

MIL-T-2452J
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 SUPERSEDING
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MILITARY SPECIFICATION

TRUCKS, REFUSE COLLECTION: COMPACTION TYPE, REAR
 HOPPER LOADING, WITH TILT CAB, DIESEL AND GASOLINE ENGINE DRIVEN,
 19,000 TO 44,500 POUNDS GVW, 4x2 AND 6x4, 10 TO 25 YARD, COMMERCIAL

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

1. SCOPE

* 1.1 Scope. This specification covers diesel gasoline engine driven, 4-wheel, 2-rear wheel drive and 6-wheel, 4-rear wheel drive, commercial, compaction type, refuse collection trucks having a minimum gross vehicle weight (GVW) 19,000 to 44,500 pounds. The bodies shall be of 10- through 25-cubic yard minimum rated capacities with rear hopper loading. Vehicles procured under this specification are commercial items which shall be warranted by the manufacturer as specified in acquisition documents.

1.2 Classification. The vehicle shall be one of the following classes, as specified (see 6.2):

TABLE I. Vehicle classes.

Vehicle class	Body capacity (cubic yards)	Minimum GVW (pounds)	Wheels and wheels driving
A	10	19,000	4x2
B	16	29,500	4x2
C	20	32,000	4x2
D	25	44,500	6x4
E	20	39,500	6x4

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

AMSC N/A

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

MIL-T-2452J

2. APPLICABLE DOCUMENTS

* 2.1 Government documents.

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

SPECIFICATIONS

FEDERAL

- | | |
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| W-B-131 | - Battery, Storage: Vehicular, Ignition, Lighting and Starting. |
| ZZ-T-381 | - Tires, Pneumatic, Vehicular (Highway). |

MILITARY

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| MIL-T-704 | - Treatment and Painting of Materiel. |
| MIL-B-46176 | - Brake Fluid, Silicone, Automotive All Weather, Operational and Preservative. |

STANDARDS

FEDERAL

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

MILITARY

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| MIL-STD-1223 | - Nontactical Wheeled Vehicles Treatment, Painting, Identification Marking and Data Plate Standards. |
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* 2.1.2 Other Government documents. The following other Government documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

DEPARTMENT OF TRANSPORTATION (DoT)

- Federal Motor Carrier Safety Regulations.
Federal Motor Vehicle Safety Standards.

(Application for copies of DoT publications should reference the code of Federal Regulations, 49 CFR, and the Federal Register and should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

MIL-T-2452J

ENVIRONMENTAL PROTECTION AGENCY (EPA)

Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines.
Noise Emission Standards for Transportation Equipment – Medium and Heavy
Trucks.

Truck-Mounted Solid Waste Compactors: Noise Emission Standards.

(Application for copies of EPA publications should reference the Code of Federal Regulations, 40 CFR, and the Federal Register and should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

(Copies of specifications, standards and other Government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

* 2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted shall be those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS shall be the issue of the non-Government document which is current on the date of the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM Standards

B-117 - Method of Salt Spray (Fog) Testing.

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

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)

Standard 1910.95 - Occupational Noise Exposure.

(Application for copies of OSHA publications should be addressed to the Occupational Safety and Health Administration, Department of Labor, 200 Constitution Avenue N.W., Washington, D.C. 20210.)

SAE, INC.

SAE Standards and Recommended Practices

J350 - Spark Arrester Test Procedure for Medium Size Engines
(DoD adopted).

J537 - Storage Batteries.

MIL-T-2452J

*	J551	- Performance Levels and Methods of Measurement of Electromagnetic Radiation from Vehicles and Devices (30-1000 MHz).
	J588	- Turn Signal Lamps.
	J589	- Turn Signal Switch.
	J682	- Rear Wheel Splash and Stone Throw Protection (DoD adopted).
	J688	- Truck Ability Prediction Procedure (DoD adopted).
	J704	- Openings for Six- and Eight-bolt Truck Transmission Mounted Power Take-Offs.
	J1349	- Engine Power Test Code – Spark Ignition and Diesel.

(Application for copies of SAE publications should be addressed to SAE, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.)

THE TIRE AND RIM ASSOCIATION, INC.
Yearbook

(Application for copies of Tire and Rim Association publications should be addressed to the Tire and Rim Association, Inc., 3200 W. Market Street, Akron, OH 44313.)

TRUCK BODY AND EQUIPMENT ASSOCIATION (TBEA)
Hopper Capacity Ratings for Rear Loading Refuse Bodies.

* (Sources for copies of TBEA publications are not known. Use alternate publications if copies of TBEA publications are not on hand.)

* 2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein (except for associated detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

* 3.1 Standard vehicle and accessories. Except as specified in 3.1.1 through 3.1.1.6, vehicles, components, assemblies, and accessories to be delivered under the contract shall be the vehicle manufacturer's standard or optional items, which meet or exceed the requirements of this specification. All chassis items shall be as represented in the chassis manufacturer's technical data, and special bodies or mounted equipment shall be as represented in the body and equipment

MIL-T-2452J

manufacturer's technical data. Technical data shall be limited to specifications and technical material identical to that furnished to the authorized company representatives for selection of vehicle models and components and shall be available to the engineering offices of the procuring activity, prior to delivery of the items. The chassis model furnished shall be not older than the chassis manufacturer's current model on the date of the invitation for bids.

3.1.1 Special requirements. In addition to the standard vehicle and components specified in 3.1, the vehicle shall be furnished with special equipment as specified herein.

3.1.1.1 Painting and marking. Treatment, painting, identification marking and data plates shall be in accordance with MIL-STD-1223, as specified by the procuring activity for the appropriate service (see 6.2), except for the following:

- (a) The exterior of the complete body unit (see 3.5 through 3.5.8) shall be treated and painted in accordance with type A of MIL-T-704;
- (b) The interior of the body shall be painted with rust inhibiting primer and manufacturer's standard color;
- (c) The color of the exterior of the vehicle shall match color chip No. 13538, gloss yellow, of FED-STD-595 for the Navy; color chip No. 16081, gloss gray, for the Air Force; and color chip No. 17875, gloss white, for all other services;
- (d) The color of vehicle identification marking shall be gloss black, color chip No. 17038, for the Navy; reflective white numerals and letters on a red background for the Air Force; and gloss black numerals and letters, color chip No. 17038, on a reflective white background on the vehicle and on front and rear marking plates for all other services;
- (e) Rubber seals and hydraulic hoses shall not be painted.

* 3.1.1.2 Rustproofing. When specified (see 6.2), the cab, chassis and complete underside of the refuse collection body, including fenders, skirts and wheelwells shall be rustproofed in accordance with FED-STD-297. When specified (see 6.2), tropical rustproofing in accordance with FED-STD-297 shall be furnished.

3.1.1.3 Drain plugs. Drain plugs installed in the rear axle(s) shall be of the permanent magnet type.

3.1.1.4 Towing devices. Not less than two hooks, loops, pins, or a single, center mounted towing eye for towing purposes shall be furnished on the front of the vehicle.

MIL-T-2452J

* 3.1.1.5 Rear wheel splash and stone throw protection. The rear wheels shall have rubber mud flaps or the body shall be designed to provide equivalent splash protection at the rear. A metal strip not less than 1/8 inch thick and not less than one inch wide, extending the entire width of the mud flap, shall be installed to prevent the bolt heads or bolt nuts from damaging the mud flap. Splash and stone throw protection shall be in accordance with SAE J682. Rubber mud flaps or fenders shall be provided to the rear of the front wheels and shall extend down to at least the centerline of the front axle.

3.1.1.6 Silicone brake fluid. When specified (see 6.2), and if available as the manufacturer's standard or optional brake fluid, brake fluid conforming to MIL-B-46176 shall be provided when a hydraulic brake system is furnished (see 3.4.11.1). A tag shall be placed near the master cylinder stating "CAUTION: USE SILICONE BRAKE FLUID ONLY, MIL-B-46176."

3.2 General design.

3.2.1 Federal Motor Vehicle Safety Standards. The vehicle and furnished accessories shall comply with all Federal Motor Vehicle Safety Standards in effect on the date of manufacture.

3.2.2 Air pollution control. The vehicle shall comply with the EPA Regulations governing Control of Air Pollution from New Motor Vehicles and New Motor Vehicle Engines in effect on the date of manufacture. In addition, vehicles destined for California shall comply with State of California regulations governing air pollution control in effect on the date of manufacture.

3.2.3 Sound level. The interior sound level shall conform to Federal Motor Carrier Safety Regulation 393.94. The interior noise level during the packing cycle shall be within the permissible noise exposure levels of OSHA Standard 1910.95, based on an exposure duration of 8 hours per day (currently 90 dB(A)). The drive-by vehicle exterior sound level shall conform to the EPA Noise Emission Standards for Transportation Equipment – Medium and Heavy Trucks.

3.2.4 Curb weight. The curb weight shall include the weight of the chassis and cab, with all attachments, accessories, and equipment; the body; and a full complement of fuel, lubricants, coolant and hydraulic fluid.

3.2.5 Gross vehicle weight. The gross vehicle weight (GVW) shall consist of the curb weight, the operator weight (computed at 175 pounds), and a payload to provide not less than the specified GVW.

MIL-T-2452J

3.2.6 Weight distribution. The distribution of the GVW for the purpose of establishing suspension, axle and tire capacities shall be determined with the payload uniformly distributed over the load area.

3.2.7 Ratings. Vehicle ratings shall be the manufacturer's published ratings. Component and vehicular ratings shall not be raised to meet the requirements of this specification. When published ratings are not available, verification of ratings must be available to the engineering office of the procuring activity. The minimum GVW shall conform to table I for the specified class of vehicle.

3.2.8 Cab-to axle dimension. The cab-to-axle dimension shall conform to that recommended by the refuse collection body manufacturer for conformance to this specification.

3.2.9 Width. The overall width of the vehicle, exclusive of mirrors, lights, reflectors and tires, shall not exceed 96 inches. The width over the tires shall be not more than 100 inches.

* 3.2.10 Accessibility. The design of the vehicle and optional equipment shall permit access for routine servicing and shall permit access for replacement and adjustment of component parts and accessories with minimal disturbance of other components and systems.

3.3 Performance.

3.3.1 Speeds and gradeability. High and low speed requirements shall be met with vehicle loaded to the specified GVW.

3.3.1.1 High speed gradeability. The vehicle shall ascend grades specified in table II at 50 miles per hour (mph). Gradeability requirements shall be met with the main transmission in direct drive. Gradeability shall be verified with calculations in accordance with SAE J688 (see 6.3).

TABLE II. Gradeability.

Vehicle class	Percent grade
A	1.0
B	1.0
C	1.0
D	0.5
E	0.5

MIL-T-2452J

3.3.1.2 Low speed. Low speed shall be calculated with the engine operating at not less than 35 percent of recommended governed speed and shall provide a vehicle speed not greater than 4 mph.

* 3.3.1.3 Maximum geared speed. The maximum geared speed at engine governed speed shall be not less than 58 mph. Conformance to the geared speed specified shall be determined by calculating in accordance with the following formula:

$$\text{Maximum geared speed (mph)} = \frac{\text{Governed speed (rpm)}}{\text{Total gear reduction} \times \text{tire factor (see 6.3)}}$$

3.3.2 Service brakes. The service brakes shall control and hold the vehicle on a 30 percent grade when the vehicle is loaded to its specified GVW. The service brakes shall stop the vehicle, loaded to specified GVW, within the stopping distance requirements of Federal Motor Carrier Safety Regulation 393.52.

3.4 Chassis components.

3.4.1 Engine. The engine furnished shall be the chassis manufacturer's standard or optional engine for the commercial model truck which meets or exceeds the requirements of this specification.

* 3.4.1.1 Diesel engine. Unless otherwise specified (see 3.4.1.2), the vehicle shall be equipped with a liquid cooled, compression ignition, two-stroke or four-stroke cycle diesel engine, with not less than six cylinders. Diesel engines for class A vehicles shall have not less than 4 four cylinders. Engine net horsepower figures used in performance prediction calculations shall be determined in accordance with SAE J1349.

* 3.4.1.2 Gasoline engine. When specified (see 6.2), the vehicle shall be equipped with a liquid cooled, internal combustion, four-stroke cycle gasoline engine, with not less than six cylinders. The engine furnished shall provide the required vehicle performance when operated on unleaded fuel with a research octane rating of 91 at an engine speed of not more than the manufacturer's recommended operating speed. The engine shall be capable of warranted operation on unleaded fuel when used in accordance with the operator's manual. Net horsepower used in performance prediction calculations shall be determined in accordance with SAE J1349.

* 3.4.1.3 Oil filter. A full flow type oil filter shall be furnished. When specified for diesel engine driven vehicles (see 6.2), an independently mounted, minimum 10-quart, bypass oil filter with replaceable element, or the manufacturer's standard bypass filter, shall be furnished in addition to the full flow filter.

MIL-T-2452J

* 3.4.1.4 Cooling system. The cooling system shall maintain the engine coolant at a temperature below the boiling point with the vehicle loaded to rated GVW and operated at an altitude of 10,000 feet above sea level or in an ambient air temperature of not less than 125 degrees Fahrenheit (°F). The cooling system shall include a surge tank or a coolant recovery reservoir of not less than 2-quart capacity. A high coolant temperature or low coolant level alarm buzzer and a red indicator warning light shall be provided on the instrument panel. A radiator servicing access door shall be provided on the instrument panel. A radiator servicing access door shall be provided to allow verification of the coolant level.

3.4.1.5 Coolant temperature control. Thermostatic control of engine coolant temperature shall be provided. On diesel engine driven vehicles, control shall include partial thermostatic control of coolant flow through the radiator and thermostatically controlled radiator shutters or complete thermostatic control of all coolant flow through the radiator.

3.4.1.6 Governor. An engine governor shall be furnished and set to limit maximum engine speed to maximum recommended operating speed. The governor shall also provide an adjustable no-load speed setting which shall be maintained within 100 revolutions per minute (rpm) of the selected setting during the compaction cycle.

* 3.4.1.7 Fan clutch. A fan clutch shall be provided. The fan clutch shall reduce the fan speed automatically when the fan is not required for engine cooling.

3.4.1.8 Power plant heaters and fuel warmers. When specified (see 6.2), a coolant heater, an engine oil heater, and for diesel engine driven vehicles a fuel warmer shall be provided. Unless otherwise specified (see 6.2), a battery heater shall be provided when power plant heaters are specified. Heaters shall operate on 110-volt alternating current (ac), and shall be wired through a junction block to a single three-prong (male), weatherproof, slave receptacle for receiving external power and for grounding the vehicle. A three-wire connection cable, 25 five feet long and of adequate line capacity to supply power for all heater units simultaneously, shall be furnished. The connecting cable shall include a matching female connector at the vehicle end and a standard, weatherproof, three-pronged (two power plus one ground) male connector at the other end. Electrical apparatus shall conform to Federal Motor Carrier Safety Regulation 393.77(c)(7). The electrical insulation of the connecting cable shall withstand normal operating stresses in low ambient air temperature (down to minus 60°F) without cracking or loss of dielectric capacity. All heater lead wires shall be installed without interfering with vehicle

MIL-T-2452J

component operation, and without loose excess wire. Provisions for stowage of the cable shall be provided in the vehicle cab, and shall provide positive cable retention during vehicle operation. Heaters shall be furnished as follows:

- (a) A coolant heater, 1500-watt minimum rating, shall be installed in the engine block or lower coolant inlet hose. An engine thermostat with an operating range of 170°F to 195°F shall be installed.
- (b) An immersion type engine oil heater, 300-watt minimum rating, with 170°F to 195°F thermostat, shall be installed in the oil pan through any convenient opening
- (c) The battery heater shall have a capacity adequate to maintain the battery electrolyte at a temperature of not less than 10°F during vehicle exposure to ambient air temperatures as low as minus 60°F and shall embody a thermostat to limit the temperature of the electrolyte to not more than plus 80°F
- (d) A fuel warmer or preheater shall be provided on diesel engine driven vehicles to prevent clogging of fuel filters due to wa crystallization in the fuel. The fuel warmer shall use engine coolant to transfer sufficient heat to the diesel fuel to heat it from an inlet temperature of minus 40°F to an outlet temperature of plus 9°F, with a flow rate not less than the maximum fuel demand of the engine fuel system. A coolant shutoff valve shall be provided on the coolant inlet side of the fuel warmer unit.

3.4.1.9 Silicone rubber hoses. When specified (see 6.2), silicone rubber radiator and heater hoses shall be furnished.

3.4.2 Electrical systems. The electrical systems shall be in accordance with Federal Motor Carrier Safety Regulations 393.27 through 393.31 and 393.33.

* 3.4.2.1 Starting system (diesel). For diesel engine driven vehicles, a 12- or 24-volt direct current (dc) starting system with 12-volt dc lighting system, and with not less than a 60-ampere alternator, shall be furnished. Engine starting equipment shall include an ether starting system or a glow plug. If an ether system is furnished in lieu of a glow plug, it shall be of the measured shot type. The measured shot type ether system shall be key operated or manually operated from the driver's compartment and shall be inoperative with the engine warm. Complete provisions for a replaceable ether reservoir of not less than 12 fluid ounces shall be furnished. A reservoir need not be furnished.

MIL-T-2452J

3.4.2.2 Ignition system (gasoline). For gasoline engine driven vehicles, a 12-volt dc ignition system shall be furnished. An alternator of not less than 40-ampere rated capacity and which provides not less than 16 amperes dc output at normal engine idle speed shall be furnished.

* 3.4.2.3 Lighting. All vehicle lights and reflectors shall conform to Federal Motor Carrier Safety Regulations 393.12, 393.19, 393.20, and 393.22 through 393.26(d). When available as the manufacturer's standard or optional feature, the brake lights shall override the four-way emergency flasher. Identification, side marker, and clearance lights shall be of the armored or recessed type with the exception of those lights installed on the roof of the truck cab. Shock and vibration reduction means shall be provided to prolong the filament life of all lights. Stoplights, taillights, and turn signal lights shall be installed on the rear at a height of not more than 60 inches from the ground, and shall remain visible to overtaking traffic while personnel are riding on the steps. The lights shall be protected, either by recessed mounting below or behind impact surfaces, or by guards equal in strength to 6-inch diameter standard weight pipe.

3.4.2.4 Turn signals. Turn signal lamps shall conform to SAE J588. Operating units shall conform to SAE J589, class A, and shall be mounted on the steering column. The vehicle shall be provided with double-faced front signal units and with single faced rear signal units, installed in accordance with SAE J588. Turn signals shall not be mounted on the engine compartment hood. Turn signal operating units shall have visible and audible type flash indicators.

* 3.4.2.5 Batteries. Each battery shall be of 12-volt potential. The total reserve capacity ratings and the total cold cranking ampere ratings at 0°F, both measured in accordance with SAE J537, shall be not less than specified in table III. The batteries shall be of the maintenance-free type, having the maintenance-free characteristics listed in W-B-131.

TABLE III. Batteries.

Engine type	Reserve capacity (minutes)	Cold cranking (amperes)
Diesel (less than 220 gross horsepower)	320	1,200
Diesel (220 gross horsepower and over)	480	1,740
Gasoline	100	450

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MIL-T-2452J

3.4.2.6 Radio interference suppression. The vehicle shall be suppressed to limit electromagnetic radiation in accordance with SAE J551. Any body equipment emitting electromagnetic radiation shall be suppressed to the same level as the vehicle chassis.

3.4.3 Fuel system. The fuel system shall conform to Federal Motor Carrier Safety Regulations 393.65 and 393.67.

* 3.4.3.1 Air cleaner. An air cleaner shall be furnished.

* 3.4.3.2 Fuel tank(s). Fuel tank total capacity shall be not less than 30 gallons for class A vehicles and not less than 50 gallons (43 gallons for vehicles destined for California) for all other vehicle classes. When more than one tank is furnished on diesel engine driven vehicles, means shall be provided to assure an equalized fuel level in both tanks. When more than one tank is furnished on gasoline engine driven vehicles, a selector valve connecting either tank to the engine fuel intake shall be provided and means shall be provided to monitor the fuel level of either tank from a single fuel gage.

* 3.4.3.3 Fuel and water separator. When specified (see 6.2), in addition to the manufacturer's standard fuel filter(s), a fuel and water separator shall be furnished for diesel engine vehicles. The separator shall include a water coalescer and a drain valve.

3.4.4 Exhaust system. The exhaust system shall conform to Federal Motor Carrier Regulation 393.83. Vertical exhaust systems, if furnished and if capable of being reached easily by personnel entering or leaving either side of the cab, shall be provided with a heat shield. Vertical exhaust systems shall be provided with a hinged rain cap. When specified (see 6.2), naturally aspired engines shall be furnished with a spark arrester with an efficiency rating of not less than 80 percent when tested in accordance with SAE J350.

3.4.4.1 Exhaust system safety shield. The exhaust system or the hydraulic system shall be shielded so that, in the event of a hydraulic line rupture or hydraulic fluid leak, the hydraulic fluid will not come into contact with any part of the vehicle exhaust system.

3.4.5 Automatic or semiautomatic transmission. The vehicle shall be provided with an automatic or semiautomatic transmission. The input torque capacity of the transmission shall be at least equal to the maximum torque delivered by the engine. The transmission shall include a hydraulic torque converter and not less than five forward gear ratios or, for class A only, four forward speeds and a two-speed rear axle. Normal driving range selector position shall provide

MIL-T-2452J

not less than four forward gear ratios without movement of the selector. The transmission shall be provided with SAE J704 power takeoff opening(s). A hydraulic retarder shall not be used. If integral with the transmission, the hydraulic retarder shall be disconnected.

3.4.5.1 Power takeoff. The power takeoff shall be of a rated capacity to operate powered equipment. Controls to operate the power takeoff shall be located in the truck cab accessible to the seated driver. A caution plate or decal reading "DO NOT DRIVE VEHICLE WITH POWER TAKEOFF ENGAGED" shall be provided and installed so as to be readily visible to the seated driver. An air actuated power takeoff shall be furnished for all vehicles except vehicles equipped with power hydraulic brakes.

3.4.6 Driveline components. Driveline components shall be adequate to transmit the maximum delivered torque on the engine as developed through the maximum gear train reduction.

3.4.7 Frame. The chassis frame shall be the manufacturer's standard reinforced frame, or a heavy duty frame, for the type and class vehicle furnished. The reinforced frame shall have frame reinforcement extended at least from the rear of the front suspension, rear hanger bracket to the front of the rear spring for 4x2 vehicles and to the bogie trunnion mounting bracket for 6x4 vehicles. Reinforcement in the form of fishplating is not acceptable. Both the reinforced frame and the heavy duty frame shall have sufficient resisting bending moment to provide the structural strength required to at least equal the loads imposed with the vehicle loaded to provide specified GVW.

3.4.8 Suspension. The vehicle shall be equipped with a suspension system having a rated capacity at least equal to the load imposed on each member, measured at the ground, with the vehicle loaded to the specified GVW. When the suspension capacity is rated at the spring pads, unsprung weight shall be deducted. Vehicles with a front axle rating of 12,000 pounds or less shall be equipped with hydraulic double-acting shock absorbers at the front wheels.

* 3.4.9 Axles. Axle ratings shall be at least equal to the load imposed on each axle, measured at the ground, when the vehicle is loaded to its specified GVW. Axle gear ratios shall provide the performance specified in 3.3.1. When specified (see 6.2), the wheel bearings and axle spindles shall be oil lubricated. The hubcaps shall have a window for visual determination of oil level. Provisions for venting or withstanding internal pressure buildup and for replenishing the oil supply shall be provided.

MIL-T-2452J

3.4.9.1 Rear bogie. The rear bogie on class D and E vehicles shall be of the four-wheel type, complete with axles, springs, torque rods and all other necessary parts. The bogie shall be provided with a means permitting differential action between the two axles, and a manually controlled lockout assuring equal power to each rear axle. The lockout control shall be located in the cab and shall be equipped with a warning light to indicate when the lockout is engaged.

3.4.9.2 Traction control. An automatic traction control shall be furnished. The traction control on class D and E trucks shall be either on the forward or on the rear axle of the tandem. The traction control shall actuate automatically to ensure that power is transmitted to the wheels having traction when the opposite wheel loses traction. Maximum traction capabilities shall be maintained at all times under each drive wheel for the life of the vehicle.

3.4.9.3 Two-speed axle. Class A vehicle shall be provided with a two-speed axle having electric or vacuum shift and ratios which permit proper gear splitting.

* 3.4.10 Wheels, rims, tires and tubes. Unless wide base tires are specified, the vehicle shall be equipped with single front and single front and dual rear wheels. Rims and tire ratings shall conform to Tire and Rim Association recommendations for the type and size of tires furnished. Tire type and size, tire load range (ply rating), and rim sizes shall be the same for all wheels on the vehicle. After being mounted, each front tire and wheel assembly shall be balanced within industry limits so as to eliminate wheel tramp or drumming at road speeds up to 50 mph. When specified (see 6.2), the vehicle shall be equipped with wide base type tires and wheels for the front and rear axles in lieu of conventional front and dual rear wheels and tires. Wide base wheels shall be interchangeable without the use of an adapter. When specified (see 6.2), disc type wheels shall be furnished.

3.4.10.1 Tires. Tires shall be tube or tubeless type with highway tread. Tires shall be steel belted radial, or when specified (see 6.2), bias ply. Tires shall be of rated capacity at least equal to the load imposed on each tire, measured at each wheel, at the ground, with the vehicle loaded to specified GVW. Tires shall conform to Tire and Rim Association recommendations, or to ZZ-T-381 with a size designation system the same as the Tire and Rim Association.

3.4.10.2 Inner tubes. When tube type tires are furnished, inner tubes shall be of the heavy duty type, and shall be of the proper size for the tires furnished. Tire flaps shall be provided for tube type tires in accordance with Tire and Rim Association recommendations.

MIL-T-2452J

3.4.11 Brakes. The brakes shall conform to Federal Motor Carrier Safety Regulations 393.40 through 393.43 and 393.45 through 393.52. When available as the manufacturer's standard or as an option, brake linings shall be of nonasbestos material.

3.4.11.1 Power hydraulic or air type. Class A vehicles shall be equipped with either power assisted, hydraulically actuated, four-wheel service brakes or full-air brakes.

3.4.11.1.1 Split hydraulic brake system. When power hydraulic brakes are furnished, the brake system shall be so arranged as to provide separate systems for at least two wheels and so designed and constructed that rupture or leakage type failure of any single pressure component of the service brake system, except structural failures of the brake master cylinder body, effectiveness indicator body, or other housing common to the divided system, will not result in complete loss of function of the vehicle brakes when force on the brake pedal is continued. "Pressure component" means any internal component of the brake master cylinder or master control unit, wheel brake cylinder, brake line, brake hose, or equivalent, except power assist components.

3.4.11.1.2 Indicator light. The split hydraulic brake system shall be equipped with an electrically operated red light mounted on the instrument panel to indicate system effectiveness. The light shall have an area of not less than 0.196 square inch. It shall illuminate before or upon application of the brakes when an actuating-pressure component of the system has sustained a loss of pressure. The indicator light system shall include a means for testing by the vehicle operator to assure that the light bulb is operable.

* 3.4.11.2 Air brakes. Class B, C, D and E vehicles shall be equipped with full-air brakes on all wheels. The braking system, complete with all necessary components, shall include:

- (a) Air compressor, unloader-head type, engine driven and engine lubricated, air- or water-cooled, and having a capacity of not less than 7-1/4 cubic feet per minute (cfm) for classes A and B and not less than 12 cfm for classes C, D and E
- * (b) Air storage reservoir(s), each tank equipped with a drain and with safety and check valves between the compressor and the last reservoir tank.
- (c) Foot control, suspended or treadle type
- (d) Air control valves
- (e) Air-pressure gage, visible to the driver

MIL-T-2452J

- (f) Low-air-pressure warning, visible and audible
- (g) Service brake stop lamp switch
- (h) Automatic moisture ejector
- * (i) Automatic slack adjusters.

* 3.4.11.2.1 Air dryer. A replaceable cartridge desiccant type air dryer shall be installed in the air brake system. The dryer shall have the capability of removing not less than 95 percent of the moisture in the air being dried. The dryer shall have a precooler and a filter to screen out oil and solid contaminants. The dryer shall have an automatic self-cleaning cycle and a thermostatically controlled heater to prevent icing of the purge valve.

3.4.11.3 Brake controls for use from a towing vehicle. When specified (see 6.2), the vehicle shall be furnished with a system for controlling the brakes from a towing vehicle (wrecker). The installation shall be complete with air brake couplers, a relay emergency valve with no-bleed-back feature (except when a spring applied emergency brake is furnished) and additional air lines and fittings. The service and emergency couplers shall be mounted on the front in a protected position providing for ready attachment of air hoses from a towing vehicle. The service and emergency couplers shall be identified and provided with dummy gladhand couplers with chains. The system shall not compromise conformance to any Federal Motor Carrier Safety Regulation referenced herein or to any Federal Motor Vehicle Safety Standard.

* 3.4.12 Cab. Unless otherwise specified (see 6.2), a full width tilt cab with tilting and locking mechanism shall be furnished. Tilt cab features shall be in accordance with the Employee Safety and Health Standards of Federal Motor Carrier Safety Regulation 399, including the first step height, which shall be not more than 24 inches. When specified (see 6.2), the chassis manufacturer shall furnish any type of his standard or optional full width cab. Cab doors shall be equipped with locks, operable from inside the cab through mechanical linkage, and with at least the curbside door equipped with an external, key operated lock. Full length drip rails shall be installed above the cab doors. Unless otherwise specified, the cab shall have an upholstered, full width, adjustable seat and back or an individual, adjustable driver's seat and individual passenger seat. When specified (see 6.2), an individual adjustable driver's seat and an individual passenger seat shall be provided. The color of the upholstery and the interior finish shall be compatible with the exterior color (see 3.1.1.1). White upholstery shall not be furnished. Safety grips or grab handles shall be provided on each side of the cab to assist personnel in

MIL-T-2452J

entering and leaving the cab. Interior lighting shall be provided. Two pairs of seat belts shall be installed. For tilt type cabs, provisions to facilitate cleaning the windshield shall be provided by means of a bumper step, or bumper step cutouts, and a grab handle located under the windshield.

3.4.13 Steering. Power steering shall be furnished.

3.4.14 Windshield wipers and washers. The vehicle shall be equipped with dual windshield wipers and windshield washers. The windshield wipers shall be of the multispeed type and shall be operated by either air or electrical motor(s).

3.4.15 Bumper. Unless the bumper is in integral part of the vehicle cab, a channel type front bumper shall be provided.

3.4.15.1 Rear end protection. The rear end of vehicle shall be protected by the body in accordance with Federal Motor Carrier Safety Regulation 393.86.

* 3.4.16 Tool stowage. Stowage space of sufficient size to accordance hand tools, anti-skid chains, and emergency reflective triangles shall be furnished for retaining during vehicle operation. Stowage space for these tools and equipment may be furnished in the cab. When stowage space for these tools and equipment is located outside the cab, it shall be weatherproof and shall provide for locking with a padlock or a key operated lock.

3.4.17 Heater and defroster. The vehicle shall be provided with a hot water heater with fresh air intakes and discharge outlets to the floor and to the windshield defroster louvers. The heater shall be complete with blower and mounted controls convenient to the driver.

3.4.18 Controls and operating mechanisms. All controls and operating mechanisms shall be located for left hand drive. Controls shall be complete and conveniently operable by the driver. Lever controls shall be designed and located to permit easy entrance and exit of the operator to and from the driver's compartment. Instruments and controls shall be identified as to their function and installed in a manner to facilitate removal and servicing. Instruments shall be visible to the driver when seated in the driving position.

* 3.4.19 Accessories and equipment. Chassis equipment shall be complete with all accessories furnished as standard equipment by the manufacturer. The following minimum equipment shall be furnished:

MIL-T-2452J

- (a) Key operated ignition switch
- (b) Ammeter, charging indicator or voltmeter
- (c) Fuel gage
- (d) Oil pressure gage or indicator
- (e) Engine temperature gage or indicator
- (f) Speedometer with recording odometer
- (g) Dual sunvisors
- (h) Driver's compartment ventilator other than window
- * (i) Tachometer.

3.4.19.1 Horn. The manufacturer's standard electric horn shall be furnished.

* 3.4.20 Rearview mirrors. Outside rearview mirrors shall be mounted on each side of the cab. The mirrors shall be of the combination type having flat and convex areas. The flat portion shall have not less than 50 square inches of reflective area. The convex portion shall have not less than 20 square inches of reflective area. The mirrors shall have not less than two supporting arms.

3.4.21 Engine hour meter. An engine hour meter having a totalizing mechanism of not less than 9,999 hours shall be furnished for the chassis engine to register accurately the number of hours of operating time. The meter shall be of rugged construction to ensure continuous trouble-free performance under severe operating conditions. The engine hour meter shall be mounted on the cab instrument panel or in the engine compartment in a readable location.

3.4.22 Back-up alarm. When specified (see 6.2), the vehicle shall be provided with an audible, pulsating, signaling device (electrical or mechanical) to caution personnel when the vehicle is in reverse gear operation.

3.5 Body. The body shall be of the rear hopper loading power compaction type. The tailgate section shall include a loading hopper and mechanisms that shall deliver refuse from the hopper into the body and compact the refuse. Compacted refuse shall be discharged at the rear by means of a reinforced, power actuated ejection plate. The operations shall be actuated through selective controls and shall utilize power from the vehicle engine through the power takeoff. The installation of the body on the chassis shall be subject to the approval of the chassis manufacturer.

3.5.1 Construction. The body shall be of general welded construction, fabricated from steel sheets or plates reinforced with steel shapes to withstand continuous operation at maximum imposed loads without evidence of deformation or excessive wear to the body or its components.

MIL-T-2452J

The interior of the body shall have a smooth, cleanable finish and shall be free of pockets and restrictions that might collect refuse. The body shall load and retain all refuse material, including ashes and liquid-saturated garbage, without spillage or liquid leakage during both the refuse collection and the transport operations.

3.5.2 Capacities. The refuse body shall have a capacity of not less than that specified in table IV. The hopper shall have a capacity of not less than that specified in table IV, as computed in accordance with Truck Body and Equipment Association (TBEA) standards.

Table IV. Rated capacities by class.

Vehicle class	A	B	C	D	E
Body capacity	10	16	20	25	20
Minimum hopper capacity (cubic yards)	1.5	1.5	1.5	1.5	1.5
Compaction density (pounds per cubic yard)	550	700	550	700	700

3.5.3 Hopper. For class A and B vehicles, the rear loading edge of the hopper shall be not more than 38 inches from the ground when the vehicle is without payload. For classes C, D and E, the loading edge shall be not more than 40 inches from the ground. The hopper shall be of watertight construction to prevent leakage. The dimensions of the hopper shall enable two men to empty the contents of two standard 55-gallon drums simultaneously into the hopper.

3.5.4 Compacting. The compacting devices shall clear the hopper by pushing or lifting its contents into the main cavity of the body. The operation of compaction devices shall not bypass refuse and shall ensure packing of refuse in the complete body volume. The movement of the compacting device shall be by hydraulic means capable of supplying a compacting pressure sufficient to produce the compaction density specified in table IV.

3.5.4.1 Compaction density. The compaction system shall be capable of compacting refuse to the density specified in table IV for each class of vehicle. This compaction density shall be considered normal service, such that in frequent compaction to this density, the stress levels required for long fatigue life of the vehicle are not exceeded.

MIL-T-2452J

3.5.4.2 Compaction cycle time. The compaction cycle time shall be not more than 45 seconds.

3.5.5 Rear dumping. The rear dump opening shall be full body width and height. The tailgate shall be hinged at the top and shall be provided with power operated means for swinging the tailgate and hopper away from the body to permit unobstructed dumping. A reinforced, full-body cross-section, hydraulically actuated ejection plate shall completely discharge all refuse through the rear opening of the body. The ejection plate design and construction shall operate throughout the length of the body without bypassing refuse.

3.5.6 Operating mechanisms. The mechanisms for emptying the hopper, compacting the refuse, elevating the tailgate, and discharging the refuse shall be hydraulically operated. The pump shall be a heavy duty, positive displacement type. Power to the pump shall be transmitted by a heavy duty, antifriction bearing type power takeoff through a heavy duty driveline. All mechanical operating mechanisms shall have an ultimate load capacity of not less than 2.0 times the maximum operating load.

3.5.6.1 Hydraulic system. Relief valves shall be provided in the hydraulic system to prevent excessive hydraulic pressure and shall be set to relieve hydraulic pressures in excess of that recommended by the manufacturer. A hydraulic T-fitting, or equivalent, for insertion of a pressure gage shall be provided in the line beyond the main relief valve to facilitate checking the line pressure. All circulating fluid shall pass through a full-flow hydraulic fluid filter. The filter element mesh shall be of a size to limit circulation of particles of 10-micronsize or larger. The filter shall be located so that it will not contribute to pump cavitation and shall be accessible for servicing. Hydraulic lines, hoses, and fittings shall meet or exceed the requirements of Recommended Practices and Standards contained in the SAE Handbook. A reservoir shall be provided with sufficient flow volume to maintain the fluid temperature below the recommended limits and shall incorporate an oil level indicator.

* 3.5.6.1.1 Hydraulic cylinders. All exposed hydraulic cylinders shall be fitted with seals to prevent entrance of dirt, moisture and other foreign elements and to prevent leakage of hydraulic fluid from the cylinders. Hydraulic ram piston rods shall be chrome-plated full length with sufficient thickness to withstand a 30-hour salt spray test in accordance with ASTM B-117. The connecting ends shall be treated in accordance with the best commercial practice.

MIL-T-2452J

3.5.6.1.2 Hydraulic fluid. Hydraulic fluid conforming to the manufacturer's standard or recommended requirements shall be provided in the hydraulic system. A permanent decal located near hydraulic system fill port, stating the type of hydraulic fluid required, shall be furnished.

* 3.5.6.2 Controls. Controls at the rear of the truck shall operate the mechanism to deliver refuse from the hopper and to compact the refuse. The controls shall be of the interrupted cycle or deadman type. The packing mechanism shall sufficiently cover the refuse during the compaction cycle to prevent debris from flying from the hopper opening. Controls for operating the rear dumping of the load shall be located behind the cab on the left hand side or front left hand corner of the body. The speed of the engine shall be controlled electrically by the operator for class A vehicles and shall be controlled automatically on all other vehicle classes for proper operation of the body hydraulic system. A neutral interlock shall be installed to prevent advancing the throttle from the tailgate or body controls unless the vehicle automatic transmission is in neutral.

3.5.7 Body accessories. A riding step and railing or grab handles shall be provided for loading personnel riding between loading points. The step or handles shall be located either on each side of the rear body or across the rear body. Steps shall be of open or raised pattern nonskid steel. Two waterproof signal switches (one on each side) shall be furnished and located at the rear of the body and connected to a buzzer in the cab.

3.5.8 Lubrication. All moving parts of the vehicle normally requiring lubrication shall be provided with a means for lubricating. Pressure grease fittings shall be of the hydraulic type with a surface check ball.

3.6 Servicing and adjusting. Prior to acceptance of the vehicle by the Government inspector, the contractor shall service and adjust each vehicle for operational use, including at least the following: alinement of lights; adjustment of the engine and brake systems; filling and charging of the battery; alinement of front wheels; inflation of all tires; complete lubrication of the chassis, engine, and running gear with grades of lubricants recommended for the ambient air temperature at the delivery point; servicing of the cooling system with a solution of ethylene glycol type antifreeze and water in equal parts by volume; and servicing of the windshield washer reservoir with water and appropriate additives.

MIL-T-2452J

3.7 Workmanship. Defective parts and assemblies which have been required or modified to overcome deficiencies shall not be furnished. All workmanship on the vehicle chassis-cab and on the body shall be in accordance with the highest standards of the chassis and body manufacturing industries.

3.7.1 Metal fabrication. Metal used in the fabrication of the vehicle shall be free of kinks and sharp bends. The straightening of material shall be done by methods that will not cause injury to the metal. Shearing and cutting shall be done neatly and accurately in accordance with the standards specified in 3.7. Corners shall be square and true. All bends of a major character shall be made in a manner to ensure uniformity of size and shape.

3.7.2 Bolted connections. Washers and lockwashers shall be provided and all bolts, nuts, and screws shall be tight. Bolt holes shall be accurately punched or drilled and shall be deburred.

3.7.3 Welding. The surfaces of parts to be welded shall be free of rust, paint, grease and other foreign matter. Welds shall transmit stress without permanent deformation or failure when the parts connected by the welds are subjected to proof and service loadings.

4. QUALITY ASSURANCE PROVISIONS

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

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

MIL-T-2452J

4.2 Government verification. Quality assurance operations performed by the contractor will be subject to Government verification at unscheduled intervals. Verification will consist of observation of the operations to determine that practices, methods and procedures of the contractor's inspection are being properly applied. Failure of the contractor to promptly correct product deficiencies discovered shall be cause for suspension of acceptance until correction has been made or until conformance of product to specification criteria has been demonstrated.

4.3 First production vehicle inspection. The first vehicle of each class produced under the contract shall be inspected by the contractor at his plant under the direction and in the presence of Government representatives. The purpose of the inspection shall be to determine vehicle conformance to the contract. Acceptance on the first production vehicle shall not constitute a waiver by the Government of its rights under the provisions of the contract.

* 4.3.1 Vehicle weight. The first production vehicle shall be weighed to determine curb weight and distribution of the curb weight on the front and rear axles. The total imposed loading on the front and rear axles shall be computed by the contractor and verified by the Government, using the curb weight, the operator weight at 175 pounds, and the payload required to provide the specified GVW. Calculated imposed loads on the front and rear axles shall be compared to the suspension, axle and tire load capacity ratings to determine if these components are of adequate capacity to meet contractual requirements.

4.3.3 Compaction unit. Compaction cycle time shall be measured to determine conformance to 3.5.4.2. When specified (see 6.2), the first production vehicle compaction unit shall be tested using refuse to assure complete functional operation of the cycle for delivering refuse from the hopper into the body, compacting the refuse and discharging the refuse.

4.3.4 Road test. The vehicle shall be driven for a distance of not less than ten miles over class I (concrete, asphalt, or brick) roads at maximum allowable traffic speed limits, but not less than 50 mph. The load shall be discharged and the vehicle returned to the contractor's plant.

4.3.5 Examination. When testing is completed, the vehicle shall be cleaned completely. The vehicle shall be examined for evidence of distortion, malfunction and damage. The contractor shall be responsible for correcting defects disclosed during the operation and for taking corrective action to prevent recurrence of such defects in subsequently furnished vehicle.

MIL-T-2452J

* 4.3.6 Body treatment and painting. A certification regarding body cleaning, treating, prime painting and salt spray resistance testing, as required by MIL-STD-1223, shall be made to Government representatives at the first production vehicle inspection.

4.3.7 Production sample. Upon acceptance of the first production vehicle, it shall remain at the manufacturing facility as a production sample, and shall be the last vehicle shipped on the contract. The contractor shall maintain the vehicle in a serviceable condition for the duration of the contract.

4.3.8 Failure. Failure of the first production vehicle to meet requirements of the contract shall be cause for the Government to refuse acceptance of all vehicles under contract until corrective action has been taken.

4.4 Inspection of production vehicles. The contractor's inspection system shall, as a minimum, assure that each vehicle conforms to the physical and dimensional requirements and is capable of meeting the performance requirements specified herein. For each vehicle under the contract, the contractor shall make available to the Government, at point of final acceptance, records acceptance to the Government indicating that the servicing and adjusting required in 3.6 have been accomplished.

5. PACKAGING

5.1 Vehicle processing. The vehicle shall be processed for shipment, from the manufacturer's plant to the initial receiving activity, in accordance with the manufacturer's standard commercial practice.

6. NOTES

6.1 Intended use. The vehicle is intended for general, nontactical use in loading, compacting, transporting and dumping miscellaneous refuse generated at military installations.

* 6.2 Ordering data. Acquisition documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Class of vehicle required (see 1.2).
- (c) Identification of appropriate service for painting and marking (see 3.1.1.1).

MIL-T-2452J

- (d) Rustproofing, if required (see 3.1.1.2).
- (e) Tropical rustproofing, if required (see 3.1.1.2).
- (f) Silicone brake fluid, if required (see 3.1.1.8).
- (g) Gasoline engine, if required (see 3.4.1.2).
- (h) Ten-quart oil filter, if required (see 3.4.1.3).
- (i) Power plant heaters, if required (see 3.4.1.8).
- (j) If battery heater is not required with power plant heaters (see 3.4.1.8).
- (k) Silicone rubber hoses, if required (see 3.4.1.9).
- (l) Diesel engine fuel and water separator, if required (see 3.4.3.3).
- (m) Spark arrester, if required (see 3.4.4).
- (n) Oil lubricated wheel bearings and axle spindles, if required (see 3.4.9).
- (o) Wide base tires and wheels, if required (see 3.4.10).
- (p) Disc type wheels, if required (3.4.10).
- (q) Bias ply tires, if required (see 3.4.10.1).
- (r) Brake controls for use from a towing vehicle, if required (see 3.4.11.3).
- (s) The manufacturer's standard or optional full width cab, if required (see 3.4.12).
- (t) Individual driver and passenger seats, if required (see 3.4.12).
- (u) Back-up alarm, if required (see 3.4.22).
- (v) Cycling of compaction unit with refuse, if required (see 4.3.3).

6.3 Performance prediction. SAE Truck Ability Prediction Procedure computations and computations for low speed and maximum geared speed will be required by the contract. The SAE Work Sheet Item 1 should include vehicle model number, engine model number and vehicle class. Unless other conditions are cited in the contract, computations should be made for normal atmospheric pressure, normal ambient air temperature, and still dry air. The factors to be used in predicting truck ability (see 3.3.1.1) are established as follows for the corresponding SAE Truck Ability Prediction Procedure Tables:

- Table 1 - Tire factor. This factor must relate to the size of tires furnished by the contractor in accordance with this specification.
- Table 2 - Altitude factor. 1.00
- Table 3 - Rolling factor. 1.613
- Table 4 - Area factor. 0.240
- Table 5 - Velocity factor. 250.0
- Table 6 - Altitude factor. 1.00

MIL-T-2452J

Table 7 - Chassis friction horsepower. Use applicable power unit GVW (to nearest, higher 1,000 pounds) and the engine rpm (to nearest 100 revolutions) which is required for 50 mph geared speed. For GVW and engine speed beyond the range of this table, factors shall be extrapolated.

Table 8 - Grade factor. 0.75

Table 8A- Correction factor. Not required.

Table 9 - Road factor. 0.0.

* 6.4 Subject term (key word) listing.

Compaction density

Hopper capacity

Rear hopper loading

Truck, commercial

Truck, nontactical

Truck, refuse collection.

6.5 Identification of changes. The margins of this specification are marked with asterisks (*) to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content regardless of the marginal notations and relationship to the last previous issue.

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Army - AT

Navy - YD

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