INCH POUND

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COMMERCIAL ITEM DESCRIPTION

TRACTOR, AIRCRAFT TOWING, MB-4

The General Services Administration has authorized the use of this commercial item description by all federal agencies.

1. SCOPE. This Commercial Item Description (CID) covers the requirements for one type of MB-4 aircraft towing tractor, hereafter referred to as tow tractor. The tow tractor is capable of towing trailers up to 80,000 pounds, and military aircraft up to 175,000 pounds on dry level concrete.

2. SALIENT CHARACTERISTICS. Failure of the tow tractor to meet the salient characteristics of this CID shall be cause for rejection of the tow tractor. The tow tractor shall be free from faulty construction and any defect that affects appearance, serviceability, and durability. The tow tractor shall be representative of the quality and workmanship found in tow tractors offered for new commercial sale.

2.1 Gross vehicle weight (GVW). The tow tractor shall have a minimum GVW of 19,000 pounds.

2.2 Overall dimensions. Overall dimensions shall be the minimum consistent with the operational performance and the design constraints necessary to achieve the specified performance. Overall dimensions shall not exceed:

Length: 200 inches without couplers
Width: 100 inches without mirrors
Height: 100 inches

2.3 Drawbar pull (DBP). The tow tractor shall have a minimum DBP of 16,000 pounds on dry level concrete.

Comments, suggestions, or questions on this document should be addressed to WR-ALC/LGEC, 480 Richard Ray Blvd. Suite 200, Robins AFB, GA 31098-1640 or emailed to Priest.Blackstock@robins.af.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at http://assist.daps.dla.mil

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2.4 Power train. The tow tractor shall have a commercially available, liquid cooled, turbocharged diesel engine of not less than six cylinders and power train sufficient to develop the required drawbar pull and obtain the required tow tractor speeds. Power train components shall have adequate torque and power ratings for the imposed torque and power. The tow tractor power train shall possess sufficient cooling capacity to perform continuous maximum performance towing in high ambient temperatures of +125 degrees F without exceeding the manufacturer's maximum allowable temperatures on the individual power train components. Any requirements for towing in high ambient temperatures (recommended coolant ratios, oil types and viscosities, etc., for various temperature ranges) shall appear in the Technical Order (TO). The diesel engine shall operate satisfactorily when using Jet A-1 (JP-8) fuel. Power train shall feature a standard (type C) winterization package that is good for starting down to minus 20F, or when specified (see 6.2 c), a heavy-duty (type A) winterization package good for storage down to minus 65F and starting to minus 40F. Winterization package components with external power requirements shall be compatible with 110VAC/20A circuitry. For each winterization package, a breakdown of the winterization components and requirements (recommended coolant ratios, oil types and viscosities, etc., for the various temperature ranges) shall appear in the TO. The tow tractor shall meet applicable 50-state exhaust and evaporative emissions standards in effect at the time of vehicle manufacture. The tow tractor shall include an anti-restart, as well as a neutral safety start feature. Engine shall have an automatic engine shutdown system for high coolant temperature and low oil pressure. Transmission shall be of the power-shift type, with an integral, limited-slip, inter-axle differential. Maximum allowable transmission temperature during all operations shall not exceed 260 degrees F. Axles shall be planetary-drive/steer axles.

2.5 Driveline and steering. The tow tractor shall have four-wheel drive, and two-wheel and four-wheel power steering. Four-wheel steering shall feature both crab and coordinated steering. The selection of the steering mode shall be accomplished by the movement of a one-hand-operated lever or switch. When switching from the crab or coordinated four-wheel mode of steering to the two-wheel mode of steering, the rear wheels shall center automatically (wheels perpendicular to axle) as the steering wheel is rotated to the wheel center, without additional operator input or adjustment. The tow tractor shall have a maximum wall-to-wall turning radius of 17 feet or less while in four-wheel coordinated steering mode. Wheel-wells shall be designed so that tire chains may be used without interference.

2.6 Electro-magnetic interference (EMI). The tow tractor shall comply with EMI requirements of MIL-STD-461 for Radiated Emission per RE102, Radiated Susceptibility per RS103, and Conducted Susceptibility per CS114, CS115, and CS116 for Air Force ground equipment.

2.7 Mobility. The tow tractor shall be capable of traveling a minimum of 25 miles per hour (MPH) forward and 2.5 MPH in reverse on flat asphalt or concrete surfaces without a trailing load. Additionally, the tow tractor shall be capable of towing an 80,000 pound trailer on a 4% grade at a minimum of 8 MPH on asphalt or concrete surfaces. An externally-mounted back-up warning alarm shall be included in the reverse lights circuit.

2.8 Suspension. On occasion the tow tractor will leave the flight lines and roads within the perimeter of the base, and enter both paved and unpaved surfaces. The angle of each surface relative to the other can differ. The tow tractor shall have a suspension that will allow for

articulation of one or both of the tow tractor's axles, so that an axle's position relative to the other will allow for four-wheel contact with the normal working surfaces found in the above described conditions.

2.9 Wheels and tires. The tow tractor shall be equipped with steel disc wheels and tubeless steel belted radial tires with an appropriate tread pattern. The valve stems may be rubber or metal, but the valve stem caps shall be vinyl or plastic. The wheels and tires shall be in accordance with (IAW) the Tire and Rim Association recommendations for this application. All wheels and tires shall be uniform. Tire inflation pressures shall be noted on all wheel well openings, and shall be in accordance with Air Force Technical Order (T.O.) 36-1-191. If tire loads and tire inflation pressures that exceed the specifications on the tire sidewall markings are required, a copy of the application approval from the tire manufacturer shall be added in the Technical Order.

2.10 Braking system. The tow tractor shall feature a four-wheel, hydraulically operated braking system with power assist. If an air system is used as the power assist (air-over-hydraulic brakes), cab instrumentation shall include an air pressure gauge and a low-pressure indicator with buzzer and/or warning light (see 2.15). When an air system is specified for trailer towing (see 6.2 d), the air system shall be used as the power assist for the braking system (air-over-hydraulic brakes). Air-over-hydraulic braking systems shall be activated by a brake foot pedal which modulates air to the braking system. The brakes shall be capable of stopping a 175,000 pound towed load on a dry level asphalt or concrete surface from 5 MPH in no more than 18 feet.

2.11 Parking brake. The tow tractor shall be equipped with a mechanically actuated disc type parking brake. A lockout system shall be provided so that the tow tractor will shut down when the parking brake is on and the tow tractor is placed in forward or reverse gear. The lockout system shall also include a cab-mounted warning light. The tow tractor parking brake shall be capable of holding the tow tractor and a fully loaded MHU-141 trailer on an 11.5 degree incline, headed either up or down, without the trailer's parking brake engaged. The MHU-141 trailer has a maximum loaded weight of 8,400 pounds and a manual parking brake located on the trailer.

2.12 Air system. When specified (see 6.2 d), the tow tractor shall have an air system for towing the Air Force's four-wheel MHU-196 and MHU-204 trailers with air brakes. The air system shall be an over-the-road commercial truck/tractor design to include primary and secondary reservoir tanks, a wet tank, heated and automatic drain valves, automotive compressor, dryer, trailer protection valve, low-pressure indicator, service and emergency glad hands, glad hand covers with lanyards, etc. The glad hands shall be in accordance with SAE J318, and shall be polarized and identified as "service" and "emergency". Compressor sizing shall be in accordance with compressor manufacturer's recommendations for off-highway use. Components of the air system that are sensitive to the elements (rain water, road water, ice build-up, road grit, etc.) and installed in positions on the tow tractor that are vulnerable to those elements shall be covered or shielded to prevent the premature failure of those components over time or during service. The tow tractor's air system shall be activated by a brake foot pedal which modulates air to the braking system and supplies air to the trailer with sufficient speed and volume so as to work the tow tractor and trailer brakes simultaneously. The tow tractor/trailer combination shall stop straight in a 12 foot wide corridor. The tow tractor shall not exhibit

tendencies to tip, tilt, yaw, sway, skid, bounce, or jackknife under maximum performance maneuvers in such a way that safe control of the trailer payload is in jeopardy. The MHU-196/204 trailers have 1/4" ID service brake air lines and 3/8" ID parking brake air lines. The trailers have air brake chambers and drum brakes on each wheel, and a complete self-contained air control system including a supply reservoir fed from the tractor's emergency glad hand. The trailer's service brakes are actuated from the trailer's own air supply by air relays that get their signal from the tractor service glad hand. The trailer's air relays are located adjacent to the trailer's front wheels. The distance from the rear of the tow tractor to first set of wheels on the trailer is approximately 10 feet, and from the first set of wheels to the second set of wheels is approximately 30 feet. The trailer's braking system working pressure is 90 psi. The fully loaded trailer has a maximum deceleration rate not exceeding 20 ft/sec at 90 psi. Prior tow tractor and trailer testing has revealed an actual deceleration rate of approximately 17~19 ft/sec for the MHU-196/204 trailer. The MHU-196 trailer is towed at 10 mph loaded, and 20 mph unloaded. The MHU-204 trailer is towed at 10 mph loaded or unloaded. The maximum weight of the fully loaded MHU-196/204 trailer is 80,000 pounds. When the air system is specified, a decal shall be included on the front of the vehicle near the pintle hook locations that states, "DO NOT USE THE FRONT PINTLE POSITIONS TO TOW MHU-196/204 TRAILERS".

2.13 Electrical system. The tow tractor shall be equipped with a 12V electrical system. The battery(ies) shall be maintenance free. All external chassis wiring shall incorporate weather-proof connections and terminations. Exceptions to this are under-hood terminal strips and electrical posts that are protected from the elements. Any wire splicing (typically resulting from special-request options) shall incorporate a mechanically-crimped connector, solder and heat-shrink tubing. All crimped-on wire components (i.e. Weatherpac or Metri-pac style connectors) shall be installed using the appropriate crimping tool for the application. All wiring shall be of the appropriate gauge for the amperage the circuit is drawing and/or protected to. Batteries shall be accessible for daily inspection without the need for hand tools.

2.14 Frame structure. The tow tractor shall have an all-welded, one-piece frame structure.

2.15 Cab design. The tow tractor shall be equipped with a center-mounted, enclosed, two-man cab. Interior cab sound level shall not exceed 84 dB (A) with doors and windows closed. Doors shall be constructed of rigid materials. The first entrance step to the cab shall not exceed 18 inches in height from the ground. If there is more than one step to the cab (including the cab floor), then each step shall be offset out from the next step up by at least 3 inches. Cab instrumentation shall be standard commercial installation to include an hour meter, odometer, tachometer, speedometer, voltmeter, engine oil pressure gauge, engine coolant temperature gauge, transmission temperature gauge, and a fuel level gauge. When an air system is used as the power assist for the braking system (see 2.10), or when an air system for trailer towing is specified (see 6.2 d), cab instrumentation shall include an air pressure gauge and a low-pressure indicator with buzzer and/or warning light. When specified (see 6.2 g), the tow tractor shall have an Air Conditioning system. The tow tractor cab shall be equipped with wipers, a windshield washer, driver and passenger-door rear-view mirrors, windshield-area rear-view mirror, visors, heater/defroster, ventilating fan, interior dome light, seat belts, and other equipment as found in standard commercial offerings. The cab shall feature a rear sliding window and a 12V power

outlet (cigarette lighter type). The driver's and passenger's seats shall incorporate a scissors-type suspension for driver and passenger comfort.

2.16 Lighting. The tow tractor lighting shall be equivalent to the standard commercial offering to include a rear adjustable aim floodlight, parking lights, head lights (high and low beam), brake lights, turn signals, hazard lights, and reverse lights. A flashing amber beacon light shall be mounted on the cab roof on the tow tractor's centerline. The rear adjustable aim floodlight, of not less than 3000 candlepower, shall be mounted on the tow tractor so that the following areas are illuminated: the rear working area behind the cab, the rear coupling positions, and a reflective, vertical indicator stripe measuring approximately 1" x 8" located on the towed MHU-196/204 trailer; the stripe is located at a horizontal distance of 10 feet behind the pintle hook, and a vertical distance of 2'2" to 2'10" from the ground. When specified (see 6.2 f), the tow tractor shall be equipped with an adjustable spotlight, capable of illuminating 180 degrees of elevation and 360 degrees of rotation, and centrally located on the top, rear portion of the cab. The spotlight shall be installed in the cab's roof, and steerable from the driver's position, inside the cab. The primary function of the spotlight is to illuminate the towing path of an aircraft, rear of the tow tractor, but shall also illuminate areas in the front and sides of the tow tractor.

2.17 Pintle hooks. The tow tractor shall be equipped with front and rear pintle hooks that incorporate a cotter or snapper pin as a secondary-locking device, and conforming to CID A-A-52550 Type 1, Class 2 (old MS51335-2). Pintle hooks shall be attached to the pintle hook mounting structure with a minimum of four ½-13 or ½-20, Grade 8 fasteners. The pintle hook fasteners shall be installed with a design fastening torque applied such that an adequate preload is introduced in the fastener to prevent losing or fatiguing the fasteners and/or the pintle hook. A description of the fastener type and the fastening torque shall be recorded in the Technical Order. The front and rear pintle hooks shall be located on the centerline of the tow tractor with the coupling positions of the pintle hooks located at 14 inches above the ground. Additional mounting holes (front and rear) for pintle hooks with the coupling positions of the pintle hooks located at 25 inches above the ground shall be provided. For the front pintle hook positions, the pintle hook assembly and mounting structure shall be designed to accommodate the greatest force exerted by the drawbar with adjustments for loads and accelerations, in all directions, encountered during air/ground transport and towing operations, and the shock loads associated with mate, demate, load, and unload operations. For the rear pintle hook positions, the pintle hook assembly and mounting structure shall comply with the following:

a. The rated load shall be the load combination of forces that the pintle hook assembly and structure must support or resist in a static state.
b. The dynamic load shall be the rated load with adjustments for loads and accelerations, in all directions, encountered during air/ground transport and towing operations, and the shock loads associated with mate, demate, load, and unload operations.
c. The design load shall be based on the rated load multiplied by a factor of three, or on the dynamic load multiplied by a factor of two, which ever is greater. This design load shall be considered the minimum load for attaining the design stress levels.

2.18 Breakaway cable hookup. When an air system for towing trailers is specified (see 6.2 d), the tow tractor shall be equipped with a rear trailer emergency breakaway cable hookup, capable of mating with NAS 1281C10 spring snap hook. The breakaway chain attachment shall be

installed on the bumper or frame within 9 inches of the pintle hook assembly. It shall not be installed on the pintle hook or pintle hook assemblies.

2.19 Safety chain attachment points. When an air system for towing trailers is specified (see 6.2 d), the tow tractor shall have two rear safety chain attachment points, one located on each side of the pintle hook, symmetrical about the pintle hook and shall be located 14 inches high for use during towing with rear pintle hook only. The attachment points shall be located a distance of not greater than 12 inches from the pintle hook and shall in no way be a part of, or attached to, the pintle hook. Each of the attachment points shall be capable of withstanding a shock load of 16,000 pounds 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.

2.20 12-Volt Trailer light harness receptacle. When an air system for towing trailers is specified (see 6.2 d), the tow tractor shall be equipped with an SAE J560b electrical receptacle, provided on the tow tractor's centerline, within 14 inches of the top of the center pintle hook. All terminals of the receptacle shall be wired in accordance with SAE J560b. The #7 terminal (blue wire) in the J560b connector shall be an auxiliary, ignition-hot circuit, capable of handling 10 amps.

2.21 Fire extinguisher. The tow tractor shall be equipped with two 5 pound (minimum) dry chemical type fire extinguishers with mounting brackets, and a ULC rating of 4A:70B:C (minimum). Extinguishers shall be mounted on the left and right side of the tow tractor, rear of the cab.

2.22 Finish. Prior to the application of the finish top coat, the cab and chassis shall be primered with a zinc-rich primer. As specified (see 6.2 e), the tow tractor shall be painted Dark Green (Color 24052, FED-STD-595) or Desert Sand (Color 23448, Fed-STD-595) using offeror's standard commercial paint system.

2.23 Corrosion protection. The tow tractor shall be corrosion-protected with a thick, hard, black, commercially-available Corrosion Preventive Compound (CPC) that is difficult to remove. Application shall include all of the chassis-frame metal underneath the tow tractor (exposed, boxed-in, and enclosed areas), the insides of the ballast-weight and battery compartments and the reverse sides of their access doors if equipped, the inside of the wheel wells, behind the fender skirts, and the inside of the inner areas of the chassis adjacent to the drive train including the undersides of the engine compartment and the reverse sides of the access doors. Tow tractors that are to be shipped overseas shall be temporarily corrosion-protected from salt spray with a thin, soft-film, semi-transparent, commercially-available CPC that is removable with a low pressure steam. Application shall consist of the exterior of the tow tractor in its entirety. The overseas Air Force vehicle maintainers shall remove this temporary CPC on receipt of the tow tractor from the shipper. The Commercial Tow Tractor Manual shall reflect the temporary CPC removal process.

2.24 Visibility. The tow tractor shall be so constructed as to provide maximum visibility in all directions for the 95th percentile driver. The front and rear pintle hooks shall be visible from the

driver's position either directly or via a single mirror mounted on the front and rear of the tow tractor.

2.25 Air transportability. The tow tractor shall be air transportable on C-130, C-141, C-17 and C-5 aircraft without removing ballast. Use MIL-HDBK-1791 as a guide. In all transport configurations, the tow tractor shall be capable of being restrained and withstanding 2.0 G up, 4.5 G down, 3.0 G forward, 1.5 G aft, and 1.5 G lateral accelerations. The tow tractor shall be equipped with pressure relief devices or configured for air transport to prevent any part from becoming a projectile in the event of catastrophic loss of aircraft cabin pressure.

2.25.1 Air transportable configuration. The air transportable configuration shall include all equipment, ¾ tank of fuel, and no crewmembers. In this configuration, maximum weight shall be 20,000 pounds, with a maximum single axle weight of 10,000 pounds. At least 6.0 inches sidewall and 6.0 inches overhead clearance shall be maintained between the tow tractor and the aircraft at all times during loading and flight. The restrained tow tractor shall allow for loadmaster in-flight access from the front to the rear of the aircraft.

2.25.2 Equipment removal/reconfiguration. Preparation and restoration of the tow tractor for air transportability shall take no more than 15 minutes for two persons using common non-powered hand tools. All equipment removed shall be stored on the tow tractor; caps and plugs shall permit driving and storage in transport configuration.

2.25.3 Tie down points. The tow tractor shall be symmetrically restrained during air transport. Tie down points shall be rated at a minimum of 10,000 pounds, marked for capacity, with a clear opening compatible with the appropriate devices. Each end of each tie down device shall terminate at a tie down point and not pass through any other tie down point. There shall be no interference between tie down devices and the tow tractor.

2.25.4 Shoring. The use of shoring to load the aircraft (referred to as approach shoring and step-up shoring) and during flight (referred to as load shoring, parking shoring, and sleeper shoring) is permitted, but not desired. The use of shoring, especially in loading the aircraft, is not an alternative to good tow tractor design. The tow tractor shall be designed to the maximum extent possible with adequate clearances to load onto the aircraft.

2.26 Transportation data plate. The tow tractor shall be provided with a permanently-marked transportation data plate constructed of a non-corroding metal, mounted on the exterior surface of the tow tractor. The plate shall contain at least the following information:

1. Side and rear silhouette views of the tow tractor
2. Horizontal and vertical location of the center of gravity of the tow tractor in air transportable configuration, marked on the silhouette views
3. Shipping weight
4. Loading cubage
5. Overall height, width, and length
6. Front and rear axle loads
7. Tie down information

The information contained on the transportation data plate shall also appear in the Technical Order as it is presented on the plate.

2.27 Identification plate. The tow tractor shall be provided with a permanently-marked identification plate constructed of a non-corroding metal, mounted on the inside of the tow tractor cab, and a rear license plate mounting bracket with license plate attaching hardware. The variable information on the identification plate shall be engraved onto the plate by a method that produces a consistent lettering quality. At a minimum, the identification plate shall include the following information:

1. Vehicle Nomenclature
2. Manufacturer's Model Number
3. Vehicle Identification (serial) Number or VIN
4. Manufacturer's address and phone number
5. Date of Manufacture
6. National Stock Number
7. Contract Number
8. Registration Number

The information contained on the identification plate shall also appear in the Technical Order as it is presented on the plate.

2.28 Lubrication data plate. The tow tractor shall be provided with a permanently-marked lubrication data plate constructed of a non-corroding metal, mounted on the exterior surface of the tow tractor that shall direct attention to all lubrication fittings and components that require lubrication. The plate shall identify the type and grade of lubricant required for all operational temperatures. The information contained on the lubrication data plate shall also appear in the Technical Order as it is presented on the plate.

2.29 Miscellaneous specifications. The tow tractor shall comply with Society of Automotive Engineers (SAE) specifications ARP1247 and AIR 1363.

2.30 Technical Order (TO) requirements. The contractor shall provide copies of the tow tractor manuals in accordance with the DD Form 1423. The contractor's parts manuals shall list the part numbers for contractor-manufactured parts, plus the part numbers for purchased sub-level components and whole components. The contractor shall also provide with each tow tractor, a product familiarization videotape that verbally and visually provides all information for the operation and routine maintenance of the tow tractor and its components, using the commercial manuals as a baseline. See DD Forms 1423 to this solicitation/contract.

3. REGULATORY REQUIREMENTS.

3.1 The offeror/contractor is encouraged to use recovered materials to the maximum extent practical, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR). Used, rebuilt, or remanufactured components shall not be incorporated in the tow tractor.

4. PRODUCT CONFORMANCE.

4.1 Product Conformance. The product provided shall meet the salient characteristics of this CID, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be substantially the same product offered for sale in the commercial market. The government reserves the right to require proof of such conformance.

4.2 Commercial item requirement. The tow tractor furnished must meet the "commercial item" definition, as specified in FAR 2.101, as of the date of award. The offeror/contractor shall identify all modifications made to their commercial model in order to meet the performance and descriptive requirements of the CID or the referenced documents. In regard to the offered item, the offeror/contractor shall identify any enhancements or improvements to the performance requirements of paragraph 2 of the CID or the referenced documents.

4.3 Verification. Prior to delivery of the first tow tractor, the contractor shall demonstrate or test at his facility, each requirement of the CID or referenced documents.

4.3.1 Gross vehicle weight (GVW). The first production tow tractor shall be weighed for verification of the minimum GVW.

4.3.2 Overall dimensions. The first production tow tractor shall be measured for verification of the overall dimensions.

4.3.3 Drawbar pull (DBP). The first production tow tractor shall be tested for verification of the DBP on dry level concrete using a load sensing device and a fixed anchoring position. The drawbar position shall be horizontal and level.

4.3.4 Power train. The first production tow tractor shall be inspected for verification of the specified power train components. A copy of the manufacturer's signed application for approval shall be submitted to the government representative at the first production verification with the vehicle documents for the following components: engine, transmission/transfer case, and axles, to include torque and power ratings, use of Jet A-1 or JP-8 fuels, emissions compliance, and engine shutdown system. The cooling system shall be certified by the vehicle manufacturer to satisfy all operating conditions at all ambient temperatures up to the specified, for both the engine and transmission, and any requirements for towing in high ambient temperatures (recommended coolant ratios, oil types and viscosities, etc., for various temperature ranges) shall be submitted to the government representative at the first production verification. The winterization packages shall be certified by the vehicle manufacturer to satisfy the winterization conditions specified, and a breakdown of the winterization components and requirements for each winterization package (recommended coolant ratios, oil types and viscosities, etc., for the various temperature ranges) shall be submitted to the government representative at the first production verification.

4.3.5 Driveline and steering. The first production tow tractor shall be demonstrated in two-wheel steer and four-wheel steer, using both crab and coordinated steering. The tow tractor shall be tested for verification of tire chain use without interference in wheel-wells. Tire chains shall be fitted to the tires, and the tow tractor shall be operated by driving a short distance and turning the wheels to the extreme left and right. The tow tractor shall be tested for verification of the

maximum wall-to-wall turning radius while in four-wheel coordinated steering mode. The fully ballasted first production tow tractor shall be tested as follows to demonstrate compliance with the turning radius specification:

a. Facility. Perform the test on a dry, level, paved area that is free from loose material and is larger in all directions than three times the length of the vehicle being tested.
b. Equipment required.
   1. A device suitable for measuring three times the length of the vehicle being tested with an accuracy of at least ±1-inch.
   2. Markers or marking device suitable for marking the pavement.
   3. A plumb bob suitable for locating a point on the pavement directly below a fixed point on the vehicle.
   4. A test report notebook or similar record forms to be used as a test report work sheet and incorporated into the documentation package.
c. Test Conditions.
   1. The tow tractor shall be fully ballasted and in operational form.
   2. The tow tractor steering system shall be fully operational, and the steering linkage stops shall be adjusted to the manufacturer's specified production tolerance limits.
d. Test Procedure.
   1. The vehicle shall be driven slowly in a full cramp circle (left or right) to establish a steady state in the steering linkage.
   2. Continue driving the slow full cramp circle.
   3. At approximately three equidistant points (identified as A, B, and C) around the circle, gently stop the vehicle using the service brakes.
   4. At each stop, place a plumb bob against the outermost point of the vehicle and mark the spot on the ground directly below where the plumb bob comes to rest.
   5. Measure and record the straight line distances between each pair of points, i.e., Lengths AB, BC, and CA.
   6. Calculate the wall-to-wall turning radius (R) as follows:

$$R = D / 2 \quad \text{where}$$

$$D = \frac{(AB \times BC \times CA)}{2 \times \sqrt{(S \times (S - AB) \times (S - BC) \times (S - CA))}} \quad \text{and}$$

$$S = (AB + BC + CA) / 2$$

   7. Repeat steps (1) through (6) with the vehicle moving in the opposite direction.

4.3.6 <u>Electro-magnetic interference (EMI)</u>. The first production tow tractor shall be tested by the contractor for verification of the specified EMI requirements prior to first production verification of the tow tractor. The tow tractor shall be tested for Radiated Emission per RE102 of MIL-STD-461 and Radiated Susceptibility per RS103 of MIL-STD-461. The tow tractor shall be tested for Conducted Susceptibility per CS114, CS115, and CS116 of MIL-STD-461. Test results shall be submitted to the government representative at first production verification.

4.3.7 Mobility. The first production tow tractor shall be tested for verification of the forward and reverse speeds on a flat asphalt or concrete surface without a trailing load, using the tow tractor's speedometer as the speed-measuring device. The tow tractor shall be tested for verification of its capability to tow an 80,000 pound trailer on a 4% grade at a minimum of 8 MPH on an asphalt or concrete surface, using the tow tractor's speedometer as the speed measuring device.

4.3.8 Suspension. The first production tow tractor shall be inspected for verification of a suspension that will allow for articulation of one or both of the tow tractor's axles relative to the other.

4.3.9 Wheels and tires. The first production tow tractor shall be inspected for verification of the specified wheels and tires. Documentation of the proper wheel and tire selection and deviations in tire pressures (if any) with references to the Tire and Rim Association shall be submitted to the government representative at the first production verification.

4.3.10 Braking system. The first production tow tractor shall be inspected for verification of a four-wheel, hydraulically operated braking system with power assist. A schematic of the braking system shall be submitted to the government representative at the first production verification. The tow tractor shall be tested for verification of its capability to stop a 175,000 pound towed load on a dry level asphalt or concrete surface from 5 MPH in no more than 18 feet.

4.3.11 Parking brake. The first production tow tractor shall be inspected for verification of the parking brake lockout system. The first production tow tractor shall be tested for verification of the parking brake holding ability with a towed 8,400 pound load on an 11.5 degree incline. Prior to delivery of the first air system-equipped tow tractor (see 6.2 d), the first production tow tractor shall also be tested for verification of the parking brake holding ability as specified above.

4.3.12 Air system. Prior to delivery of the first air system-equipped tow tractor (see 6.2 d), the first production tow tractor shall be tested for verification of the tow tractor's air system performance while towing an Air Force MHU-196 or MHU-204 trailer at a location to be determined, to the specified braking performance. After the testing is successfully completed, the tow tractor shall be shipped back to the manufacturer's facility to be inspected, cleaned, and made ready for delivery to the tow tractor's final destination. The tow tractor shall then be delivered to its final destination. If the testing is not successfully completed, the tow tractor shall be shipped back to the manufacturing facility. The contractor shall be responsible for any shipping of the tow tractor to the testing site(s) and any shipping back to the manufacturing facility. The contractor shall make any necessary design adjustments to the air/brake system to ensure acceptable braking performance.

4.3.13 Electrical system. The first production tow tractor shall be inspected for verification of the specified electrical system.

4.3.14 Frame structure. The first production tow tractor shall be inspected for verification of the specified all-welded, one-piece frame structure.

4.3.15 Cab design. The first production tow tractor shall be inspected for verification of the center-mounted, enclosed, two-man cab, the entrance step height, cab instrumentation, and specified equipment. The tow tractor shall be tested for verification of the interior sound level using a sound level meter at the operator and passenger ear level, with the doors and windows closed, and the vehicle and accessories running at engine idle, mid-range power, and full power.

4.3.16 Lighting. The first production tow tractor shall be inspected for verification of the specified lighting.

4.3.17 Pintle hooks. The first production tow tractor shall be inspected for verification of the specified pintle hooks and locations. A strength analysis report shall be submitted to the government representative at first production verification that contains supporting calculations to show that the front and rear pintle hook assemblies and mounting structures are in compliance with their respective strength specifications. The analysis shall include methodology leading to the arrival of values for static and dynamic loading, and ultimately the design load. Additionally, the rear pintle hook assembly and mounting structure calculations shall be supplemented with a Finite Element Analysis (FEA) to further support compliance with the strength specification.

4.3.18 Breakaway cable hookup. Prior to delivery of the first air system-equipped tow tractor (see 6.2 d), the first production tow tractor shall be inspected for verification of the specified breakaway cable hookup and location.

4.3.19 Safety chain attachment points. Prior to delivery of the first air system-equipped tow tractor (see 6.2 d), the first production tow tractor shall be inspected for verification of the specified rear safety chain attachment points and locations. Documentation of the strength of the safety chain attachment points and mounting (through ratings and/or calculations) shall be submitted to the government representative at first production verification of the air system-equipped tow tractor.

4.3.20 Trailer light harness receptacle. Prior to delivery of the first air system-equipped tow tractor (see 6.2 d), the first production tow tractor shall be inspected for verification of the specified J560b electrical receptacle and location. An electrical schematic of the receptacle and its circuitry shall be submitted to the government representative at first production verification of the air system-equipped tow tractor.

4.3.21 Fire extinguisher. The first production tow tractor shall be inspected for verification of the specified fire extinguishers and mounting brackets.

4.3.22 Finish. Documentation showing the specifications of the zinc-rich primer used in the tow tractor's production shall be submitted to the government representative at the first production verification. Color sample cards with the specified colors shall be submitted at the first production verification.

4.3.23 Corrosion protection. The first production tow tractor shall be inspected for verification of the specified corrosion protection. Documentation of the application process and certification

of the level of corrosion treatment shall be submitted to the government representative at the first production verification.

4.3.24 Visibility. The first production tow tractor shall be inspected for verification of the specified visibility.

4.3.25 Air transportability. An air transportability report shall be submitted to the government representative at first production verification to begin the air transportability certification process. The report shall outline the steps necessary to load the tow tractor onto the specified aircraft, including diagrams, drawings, or instructions of the tow tractor preparation, loading, shoring, and tie down procedures (including engineering analysis of the tie down devices) for both the tow tractor and any removable ballasts, if applicable, along with critical dimensions, tow tractor weights, axle weights, etc.

4.3.26 Transportation data plate. The first production tow tractor shall be inspected for verification of the specified transportation data plate.

4.3.27 Identification plate. The first production tow tractor shall be inspected for verification of the specified identification plate and a rear license plate mounting bracket.

4.3.28 Lubrication data plate. The first production tow tractor shall be inspected for verification of the specified lubrication data plate.

4.3.29 Miscellaneous specifications. The first production tow tractor shall be inspected for verification of compliance with SAE specifications ARP1247 and AIR 1363.

4.4 Reconfiguration criteria. Failure to comply with the requirements of this CID, reference documents, or the tests shall be cause for reconfiguration and re-demonstration. Causes for reconfiguration shall include: structural failure; non-correctable misalignments; component interference; conditions presenting a safety hazard to the user or maintainer: instability during operation, spillage of fuel or coolant, and overheating.

5. PACKAGING.

5.1 Preservation, packing, and marking shall be as specified in the contract or order (see 6.2 b).

6. NOTES.

6.1 Sources of documents.

6.1.1 Department of Defense and Federal documents may be obtained from the Document Automation and Production Service, 700 Robbins Avenue, Philadelphia PA 19111-5094, or online at http://assist.daps.dla.mil .

6.1.2 FAR. The Federal Acquisition Regulation (FAR) may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 or online at http://www.arnet.gov/far.

6.1.3 SAE documents may be obtained from SAE, Inc., 400 Commonwealth Drive, Warrendale PA 15096, or online at http://www.sae.org.

6.2 Ordering data. The purchaser must specify the following at the time of purchase:

a. Title, number, and revision letter, and date of this document.
b. Packaging requirements (see 5.1).
c. When heavy-duty (type A) winterization is required (see 2.4).
d. When an air system for trailer towing is required (see 2.10, 2.12, 2.15, 2.18, 2.19 & 2.20).
e. Color required (see 2.22).
f. When driver's side spotlight is required (see 2.16).
g. When Air Conditioning is required (see 2.15).

6.3 Subject term (key word) listing.

Aircraft parking
Ground handling
Tug

MILITARY INTERESTS

Custodians:
Air Force – 99

Preparing Activity:
Air Force – 84

Agent:
Air Force – 99

(Project 1740-2006-003)

Note: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at http://assist.daps.dla.mil.