and Combination of Vehicles
J1082	Fuel Economy Measurement Road Test Procedure
ARP 1247	General Requirement for Aerospace Ground support Equipment Motorized and Non-motorized
J1349	Engine Power Test Code, Spark ignition and Diesel

(Application for copies should be addressed to the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale PA 15096)

State of California

California Vehicle Code Section 2711

(Application for copies should be addressed to Department of Motor Vehicles, 2570 24th Street, Sacramento CA 95809.)

Underwriters Laboratories Incorporated (UL)

(Application for copies should be addressed to Underwriters Laboratories, Incorporated, 1285 Walt Whitman Road, Melville, Long Island, New York NY 11749.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence In the event of a conflict between the text of this document and the references cited herein, the text of this specification shall take precedence, except in the case where MIL-STD-1472 is concerned. In such a case, MIL-STD-1472 shall govern. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Design

3.1.1 Selection of specification and standards. Specifications and standards, necessary commodities, and services not specified herein shall be selected in accordance with MIL-STD-143.

3.1.2 Materials The selection of materials and processes shall be IAW MIL-STD-1568 and MIL-STD-1587. Materials not covered by this specification or referenced document shall be suitable for the intended environment and application. The contractor shall not use nonstandard or proprietary materials and processes without prior government approval.

3.1.2.1 Dissimilar metals. Unless protected against electrolytic corrosion, dissimilar metals shall not be used in intimate contact with each other. Dissimilar metals are defined in MIL-STD-889

3.1.2.2 Primers MIL-P-23377 and MIL-P-26915 epoxy primers shall be used on aluminum and ferrous alloys respectively.

3.1.2.3 Topcoat. MIL-C-83286 polyurethane shall be used as the topcoat finish

3.1.2.4 Drainage Complete drainage shall be provided for both internal and exterior pockets, areas, parts and components.

3.1.2.5 Magnesium. Magnesium and magnesium alloys shall be subject to approval by the government,

3.1.2.6 Prohibited Materials The use of asbestos, wood and/or wood products is prohibited. Similarly, vinyl, polyvinylchloride, polyester, and corrosive type RTV (yields acetic acid upon curing) are prohibited for use in all electrical systems. If vinyl, polyvinylchloride, polyester, or corrosive type RTV are used near an electrical system, the area must be adequately ventilated so as to prevent any corrosive effects on the electrical wires or components.

3.1.2.7 Fasteners. Ferrous alloy fasteners shall be cadmium plated per QQ-P-416 Type II or zinc plated, to a minimum thickness of 0.0003 inches unless threaded tolerances dictate a different thickness, and aluminum alloy fasteners shall be anodized per MIL-A-8625. Fastener installation shall be IAW MIL-STD-1568. Fastener quality shall be IAW US Air Force Drawing 8838302. All screws, bolts, nuts, pins, and other fastening devices shall be properly designed, manufactured and installed with adequate means

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of preventing loss of torque or adjustment. Cotter pins, lock washers, or nylon patches shall not be used for this purpose, except for attachment of trim items or as provided in commercial (see 6.3.2) components. All bolt/washer/nut fasteners shall be a minimum grade five hardness Tapped aluminum threads shall have a minimum thread engagement of at least two times the nominal fastener diameter

3.1.2.8 Sealant for permanent fasteners. All joints, rivets and mating/faying surfaces of exterior and interior components shall be sealed using MIL-S-81733.

3.1.2.9 Conformal coating. Printed circuit./printed wire boards shall be conformal coated with materials IAW MIL-I-46058.

3.1.2.10 Welding. Ferrous and aluminum welding shall be IAW American Welding Standards and MIL-STD-1595. If there is a conflict between the two standards, the most stringent requirement shall take precedence

3.1.2.11 Soldering. Soldering shall be IAW MIL-STD-454, requirement 5.

3.1.2.12 Brazing. Brazing shall be performed IAW MIL-B-7883

3.1.2.13 Commercial off-the-shelf equipment All commercial equipment and parts shall be assessed by the contractor as to their suitability to function in the intended environment and comply with the system's life expectancy requirements.

3.1.2.14 Galvanized steel Many producers of zinc-coated steel apply inhibitors to protect their products from moisture during shipment and storage Some of these inhibitors interfere with Pretreatment resulting in poor priming surfaces. Contractors shall consult with their supplier of galvanized steel for recommendations on the pretreatment to be used on their respective product.

3.1.3 Design and construction. The vehicle shall be constructed so that parts do not work loose in service and shall withstand the loads, shocks, vibrations, and other conditions incident to operation, shipping, and storage with minimum loss of time for maintenance, repair, and servicing. The design of the vehicle shall ensure safe, efficient, and economical operation. All assemblies, controls, and installed equipment shall be located so that there is no adverse interference with each other, or with the operation, and shall be readily accessible for maintenance, operation, and replacement All rotating and reciprocating parts and all parts subject to high operational temperatures or subject to being electrically energized, that are of such nature or so located as to be hazardous to personnel, shall be guarded or insulated to the extent necessary to eliminate the hazard All walking/stepping surfaces shall be of the non-skid type Wear points shall be designed to permit replacement of wear surface components

a Finishes protective coating application shall be considered during the design stage Sharp, angular corners are undesirable due to coating failures on outside corners (too thin) and the tendency of coatings to bridge inside corners Smooth, round corners allow uniform coating thickness and avoids creation of possible sump areas All mechanically joined components shall be finished before assembly. Welded structures shall have finishes applied after welding. When welded and bolted assemblies are used, manufacturing steps shall be arranged to minimize disruption of the protective coatings. Supplementary corrosion prevention treatments - rustproofing, sealants, greases, etc., shall be applied after finish application All metallic surfaces shall be treated for corrosion prevention

b Joints and faying surfaces. Joint designs shall minimize crevices formed by overlapping surfaces and shall point away from the forward direction of vehicle travel or point down Butt welds are preferable to lap welds Continuous welds are preferable to tack welds The joints shall be designed so there are no gaps on joint laps This can be accomplished by continuous welds, solder or sealant bead lines All faying surfaces shall be primed and completely coated with sealant prior to assembly

- c. Core panel structures. Pretreat and prime all internal surfaces prior to assembly. Pretreat and prime interior panel skin and faying surfaces prior to assembly. Coat entire faying surface area with sealant during assembly and apply sealant bead after assembly to the lap joint. The panels shall then be foamed in place using non-reverting polyurethane.
- d. Drain holes. Structures shall be designed to avoid pockets where debris or moisture might accumulate. Inverted u-channel structural members do not accumulate moisture or debris. Closed structural configurations should have sloping surfaces towards drain holes which are adequately sized and placed in the lowest sump areas. All interior surfaces shall be treated IAW MIL-STD-808, with priming being the minimum finish requirement. The finish shall be reapplied/applied through drain holes after welding operations.
- e. Doors. Consideration shall be given to open configuration doors. Use of single panel doors eliminates crevice corrosion sites and leads to easier maintenance of latches and window mechanism.
- f. Alternate materials. Use of composites, polymers, etc., type materials should be investigated. While not subject to corrosion, consideration of material interaction, environmental stability and field repair should be investigated before recommending alternate material.
- g. Shields. Wheeled vehicles shall have aprons or splash shields designed to prevent mud, stones, debris and water from being thrown against areas outside of the wheel-wells.

31.3.1 Reliability. The vehicle, including all components, shall have a Mean-Time-Between-Failure (MTBF) of not less than 250 hours demonstrated at a 0.80 confidence level in accordance with 4.6.9. A failure is defined as the event or inoperable state in which any item, or part of an item, does not or would not perform as previously specified. Definitions of reliability terms not included herein shall be as found in MIL-STD-721 and MIL-STD-781. In the event of a conflict between these documents, MIL-STD-781 shall take precedence. The vehicle shall be designed for a life expectancy of at least 12 years.

3.1.3.2 Maintainability. The vehicle shall be designed and constructed to provide the following:

- a. Servicing, for components that require scheduled service, without disturbing adjacent components.
- b. A minimum amount of time for assembling, disassembling, locating trouble sources, and maintaining the vehicle. Where practical, components shall be located for rapid inspection and recognition of potential failure.
- c. Ease of adjusting, servicing, and replacing parts and components.
- d. Use of vehicle mechanic's common hand tools and vehicle maintenance shop equipment.
- e. Maintenance with a minimum number of tools.
- f. Mean corrective maintenance downtime of no greater than one hour.
- g. Maximum repair time, excluding time to troubleshoot, of no greater than eight hours.
- h. Maximum time for one person to perform all required daily scheduled maintenance and servicing tasks of no greater than 15 minutes total.
- i. Designs giving consideration to modular system components and quick disconnect type electrical wiring harness connectors.

31.3.2.1 Maintenance tasks. The vehicle shall be designed so that one mechanic, using common hand tools, can perform the following maintenance operations within the time specified:

- a. Remove, replace, and adjust all engine driven belts - 3/4 hour.
- b. Remove and replace alternator - 1/2 hour.
- c. Remove and replace all filters, screens, and strainers in all hydraulic systems - 1/2 hour.
- d. Remove and replace engine coolant system hoses, fill cooling system to the proper level, and check/repair coolant leaks - 1/2 hour.
- e. Drain engine lubricating oil, remove, and replace oil filter element(s) and refill crankcase - 3/4 hour.
- f. Remove and replace fuel filter element(s) and bleed air from fuel system - 1/2 hour.

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- g. Disconnect battery cables, remove and replace batteries and reconnect battery cables -1/2 hour
- h Drain torque converter oil and transmission oil remove and replace all filter elements and strainers, and refill converter and transmission one hour.
- i. Remove and replace starter - 1/2 hour.
- j. Remove or install the engine/transmission package, two mechanics - four hours

3.1.3.3 Foolproofness Where improper installation of an item could cause a malfunction, an asymmetric mounting system shall be provided

3.1.3.4 Servicing provisions. Drains, grease fittings, lines, and check points for all components shall be so located that they are readily accessible and do not require special tools for proper servicing.

3.1.3.5 Lubrication. All parts requiring grease for lubrication shall be provided with lubrication fittings in accordance with SAE J534. All moving parts shall be lubricated with either oil or grease. Where the use of high lubrication pressures may damage grease seals, a pressure relief device shall be provided. Extended fittings shall be provided to lubricate parts or assemblies which are not readily accessible for direct lubrication or which are likely to be overlooked because of inaccessibility.

3.1.3.6 Hydraulic fluid. Hydraulic fluid shall be in accordance with MIL-H-83282.

3.1.3.7 Component protection. All space in which work is performed during operation, service, and maintenance of the vehicle shall be free of hazardous protrusions, sharp edges, or other features which may cause injury to personnel. All rotating and reciprocating parts and all parts subject to high operational temperatures or subject to being electrically energized, that are of such nature or so located as to be hazardous to personnel, shall be guarded or insulated to the extent necessary to eliminate the hazard

3.1.3.8 Foreign object damage. All loose metal parts, such as pins and valve caps, shall be securely attached so they cannot become separated from the vehicle.

3.1.4 Environmental conditions. The vehicle shall be capable of satisfactory storage and operation under the following environmental conditions.

- a. Full time exposure to temperatures ranging from -65°F to +125°F.
- b Full time exposure to relative humidities up to 100 percent.
- c. Part-time (five percent of the time) exposure to rain, droplets of size 20 to 45 mm falling at a rate of 13 cm per hour.
- d. Part-time (five percent of the time) exposure to salt fog, five percent solution (five parts by weight of salt in 95 parts by weight of water) with fallout of 3.0 ml/80 cm²/hour.
- e Part-time (five percent of the time) exposure to blowing dust, velocity 50 knots, concentration 0.5 g/ft³.
- f Part-time (five percent of the time) exposure to blowing sand; velocity 50 knots, concentration 0.0773 g/ft³.
- g Part-time (25 percent of the time) exposure to blowing snow or freezing rain or a combination thereof, velocity of 50 knots, concentration 0.0773 g/ft³

3.1.5 Weight distribution The weight distribution of the vehicle in any loading condition shall not be unbalanced or improperly distributed. The difference in load between the left and right wheels of any axle shall not exceed 2.5 percent of the total load on the axle.

3.1.6 Vehicle lean. The vehicle shall not lean to either side more than one percent of the maximum width, in either the fully loaded or the unloaded condition. Vehicle lean measurements shall be made at the outermost portion of the vehicle (excluding mirrors, mirror support brackets, lights, or asymmetrical shapes) directly above each axle. The difference in body height at each axle shall not exceed one percent of the maximum width at that location.

3.1.7 Electromagnetic interference suppression. The vehicle shall be equipped for the suppression of electromagnetic interference in accordance with Part 8 (Group I) of MIL-STD-461 as modified below. As a minimum, the bandwidths listed below shall be used in the appropriate frequency band of the measurement receiver for UM03 testing.

TUNED FREQUENCY	BANDWIDTH	TYPE BANDWIDTH
150 KHz -1 MHz	1 KHz, plus or minus 10 percent	Impulse
1 MHz -30 MHz	10 KHz, plus or minus 10 percent	Impulse
30 MHz - GHz	100 KHz, plus or minus 10 percent	impulse

The limits for UM03 (Figure 8-1) shall be relaxed by 20dB.

3.1.8 Sound levels. The maximum sound level produced by the vehicle shall not exceed 84dBA when tested in accordance with 4.6.7.7 An additional 2dBA allowance shall be permitted for production units to provide for variation in test site, temperature gradients, test equipment, and inherent differences in nominally identical vehicles.

3.1.9 Air transportability. The vehicle shall be air transportable without shoring in accordance with MIL-STD-1791 in Types C-130, C-141, and C-5 Aircraft and shall be air transportable in a Type C-17 Aircraft Preliminary design guidelines for the Type C-17 are 142 inches maximum height, 204 inches maximum width, 812 inches maximum length, 9° ramp angle, and floor load capacity equal to that allowed for the Type C-5 Aircraft.

3.1.9.1 Tiedowns. The vehicle shall be equipped with sufficient tiedown points so located that it can be restrained in all directions during air transport. The attachment points shall be designed for use with attachment in the aircraft as described in MIL-STD-1791. Sufficient clearance shall be maintained around all attachment points to allow for restraining chains without interference from any other structure. The tiedown points shall have a minimum clear opening of three inches to allow attachment of a chain with a grabhook.

3.1.10 Documentation and certification All documentation and certification shall be available at the first article contractor test (see 4.4), and upon request, be furnished to the engineer during the tests

a Required certification from OEMs.

- (1) Pintle hook rating.
- (2) Axle load rating.
- (3) Engine compatibility with towing requirement as stated in specification
- (4) Transmission manufacturer's certification that the transmission is approved for this application; include a torque converter/engine match and a performance scan showing drivetrain performance throughout the entire range of gearing
- (5) Wright Patterson ASD transportability certification, where no park shoring is required.
- (6) EMI test (with signature of appropriate QAR that was present).
- (7) Miles per gallon certification per SAE J1082.
- (8) Certify gross and net horsepower and torque in accordance with SAE J690 This shall include forms shown in Figures 1 and 3 A "Description of Engine and Equipment" table and "Power Absorbing Accessories, Equipment and Attachments" table shall be included.
- (9) Tire and rim shall be rated for 45 GVW loadings.
- (10) Cooling system(s) will maintain the oil in the transmission during continuous use to a temperature of not more than 125°F above ambient temperature.
- (11) Frame load analysis

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b. Analytical review. Contractor shall supply certification or verifying calculations upon request of the TRCO (MMVRS Engineer) that any component or system is in compliance with the specification. The calculation shall have all variables labeled and well defined and presented in an easy to read format.

3.1.11 Curb weight. Curb weight shall include weight of chassis and cab with all attachments, accessories, equipment, body full complement of fuel, lubricants and coolant. Front axle weight shall be not less than 113 of curb weight. Curb weight of vehicle shall be not less than 8,000 pounds. Weight distribution shall be such as to allow for total stability with 1,000 pound tongue load on rear pintle.

3.1.12 Gross vehicle weight. Gross vehicle weight (GVW) shall consist of vehicle curb weight, operator weight and a payload distributed evenly over the tool box floor. Tractor shall have GVW computed with 1,000 pounds of payload located in the tool box (see 3.7.1)

3.2 Performance.

3.2.1 Mobility. The vehicle, at its GVW (see 3.1.12), shall

- a. Maintain a high gear, forward speed of at least 35 miles per hour (MPH), plus or minus 1.5 MPH, on a level paved road.
- b. Maintain a low gear, forward speed of at least 5 MPH on a level paved road
- c. Maintain a reverse speed of at least 2.5 MPH on a level paved road.
- d. Be capable of providing small increments of forward and reverse movement
- e. Ascend and descend a 12 percent grade without spillage of any fluid.
- f. Negotiate a 10 percent side slope in each direction without spillage of any fluid.
- g. Negotiate, in each direction, a ramp with a 20.8° minimum slope connecting two horizontal surfaces. The ramp length shall be at least 1.2 times the wheelbase of the vehicle. The vehicle shall be driven forward or backward from one horizontal surface across the ramp crest, ascend or descend the ramp, cross the ramp crest and proceed on the other horizontal surface without any portion of the vehicle, other than its tires, contacting any of the three surfaces
- h. Traverse graded gravel roads at a speed of 30 MPH
- i. Traverse Belgian Block at a speed of 20 MPH.
- j. Comply with all service brake performance requirements of SAE J992b
- k. Comply with all parking brake performance requirements of SAE J293, except that the required grade shall be 20.4 percent.
- l. Develop, at a pintle height of 12 inches, a DBP of not less than 4,500 pounds, at governed speed in first forward gear.
- m. Be capable of pulling support equipment trailing loads of 40,000 pounds on level dry surface at 15 miles per hour (MPH) minimum, 25,000 pounds up a three percent grade on a dry surface at 10 MPH minimum, 20,000 pounds up an eight percent grade on a dry surface at 10 MPH minimum, and aircraft trailing loads of 70,000 pounds up a one percent grade on a dry surface at 5 MPH minimum. Additionally, the vehicle shall be capable of towing 40,000 pound support equipment trailing load on level packed ice/snow surface at a 10 MPH minimum and 25,000 pounds up a three percent grade on packed ice/snow surface at a 5 MPH minimum
- n. Have an adjustable turning radius with a minimum adjustable limit at 17 feet and adjustable to 23 feet. The turning radius shall be set at 22 feet. Tires shall not show signs of wearing or scuffing prematurely or develop any flat spots when operating the vehicle on the flight line with the front end properly aligned according to the manufacturer's specification.

3.2.2 Durability. The vehicle, at its GVW, shall demonstrate a positive capability of providing operation over 2,000 miles under loads as follows.

- a. One hundred miles at 4,500 pounds DBP
- b. Two hundred miles at 3,500 pounds DBP

- c. Four hundred miles at 3,000 pounds DBP
- d. Five hundred miles at 2,000 pounds DBP
- e. Eight hundred miles at 1,000 pounds DBP

3.3 Chassis. Except as specified in this specification, the chassis (with cab) components, assemblies and accessories to be delivered under this contract shall be standard or optional items which meet or exceed the requirements of this specification. The chassis with cab shall be a commercial type modified for SE/AC towing. All chassis (with cab) items shall be represented in the chassis manufacturer's technical data. All chassis (with cab) items considered standard equipment on the vehicle model to be supplied under the applicable contract shall be furnished, except when the requirements of this specification preclude compliance. Technical data shall be limited to specifications and technical material identical to that furnished to the authorized company representatives for selection of chassis and components and shall be on file in the engineering offices of the procurement activity prior to presentation of the preproduction model or first production article, if preproduction model is not required.

3.3.1 Wheel base modification Wheel base shall be 90 inches, plus two inches, minus 0 inches. Frame modification (if any) shall be accomplished by standard modified commercial practices and shall not degrade strength and performance of frame. Driveshaft provided shall be a standard commercial product and shall have an input torque capacity at least equal to the maximum torque [before parasitical loss] delivered by the engine.

3.3.2 Powertrain.

3.3.2. Engine The vehicle shall be equipped with a commercial (see 6.3.2) liquid cooled diesel engine. The total power output required by all items driven by the engine shall not exceed its net power output rating at 2,000 feet elevation, determined in accordance with SAE J1349. The engine shall demonstrate the performance characteristics specified herein when operating on diesel fuel in accordance with W-F-800 and Grade JP-8 turbine fuel. the primary fuel, in accordance with MIL-T-83133 The engine shall also demonstrate the performance characteristics specified herein when operating on Grade JP-4 turbine fuel, the alternate fuel, in accordance with MIL-T-5624. When operating on JP4, a minimal horsepower degradation is expected: but no greater than a 15 percent reduction is acceptable, see paragraph 46.78 for testing. Also, the reduction of the fuel system's life operating on JP-4 is not to exceed 50 percent of the expected life of the system on JP-8. No change in any engine component is allowed. The engine shall be certified by NATO AEP-5 test procedures. Any engine that is adversely affected by either of the above fuels is not acceptable.

3.3.2.1.1 Governor Engine governor shall be furnished and set and sealed to limit vehicles speed to that specified in 3.2.

3.3.2.1.2 Engine cooling system. The engine shall be equipped with a cooling system capable of satisfactory performance under the environmental conditions specified herein in an ambient temperature of not less than +125°F and a relative humidity of 90 percent; coolant temperature shall not exceed the engine manufacturer's recommended maximum. Expansion tanks of sufficient capacity for expansion of all coolant in the system shall be provided.

3.3.2.1.2.1 Coolant recovery system. An overflow coolant recovery system shall be furnished. The coolant recovery system shall include an unbreakable translucent reservoir of not less than two quart capacity. The reservoir shall be located in a position readily visible for checking coolant level.

3.3.2.1.3 Engine starting system The engine shall start within 15 seconds in any ambient temperature within the required operating range of the vehicle (see 3.1.4) Installed glow plugs, fluid starting aids and neat from the winterization system (see 3.6, may be used prior to and during the start period to facilitate engine starting under the following conditions:

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TEMPERATURE RANGE (DEGREES F)	STARTING AID PERMITTED
40 through 125	None
1 through 39	Glow plugs and fluid starting aids
-65 through 0	Glow plugs, fluid starting aids, and heat from the winterization system

The starting system shall be equipped with an interlock device to prevent starter engagement when the transmission is in any position other than "neutral" or "park" and to preclude inadvertent starter engagement while the engine is running/rotating. The engine's preheat system shall be designed so the heating system will continue to function in the event one glow plug fails

3.3.2.1.4 Exhaust system. The exhaust system shall incorporate a spark arrestor muffler, if a turbo charger is not used, in accordance with USDA Standard 5100-1A, equipped with a cleanout plug of at least 3/4 inch. The spark arresting muffler shall be mounted in a location that permits easy access to the clean out plug without having to remove adjacent components to facilitate servicing the exhaust system. The exhaust system shall be designed to expel exhaust gases in a manner that is not hazardous to operators or mechanics; the outlet shall not be directed toward the ground. The exhaust system, including all fasteners, shall be constructed of corrosion resistant materials. The system shall be protected from damage which could result from traversing rough terrain.

3.3.2.1.4.1 Air pollution control Vehicles destined for the 50 states, the District of Columbia, Puerto Rico and all US territories shall comply with the Environmental Protection Agency Regulations Governing Control of Air Pollution for New Motor Vehicle Engines in effect on date of manufacture. In addition, vehicles destined for California shall comply with State of California regulations governing air pollution control in effect on the date of manufacture (see 4.4.4 (i) for evidence-of-compliance requirements).

3.3.2.1.5 Air cleaner. An engine air cleaner shall be furnished with a dry type (replaceable element) air cleaner filter. An intake restriction indicator shall be provided and visible by the operator. Intake restriction indicator shall have reset capabilities

3.3.2.2 Transmission. A commercial (see 6.3.2) automatic transmission shall be provided, complete with a hydraulic torque converter. The transmission shall provide not less than three forward speeds and one reverse speed. All positions of the transmission shall be operable. Input torque capacity of the transmission shall be at least 105 percent of the maximum net engine torque (with no parasitical losses). Cooling shall be provided to prevent the transmission fluid temperature from exceeding 225°F in any ambient temperature when towing 40,000 pounds towed load on a dry level surface at 10 mph for a period of one hour. The transmission shall permit the performance characteristics specified herein. A smooth transition between gear shifts shall occur for aircraft towing. Transmission shall be capable of withstanding a maximum stall operation for a minimum of one minute without any type of damage.

3.3.2.2.1 Auxiliary Transmission When required (see 6.2), a four wheel drive vehicle shall be supplied. An auxiliary transmission or transfer box shall be provided to direct the power *to the front and rear axles*. The unit may incorporate torque multiplication. This unit shall contain a selective type four wheel drive system to permit the vehicle to operate in either two wheel or four wheel drive mode. The selection controls for the two/four wheel drive modes shall be operable from inside the cab. The functions of this unit may be included in the transmission. The auxiliary transmission must meet the same rating criteria as the transmission

3.3.2.2.2 Transmission controls. Transmission controls shall be accessible to an operator wearing arctic or chemical warfare clothing. Controls shall be detent or controlled gear selection transmission shall not be capable of being shifted into the opposite direction while the vehicle is in motion

3.3.2.3 Driveline components. Driveline components shall be adequate to transmit the maximum delivered torque (not including parasitical losses) of the engine as developed through the maximum gear train reduction

3.3.2.4 Axles. The load rating of each axle shall be not less than the imposed load on the axle, measured at the ground, with the vehicle at gross weight. The front axle shall be equipped for steering. When a four wheel drive vehicle is required (see 6.2), the front axle shall be equipped for steering and shall incorporate a torque proportioning differential with a bias ratio of not less than five to one or a limited slip differential. The axles shall be planetary final drive type.

3.3.2.4.1 Rear axle differential ratio. A conventional limited slip or a torque proportioning differential with a bias ratio of not less than five to one shall be provided for the rear axle such that vehicle will meet the performance requirements specified herein. When required (see 6.2), a no spin differential shall utilize a heavier front axle and more weight to the front of the vehicle to hold it down during staffing and turns

3.3.3 Steering system. The vehicle shall be equipped with a power assisted steering system, with manual steering available in the event of power assist failure. The steering system shall not require more than four turns lock to lock. The static vehicle, at idle, shall be capable of steering from extreme left to extreme right in a maximum of five seconds in accordance with Figure 8 of MIL-STD-1472. The steering system shall be capable of returning to the neutral position when traveling 10 MPH in a right or left turn and releasing the steering wheel. The vehicle's steering system shall have easily accessible adjustments for caster, camber and toe-in. The power steering system shall be independent of other vehicle hydraulic systems. The steering system shall also meet the emergency steer criteria in SAE J53

3.3.3.1 Steering wheel. The steering wheel shall have a diameter of 18 inches minimum. Not less than four inches clearance shall be provided around the steering wheel in all directions.

3.3.4 Brakes

3.3.4.1 Brake system. The brake lines shall be securely anchored to the chassis and protected from damage. Brake lines shall not be copper or aluminum tubing. Brake lines shall not contain a 90° fitting of less than five inches in radius of curvature. Brake lines shall be readily detachable at their axle ends. Through frame connectors shall be provided at each point where lines pass through metal members. Operation of the service brakes shall not result in evidence of excessive fading as governed by SAE J992b. The brake system shall be functionally compatible with the tow vehicle brake system. The towing vehicle should not add to yaw, sway, skid, tip, tilt or jackknife under maximum braking conditions and minimum stopping distances.

3.3.4.2 Service and parking brakes. The service brakes shall stop the tractor at curb weight within 20 feet from 20 MPH on a 0.7 coefficient of friction surface. The parking brake shall be a manually engaged mechanical brake system independent of the service brakes.

3.3.4.3 Service brakes. Automatic adjusting heavy duty disc brakes shall be furnished on the front wheels, and self-adjusting heavy duty drum brakes shall be furnished on the rear wheels. Power assisted, by hydraulic, brakes shall be provided. Also, the service brakes shall have:

- a. A maximum of 100 pounds foot pressure and shall be required to lock brakes in accordance with SAE ARP 1247B.
- b. Braking capability and foot pressure shall remain constant during any/all engine speed and vehicle maneuvers
- c. Physical arrangement of the tractor brakes shall allow brake (accelerator clearance for heavy snow boots (reference MIL-STD-1472).
- d. The brakes shall be hydraulic in accordance with SAE ARP 1247B.

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e. The master cylinder shall be the dual compartment reservoir, two piston type. The front set of wheels shall be independently supplied from one side of the reservoir and the rear set of wheels shall be independently supplied from the other compartment of the master cylinder reservoir. A red warning light shall be mounted on the dash and shall illuminate when either compartment of the brake master cylinder is low on hydraulic brake fluid.

f. Means shall be provided to bring an unloaded tractor to a stop in 30 feet with a maximum of 150 pounds foot pressure in the event of an engine off situation at 20 MPH.

g. Under maximum brake effort, all four wheels shall lock simultaneously and shall remain locked while the tractor is being dragged on dry concrete with a coefficient of friction of 0.75.

h. In the event of engine failure, the boost (assist) to the service brake system shall be maintained for at least one brake application and be capable of stopping the vehicle within the limits specified herein. After the boost (assist) is no longer available to the service brake system, an operator shall be capable of stopping the vehicle with a maximum of 130 pounds pedal effort.

3.3.4.4 Parking brake. The parking brake, together with the towed vehicle parking brake, shall be capable of holding the fully loaded towing and towed vehicle combination on an 11.5° incline with the tow vehicle headed up or down while the transmission is placed in the lowest gear and reverse gear with the engine idling. The parking brake shall hold the vehicle in this position for an indeterminate amount of time. Physical arrangement shall be such that at least three inch clearance shall be provided for operation by an operator wearing arctic gear.

3.3.4.5 Special trailer air connection. When specified (see 6 2), the vehicle shall be furnished with the following additional equipment for special trailer operation.

3.3.4.5.1 Air system. The vehicle shall be equipped with an air system designed for an operating pressure range of 95 pounds per square inch (psi) to 105 psi. The air system shall consist of an air compressor, air compressor governor, front and rear air couplings, low air pressure warning buzzer, pressure gauge, air reservoir and all required piping. The air system shall be equipped with automatic water drain systems in both the wet and dry tank such that moisture entering the system shall be eliminated to prevent excessive water accumulation in the air tanks, piping and other related components. The air system shall be equipped with an alcohol injection system or desiccant filter.

3.3.4.5.1.1 Air compressor. The air compressor shall have a capacity of not less than 7 CFM and shall be provided with a suitable unloading mechanism for pressure relief when the system is fully charged. The air compressor shall also be capable of increasing the air pressure in the supply and service reservoirs from 90 psi to 110 psi, when the engine is operating at the vehicle manufacturer's maximum recommended rpm, within a time span of not more than 25 seconds. The air compressor governor shall adequately maintain pressure in the air reservoir tank within normal operating ranges by controlling the compressor unloading mechanism. A means to adjust drive belt tension shall be provided on belt driven compressors. The air compressor shall not vibrate excessively under load.

3.3.4.5.1.2 Air connectors. Two air line connectors shall be provided in a suitable location at the rear of the vehicle and two at the front of the vehicle. The couplings shall be properly connected to the air supply system as required by DOT regulations. Dummy caps shall be provided and shall be securely attached to the vehicle to prevent their loss. The couplings shall suitably connect with trailer couplings and shall permit operation of towed load air brakes by use of the tow vehicle service brakes. Air line connectors shall comply with SAE J318. Furthermore, means shall be provided to prevent loss of air through connectors when not coupled to a trailer (i.e., a manually operated shutoff valve immediately upstream would suffice). The air connectors (couplers) shall be mounted in a location to prevent possible damage from wheel chocks being placed on the rear of the vehicle.

3.3.4.5.1.3 Control mechanism. Control of the towed load brakes shall be through the tow vehicle service brake pedal. Means shall be provided so the towed load shall be activated at least 0.3 seconds and no

more than 0.6 seconds, before the tow vehicle service brakes. When a trailer is not attached to the tow vehicle, the tow vehicle service brakes shall function without delay when the brake service pedal is applied. Air shall be modulated, proportional between foot pressure applied to the service brake and air released to the trailer.

3.3.4.5.1.4 Low air pressure warning device. The low air pressure warning device shall actuate a buzzer and warning light located within the cab when the air pressure within the system falls below 90 psi.

3.3.4.5.1.5 Pressure gauge. An air pressure gauge indicating air pressure within the system shall be installed in the instrument panel area in such a location as to be readily visible to the operator.

3.3.4.5.1.6 Air reservoir. The air reservoir capacity shall be not less than 400 cubic inches. A check valve shall be installed between the reservoir tank and the compressor to control the direction of the flow. The air reservoir shall be protected with a safety valve to prevent hazardous pressures.

3.3.5 Frame. Frame shall be properly designed, analyzed and evaluated as to ensure that the frame's load carrying capacity will be adequate to prevent any stress cracking, warping, etc, during the life of the vehicle. Frame rails and crossmembers shall have a minimum yield strength of 36,000 psi. The frame assembly shall be bolted and/or riveted; no welding shall be performed unless certification that the material has been properly normalized (stress relieved) and its strength has not been degraded is provided with first article report. No unused holes shall be permitted in the frame rail flanges. All unused holes shall be plugged with tight-fitting fasteners, made of a material that is more ductile than the frame material. There shall be no point on the frame that, during static loading from the maximum GVW, exceeds 20 percent (safety factor of five) of the yield strength of the frame.

3.3.6 Suspension. Vehicle shall be equipped with suspension system with components having a rated capacity at least equal to the load imposed on each member measured at the ground with vehicle loaded to its GVW. When suspension is rated at the spring pads, unsprung weight shall be deducted. Vehicle shall be equipped with hydraulic double acting shock absorbers at the front and rear wheels. Single stage springs, front and rear, shall be furnished. The suspension system, in conjunction with tires selected, must produce a cushioned ride with stability, lack of vehicular bounce and no porpoising while maintaining good tire contact and traction on the operating surface. All four wheels shall remain in contact at all times on any surface normally used for aircraft operations.

3.3.7 Wheels and tires. Rim size shall be the same for all wheels on the vehicle. Tire size and ply rating shall be the same for all tires on the vehicle. Wheel and tire ratings shall conform to Tire and Rim Association recommendations for the size, weight and speed of the tractor. Tubeless tires shall be furnished and shall be truck type. Unless otherwise specified, tires shall have highway tread. When specified (see 6.2), tires with nondirectional mud and snow tread shall be furnished on the front and rear wheels. Tires shall be rated for a minimum of 4.5 G static loading without bottoming out.

3.3.7.1 Tires chains. When specified (see 6.2), tire chains shall be provided. At least a three inch clearance shall be provided for operation with tire chains when the vehicle is loaded to maximum vehicle weight and the tires are inflated to recommended pressure. The chains shall not strike the tractor parts. Installed chains of 5/8 inch deep cross links shall not contact any part of the tractor in any steering mode at any speed (O -35 MPH) after five minutes of operation to allow chains to expand. This applies to new or recapped tires. This shall be in accordance with SAE J683 Tire chain requirements shall be met even when tire chains are not provided.

3.3.8 Fuel system. The fuel system shall conform to Federal Motor Carrier Safety Regulations 393.65 and 393.67, except compliance with 393.67(c)(1).

3.3.8.1 Fuel tank. Fuel tank shall have sufficient capacity to provide for eight hours of continuous full throttle operation when towing a 40,000 pound load on a dry level surface at 15 mph. Full pig operation

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shall be located outside the passenger compartment. Fuel tank joints shall be rolled and welded along entire distance. Tank shall be constructed of heavy gauge steel and UL approved. All scale and residue shall be removed. Tank shall be internally coated for protection against rust. Fuel cap shall be UL approved. The tank shall be adequately protected from puncture and/or structural damage. It shall be equipped with a filler tube, a safety filler cap, a float type rheostat or fuel gauge indicator, a fuel shutoff cock in the fuel line connection, a drain plug at the lowest point in the tank bottom and an overflow which shall not carry fuel onto the engine, muffler or exhaust tailpipe.

3.3.8.2 Fuel filter. At least one filter of the fuel water separator type with a water drain cock shall be located in the fuel line between the fuel tank and the fuel pump. It shall be installed so the element can be readily serviced without removing surrounding equipment. Unless the filter is mounted higher than the fuel tank, a shutoff valve shall be included in the inlet line to the filter.

3.3.9 Body.

3.3.9.1 Fenders The rear fender shall be wide enough so neither the outboard pintle hooks nor the bumper laterally extend past the rear fender. The front fender shall be wide enough so the front bumper does not laterally extend past the front fender.

3.3.9.2 Bumpers. Front and rear bumpers shall be provided on the vehicle.

3.3.9.3 Body side molding. Body side molding shall not be furnished on the vehicle body sides.

3.3.9.4 Running board. A running board shall be attached to the front and rear fenders of the vehicle on both sides to prevent the operator or passenger from placing their feet under the rear wheels. The vehicle operator shall not be able to stand on the ground with one foot while placing the other foot on the brake/accelerator control. A nonskid surface (e.g., diamond plate) shall be provided on the running board.

3.3.1.0 Fabrication. Welded and brazed fabrication shall be in accordance with AWS D1.1, and all welders and welding equipment shall be certified by the requirements of Section 5 of AWS D 1 1.

3.4 Cab. Conventional two man cab shall be furnished and shall be equipped with locks inoperable from inside the cab and with both doors equipped with external key operated locks and dampers. The body design may be either conventional "cab forward" or cab over engine. All horizontal top surfaces, including the engine cover, but excluding the cab roof, shall be capable of supporting a 200 pound man at any one foot square on the surface without permanent deformation. Nonskid surface (e.g., diamond plate) on cab floor located under brake and accelerator pedals shall be furnished. The cab shall provide access holes in its floor for any adjustments on the top of components located under cab. All openings in the cab floor shall be sealed by boots or mats. Cab design shall conform to requirements of MIL-STD-1472.

3.4.1 Seats. A bench type seat is desired, however, if two individual seats are furnished, they shall be identical and shall have air or spring suspension. Each seated position shall be furnished with seat belts. The seats shall conform to SAE J899 and MIL-STD-1472. The seats shall adjust fore, aft and vertically to accommodate an operator as large as a 95 percentile male and as small as a 5 percentile female in accordance with SAE J899. A full width bench seat meeting these requirements is acceptable. Seat lap belts with retractors shall be provided for both operator and passenger. Belts shall be metal to metal closure.

3.4.2 Doors. The doors shall be provided with heavy duty door limiters. The hinges and limiters shall be capable of stopping door when exposed to 50 MPH wind in any direction. The doors/door frames shall be designed to prevent possible damage when the doors are jerked open in a 50 mph wind in any direction. The door hinges/latches shall not be welded to the doors/door frame. Also a driver's side front door mounted armrest shall be provided.

3.4.3 Windshield and windows. All windshields and windows shall be tinted to manufacturer's standards.

3.4.3.1 Windshield. The cab shall be provided with a glareproof windshield of safety plate or tempered glass. Two glareproof sunvisors shall also be provided. The sunvisors shall not show any signs of deflection when positioning them.

3.4.3.1.1 Windshield wipers and washer. Vehicle shall be equipped with dual front windshield wipers and windshield washers. Windshield wipers shall be multispeed type, including intermittent operation, and operated by electric motor(s).

3.4.3.2 Windows. The cab shall be provided with two doors with crank regulated windows and a rear sliding window with two sliding sections. Sliding sections shall be 120 square inches minimum total in area and shall lock from inside of cab. Sliding sections shall be centered on the longitudinal centerline of the vehicle.

3.4.4 Visibility. Cab design shall ensure unobstructed operator visibility forward, rearward, to either side and overhead at an angle not less than 70° from the horizontal at the operator's eyes. The cab shall be so devised to ensure that the operator can see all rear pintle hooks (aided or unaided).

3.4.4.1 Mirrors. An adjustable outside low mount rear view mirror having not less than 50 square inches of flat reflective area shall be provided on each side of the vehicle. An inside rear view mirror and a glare proof visor over the operator's head shall be provided. Mirrors shall, in no case, Interfere with operator visibility or safety.

3.4.5 Instruments and controls. Instruments and controls shall be arranged so that those which are most vital to operation have the most predominant location. They shall be placed in blocks distinctly marked to group those instruments and controls pertinent to the operation of any individual component. For example, all instruments and controls relative to the operation of the engine shall be in one block. Controls having similar functions shall have similar actions All movement controls (except for such devices as the parking brake, steering control, transmission selectors, power takeoff, and hydraulic pump) shall be self-centering Indicator lights shall be green to Indicate proper operation, amber to indicate caution, and red when warning is intended. The headlight high beam indicator may be blue. All instruments and controls shall be illuminated so that personnel can determine their function during night operation. Instrumentation and electrical controls shall have a quick disconnect plug integrated into the wiring harness to allow removal of the complete panel or sections of panels for maintenance All air gages shall be blocked together and not interfere with removal of instrument panels. At least the following instruments and controls shall be provided

- a. Speedometer and odometer (speedometer shall read correct speed within plus or minus one percent).
- b. Tachometer.
- c. Engine 011 pressure gauge and low engine oil pressure warning light.
- d. Engine coolant temperature gauge and high engine coolant temperature warning light.
- e. Transmission oil temperature gauge.
- f. Voltmeter or ammeter.
- g. Fuel level gauge.
- h. Fuel control switch (manual engine cutoff switch).
- i. Hourmeter.
- j. Light switches.
- k. Dash light(s).
- l. Parking brake flasher light.
- m. Brake master cylinder red warning light.
- n. Headlight high beam indicator

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- o. Winterization system controls.
- p. Block heater red warning light.

3.4.6 Climate control system. The climate control system shall provide heater, defroster, and ventilator modes. The system shall include a heater core, a blower, and the plumbing, ductwork, dampers, controls, and other components necessary to meet the performance requirements specified herein. At least four adjustable panel louvers shall be provided, approximately evenly spaced across the width of the cab each shall provide approximately equal flow of air. Cab mounted components shall be protected from inadvertent damage by personnel.

3.4.6.1 Heater and defroster. Hot water type heater shall be provided. Heater shall be of the recirculating type. Discharge outlets shall be provided to direct heated air to floor and to defroster louvers. Heater shall be complete with blower Heater blower switch should be multispeed (minimum of two speeds) Mounted controls shall be convenient to driver. The heater shall maintain a temperature of at least 40°F in the cab with an outside ambient temperature of -65°F. The defroster shall clear the cab windows and windshield within 15 minutes after starting the vehicle with an outside ambient temperature of -65°F. An electric fan may be used to aid in keeping the windows clear.

3.5 Electrical system. The vehicle shall be equipped with a 12 volt electrical system. Wiring shall be weatherproof and color coded or numbered for easy identification. All circuits shall be protected by circuit breakers located so as to be protected from the environmental conditions described herein and to be readily accessible to a mechanic. The system shall have a negative ground The system shall provide for an external slaving system. The slaving system shall provide for charging of the vehicle batteries and for starting of the vehicle. Slaving system voltage shall be identified on the receptacle. Slaving system shall be installed on the exterior of the vehicle near the batteries.

3.5.1 Alternator. The engine shall be equipped with an alternator sufficient for operating all vehicle electrical components simultaneously. Minimum capacity of the alternator shall be 12 volts, 60 amperes, providing not less than 30 amperes DC output at normal engine idle The alternator shall have the capability to charge the battery with all electrical accessories operating at engine idle RPM

3.5.2 Battery. The battery shall be of 12 volt potential and shall have 1.25 times the cranking amperes required to start the engine when both battery and engine are at -20° F The battery shall conform to SAE J537 and shall be of the maintenance free sealed type having the maintenance free characteristics listed in W-B-131. Dual batteries may be used to meet specification.

3.5.3 Lighting

3.5.3.1 Vehicle lighting The vehicle shall be equipped with headlights, taillights, parking lights, clearance lights, brake lights, turn signal lights, back-up lights and reflectors in accordance with Federal Motor Carrier Safety Regulations Rear lights shall be installed flush with, or forward of, the rear of body with wire type guards over the lens to protect them from damage with chocks, tools tool boxes. towbars etc. The taillights themselves shall be of the removable lens and bulb replacement type Two backup lights shall be furnished which are activated by placing transmission shift lever in the reverse position A separate hand operated on/off backup light switch is not permitted.

3.5.3.1.1 Additional lighting in addition to the standard tail/stop/turn signal system, the vehicle shall be equipped with two double faced signal lamps in accordance with SAE J588 Signal lamps shall be mounted on roof of cab approximately 48 inches apart and located on cab transverse centerline Signal lamps shall be integrated with the standard turn signal system for easy operation from operator's position The emergency flashers shall activate the roof mounted signal lamps Turn signal operating unit shall be self-canceling type with visible and audible flash indicator

3.5.3.1.2 Floodlight. One round adjustable floodlight, of not less than 3,000 candlepower and not less than 3 1/2 inches in diameter, shall be furnished on the vehicle. Floodlight shall be located on the vehicle so that the areas immediately behind it and all three pintles will be illuminated at night. Floodlight on/off switch shall be labeled and easily operable from operator's position inside the cab.

3.5.3.2 Interior lighting. The cab and all compartments shall be provided with lighting adequate to enable personnel to readily obtain equipment and perform all functions necessary during night operation. Sealed contact switches shall be provided to automatically illuminate the lights in the cab or a compartment when its door is opened.

3.5.3.2.1 Domelight. One domelight with integral individual on/off switch shall be provided. The dome-light shall be mounted on the cab roof and centered over the operator's and passenger's seats (in center of adjustment range). The light shall illuminate the cab adequately to allow reading of a checklist.

3.5.4 Horn. Manufacturer's standard electric horn shall be furnished.

3.5.5 Electrical wiring. The electrical wiring shall be coded every two feet. The wiring shall be enclosed in a harness to within three inches of the terminal end. The harness shall be secured to the chassis frame using insulated clamps and secured to other components with nylon electrical tie straps or other means in accordance with industry standards.

3.6 Winterization system. When specified (see 6.2), the vehicle shall be equipped with a winterization system to permit storage and operation in ambient temperatures as low as -65°F. Heaters shall operate on 110 volt/240 volt, step up/step down alternating current (AC) and shall be wired through a function block to a single three pronged (male) weatherproof slave receptacle for receiving external power and grounding the vehicle. The slave receptacle shall be mounted on the left side (driver's side) of the vehicle so the operator can see the external electrical power cord connected to the vehicle. A red warning light shall be mounted on the dash and shall be connected to the external power circuit in the junction block so it will illuminate when the block heater is connected to external power. A three wire connecting cable, 25 feet long and of adequate line capacity to supply power for all heater units simultaneously, shall be furnished. The connecting cable shall include a matching female connector at the vehicle end and a standard weatherproof three pronged (two power, plus one ground) male connector at the other end. Electrical apparatus shall conform to FMCSR 393.77(c)(7). Electrical Insulation of connective cable shall withstand normal operating stresses in low ambient air temperature without cracking or loss of dielectric capacity. All heater lead wires shall be installed without interfering with vehicle component operation and without loose excess wire. Provisions for storage of the cable shall be provided in the vehicle cab. Heaters shall be furnished as follows.

- a. A coolant heater, 1,500 watt minimum rating, shall be installed in the engine block or in the lower coolant inlet hose, controlled by a thermostat with an operating range of 140°F to 160°F.
- b. An immersion type engine oil heater, 300 watt minimum rating, shall be installed in oil pan through any convenient opening. The 011 heater shall be controlled by the coolant heater thermostat.
- c. A battery heater shall be provided having a capacity adequate to maintain battery electrolyte at a temperature of not less than 10°F during vehicle exposure in ambient air temperatures as low as -65°F and shall embody a thermostat to limit the temperature of the electrolyte to not more than 80°F.
- d. A fuel warmer or preheater shall be provided to prevent clogging of fuel filters due to wax crystallization in the fuel. The fuel warmer shall use engine coolant to transfer sufficient heat to the diesel fuel to heat it from an inlet temperature of -65°F to an outlet temperature of 10°F, with a flow rate not less than the maximum fuel demand of the engine fuel system.

3.7 Auxiliary equipment

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3.7.1 **Toolbox.** Tool box (or cargo box) shall be furnished behind the cab and shall be attached to or be a part of the vehicle. The volumetric dimensions of the tool box shall be at least 45 inches long, 25 inches wide, and shall be sloped from a height of 12 inches to a height of 4 inches. Tool box sides and bottom shall be constructed of 1/4 inch minimum steel and the lid shall be constructed of 12 gauge minimum steel with a reinforced sealing flange around the perimeter. It shall be capable of being locked by a heavy duty hasp. The tool box shall have an inside flange to mate with lid flange. Locking tool box shall include drain holes (one each corner) for eliminating standing water. Vehicle shall be capable of supporting the tool box with 1,000 pounds payload evenly distributed inside on its floor.

3.7.2 **Towing devices** The rear of the vehicle shall be equipped with one center pintle and two outboard pintles conforming to MS 51335-2. The pintles shall be located in the same vertical plane. All rear pintle hooks shall be mounted on extendable units. The units shall consist of a self-locking sliding bar that will allow the hook backward movement of not less than 10 1/2 inches, nor more than 12 inches. The center pintle hook shall have lateral movement of 45° in either direction from the centerline of the vehicle. The outboard pintle hooks shall not have any lateral movement. The units shall be fitted with rollers, and provisions shall be made for lubricating all moving parts. The normal procedure will be with the pintle assemblies in the closed, rather than the extended position. The telescoping bar shall be equipped with a safety grab handle. The bar shall be easily removable to facilitate inspection and maintenance. The expendable swing feature is required to facilitate connection of the hook to the trailer by the operator rather than the method requiring a two man operation. Once the lunette or towing eye of the towed load is secured, the extendable units will be engaged in the closed position for towing by the backward movement of the vehicle until the self-locking device is secure. The extendable units shall be capable of withstanding 6,000 pounds DBP in the extended position and 13,000 pounds DBP in the closed position. The expendable units may be the type manufactured by Lift Part Manufacturing Company (Part Number 54100 - 1) or PSI Mobile Products, Incorporated (Part Number 580285), or equal. The outboard pintles shall be located 43.5 inches, plus 1.5 inches, to each side of the center pintle. The front of the vehicle shall be equipped with a center mounted pintle hook conforming to MS 51335-2. The mount shall be capable of withstanding 18,000 pounds DBP. All units (except the center rear pintle) shall be located 18 1/2 inches, plus or minus 1/2 inch, high. The center rear extendable towing device shall be height adjustable from 12 inches to 18 1/2 inches (from the ground). A minimum of four evenly spaced height positions (including 12 inches and 18 1/2 inches) shall be provided. Height adjustment shall be easily made by the operator without the use of tools. All pintles, except the front pintle, shall be visible from the operator's position. If constructed of mild steel, the hitch shall have hardened steel bushing and pins at all pivot and locking points. The bushings shall be easily removed for service.

3.7.2.1 **Breakaway chain.** Trailer emergency breakaway cable hookup, capable of mating with NAS 1281C10 spring snap hook, shall be required. The breakaway chain attachment shall be installed on bumper or frame within 18 inches of pintle assembly. It shall not be installed on the pintle or pintle assemblies.

3.7.2.2 **Safety chain attachment points** The vehicle shall have two safety chain attachment points, one located on each side of pintle hook, symmetrical about the pintle hook and shall be located 14 inches high for use during towing on center rear pintle only. The attachment points shall not be located a distance of greater than 12 inches from the pintle hook and shall in no way be a part of or attached to the pintle hook. The attachment points shall be capable of withstanding a maximum shock load of 5,000 pounds each and shall have the ability for standard safety chain hooks to be attached. The inside radius of the safety chain hook is between one inch and three inches.

3.7.3 **Electrical receptacles.** The vehicle shall be equipped at the rear with a seven prong type female weatherproof electrical receptacle in accordance with SAE J560b to receive trailer jumper cable. The receptacle shall be located within a 24 inch radius from the center pintle hook located on the rear of the vehicle. The receptacle shall be installed complete with all the necessary wiring and connections to assure that trailer electrical devices can be actuated when the trailer jumper cable is connected to the receptacle.

Wiring shall be connected to conform to SAE J560b. The electrical cables shall conform to SAE standard for truck and trailer connections and shall have a weatherproof rubber boot to cover the terminal on the back of the receptacle. All cables passing through holes in sheet metal members shall be protected by rubber grommets. The entire trailer electrical system shall be designed for use with a 12 volt potential electrical system.

3.7.4 Seatbelts. Seat lap belts or Class II lap/shoulder harness with inertia metal closure reels shall be provided for all seating positions. Belts shall be metal to metal closure. All seating positions located at doors shall have shoulder harness in accordance with 49CFR, Part 571.

3.7.5 Fire extinguishers. Two 5 lb. Halon 1211 Fire Extinguishers (10-B:C) in accordance with A-A-1108, Type B, shall be provided with holding brackets. They shall be mounted at the right and left side rear surface of the tractor.

3.8 Finish and protective coatings.

3.8.1 Cleaning, painting, plating, anodic films, and chemical treatments. Cleaning, painting, plating, anodic films, and chemical treatments shall be in accordance with MIL-STD-808, except that commercial (see 6.3.2) components may be prepared in accordance with the manufacturer's standard practice, provided it is compatible with the exterior finish paint. Unless otherwise approved by the procuring activity, primer shall be in accordance with MIL-P-23377. However, MIL-P-85582A (Type 1, Class 2) primer may be used when MIL-P-23377 is prohibited by state/local regulations (see 6.2)

3.8.2 Finish. The paint finish shall show no evidence of uneven application, curtains, runs, sags, orange peel, lack of adhesion, or other defects and shall pass the wet tape test described in paragraph 4.6.1.1 of this specification.

3.8.2.1 Dark Green. Unless otherwise specified (see 6.2), the outer surface of the vehicle and the interior surfaces of compartments (except in the cab) shall be painted with polyurethane paint, Dark Green, Color Number 24052 of FED-STD-595. The paint shall be MIL-C-83286, or shall be a commercial polyurethane paint which meets the following requirements of MIL-C-83286

- a Paragraph 3.7.3.4 Low temperature resistance
- b Paragraph 3.7.3.6.1 Accelerated weathering.
- c. Paragraph 3.7.3.7 Resistance to taping

In addition, the paint shall have a minimum pencil hardness of 6H when tested in accordance with paragraph 4.8.12 of MIL-C-83286. All exterior trim items (such as wheels, wheel covers, running boards, metal radiator grilles, drip rails, bumpers, door handles, and light trim rings) shall be painted with the same paint as the exterior of the vehicle.

3.8.2.2 Desert Sand When specified (see 6.2) the outer surface of the vehicle and the interior surfaces of compartments (except in the cab) shall be MIL-C-83286, Desert Sand, Color Number 30313 of FED-STD-595. All exterior trim items (such as wheels, wheel covers, running boards, metal radiator grilles, drip rails, bumpers, door handles, and light trim rings) shall be painted with the same paint as the exterior of the vehicle.

3.8.3 Rustproofing. Unless otherwise specified (see 6.2), the vehicle shall be rustproofed in accordance with paragraph 5.8 of FED-STD-297D. The first article units shall not be rustproofed until after approval of the first article test report.

3.9 Markings Unless otherwise specified, markings for vehicles painted Forest Green shall be applied with black paint, Color Number 37038 of FED-STD-595, and markings for vehicles painted Desert Sand shall be applied with white paint Color Number 37875 of FED-STD 595

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3.9.1 Identification markings. Unless otherwise specified (see 6.2), the vehicle shall be marked for the appropriate service in accordance with MIL-STD-1 223.

3.9.2 Vehicle marking Unless otherwise specified (see 6.2), markings on the tractor shall be painted Lusterless Black, Color Number 37038 of FED-STD-595. Characters shall be clocktype capitals and Arabic numerals. Location, information and character size shall be as follows.

INFORMATION	EXAMPLE	LOCATION	MINIMUM CHARACTER HEIGHT
Agency	USAF	On each side and rear	1 /2 inches
Registration Number	10D315	On each side and rear	1 /2 inches
Capacity	4,500 pounds DBP	On each side and rear	1 inch
Safety	No Riders	On each side panel	1 /2 inches
Tire Pressure	TPXX	On frame above each tire	1 inch
Type Fuel	Diesel	Near fuel tank filler	1 inch
Lifting/Tiecfown	Lift/tiedown points		1 inch

3.10 Identification plates and operating instructions. All identification plates, instruction plates, data plates, etc. shall conform to MIL-P-514 and shall be of a size and shape consistent with the information required thereon Abbreviations shall be in accordance with MIL-STD-12

3.10.1 Identification plate An identification plate, permanently marked in accordance with MIL-STD-130, shall be securely attached to the vehicle in a readily accessible location The identification shall contain the following information

Nomenclature
 Manufacturer's model number
 Manufacturer's serial number
 Manufacturer's name
 Manufacturer's address
 Manufacturer's service phone number
 Date of manufacture
 Contract number
 National stock number

3.10.2 Control markings. All controls, valves, gauges, and indicators used in the operation of the vehicle shall be identified by nameplates securely installed in clearly visible locations.

3.10.3 Operating instructions. Brief operating and precautionary instructions shall be permanently affixed near the appropriate controls. The instructions shall be clear, concise, and adequate to enable operation of the vehicle without damage to the equipment or injury to personnel and shall refer to the components as identified by nameplates.

3.10.4 Lubrication plate. A lubrication plate shall be provided directing attention to all lubrication fittings and components which require lubrication. The plate shall identify the type and grade of lubricant required for all operational temperatures.

3.10.5 Transportation data plate A transportation data plate shall be provided. The plate shall contain at least the following information:

- a. Side and rear silhouette views of the vehicle.
- b. Horizontal and vertical location of the center of gravity of the vehicle in transport condition.
- c. Shipping weight.
- d. Loading cubage
- e. Overall length, width, and height.
- f. Tiedown instructions for air transport in Types C-130, C-141, C-17, and C-5 Aircraft.

3.11 Part numbering of interchangeable parts. All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable. All parts shall be marked for identification in accordance with MIL-STD-130. (Note that MIL-STD-130 does not require marking of commonly known commercial parts which present no identification problem or parts in assemblies which are not normally subject to disassembly or repair.)

3.12 Dimensions. The vehicle, in fully operational condition, including all equipment and accessories, shall not exceed the following dimensions:

- a. Length (maximum) -191 inches.
- b. Width (maximum) -98 inches
- c. Height (maximum) -102 inches.
- d. Ground clearance (minimum) -10 inches.

3.13 First article When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.4 and 6.2.1)

3.14 Fabrication

3.14.1 Welders and welding

3.14.1.1 Welders All welders employed in the fabrication of the vehicle, except for commercial (see 6.3.2) components, shall be certified in accordance with the applicable requirements of MIL-STD-1595, the American Welding Society, or the American Society of Mechanical Engineers

3.14.1.2 Welding. Welding procedures shall be in accordance with MIL-STD-1595 and American Welding Standards. The surface parts to be welded shall be free from rust, scale, paint, grease, and other foreign matter. Welds shall be of sufficient size and shape to develop the full strength of the welded parts. Welds shall transmit stress without cracking or permanent distortion when the parts connected by the welds are subjected to test, proof, and service loadings

3.14.2 Bolted Connections. Bolt holes shall be accurately punched or drilled and shall be deburred. Unless torque is specified, threaded fasteners shall be tight and shall not work loose during testing or service usage.

3.14.3 Riveted connections. Rivet holes shall be accurately punched or drilled and shall be deburred. Rivets shall be driven with pressure tools and shall completely fill the holes. Rivet heads, when not countersunk or flattened, shall be of approved shape. Rivet heads shall be full, neatly made, concentric with the rivet holes, and in full contact with the surface of the component

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3.14.4 **Gear and lever assemblies.** Gear and lever assemblies shall be properly aligned and meshed and shall be operable without interference, tight spots, loose spots, or other irregularities. Where required for accurate adjustment gear assemblies shall be free of backlash

3.14.5 **Cleaning.** The vehicle shall be cleaned. Loose, spattered, or excess solder, welding slag, stray bolts, nuts and washers, rust, metal particles, pipe compound, and other foreign matter shall be removed during and after final assembly

3.15 **Servicing and adjusting.** Prior to acceptance of the vehicle by the Government, contractor shall service and adjust each vehicle for operational use, including at least the following:

- a. Focusing of lights.
- b. Adjustment of the engine, electrical and brake systems.
- c. Filling and charging the battery.
- d. Alignment of front wheels.
- e. Inflation and balancing of all tires.
- f. Complete lubrication of chassis, engine and running gear with grades of lubricants recommended for the ambient air temperature at the delivery point.
- g. Servicing of cooling system with a solution of ethylene glycol and water in equal parts by volume.
- h. Servicing of windshield washer reservoir with water and appropriate additives.

3.16 **Parts control.** The contractor shall participate in Government Industry Data Exchange Program (GIDEP) in accordance with MIL-STD-1556b. In the design of the vehicle, the contractor shall ensure the components selected have not been identified as a problem or unresolved deficiency by GIDEP. The contractor shall submit an Alert/Safe-Alert, on a DD Form 1939, whenever an actual or potential problem is evident with respect to a part, component, material, test equipment, process or safety condition. The contractor shall certify maximum use of off-the-shelf items in accordance with MIL-STD-965a.

3.17 **Preproduction model.** When specified (see 6.2), one or two first article(s) of the complete vehicle to be furnished under this specification shall be produced prior to the manufacture or fabrication of vehicles in quantity for inspection in accordance with Section 4. The vehicle submitted by the contractor shall be identical to vehicles proposed to be supplied under the applicable contract. The vehicle shall be symmetrical about the Centerline. The preproduction model shall be furnished with special trailer air connections, Type A winterization, power plant heaters, a set of four snow chains, a no-spin rear differential, four wheel drive and EPA Standards for the State of California.

3.18 **Workmanship.** The vehicle, including all parts and accessories, shall be constructed and finished in a thoroughly workmanlike manner. Particular attention shall be given to freedom from blemishes, defects, burrs, and sharp corners and edges; accuracy of dimensions, surface finish, and radii of fillets, thoroughness of soldering, welding, brazing, painting, wiring, and riveting; marking of parts and assemblies, alignment of parts and tightness of assembly fasteners; etc

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 as 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 Responsibility for compliance All items must meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.

4.1.2 Acceptance. All vehicles shall be inspected 100 percent for the acceptance tests specified herein at final inspection and all applicable requirements which would affect the form, fit or function of the vehicle.

4.1.2.1 Production inspection. If the DCASMA finds 35 or more minor deficiencies or four or more major deficiencies during the initial inspection of 25 vehicles, prior to acceptance, the ACO will notify the contractor that no more vehicles shall be inspected until the causes of the deficiencies are determined and that adequate corrective action has been taken by the contractor to preclude recurrence. The same criteria shall be used during the acceptance inspection of each 25 vehicle lot. Acceptance inspections shall stop if 35 or more minor deficiencies or 4 or more major deficiencies are identified. The ACO shall give a cure notice to the contractor that the government reserves the right and may exercise that right to terminate the contract after a second 25 vehicle lot fails to meet the production/acceptance inspection criteria. Major deficiencies are considered to be those deficiencies affecting the safe, effective operation of the vehicle. Minor deficiencies are strictly cosmetic type defects

4.2 Classification of tests. The inspection and testing of the vehicle shall be classified as follows

- a First article testing (see 4.4 and 6.2.1).
- b Acceptance testing (see 4.5)

4.3 Test conditions.

4.3.1 Apparatus. Apparatus used in conjunction with the testing specified herein shall be of laboratory precision type and shall be calibrated at proper intervals to ensure laboratory accuracy

4.3.2 Data During all testing specified herein, at least the following data, unless not applicable, shall be recorded at intervals not to exceed 30 minutes. Additional data and/or shorter intervals shall be provided as appropriate for any specific test.

- a Date.
- b. Time started.
- c. Time finished.
- d Ambient temperature
- e. Engine speed
- f. Engine oil pressure.
- g Engine coolant temperature
- h Transmission oil temperature
- i Vehicle odometer reading at the start and finish of each test.
- j. Engine hourmeter reading at the start and finish of each test
- k Hydraulic fluid pressure at the pump outlet
- l Hydraulic fluid temperature in the reservoir.

4.3.3 Preparation for tests. The vehicle, equipped with all specified auxiliary equipment shall be fully serviced and all equipment shall be prepared for immediate operation

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4.3.4 Test rejection criteria Throughout all tests specified herein, the vehicle shall be closely observed for the following conditions, which shall be cause for rejection:

- a. Failure to conform to design or performance requirements specified herein.
- b. Spillage or leakage of any liquid, including fuel, coolant, lubricant, or hydraulic fluid, under any operating condition, except as allowed herein.
- c. Structural failure of any component, including permanent deformation, or evidence of impending failure.
- d. Evidence of abnormal wear.
- e. Interference between vehicle components or between the vehicle, the ground, and all required obstacles, with the exception of normal contact by the tires.
- f. Misalignment of components.
- g. Evidence of undesirable readability characteristics, including instability in handling during cornering, braking, and while traversing rough terrain.
- h. Conditions which present a safety hazard to personnel during operation, service, or maintenance.
- i. Overheating of the engine, transmission, or any other vehicle component

4.4 First article testing.

4.4.1 First article test samples. The first article test samples shall be identical to the items procured under the terms of the contract. Approval of the first article test report shall not constitute a waiver by the Government of its rights under the provisions of the contract. Two first article samples shall be produced and tested as follows:

- a Contractor test sample (see 4.4.2.1)
- b User test sample (see 4.4.2.2)

4.4.2 First article tests.

4.4.2.1 Contractor test sample. The contractor test sample shall be subjected to the tests described in 4.6.1 through 4.6.11. All tests, with the exception of 4.6.7.8, shall be run using JP-8 fuel conforming to MIL-T-83133

4.4.2.2 User test sample. The user test sample shall successfully complete the tests in 4.6.1 through 4.6.11 prior to being shipped to the user test facility for the test described in 4.6.12.

4.4.3 Notifications of tests. The procuring activity shall be notified of the time and location of all first article tests so that representatives of the procuring activity may attend. The notification shall be in writing and shall include the nomenclature and the National Stock Number (NSN)

4.5 Acceptance testing Acceptance testing shall be classified as follows.

- a Individual testing (see 4.5.1),
- b. Random sample testing (see 4.5.2).
- c. Road test (production vehicle) (see 4.5.3)

All defects identified shall be corrected prior to acceptance

4.5.1 Individual testing Each production vehicle shall be subjected to the tests specified in 4.6.1, 4.6.2, 4.6.3, and 4.6.4.

4.5.2 Random sample testing. Any production vehicle, when specified (see 6.2), may be selected by the procuring activity at any time to be subjected to the tests described in 4.6 except for 4.6.7.2

4.6.7.3, 4.6.7.10, and Air Transportability Certification. Upon completion of the random sample testing, the contractor shall prepare a test report in accordance with MIL-STD-831. An authorized Government representative shall countersign all data sheets of the report.

4.5.2.1 **Random sample test failure.** When a vehicle fails to successfully complete any random sample test, the cause of the failure shall be determined, corrective action shall be taken, and the test shall be repeated to verify adequacy of the corrective action. Tests not involving the defective component(s) may be continued pending the investigation of the failure. Vehicles to be delivered pursuant to the contract shall be inspected for all defects identified during all random sample tests and may not be accepted prior to verification of adequacy for the corrective action for a random sample test failure.

4.5.3 Road test (production vehicle). Each production vehicle shall be given a road test of at least five miles over paved surfaces. The following shall be observed for evidence of improper operation:

- a. Service and parking brakes.
- b. Transmission operable in all gears.
- c. Engine starting and operation at all speeds.
- d. Engine RPM.
- e. Top speed.
- f. Tire wear.
- g. Fluid leaks.
- h. Unusual noises, vibrations or unsafe conditions
- i. Drawbar pull test.

NOTE: This test shall be performed before individual tests a and b (see 4.5)

4.6 **Test methods.**

4.6.1 **Examination of product.** The vehicle shall be inspected to determine compliance with the requirements specified herein. Particular attention shall be given to materials, workmanship, dimensions, surface finishes, protective coatings and their application, welding and riveting, and markings. Any painted surface on the exterior of the vehicle may be tested in accordance with paragraph 4.6.1.1 of this specification. Check the vehicle for proper coolant level, oil level, fuel level, and hydraulic levels. For the first article and random sample vehicles, this examination shall be accomplished by use of a checklist which lists each requirement not validated by a test and the results of the examination

4.6.1.1 **Adhesion (wet) tape test.** This method covers a procedure suitable for establishing acceptability of intercoat and surface adhesion of the polyurethane coating system. The test will be accomplished on each production end item, e.g., loader, trailer, vehicle

- a. The test is not applicable to a unit where the surface area or contour of the unit is such that the test would be physically impossible to accomplish, e.g., individual components such as motors or engines.
- b. Adhesion tests shall be made on the completed exterior finish on the painted area after drying for a period preferably of at least 48 hours. The test will be accomplished on only one area unless failure occurs, then several areas will be checked to determine that a satisfactory level of adhesion has been achieved. Three consecutive failures are grounds for rejection. Failures are defined as any visible peeling, chipping or defects.
- c. Perform the wet tape test as follows:
 - (1) Soak a clean cloth in distilled water (size at least 6 inches X 3 inches).
 - (2) Fold the cloth into a square while it is still wet and place it on the area to be tested.
 - (3) Place a piece of plastic over the wet cloth. The plastic must completely cover the cloth and hold the cloth in contact with the test surface.

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(4) Tape the plastic sheet onto the structure. Completely seal the edges with tape so that the water cannot evaporate.

(5) Allow the wet cloth to continuously contact the area for a minimum of 24 hours.

(6) Remove the wet cloth and blot up the surface water. Immediately apply a one-inch strip of tape, (Code No. 250 Minnesota Mining and Manufacturing Company, age of tape not to exceed one year), adhesive side down. Press the tape down, using two passes of 4-1/2 pound rubber covered roller or employ firm pressure with the hand.

(7) Remove the tape in one abrupt motion and examine the tested area for any paint damage such as removal of paint at one of the layers of the finish system or removal of the entire system from metal.

4.6.2 Mechanical operation. A thorough check shall be made of the vehicle to ensure proper functioning of all mechanical parts, accessibility of all controls and levers, interchangeability of removal parts, proper installation of equipment and safety.

4.6.3 Lubrication inspection. Observe the lubrication of every fitting on the vehicle to determine compliance with:

- a. Lubrication by standard military lubricants
- b. All fittings accessible
- c. Fittings in vulnerable positions are protected by recessing or bossing

4.6.4 Drawbar pull test The vehicle at its curb weight, plus operator, while on a clean dry level brushed concrete surface, with 0.75 minimum coefficient of friction, shall be coupled at pintle height with no slack by a drawbar dynamometer to a deadman consisting of an immovable object. Measurement of the coefficient of friction shall be by a standard method and the measured value included in the test report. Tires shall be inflated with air to technical order recommended pressure. The vehicle engine shall be started, the power transmission system engaged and power gradually exerted against the deadman to full throttle until the vehicle torque converter stalls or the wheels begin to slip. Torque converter oil shall not overheat. The DBP shall be measured on the dynamometer at the instant prior to wheel slippage or during torque converter stall at full throttle. The DBP exerted shall be 4,500 pounds minimum. No mechanical or functional failures shall result from this test. Engine shall not overheat. The test shall only be conducted in an environment where the dry barometer pressure is between 28 in Hg to 30 in Hg and ambient air temperature is between 60° F to 110° F.

4.6.5 Torque converter test Immediately following the test in 4.6.4, the tractor shall be stopped by application of the service brakes and held stationary by the brakes while the transmission is in the lowest gear. The engine shall be run at 90 percent of torque converter stall speed for one minute. The transmission oil temperature shall not exceed 125°F above ambient temperature. A thermocouple shall be placed in the transmission oil, and LED readout shall be visible to the operator to show conformance to the above.

4.6.6 Mobility tests

4.6.6.1 Speed. Speed tests shall be conducted over a dry clean smooth level surface of sufficient length to attain maximum speed of the vehicle, including a measured test course of 154 feet minimum. Drive the vehicle sufficient distance to attain maximum speed prior to entering the measured test course. Record length of test course and time to traverse it. Calculate speed and record. Perform test three times for each forward and reverse gear. Travel speed in each gear shall be the average of three runs. Vehicle speeds shall comply with 3.2.1. Vehicle shall be at its GVW during all tests. For one of the speed tests, record vehicle speed from speedometer and compare with speed calculation. Vehicle speedometer shall comply with 3.4.5.

4.6.6.1.1 Incremental movement. The vehicle shall show a capability of small increments, for forward and reverse movement, of not more than 1 foot.

4.6.6.2 Road test. The vehicle shall be given a road test over level paved surfaces for 30 minutes while pulling a trailer test load of 40,000 pounds minimum at 10 MPH minimum. The vehicle shall then be road tested over level paved surfaces for 30 minutes without any trailing test load at 20 MPH minimum. Repeat above six times. Vehicle shall be at its curb weight, plus operator, during all tests. At the conclusion of each test, a 10 minute rest period shall be permitted. During each test, 15 stops, 15 short radius right turns and 15 short radius left turns shall be accomplished. At the conclusion of the tests, the vehicle shall be examined, and any evidence of permanent deformation, maladjustment or undue wear shall be cause for rejection. Evidence of skewing or overheating during the tests will be cause for rejection. Evidence of tire scuffing or wear shall be cause for rejection. During the above tests, a thermal couple shall be placed in the coolant fluid, and an LED readout shall be visible to the operator to show conformance to 3.3.2.1.2

4.6.6.3 Steering sytem test. The vehicle shall travel at 10 MPH and shall make a minimum of 15 right hand turns. Each right hand turn shall be of the varying radius of curvature. During each right hand turn, the steering wheel shall be released, and the vehicle's steering system shall return to the neutral (straight) position. The test then shall be repeated for left hand turns. Failure of this test shall be cause for rejection. The performance test for emergency steer shall be in accordance with SAE J53.

4.6.6.3.1 Turning capability. Vehicle shall be tested in accordance with SAE J695b to show conformance with 3.2.1. Particular attention will be given to tire wear due to tight turning radius.

4.6.6.4 Brake test. The vehicle shall be capable of stopping itself in 20 feet when traveling 20 MPH. A fifth wheel shall be used, and stopping distance accomplished shall not exceed requirement from any one of six tries. Compliance with parking brake requirements shall be demonstrated. Additionally, the vehicle shall be shown, by mathematical calculation, to conform with all other requirements in paragraph 3.34. When towing, the vehicle shall not add to yaw, sway, skid, tip, tilt, or jackknife under maximum braking conditions and minimum stopping distances

4.6.6.4.1 Brake test at curb idle. Apply the service brakes, pedal force not to exceed 100 pounds, with the engine operating at curb idle, move the transmission from neutral to forward drive, back through neutral to reverse. There shall be no movement of the tractor in either direction due to wheel rotation because of brake slippage. The parking brake shall not be applied during this test. This test shall be repeated 10 times in each direction.

4.6.6.4.2 Service brake test. While traveling, the vehicle shall experience an engine failure simulation and, while maintaining the boost (assist) to the service brake system for at least one brake application, shall be capable of stopping within the limits specified herein. After the boost (assist) is no longer available to the service brake system, the operator shall be capable of stopping the vehicle with a maximum of 130 pounds pedal effort.

4.6.6.4.3 Parking brake test. Tractor's parking brake together with the towed vehicle parking brake shall hold a fully loaded towing and towed vehicle combination, both in forward and aft position, on an 11.5° incline for five minutes (each way). Service brakes shall not be applied

4.6.6.5 Axle bind test. When a four wheel drive vehicle is required (see 6.2), the tractor must be placed in the two wheel drive configuration and be driven 360° through the tightest turning radius obtainable. The number of rotations each wheel makes must be counted and recorded. This must be repeated in the four wheel drive configuration. The number of revolutions each wheel makes in four wheel drive must be within five percent of the number of revolutions that same wheel made in two wheel drive.

4.6.7 Design verification

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4.6.7.1 Vehicle weight The vehicle shall be weighed to determine curb weight and distribution of curb weight on front and rear axle. The imposed loading of the front and rear axles shall be computed using the curb weight, the operator weight at 175 pounds and the payload (see 3.1.12) to provide the GVW of the tractor. Calculated imposed loads shall be utilized to ascertain that the suspension, axles and tires furnished are of adequate capacity to meet contract requirements. Show vehicle conforms with 3.1.11.

4.6.7.2 EMI test. The vehicle shall conform to the requirements of paragraph 3.1.7 when tested in accordance with the procedures of MIL-STD-462, Notice 2.

4.6.7.3 Fuel consumption. The vehicle shall be tested for fuel consumption at 5 MPH exerting 500 pounds DBP and at 15 MPH with no load. Each speed will be tested for one hour. The distance shall be verified by fifth wheel, and test track shall be relatively level. The fuel measuring device and all fuel economy correction shall be in accordance with SAE J1 082.

4.6.7.4 Tire chains. Type "RS" tire chains shall be installed on all four wheels, and the tractor shall be driven for five minutes making right and left turns at a 17 foot radius, as well as for five minutes making right and left turns at a 23 foot radius to show that sufficient clearance exists

4.6.7.5 Racking test. The tractor shall be driven over a course of 12 tractors wheel base length (WBL). One wheel track shall have timbers spaced at 0.3 WBL. The other track shall have timbers spaced at 0.4 WBL. Four by four timbers shall be used. Timber spacing shall be fixed by rope or cable connection. The test shall consist of six round trips over the course at a speed of 8 MPH and six round trips over the course at a speed of 4 MPH (70 timbers will be required).

4.6.7.5.1 Torsion test. The tractor shall be driven over a course of 12 tractors WBL. One wheel track shall have ramps spaced at two WBL starting at an initial position. The other track shall have ramps spaced at two WBL starting at one WBL from the initial position. Eight inch by eight inch ramps may have an angle at each end of not less than 30°. The test shall consist of 12 round trips over the course at a speed of 4 MPH. The ramps shall be fixed by rope or cable connection.

4.6.7.6 Human factors engineering (HFE) evaluation. Two operators, one as large as 95 percentile male and one as small as a five percentile female in accordance with SAE J833, shall demonstrate that all controls, switches and any other components are located so as to assure the operators can reach, remove, manipulate, maintain or operate them (see 3.4) per MI L-STD-1472

4.6.7.7 Sound level tests. The sound level inside the cab at the operator's ear level and outside the cab at a distance of 15 feet at a five foot height shall be measured and recorded Tractor shall meet requirements of 3.1.8.

4.6.7.8 Alternate fuel test. The vehicle shall use JP-4 fuel and shall be driven a total of eight hours at 20 MPH exerting a 1,000 DBP. After every hour, a 10 minute break shall be taken. Following 10 minute break the vehicle shall be tested per paragraph 4.6.4 except fuel used in the engine shall be JP-4 fuel and minimum drawbar pull exerted shall be 3690 pounds. The tractor shall then be driven 1 hour at 5 MPH exerting a 2,250 DBP. Failure to tow said loads and/or failure to complete test shall be cause for rejection.

4.6.7.9 Corrosion test. A three foot by two foot panel, rustproofed in accordance with the contractor's standard commercial practice and painted in accordance with 3.8 of this specification, shall withstand 120 hours of a five percent, plus or minus one percent, concentrated salt spray in a closed environment without any evidence of corrosion.

4.6.7.1.0 Cold start test. The vehicle shall be cold soaked for a period of not less than 24 hours in an ambient temperature of -65°F, plus or minus 2.5°F. The starting-aid device selected, as well as specific heaters stated in 3.6, shall be the only starting aids used for this test. Arctic fuel and lubricants shall be permitted at this temperature. At this time the vehicle shall be tested for operation of all lights, brakes,

gears and other controls to prove proper working condition The vehicle shall then be cold soaked for a period of 24 hours at -10°F, plus or minus 2.5°F. Ether injection shall be the only starting aid used. Non-compliance with said test shall be cause for rejection.

4.6.8 Environmental tests.

4.6.8.1 Low temperature storage and operation. The complete vehicle, including all accessories, shall be tested in accordance with Test Method 502.2, Procedures I and II, of MIL-STD-810 to demonstrate compliance with 3.1.4(a). Temperature sensor locations shall be approved by the procuring activity. Operational checkouts shall be performed in accordance with paragraph 4.6.8.5. Engine starting aids may be used (see 3.3.2.1.3). When applicable, a fine mist of water shall be applied to the entire windshield to form a thin film of ice. The defroster shall clear the windshield within one hour and maintain clear vision throughout the remainder of the test. "Standard ambient" and "controlled ambient" shall be defined as the ambient condition of the test site. For Procedure I, the vehicle shall be exposed to the minimum required cold storage temperature of 3.1.4(a) in a steady state condition for 24 hours. For Procedure II, the vehicle shall be exposed to the minimum required cold operational temperature of 3.1.4(a) in a steady state condition.

4.6.8.2 High temperature storage and operation. The complete vehicle, including all accessories, shall be tested in accordance with Test Method 501.2, Procedures I and II of MIL-STD-810 to demonstrate compliance with 3.1.4(a). Temperature sensor locations shall be approved by the procuring activity. Operational checkouts shall be performed in accordance with 4.6.8.5. "Standard ambient" and "controlled ambient" shall be defined as the ambient condition of the test site. For Procedure I, the vehicle shall be exposed to the maximum required hot storage temperature of 3.1.4(a) in a steady state condition for 24 hours. For Procedure II, the vehicle shall be exposed to the maximum required hot operational temperature of 3.1.4(a) in a steady state condition.

4.6.8.3 Rain. The complete vehicle, including all accessories, shall be tested in accordance with Test Method 506.2, Procedure III, of MIL-STD-810 to demonstrate compliance with 3.1.4(c). Operational checkouts shall be in accordance with 4.6.8.5. The interior of the cab and all compartments shall be examined for water: any evidence of leakage shall be cause for rejection.

4.6.8.4 Other environmental tests. The components and materials used in the construction of the vehicle shall be subjected to, or certified as having passed, or being capable of passing, the following test methods of MIL-STD-810 to demonstrate compliance with 3.1.4

- a. Humidity - Method 507.2, Procedure I.
- b. Salt Fog - Method 509.2, Procedure I. Cycling test shall be used One cycle consists of 24 hours exposure to the test environment followed by 24 hour exposure to standard ambient conditions. A minimum of 7 cycles shall be conducted.
- c. Sand and Dust - Method 510.2, Procedures I and II. For Procedure I, air velocity shall be 1,750 ft/min and high temperature adjustment shall be 125°F. For Procedure II air velocity shall be 5,700 ft/min; sand concentration of 0.0623 g/ft³, plus or minus 0.015 g/ft³; 90 minutes per face duration.
- d. Snow and ice, perform tests in accordance with para 3.1.4g For procedure, air velocity shall be 50 knots per hour, blowing snow/freezing rain or combination, snow/ice concentration 0.0773 g/ft³ 90 minutes duration.

4.6.8.5 Operational checkout. All controls, levers, mechanisms, and doors shall be actuated a sufficient number of times to ensure consistency of operation and to determine whether the test exposure produced system degradation.

4.6.9 Reliability demonstrated Compliance with the quantitative reliability requirements of 3.1.3.1 shall be demonstrated by the tests in 4.6.9.1 The vehicle shall complete, as a minimum. the tests de-

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scribed in 4.6.9.1 with the contractor's option of using the tests described in paragraphs 4.6.6, 4.6.7.3, 4.6.7.4, 4.6.7.5, 4.6.7.5.1, and 4.6.7.8 towards the total hours required to meet the reliability demonstration. The required 250 hours MTBF at a 0.80 confidence level equates with 400 hours of testing without a failure. The test in 4.6.9.1 shall be continued if necessary to accumulate the required hours. Scheduled maintenance or adjustments authorized by this specification or the procuring activity shall be not be counted as failures.

4.6.9.1 Vehicle durability test. The vehicle, at its GVW, shall be driven 2,000 miles under loads as follows :

- a. One hundred miles at 4,500 pounds DBP
- b. Two hundred miles at 3,500 pounds DBP
- c. Four hundred miles at 3,000 pounds DBP
- d. Five hundred miles at 2,000 pounds DBP
- e. Eight hundred miles at 1,000 pounds DBP

During the tests, the vehicle shall be stopped by the service brakes at least once in each five miles.

4.6.10 Maintainability demonstration. Compliance with the repair time requirements shall be demonstrated by task performance. All scheduled maintenance tasks and all tasks listed in 3.1.3.2.1 shall be performed. In addition, corrective maintenance tasks shall be selected by the procuring activity from an approved list of tasks provided by the contractor in the first article test procedure. This list shall represent all expected failures over the life of the vehicle. Not less than 25 or more than 50 of the tasks shall be **demonstrated to verify a maximum repair time within the required limit. As part of this demonstration, the recommended frequencies of the scheduled maintenance tasks and the times recorded to accomplish the tasks shall be used to develop an expected value of scheduled maintenance time per measure of use, such as calendar time, hours of operation, or miles traveled. The capability of performing maintenance tasks by personnel wearing arctic mittens shall be demonstrated.**

4.6.11 Air transportability analysis. A detailed engineering analysis shall be conducted to demonstrate compliance with 3.1.9. The analysis shall include the tiedowns and all major components and their ability to withstand the accelerations specified in MIL-STD-1791. The evaluation shall also include a dimensional analysis for the vehicle while loaded aboard Types C-130, C-141, C-17, and C-5 Aircraft.

4.6.12 User test. The vehicle shall be delivered to the location specified (see 6.2) for 60 days of operational use. The 60 available days shall be consecutive, except when interrupted for maintenance/repair downtime, as defined herein. The user test will not begin until after completion of the first article tests as defined by 4.4 and air transportability certification. Acceptance test (see 4.5) and the examination of the product (see 4.6.1) shall be performed on the user test sample prior to shipment of the user test sample. The user test sample shall not be shipped without prior 15 day notification to the PCO. The test period shall begin after the vehicle has been inspected and prepared for towing and shall end when 60 days of availability are complete or 75 calendar days have elapsed, whichever occurs first. If the user test sample has not been available for 60 test days after 75 calendar days have elapsed, the user test sample shall be considered a failure. The vehicle shall be available for any one period of eight consecutive hours during each day of the 60 day test. The periods shall be scheduled by the sites representative, and the schedules shall be provided to the contractor at least 12 hours in advance. Any period of more than four hours of the same day that the vehicle is out of service for maintenance or repair shall not be considered an available day for the test period. The vehicle shall be operated, and scheduled maintenance shall be performed by Air Force personnel using the operation and maintenance procedures contained in the preliminary technical data to be supplied with the test sample. The preliminary technical data shall contain procedures for preparation/tiedown of the tractor for air shipment. The contractor shall provide any special tools/equipment required to perform operators maintenance/scheduled maintenance. Any parts or corrective actions required shall be provided by the contractor. Any corrective actions performed by the

contractor shall not begin before notification to the sites representative, and Government personnel shall be allowed to observe their actions. The contractor shall provide all loader consumables required in the course of the test except for diesel fuel, water, compressed air and electrical power which will be furnished. The contractor shall provide on-site familiarization to the operators and mechanics as necessary to perform this test. Test operations shall simulate normal Air Force usage and will not exceed any performance requirements defined by Section 3 of this purchase description. Noncompliance with the performance requirements of this purchase description shall be cause for rejection. The contractor shall maintain a daily log. The log shall be signed by the locations representative and the contractor after each day of activity. The daily log shall document, but not be limited to, the following:

- a. Operating time.
- b. Tasks completed.
- c. Technical manual errors
- d. All failures and corrective actions taken.
- e. Operational problems encountered.

The contractor shall report the user test results, including daily logs of activities, in the first article inspection report.

4.6.13 Shock dynamic and finite element analysis verification It shall be shown by the use of finite element analysis, which shall include a working paper, stress plots and mode analysis, that the frame proposed by the manufacturer for the fabrication of this vehicle shall maintain its structural integrity over the life of the vehicle. The analysis shall include all stress, dynamic loading, vibrational distortions and shock loading that would be imposed on the frame during normal operational use and in accordance with the performance specification described in this specification. The frame materials allowable stress used in this frame design shall be in accordance with the following order of precedence:

- a. MIL Handbook 5.
- b. Code AISC.
- c. Code ASME.
- d. Code ASTM.
- e. Code SAE

4.7 Refurbishment After successful completion of the all required testing, each vehicle shall be restored to like new condition

5. PACKAGING.

5.1 Preparation for delivery shall be in accordance with the terms of the contract.

6. NOTES.

(This section contains information of a general or explanatory nature that may be helpful. but is not mandatory.)

6.1 Intended use The tractors furnished under this document will be used for towing aircraft loads of not more than 70,000 pounds and support equipment loads of not more than 40,000 pounds on level surfaces This tractor shall also be capable of towing support equipment loads of 25,000 pounds on 3 percent grades and 20,000 pounds on 5 percent grades at a minimum of 10 MPH.

6.2 Ordering data Procurement documents should specify the following:

- a. Title number and date of this specification
- b Preproduction mode if required (see 3.17)

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- c. Special trailer air connection, if required (see 3.3.4.5).
- d. Winterization, if required (see 3.6).
- e. Nondirectional mud and snow tires, if required (see 3.3.7).
- f. Automatic locking (no-spin) differential, if required (see 3.3.2.4.1).
- g. Finish color required, if not Dark Green, Color Number 24052 of FED-STD-595 (see 3.8.2).
- h. Location for user testing (see 4.6.12).
- i. Random sample test (see 4.5.2).
- j. Identification markings required (see 3.9.1).
- k. Vehicle markings required (see 3.9.2).
- l. Tire chains, if required (see 3.3.7.1).
- m. EPA standard for California, if required (see 3.3.2.1.4.1).
- n. MIL-P-85582A (Type I, Class 2) Primer, if required (see 3.8.1).
- o. Rustproofing, if required (see 3.8.3).
- p. Four wheel drive vehicle, if required (see 3.3.2.2.1).
- q. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).

6.2.1 First article. When a first article inspection is required, the items should be first article samples. The first article should consist of two units. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract

6.2.1.1 Test report. Upon completion of the first article tests, a first article test report shall be prepared in accordance with MIL-STD-831. An authorized Government representative shall countersign all data sheets and the report. The following shall be incorporated as a part of the test report.

- a. All data collected, failures, maintenance performed, and other events recorded shall be identified by accumulated operation time, miles, cycles, or position in the test procedure, as appropriate. Test conditions at the time of failures or irregular operations identified shall be recorded.
- b. Summary of the engineering reasoning and of any tests conducted to determine assignable causes for all failures and irregular operations identified.
- c. Summary of the engineering reasoning behind any corrections made, to be made, or proposed to be made and the predicted effectiveness of those corrections.
- d. Test activity and/or contractor comments on item features or requirements that, if modified, should improve the item.
- e. Test activity and/or contractor comments on field conditions or operating procedures to be avoided or cultivated to increase the reliability and useful life of the item.
- f. List of all cleaning and finishing procedures to be used in accordance with MIL-STD-808.
- g. List of methods to be used to protect against electrolytic corrosion of dissimilar metals in intimate contact in accordance with MIL-STD-889.
- h. List of special tools and diagnostic equipment necessary to perform field level maintenance.
- i. Official certification of compliance with Environmental Protection Agency and/or State of California (as applicable) air pollution control requirements, or official waiver/exemption therefrom.

6.3 Definitions

6.3.1 Belgian Block. A Belgian Block course is paved with unevenly laid granite or basalt block forming an undulating surface. It duplicates a rough cobblestone road such as is found in many parts of the world. A cobblestone course may be used as an alternate.

6.3.2 Commercial. A manufacturer's standard (product) having been marketed, in production, and sold in substantial quantities to the general public for a minimum of one year prior to the date of invitation for bid or request for proposal. An item is "sold in substantial quantities" only when the quantities regularly sold are sufficient to constitute a real commercial market. Nominal quantities, such as models, samples, prototypes, or experimental units, do not meet this requirement. The "general public" is a significant number of buyers other than the Government or affiliates of the offeror; the item involved must not be for Government end use. For the purpose of this specification, items acquired for "Government end use" include items acquired for foreign military sales.

6.4 Data requirements. The following Data Item Descriptions (DID's) must be listed, as applicable, on the Contract Data Requirements List (DD Form 1423) when this specification is applied on a contract, in order to obtain the data, except where DOD FAR Supplement 27 475-1 exempts the requirement for a DD Form 1423.

Reference Paragraph	<u>DID Number</u>	<u>DID Title</u>	<u>Suggested Tailoring</u>
	DI-A-7088	Conference Agenda	See DD Form 1423
	DI-A-7089	Conference Minutes	See DD Form 1423
	DI-A-4901	Test procedures	See DD Form 1423
6.2.1.1	DI-A-4902	Test Report	See DD Form 1423
4.4.3	DI-T-23731A/T	Notification of Tests	See DD Form 1423
4.6.13	UDI-A-23122A/T	Shock Dynamic Design Analysis Report	See DD Form 1423
	DI-A-3011	Still Photo Coverage	See DD Form 1423

The above DID's were those cleared as of the date of this specification. The current issue of DOD 5010.12-1, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

6.5 Subject term (key word) listing

Pintle hook
Push Plate, front
Safety chain
Tow bar

Custodians.
Air Force - 99

Preparing activity
Air Force -84

Project No: 1740 -F165

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

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.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER	2. DOCUMENT DATE (YYMMDD)
	DOCUMENT TITLE	
NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed)		

REASON FOR RECOMMENDATION

SUBMITTER		
NAME (Last, First, Middle Initial)	b. ORGANIZATION	
ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY		
Name Michael A. Greene	b. TELEPHONE (Include Area Code) (1) Commercial 912-926-5616 (2) AUTOVON 468-5616	
ADDRESS (Include Zip Code) WR-ALC/MMDET Robins AFB GA 31098-5609	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	