

**INCH-POUND**

A-A-59210D

19 February 2014

Superseding

A-A-59210C

31 July 2006

## **COMMERCIAL ITEM DESCRIPTION**

### **TRACTOR, AIRCRAFT TOWING, MB-4**

The General Services Administration has authorized the use of this Commercial Item Description for all federal agencies.

#### **1. SCOPE.**

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

#### **2. CLASSIFICATION.**

2.1 Tow tractor classes. The two classes specified shall be of the same design, with the only differences being in the components necessary for an air system for towing the Air Force's four-wheel MHU-196 and MHU-204 trailers with air brakes, hereafter referred to as MHU-196/204 trailers. The tow tractor shall be one of the following classes specified:

Class 1 – tow tractor without air system for trailer towing

Class 2 – tow tractor with air system for trailer towing

Comments, suggestions, or questions on this document should be addressed to: AFLCMC/WNZEB, Robins AFB GA 31098-1813. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil/>.

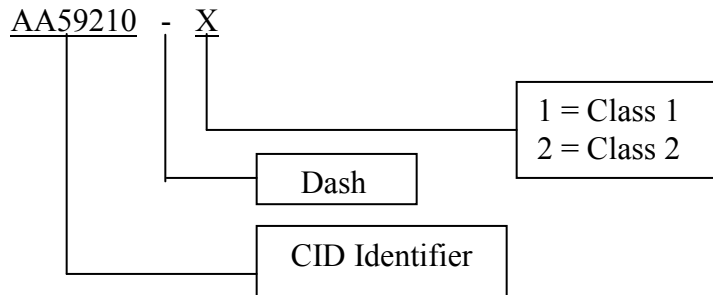
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2.2 Part or Identifying Number (PIN). The PIN is constructed as follows.



### 3. SALIENT CHARACTERISTICS.

3.1 MB-4 description. The Class 2 MB-4 tows MHU-196 and MHU-204 munitions trailers in support of bomber aircraft and is able to tow the smaller MHU-110, MHU-141, and MHU-226 trailers in support of other weapons-delivering aircraft. Both Classes of the MB-4, however, may tow any trailers that have a lunette towing hitch and fall within the towing requirements of the MB-4. The MB-4 tows C-130 and other medium-sized aircraft, and is frequently used to tow fighter aircraft.

3.2 Design and construction. The design shall promote cost effective, life-cycle sustainability by addressing considerations such as incorporating open standards, reducing pollutant emissions and wastes, and increasing fuel economy, while satisfying system performance requirements. The tow tractor shall be designed and manufactured in accordance with Society of Automotive Engineers (SAE) specifications ARP1247 and AIR 1363. The tow tractor shall be designed and constructed so that no parts will work loose in service, and to withstand the strains, jars, vibrations, and other conditions incident to shipping, storage, installation, and service. It shall be weatherproof and designed to prevent the intrusion of water, sand, and dust into critical operating components. The tow tractor shall have an all-welded, one-piece frame structure.

#### 3.2.1 Materials, protective coatings, and finish.

3.2.1.1 Protective coatings. Materials that deteriorate when exposed to sunlight, weather, or operational conditions normally encountered during the service life of the item shall not be used or shall have means of protection against such deterioration that does not prevent compliance with the performance requirements specified herein. Protective coatings that chip, crack, or scale with age or extremes of climatic conditions or when exposed to heat shall not be used. Exposed surfaces of fasteners, handles, and fittings shall also be primed and painted.

3.2.1.2 Finish. Unless otherwise specified (see 7.2), the exterior finish color of the tow tractor shall be Dark Green, Color Number 24052 of FED-STD-595. When specified, the exterior finish color shall be Desert Sand, Color Number 23448 of FED-STD-595. Prior to the application of the finish top coat, any cab or chassis component or assembly specifically manufactured by or for the tow tractor manufacturer, from sheet, plate, angular, or tubular steel, shall be coated with a zinc-rich primer. The top surfaces of the tow tractor that are stepped on in association with routine maintenance shall be covered with anti-skid material.

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3.2.1.3 Exclusion of water. The design of the tow tractor shall be such as to prevent water leaking into, or being driven into, any part of the tow tractor interior when either in an operating or travelling configuration. All windows, doors, panels, covers, etc., shall be provided with sealing arrangements such that the entry of water is minimized when these items are correctly closed. Particular care shall be taken to prevent wetting of equipment and heat and sound proofing materials. Sharp corners and recesses shall be avoided so that moisture and solid matter cannot accumulate to initiate localized attack. Sealed floors with suitable drainage shall be provided for storage compartments, engine compartments, and other areas in the tow tractor that could collect and retain water.

3.2.1.3.1 Fluid traps and faying surfaces. There shall be no fluid traps on the tow tractor. Faying surfaces of all structural joints, except welded joints, shall be sealed to preclude fluid intrusion.

3.2.1.3.2 Ventilation. Ventilation shall be sufficient to prevent moisture retention and buildup.

3.2.1.3.3 Drainage. Drain holes shall be provided to prevent collection or entrapment of water or other unwanted fluid in areas where exclusion is impractical. All designs shall include considerations for the prevention of water or fluid entrapment and ensure that drain holes are located to effect maximum drainage of accumulated fluids. The number and location of drain holes shall permit drainage of all fluids. The minimum size of the drain holes shall be 0.25 inch.

3.2.1.4 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 (CORTEC VpCI 375 or equivalent). Application shall include the exposed chassis-frame metal underneath the tow tractor (excluding the drive train), the inside of the wheel wells, and behind the fender skirts. Any equivalents used shall meet the below salient characteristics in Table I when applied on carbon steel 1010 Q-panels:

TABLE I. VpCI 375 equivalent salient characteristics.

<b>Specification</b>	<b>Dry Film Thickness (Mils)</b>	<b>Hours to Failure</b>
ASTM B117	4.0-4.5	2500+
ASTM D1748	4.0-4.5	2000+
ASTM D870	4.0	312+

In addition to the equivalent requirements in Table I, the pencil hardness in accordance with American Society for Testing and Materials (ASTM) D3363 shall be “H”, the temperature resistance shall be -150 °F – 350 °F, and the adhesion in accordance with ASTM D3359 shall be “5B”. When specified (see 7.2), tow tractors that are to be shipped overseas shall be temporarily corrosion-protected from the effect of salt spray both on the ship and at port with the application of a thin, soft-film, semi-transparent, commercially-available CPC that is easily removable by washing or with a low pressure steam (Cortec VpCI 389 or equivalent). Application of the temporary CPC shall be to the exterior of the tow tractor, in critical or corrosion sensitive areas of the tow tractor. Any equivalents used shall meet the below salient characteristics in Table II when applied on SAE 1010 carbon steel:

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TABLE II. VpCI 389 equivalent salient characteristics.

<b>Specification</b>	<b>Dry Film Thickness (Mils)</b>	<b>Hours to Failure</b>
ASTM B117	2.0	600+
ASTM D1748	1.0	1000+
ASTM G85 (94)	1.0	600+

3.2.2 Markings. All external devices which require an operational or maintenance interface shall be marked in accordance with MIL-STD-130. Markings shall be applied with decals and shall be 1-inch high block letters unless prohibited by the available space. In such cases, the markings shall be the largest size possible. Markings, Information/Caution shall be Lusterless Black, Color Number 37038 of FED-STD-595, and Markings, Warning/Danger shall be Lusterless Red, Color Number 31136 of FED-STD-595. The center of gravity of the tow tractor shall be stenciled on the unit within 1.0 inch of the calculated center of gravity. Tire inflation pressures shall be marked above all wheel well openings, with ½” high letters/numbers that are black in color. A decal shall be adhered near the top of each wheel well opening that warns personnel of the dangers of placing any part of the body into the wheel well area.

### 3.2.3 Identification and data plates.

3.2.3.1 Identification plate. An identification plate in accordance with MIL-STD-130 shall be securely attached to the tow tractor in a readily accessible location. The identification plate shall contain the following information: nomenclature, part number, serial number, date of manufacture, manufacturer’s name, Commercial and Government Entity (CAGE) code, date of warranty expiration, contract number, registration number, and National Stock Number (NSN).

3.2.3.2 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:

- a. Side and rear silhouette views of the tow tractor.
- b. Horizontal and vertical location of the center of gravity of the tow tractor in air transportable configuration, marked on the silhouette views.
- c. Shipping weight.
- d. Loading cubage.
- e. Overall height, width, and length.
- f. Front and rear axle loads.
- g. Tie down information.

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3.2.3.3 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.

### 3.2.4 Environment, Safety, and Occupational Health (ESOH).

3.2.4.1 Component protection. All wires, cables, tubes, and hoses shall be supported and protected to minimize chafing and abrasion and shall be located to provide adequate clearance from moving parts and high operational temperatures. Grommets shall be provided wherever wires, cables, tubes, or hoses pass through bulkheads, partitions, or structural members.

3.2.4.2 Foreign object damage (FOD). All loose metal parts, such as pins or connector covers, shall be securely attached to the tow tractor with wire ropes or chains. "Dog tag" style beaded chains shall not be provided. Removable panels, if provided, shall be attached with captive fasteners. Tire valve stem caps shall be made of plastic.

3.2.4.3 Fire extinguisher. The tow tractor shall be equipped with two 5 pound (minimum) dry chemical type fire extinguishers with mounting brackets, and a UL rating of 20B:C (minimum). Extinguishers shall be mounted on the left and right side of the tow tractor, rear of the cab.

3.2.5 Electromagnetic interference (EMI). The tow tractor shall be in accordance with the following radiated emission and susceptibility requirements of MIL-STD-461: RE102 and RS103.

3.2.6 Fastening devices. All screws, bolts, nuts, pins, and other fastening devices shall be properly designed, manufactured, and installed with adequate means of preventing loss of torque or adjustment. Tapped threads shall have a minimum thread engagement in accordance with Table III.

TABLE III. Minimum thread engagement.

<b>Material</b>	<b>Minimum Thread Engagement</b>
Steel	1.0 times the nominal fastener diameter
Cast iron, brass, or bronze	1.5 times the nominal fastener diameter
Aluminum, zinc, or plastic	2.0 times the nominal fastener diameter

3.2.7 Welders and welding. Welding and post heat treatment procedures shall be in accordance with the American Welding Society (AWS) welding code. 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.

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3.2.8 Special tools. The design of the item shall minimize the requirement for special tools (see 7.3.2). All special tools shall be provided with, and stored on, the tow tractor.

3.2.9 Cab specifications.

3.2.9.1 Cab design. The tow tractor shall be equipped with a center-mounted, enclosed, two-man cab. Doors shall be constructed of rigid materials. The first entrance step to the cab shall not exceed 18.00 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 3.00 inches. Steps shall be designed to prevent slipping. 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 3.2.11), or for Class 2 tow tractors, cab instrumentation shall include an air pressure gauge and a low-pressure indicator with buzzer and/or warning light. The tow tractor cab shall be equipped with 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 driver's and passenger's seats shall incorporate a scissors-type suspension. The cab shall feature a rear sliding window and a 12V power outlet (cigarette lighter type).

3.2.9.2 Cab visibility. The tow tractor shall be designed to provide maximum visibility in all directions for the range of persons represented between the 5<sup>th</sup> percentile female driver and the 95<sup>th</sup> percentile male driver in accordance with Table B-IV of MIL-STD-1472. The front and rear couplers 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.

3.2.9.3 Cab noise levels. Interior cab sound level shall not exceed 84 dB(A) with doors and windows closed. If the sound level is above 84 dB(A), the contractor shall provide a hazardous noise warning plate stating that operator's hearing protection is required when operating this tow tractor. The plate shall be made of a corrosion resistant material and shall be at least 4.0 square inches. It shall have black lettering on a yellow background and shall be located to be visible as the operator enters the cab, or is seated. Sound level shall not exceed 94 dB(A).

3.2.10 Tires and wheels. 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. The wheels and tires shall be in accordance with the *Tire and Rim Association* recommendations for the application. All wheels and tires shall be uniform.

3.2.11 Air system. The Class 2 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, and glad hand covers with lanyards. The glad hands shall be in accordance with SAE J318, and shall be polarized and identified as

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“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.

### 3.3 Environmental conditions.

3.3.1 Operating temperature range. The tow tractor shall be capable of operating in ambient temperatures ranging from -20 °F, or -40 °F when Winterization A is specified (see 7.2), to 125 F.

3.3.2 Storage temperature range. The tow tractor shall be capable of being stored in ambient temperatures ranging from -65 °F to 140°F.

3.4 Gross Vehicle Weight (GVW) and dimensions. Overall weight and dimensions in air transport configuration (see 3.5.1.4) shall not exceed:

GVW	19,000 pounds.
Length	200.00 inches, without couplers.
Width	100.00 inches, without mirrors.
Height	100.00 inches.

### 3.5 Transportability.

3.5.1 Air transportability. The tow tractor shall be transportable on C-130, C-17, and C-5 aircraft in accordance with MIL-STD-1791. In all air transport configurations, the tow tractor shall be capable of being restrained and withstanding, without loss of serviceability, 2.0 G up and 4.5 G down accelerations, and shall be capable of being restrained and withstanding, without loss of structural integrity, 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. The tow tractor shall drive on and off the aircraft, negotiating the required maximum ramp angles without shoring.

3.5.1.1 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 a good tow tractor design. The tow tractor shall be designed to the maximum extent possible with adequate clearances for the tow tractor to drive on and off the aircraft, negotiating the required maximum ramp angles without shoring.

3.5.1.2 Axle weight. Axle weight shall not exceed 13,000 pounds.

3.5.1.3 Tire pressure. Tire pressure shall not exceed 100 pounds per square inch (psi).

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3.5.1.4 Air transportable configuration. The air transportable configuration shall include all equipment,  $\frac{3}{4}$  tank of fuel, and no crewmembers. At least 6.00 inches sidewall and 6.00 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.

3.5.1.5 Equipment removal/reconfiguration. Preparation and restoration of the tow tractor for air transportability shall take no more than 30 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.

3.5.2 Tie downs. The tow tractor shall be symmetrically restrained during air and ground transport. Tie down points shall be rated at a minimum of 10,000 pounds, marked for capacity, with a clear opening compatible with MIL-DTL-25959 and MIL-PRF-27260 tie down 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. The tie down provisions shall be in accordance with 4.1 through 4.12 of MIL-STD-209.

3.5.3 Lifting provisions. The tow tractor shall be equipped with sufficient attachment points so located that it can be lifted by crane; each attachment point shall be marked "Lift Point". The lifting provisions shall be in accordance with 5.1 through 5.1.4 of MIL-STD-209.

### 3.6 Performance.

3.6.1 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.

3.6.2 Drawbar pull force (DBPF). The tow tractor shall have a minimum DBPF of 16,000 pounds on dry level concrete (coefficient of friction of 0.8).

3.6.3 Suspension. 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.

3.6.3.1 Suspension lubrication system. The tow tractor shall be equipped with a lubrication system that automatically and manually provides lubricant to several points on the suspension of the tow tractor, including all of the following: kingpins, ball joints, steering cylinders, and articulation bolsters. The automatic lubrication system components shall include a pump with integral reservoir, lubricant injectors, tubing, and fittings for the lubrication points.

3.6.4 Air system performance. The Class 2 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 actuate the tow tractor and trailer brakes simultaneously. The tow



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tractor/MHU-196/204 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 (see 7.4.2 for useful MHU-196/204 trailer specifications). The Class 2 tow tractor shall have a decal included on the front of the tow tractor between the coupler positions that states, "DO NOT USE THE FRONT COUPLER POSITIONS TO TOW MHU-196/204 TRAILERS".

**3.6.5 Driveline and steering.** The tow tractor shall have four-wheel drive, and two-wheel and four-wheel power steering. Axles shall be planetary-drive/steer axles. 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 17.00 feet or less while in four-wheel coordinated steering mode. Wheel-wells shall be designed so that tire chains may be used without interference.

**3.6.6 Brakes.**

**3.6.6.1 Parking brake.** The tow tractor shall be equipped with a mechanically actuated disc type parking brake. A lockout system shall be provided that disallows the transmission to go into forward or reverse gear, or shuts the engine down, or disallows the engine to respond to throttle when the parking brake is on and the tow tractor gear selector 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.

**3.6.6.2 Service brakes.** 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 3.2.9.1). For the Class 2 tow tractor, 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 18.00 feet.

**3.6.7 Couplers.** The tow tractor shall be equipped with front and rear clevis-pin type couplers manufactured by SAF-Holland as a Holland EH-3050 E-Hitch. The front and rear couplers shall be located on the centerline of the tow tractor with the coupling positions located at 25.00 inches,  $\pm 0.50$  inch, above the ground. Additional mounting holes (front and rear) for couplers with the coupling positions located at  $14.00 \pm 0.50$  inches, above the ground shall be provided. Coupling positions are measured to the centerline of lunette (drawbar ring) that has a material diameter or height of 1.625" as it rests within the coupler. The couplers shall be attached to the tow tractor

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using (2) ½-13, grade 8 fasteners tightened to a torque value of 108 ft-lbs (dry) in either the upper set or the inner set of 0.50” hole positions, and (2) ⅝-11, grade 8 fasteners tightened to a torque value of 212 ft-lbs (dry) in the lower set of 0.625” hole positions found on the Holland EH-3050 E-Hitch design. Fastener tightening torque is per an industry-accepted torque prescription that preloads the fastener (producing a clamp load) that is 75% of the proof load of the fastener to prevent losing or fatiguing the fasteners and/or the coupler, while maintaining an adequate safety factor for the fastener. A decal shall be included on the front and rear of the tow tractor near the coupler position that states: “MAXIMUM TOWING CAPACITY: 16,000 LBS DRAWBAR PULL FORCE / 80,000 LBS GVW TRAILERS / 175,000 LBS GVW AIRCRAFT”. A decal shall be included on the rear of the tow tractor near the upper coupler position that states: “USE UPPER COUPLER POSITION TO TOW MHU-196/204 TRAILERS”.

- a. The coupler and the tow tractor’s rear coupler mounting structure shall comply with the following:
  - i. The rated load shall be the combination of load forces that must be supported or resisted in a static state.
  - ii. 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.
  - iii. 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, whichever is greater. This design load shall be considered the minimum load for attaining the design stress levels.
- b. The tow tractor’s front coupler 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.

### 3.7 Engine and related equipment.

3.7.1 Engine. 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. The diesel engine shall operate on high-sulfur diesel fuels (containing over 15 parts per million (ppm) sulfur), and ultra-low sulfur diesel fuels (containing less than 15 parts per million (ppm) sulfur). At a minimum, the tow tractor shall meet a Tier III level exhaust and evaporative emissions standard (see 7.4.1) for industrial (off-highway) engines. The engine 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, low oil pressure, and engine over speed (engine in excess of 110% of rated speed).

3.7.2 Engine starting aids. The engine shall start within 15 seconds cranking in any ambient temperature within the required operating range of the tow tractor. Internal engine starting aids,

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fluid starting aids, and heat from the winterization system (see 3.7.6) may be used prior to and during the start period to facilitate engine starting under the following conditions in Table IV:

TABLE IV. Engine starting aids.

<b>Temperature Range</b>	<b>Starting Aids Permitted</b>
40 °F through 125 °F	None
0 °F through 39 °F	Internal engine starting aids and fluid starting aids
-40 °F through -1 °F	Internal engine starting aids, fluid starting aids, and heat from the winterization system

3.7.3 Engine cooling system. The tow tractor engine shall possess sufficient cooling capacity to perform continuous maximum performance towing in high ambient temperatures of 125 °F without exceeding the manufacturer's maximum allowable temperatures on the individual engine components.

3.7.4 Exhaust system. The exhaust system shall be constructed of stainless steel. The muffler(s) shall be constructed of aluminized steel or stainless steel. The exhaust system outlet shall exit on the right-hand side, over the rear axle and behind the rear wheel, oriented at 90 degrees from the centerline of the tow tractor, and not directed toward the ground.

3.7.5 Transmission. 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 °F.

3.7.6 Winterization system. A type C winterization system shall be provided for starting in temperatures down to -20 °F. When specified (see 7.2), a heavy-duty (type A) winterization package adequate for storage down to -65 °F and operation to -40 °F. The winterization systems may include heaters for engine coolant, engine oil, and the fuel tank, as well as battery warmers. The winterization system shall be designed to operate from an external 110 volt AC, 60 Hz power source utilizing the external electrical connections (see 3.7.6.1). The winterization system shall incorporate high-temperature shutoff switches to prevent overheating of any fluid or component.

3.7.6.1 Winterization plugs and connectors. Winterization package components with external power requirements shall be compatible with 110VAC/20A circuitry, utilizing covered male inlet plugs in accordance with National Electrical Manufacturers Association (NEMA) WD 6.

3.8 Electrical system. The tow tractor shall be equipped with a 12V, negative ground electrical system. 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. Crimped-on

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wire connectors shall be installed with a corresponding crimping tool. All wiring shall be sized to handle the system voltage and current levels. Battery cables shall be identified with "+" and "-" or red and black markings, and shall not be spliced.

3.8.1 12-volt trailer light harness receptacle. For the Class 2 tow tractor, the rear of the tow tractor shall be equipped with an SAE J560 electrical receptacle, provided on the tow tractor's centerline, spaced equally between the upper and lower coupler positions. All terminals of the receptacle shall be wired in accordance with SAE J560. The #7 terminal (blue wire) in the J560 connector shall be an auxiliary, ignition-hot circuit, capable of handling 10 amps.

3.8.2 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 wired to a constant-hot circuit, 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, parking lights, brake lights, turn signals, hazard lights, reverse lights, and beacon shall be constructed with Light-Emitting Diodes (LED). 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 10.00 feet behind the coupler, and a vertical distance of 2'2" to 2'10" from the ground. 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 adjustable 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.

3.8.3 Batteries and battery compartment.

3.8.3.1 Batteries. Batteries shall be of the commercial maintenance-free sealed lead acid, starved electrolyte, gas recombination, spiral wrapped, absorbent gas mat (AGM), top post type in accordance with MIL-B-18013/1.

3.8.3.2 Battery compartment. The batteries shall be enclosed in a corrosion-resistant, weatherproof box or compartment and shall be readily accessible.

3.9 Breakaway cable hookup. For the Class 2 tow tractor, the rear of the tow tractor shall be equipped with an emergency trailer-breakaway cable attachment point, capable of mating with a National Aerospace Standards (NAS) 1281C10 spring snap hook. The attachment point shall be located on the right hand side and within 5.00 inches of the SAE J560 electrical receptacle (see 3.8.1). The attachment point shall not be installed on the coupler.

3.10 Safety chain attachment points. For the Class 2 tow tractor, the rear of the tow tractor shall be equipped with two safety chain attachment points for use when towing, composed of hinged D-rings suspended in the downward position. The D-rings shall be compatible with trailer safety chain hooks with an inside radius between 1.00 and 3.00 inches. The D-rings shall be located

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symmetrically on each side of the lower coupler position at a distance of 14.00 inches above the ground. The vertical centerline of the D-rings shall be located at a parallel distance of not greater than 12.00 inches to the left and right of the tow tractor's centerline. The D-rings shall not be installed on the coupler assembly. Each D-ring 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.

3.11 Diagnostic software. When specified (see 7.2), a copy of any diagnostic software on CD-ROM or DVD-ROM, and/or an accessory module, required or recommended for maintaining the tow tractor shall be provided.

3.12 Workmanship. The tow tractor, including all parts and accessories, shall be constructed and finished in a thoroughly workmanlike manner. Workmanship objectives shall include freedom from blemishes, defects, burrs and sharp corners and edges; accuracy of dimensions, surface finish, and radii of fillets; thoroughness of welding, painting, and riveting; marking of parts and assemblies; and proper alignment of parts and tightness of assembly fasteners.

3.12.1 Bolted connections. Bolt holes shall be accurately punched or drilled and shall be deburred. Threaded fasteners shall be tight and shall not work loose during testing or service usage.

3.12.2 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 shall be full, neatly made, concentric with the rivet holes, and in full contact with the surface of the component.

3.12.3 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 excessive backlash.

3.12.4 Cleaning. The tow tractor shall be thoroughly 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.

#### 4. REGULATORY REQUIREMENTS.

4.1 Recycled recovered materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs. The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with 23.403 of the Federal Acquisition Regulation (FAR). However, used, rebuilt, or refurbished items shall not be provided.

4.2 Green Procurement Program. Green Procurement Program (GPP) is a mandatory federal acquisition program that focuses on the purchase and use of environmentally preferable products and services. GPP requirements apply to all acquisitions using appropriated funds, including services and new requirements. FAR 23.404(b) applies and states the GPP requires 100% of

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EPA designated product purchase that are included in the Comprehensive Procurement Guidelines list that contains recovered materials, unless the item cannot be acquired: a) competitively within a reasonable timeframe; b) meet appropriate performance standards, or c) at a reasonable price. The prime contractor is responsible for ensuring that all subcontractors comply with this requirement.

## 5. PRODUCT CONFORMANCE PROVISIONS.

The products provided shall meet the salient characteristics of this Commercial Item Description, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial marketplace, modified as necessary to comply with the requirements herein. The Government reserves the right to require proof of such conformance.

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

- a. Pre-production inspection (see 5.2).
- b. Conformance inspection (see 5.3).

5.2 Pre-production inspection. The pre-production tow tractor shall be subjected to the analyses, demonstrations, examinations, and tests described in 5.5.1 through 5.5.13.3. The contractor shall provide or arrange for all test equipment and facilities.

5.3 Conformance inspection. Each production tow tractor shall be subjected to the examination described in 5.5.1.

5.4 Inspection requirements.

5.4.1 General inspection requirements. Apparatus used in conjunction with the inspections specified herein shall be laboratory precision type, calibrated at proper intervals to ensure laboratory accuracy.

5.4.2 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 or shorter intervals shall be provided as appropriate for any specific test.

- a. Date.
- b. Time started.
- c. Time finished.
- d. Ambient temperature.

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- e. Ambient humidity.

5.4.3 Test rejection criteria. Throughout all tests specified herein, the tow tractor 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. Any spillage or leakage of any liquid, including fuel, coolant, lubricant, or hydraulic fluid, under any condition, except as allowed herein.
- c. Structural failure of any component, including permanent deformation, or evidence of impending failure.
- d. Evidence of excessive wear. If excessive wear is suspected, the original equipment manufacturer's (OEM's) specifications or tolerances shall be utilized for making a determination.
- e. Evidence of corrosion or deterioration.
- f. Misalignment of components.
- g. Conditions that present a safety hazard to personnel during operation, servicing, or maintenance.
- h. Interference between the tow tractor components or between the tow tractor, the ground, and all required obstacles, with the exception of normal contact by the tires.
- i. Evidence of undesirable mobility characteristics, including instability in handling during cornering, braking, and while traversing all required terrain.
- j. Shutdown faults from:
  - i. Engine cooling system.
  - ii. Engine lubrication system.
  - iii. Engine protective circuits.

## 5.5 Test methods.

5.5.1 Examination of product. Each tow tractor shall be examined to verify compliance with the requirements herein prior to accomplishing any other demonstrations or tests listed in 5.5. A contractor-generated, Government-approved checklist (part of the test procedure) shall be used to identify each requirement not verified by an analysis, certification, demonstration, or test, and shall be used to document the examination results. Particular attention shall be given to materials, workmanship, dimensions, surface finishes, protective coatings and sealants and their application, welding, fastening, and markings. Proper operation of each tow tractor function shall be verified. Certifications and analyses shall be provided in accordance with Table V.

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Each production tow tractor shall be inspected to a Government-approved reduced version of the checklist.

TABLE V. Certifications and analyses.

<b>Paragraph</b>	<b>Required Certifications and Analyses</b>
3.2 <u>Design and construction.</u>	Contractor certification that the tow tractor is in accordance with all requirements of SAE specifications ARP1247 and AIR 1363.
3.2.9.2 <u>Cab visibility.</u>	Contractor certification that the cab visibility requirements of 3.2.9.2 in accordance with MIL-STD-1472 are met or exceeded.
3.5.1 <u>Air transportability.</u>	Contractor air transportability analysis (see 5.5.7.2).
3.5.1.1 <u>Shoring.</u>	
3.5.2 <u>Tie downs.</u>	Contractor tie down provision analysis (see 5.5.7.4.1).
3.5.3 <u>Lifting provisions.</u>	Contractor lifting provision analysis (see 5.5.7.5.1).
3.6.7 <u>Couplers.</u>	Contractor analysis of coupler requirement (see 5.5.11).
3.7.1 <u>Engine.</u>	Engine manufacturer certification that the engine is in accordance with all applicable requirements, including exhaust emissions standards and fuels. Engine manufacturer application approval for the engine and its installation, including cooling system, lubrication system, and mounting system.
3.7.3 <u>Engine cooling system.</u>	
3.7.5 <u>Transmission.</u>	Transmission manufacturer certification that the transmission is in accordance with all requirements of 3.7.5.
3.10 <u>Safety chain attachment point.</u>	Contractor analysis of the safety chain attachment point (see 5.5.12).

5.5.3 Electromagnetic interference test. A pre-production tow tractor shall be tested in accordance with MIL-STD-461: RE 102 and RS 103 to demonstrate compliance with 3.2.5.

5.5.4 Noise level test. The noise level at the operator's ear with the engine operating at maximum rpm and windows and doors closed shall be measured to demonstrate compliance with 3.2.9.3. If noise level is between 84 and 94 dB(A), the noise warning plate required by 3.2.9.3 shall be on all tow tractors delivered on this contract.

5.5.5 Environmental testing.

5.5.5.1 High temperature storage and operation test. A pre-production tow tractor shall be tested in accordance with MIL-STD-810, Method 501.5, Procedures I and II, to demonstrate



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compliance with the high temperature storage and operating requirements of 3.3.1 and 3.3.2. Test duration shall be one 24-hour cycle for each procedure beginning no less than two hours after test item temperature stabilization.

5.5.5.2 Low temperature storage and operation test. A pre-production tow tractor shall be tested in accordance with MIL-STD-810, Method 502.5, Procedures I and II, to demonstrate compliance with the low temperature storage and operating requirements of 3.3.1 and 3.3.2, as well as the engine starting requirement of 3.7.2. Test duration shall be one 24-hour cycle for each procedure beginning no less than two hours after test item temperature stabilization.

5.5.6 Weight and dimension tests.

5.5.6.1 Weight and center of gravity test. The weight, center of gravity, and axle weights of a pre-production tow tractor shall be measured to demonstrate compliance with the weight requirement of 3.4 and the axle weight requirement of 3.5.1.2.

5.5.6.2 Dimension measurement. A pre-production tow tractor shall be measured to demonstrate compliance with the dimensional requirements of 3.4.

5.5.7 Transportability verification.

5.5.7.2 Air transportability analysis. An engineering analysis shall be performed to demonstrate compliance with the air transportability requirements of 3.5.1, 3.5.1.1, and 3.5.1.4. The analysis shall include the tie downs and all major components and their ability to withstand the accelerations specified in 3.5.1. The evaluation shall also include a dimensional analysis for the tow tractor while traversing the ramp and while loaded aboard C-130, C-17, and C-5 aircraft.

5.5.7.3 Equipment removal and reconfiguration demonstration. A pre-production tow tractor shall be configured for transport on C-130, C-17, and C-5 aircraft and then reconfigured for operation to demonstrate compliance with 3.5.1.5. It shall be demonstrated that the forces required do not exceed those allowed in MIL-STD-1472.

5.5.7.4 Tie down provision verification.

5.5.7.4.1 Tie down provision analysis. An engineering analysis shall be performed to demonstrate compliance with the tie down provision requirements of 3.5.2.

5.5.7.4.2 Tie down provision test. A pre-production tow tractor shall be tested to demonstrate compliance with the tie down provision requirements of 3.5.2.

5.5.7.5 Lifting provision verification.

5.5.7.5.1 Lifting provision analysis. An engineering analysis shall be performed to demonstrate compliance with the lifting provision requirements of 3.5.3.

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5.5.7.5.2 Lifting provision test. A pre-production tow tractor shall be tested to demonstrate compliance with the lifting provision requirements of 3.5.3.

5.5.8 Drawbar pull test. The pre-production tow tractor shall be tested for verification of the DBPF on dry level concrete using a load sensing device and a fixed anchoring position. The drawbar position shall be horizontal and level to demonstrate compliance with 3.6.2.

5.5.9 Driveline and steering. The pre-production tow tractor shall be demonstrated in two-wheel steer and four-wheel steer, using both crab and coordinated steering to demonstrate compliance with 3.6.5. 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 pre-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 tow tractor being tested.
- b. Equipment required.
  - i. A device suitable for measuring three times the length of the tow tractor being tested with an accuracy of at least  $\pm 1.00$  inch.
  - ii. Markers or marking device suitable for marking the pavement.
  - iii. A plumb bob suitable for locating a point on the pavement directly below a fixed point on the tow tractor.
  - iv. 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.
  - i. The tow tractor shall be fully ballasted and in operational form.
  - ii. 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.
  - i. The tow tractor shall be driven slowly in a full cramp circle (left or right) to establish a steady state in the steering linkage.
  - ii. Continue driving the slow full cramp circle.
  - iii. At approximately three equidistant points (identified as A, B, and C) around the circle, gently stop the tow tractor using the service brakes.
  - iv. At each stop, place a plumb bob against the outermost point of the tow tractor and mark the spot on the ground directly below where the plumb bob comes to rest.
  - v. Measure and record the straight line distances between each pair of points, that is, Lengths AB, BC, and CA.

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vi. Calculate the wall-to-wall turning radius (R) as follows:

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

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

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

e. Repeat steps (i) through (vi) with the tow tractor moving in the opposite direction.

5.5.10 Parking brake test. The pre-production tow tractor shall be tested to demonstrate compliance with 3.6.6.1 with a towed 8,400 pound load on an 11.5 degree incline.

5.5.11 Coupler analysis. A strength analysis report shall be submitted to the Government representative at pre-production verification that contains supporting calculations to show that the front and rear couplers and mounting structures are in compliance with the respective strength specifications of 3.6.7. The analysis shall include methodology leading to the arrival of values for static and dynamic loading, and ultimately the design load. Additionally, the rear coupler and mounting structure calculations shall be supplemented with a Finite Element Analysis (FEA) to further support compliance with the strength specification.

5.5.12. Safety chain attachment point analysis. A strength analysis of the safety chain attachment points and mounting (through ratings and/or calculations) shall be submitted to the Government representative at pre-production verification of the air system-equipped tow tractor to demonstrate compliance with 3.10.

5.5.13 Compatibility tests.

5.5.13.1 Mobility tests. The pre-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 MHU-196 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. The pre-production tow tractor shall be placed in reverse to demonstrate compliance with the warning light requirement of 3.6.1.

5.5.13.2 Air system tests. The pre-production tow tractor shall be tested while towing an Air Force MHU-196 or MHU-204 trailer to demonstrate compliance with the air system requirements of 3.6.4. Testing shall be performed using two different Air Force personnel to drive the tow tractor/trailer train. A follow vehicle shall drive behind the tow tractor/trailer train at a safe distance to monitor the tow tractor's performance. Both tests shall be performed in the below three configurations:

a. No trailing load (tow tractor only).

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- b. Tow tractor towing an unloaded MHU-196/204 munitions trailer.
- c. Tow tractor towing a loaded MHU-196/204 munitions trailer.

#### 5.5.13.2.1 Collision avoidance test.

For configuration (a), the pre-production tow tractor shall be brought up to 20 mph, and subjected to left and right turn lane change swerving maneuvers that simulate the avoidance of collisions. While performing the lane change maneuvers, the equipment shall remain within a 22 ft wide boundary.

For configuration (b), the pre-production tow tractor/trailer train shall be brought up to 20 mph (unloaded MHU-196 trailer; 10 mph if an unloaded MHU-204 trailer is used) and subjected to left and right turn lane change swerving maneuvers that simulate the avoidance of collisions. While performing the lane change maneuvers, the equipment shall remain within a 22 ft wide boundary.

For configuration (c), the pre-production tow tractor/trailer train shall be brought up to 10 mph (loaded MHU-196/204) and subjected to left and right turn lane change swerving maneuvers that simulate the avoidance of collisions. While performing the lane change maneuvers, the equipment shall remain within a 22 ft wide boundary.

For all three configurations, each new driver shall start out by accelerating and steering the tow tractor or tow tractor/trailer train in a cautious and conservative manner in order to gain familiarization with the characteristics of the tow tractor/trailer train, progressing toward increasing speed and steering input/response. Each driver shall base the rate of progression of the testing on his/her sense of comfort and control. Eventually, left and right turn lane change swerving maneuvers from 20 mph (tow tractor with unloaded MHU-196 trailer; 10 mph if MHU-204 trailer is used) and from 10 mph (tow tractor with loaded MHU-196/204 trailer) shall be conducted regularly. Once this level of vehicle performance is achieved, each configuration shall be repeated at least 24 times by the two drivers.

#### 5.5.13.2.2 Air system brake performance test.

For configuration (a), the pre-production tow tractor shall be brought up to 20 mph, and stopped within a distance of 35 feet, and within a 12 foot wide lane. The stopping distance of the tow tractor with no trailing load shall be recorded.

For configuration (b), the pre-production tow tractor/trailer train shall be brought up to 20 mph (unloaded MHU-196; 10 mph if MHU-204 is used) and subjected to panic braking with maximum effort. Passing test results include minimal amounts of wheel lock-up, skids, bouncing, and yawing (sideslip) from the tow tractor during panic braking, with the tow tractor/trailer train coming to a stop within a 12 ft wide lane. Severe jack knifing shall be classified as failing testing results.

For configuration (c), the pre-production tow tractor/trailer train shall be brought up to 10 mph (loaded MHU-196/204) and subjected to panic braking with maximum effort. Passing test results include minimal amounts of wheel lock-up, skids, bouncing, and yawing (sideslip) from

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the tow tractor during panic braking, with the tow tractor/trailer train coming to a stop within a 12 ft wide lane. Severe jack knifing shall be classified as failing testing results.

For all three configurations, each new driver shall start out by accelerating and steering the tow tractor or tow tractor/trailer train in a cautious and conservative manner in order to gain familiarization with the characteristics of the tow tractor/trailer train, progressing toward increasing speed and steering input/response. The rate of progression in increasing speed shall be in increments of 5 mph. Eventually, panic stops from 20 mph (tow tractor with unloaded MHU-196 trailer; 10 mph if MHU-204 trailer is used) and from 10 mph (tow tractor with loaded MHU-196/204 trailer) with maximum braking effort shall be conducted regularly. Once this level of vehicle performance is achieved, each configuration shall be repeated at least 24 times by the two drivers.

At the conclusion of configurations (b) and (c), interviews of both the drivers and observers shall be conducted after the unloaded and loaded brake performance tests to get their opinions of the tow tractor's braking performance. Topics to be discussed during the interviews shall be brake modulation, smooth vs. rough stopping, and brake "feel" (sufficient air volume and pressure). At least 5 sample stopping distances of the tow tractor/trailer train in the unloaded and loaded configuration shall be recorded.

5.5.13.3 Service brake test. A schematic of the braking system shall be submitted to the Government representative at the pre-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 18.00 feet to demonstrate compliance with 3.6.6.2. This test shall be conducted while towing a C-130 aircraft.

6. PACKAGING. Preservation, packing, and marking shall be as specified in the contract or order.

7. NOTES.

7.1 Source of documents.

7.1.1 Military Specifications, Standards and Handbooks referenced herein may be obtained at <https://assist.dla.mil> or available from the Standardization Documents Order Desk, 700 Robbins Ave, Bldg. 4, Section D, Philadelphia, PA 19111-5094.

7.1.2 FAR. FAR may be obtained from the Superintendent of Documents, P.O. Box 371954, Pittsburgh PA 15250-7954. Electronic copies of the FAR may be obtained from <https://www.acquisition.gov/far/>.

7.1.3 ASTM documents. Application for copies should be addressed to ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken PA 19428-2959. Electronic copies of ASTM standards may be obtained from <http://www.astm.org/>.

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7.1.4 AWS documents. Application for copies should be addressed to American Welding Society, 550 N.W. LeJeune Road, Miami FL 33126. Electronic copies of AWS standards may be obtained from <http://www.aws.org> .

7.1.5 SAE documents. Application for copies should be addressed to SAE, Inc., 400 Commonwealth Drive, Warrendale PA 15096. Electronic copies of SAE standards may be obtained from <http://www.sae.org> .

7.1.6 NAS documents. Application for copies should be addressed to Aerospace Industries Association, 1000 Wilson Boulevard, Suite 1700, Arlington VA 22209. Electronic copies of NAS standards may be obtained from <http://www.aia-aerospace.org/> .

7.1.7 NEMA documents. Application for copies should be addressed to National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1752, Rosslyn, Virginia 22209. Electronic copies of NEMA standards may be obtained from <http://www.nema.org/stds/> .

7.1.8 CORTEC documents. Application for copies should be addressed to 4119 White Bear Parkway St. Paul, MN 55110 U.S.A.. Electronic copies of Cortec standards may be obtained from <http://www.cortecvci.com> .

7.1.9 SAF-HOLLAND documents. Application for copies should be addressed to National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1752, Rosslyn, Virginia 22209. Electronic copies of SAF-HOLLAND standards may be obtained from <http://ww1.safholland.us/sites/usa/en-US/Pages/default.aspx> .

7.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this CID.
- b. Finish color required (Dark Green or Desert Sand) (see 3.2.1.2).
- c. Temporary CPC (see 3.2.1.4)
- d. Winterization A (see 3.3.1)
- e. Diagnostic software (see 3.11)
- f. Packaging requirements (see 6.0)

7.3 Definitions.

7.3.1 Common hand tool. A non-powered tool that is likely to be found in a typical mechanic's toolbox. Common hand tools include open end, boxed end, combination, socket (both 6- and 12-point in both standard and deep-well), and hex key wrenches, in SAE sizes up to and including 1-inch and metric sizes up to and including 25-mm; ratchet handles, extensions, and swivels; slotted and Phillips-head screwdrivers; regular and snap-ring pliers; and a ball-peen hammer.

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7.3.2 Special tool. A tool that is not commercially and readily available from a source other than the tow tractor contractor.

7.4 Additional information.

7.4.1 Engine waiver. Tier III represents the highest level of exhaust and evaporative emissions standards that will permit the use of high sulfur fuels. The Air Force possesses an Environmental Protection Agency (EPA) waiver to allow for deviation from EPA emissions guidelines. The waiver will be transferred from the Air Force to the engine manufacturer. The transfer process requires the engine manufacturer to supply a decal for the engine stating “insert engine description here – This engine has an exemption for national security under 40 CFR 89.908 and/or 40 CFR 1068.225”.

7.4.2 MHU-196/204 specifications. The MHU-196/204 trailers have 1/4” inner diameter 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 10.00 feet, and from the first set of wheels to the second set of wheels is approximately 30.00 feet. The trailer’s braking system working pressure is 105 psi  $\pm$  5 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.

7.5 Key words.

Aircraft parking  
Flight line  
Ground handling  
MB-4  
Munitions handling  
Tug

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Custodian:  
Air Force - 84

Preparing activity:  
Air Force - 84

Reviewer:  
Air Force - 99

Agent:  
Air Force – 99

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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 <https://assist.dla.mil/> .