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INCH-POUND
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COMMERCIAL ITEM DESCRIPTION

AIRCRAFT LAVATORY SERVICE TRUCK

The General Services Administration has authorized the use of this Commercial Item Description as a replacement for MIL-T-38010 for all federal agencies.

1. SCOPE.

This document covers a commercial, diesel engine driven, chassis-mounted, aircraft lavatory service truck (LST). To service commercial aircraft and their military derivatives, the LST has an integral aerial work platform, hydraulic pumps, and stainless steel shroud, tanks, pumps, plumbing, and fittings. Specific aircrafts to be serviced by this unit include but are not limited to all models of the B-707, B-747, B-767, C-5, C-17, C-130, C-141, KC-10, KC-135, L-100, and E-3A airframes.

2. SALIENT CHARACTERISTICS.

2.1 LST description. The LST shall be constructed in accordance with the requirements of SAE ARP1247 "General Requirements for Aircraft Ground Support Equipment", SAIA A92.2, "Vehicle-Mounted Elevating and Rotating Aerial Devices," and this document. In the event of a conflict between either SAE ARP 1247 or SAIA A92.2, and the text of this document, this document shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations, unless specific exception has been obtained by the procuring agency. The LST shall be operable by a single person. It shall be maintainable with standard tools and built with parts supplied from commercial sources. The spraying unit shall be designed to have at minimum a service life of twelve years.

2.1.1 Modified commercial product. The LST as a minimum shall be the manufacturer's standard commercial product, which shall be modified as necessary to be in accordance with the requirements specified herein. Additional or better features that are not specifically prohibited

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by the specifications, but are part of the manufacturer's standard product, shall be included in the unit being furnished.

2.1.2 Components. The LST shall consist of the following major components:

Item or System Name	See Characteristic
Chassis	2.7
Shroud	2.9
Engine and Related Equipment	2.12
Transmission	2.13
Electrical Systems	2.14
Hydraulic System	2.17
Pumping Systems	2.18
Tanks	2.19
Hydraulic Lift & Work Platforms	2.20
Lighting	2.21

2.2 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. It 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.

2.2.1 Materials, protective coatings, and finish.

2.2.1.1 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. See 2.2.4.1 for prohibited hazardous materials.

2.2.1.2 Underside corrosion. The vehicle shall have environmental sealing of the underside and all joints for corrosion resistance to moisture and other corrosives. MIL-HDBK-808 shall be used as a reference.

2.2.1.3 Finish. Unless otherwise specified, the exterior finish color of the LST shall be gloss Forest Green, Color Number 14050 of FED-STD-595. All exposed surfaces shall be covered or finished using a coating that will be resistant to the effects of the chemicals used with the LST, as specified in 2.16.

2.2.1.4 Exclusion of water. The design of the LST shall be such as to prevent water leaking into, or being driven into, any part of the LST interior when either in an operating or travelling

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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 LST that could collect and retain water.

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

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

2.2.1.4.3 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 be sufficient to permit drainage of all fluids when the LST is on a 20 degree longitudinal slope facing both up and down and on an 11.5 degree side slope facing both directions. The minimum size of the drain holes shall be 0.25 inch.

2.2.1.4.4 Dissimilar metals. Dissimilar metals, as defined in MIL-STD-889, shall not be in contact with each other. Metal plating or metal spraying of metals of dissimilar base to provide electromotively compatible abutting surfaces shall be permitted. The use of dissimilar metals separated by suitable insulating material shall be permitted.

2.2.2 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 LST shall be stenciled on the unit within 1.0 inch of the calculated center of gravity.

2.2.3 Identification and information plates.

2.2.3.1 Identification plate. An identification plate in accordance with MIL-STD-130 shall be securely attached to the LST 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, and National Stock Number (NSN). The LST and any of its components for which the Government's unit cost is more than $5,000, is serially managed, or the procuring agency determines is mission essential, shall have Unique Identification (UID) (also known as Item Unique Identification (IUID)) information permanently affixed on or near the respective identification plate(s), marked in accordance with MIL-STD-130. UID information shall be included as both a bar code and human readable markings.

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2.2.3.2 Transportation data plate. A transportation data plate shall be securely attached to the LST in a readily accessible location. The plate shall contain at least the following information:

a. Side and rear silhouette views of the LST.

b. Horizontal and vertical location of the center of gravity of the LST 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.

2.2.4 Environment, Safety, and Occupational Health (ESOH).

2.2.4.1 Hazardous material. The design shall minimize and control hazards associated with the inclusion or use of hazardous or toxic materials and the generation of toxic or noxious gases. The LST shall not generate or use Class I or Class II Ozone Depleting Substances (ODS) during operation, maintenance, or disposal. The LST shall not contain or use hexavalent chromium. For the purposes of this requirement, the Class I ODS and controlled substances identified in Chapter 4 of AFI 32-7086 shall not be used in any system, component, or process.

2.2.4.2 Component protection. All space in which work is performed during operation, service, and maintenance shall be free of hazardous protrusions, sharp edges, or other features which may cause injury to personnel. All rotating and reciprocating parts and all parts subject to high operational temperatures or subject to being electrically energized, that are of such nature or so located as to be hazardous to personnel, shall be guarded or insulated to eliminate the hazard. All wires, cables, tubes, and hoses shall be supported and protected to minimize chafing and abrasion and shall be located so as 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.

2.2.4.3 Foreign object damage (FOD). All loose metal parts, such as pins or connector covers, shall be securely attached to the LST 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.

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

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2.2.6 Human systems integration. The LST shall be designed in accordance with MIL-STD-1472 for ease of operation, inspection, and maintenance, including the use of arctic mittens and Mission-Oriented Protective Posture (MOPP) Level 4 Chemical Warfare Gear. Chemical Warfare Gear is not required for preventive maintenance or major corrective maintenance.

2.2.7 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. Cotter pins, lock washers, or nylon patches shall not be used for this purpose, except for the attachment of trim item or as provided in commercial components. Tapped threads shall have a minimum thread engagement in accordance with Table I.

TABLE I. Minimum thread engagement.

Material	Minimum Thread Engagement
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

2.2.8 Welders and welding. All welders shall be certified to weld in accordance with AWS D1.1 and AWS D1.2, as applicable. The contractor shall make available to the Government certifications for all welders being utilized on the LST. Welding procedures and all welding on the LST shall be in accordance with AWS D1.1 and AWS D1.2, as applicable. 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.

2.3 Environmental conditions.

2.3.1 Operating temperature range. The LST shall be capable of operating in ambient temperatures ranging from -40° F to +125° F.

2.3.2 Storage temperature range. The LST shall be capable of being stored in ambient temperatures ranging from -60° F to +140° F.

2.3.3 Precipitation.

2.3.3.1 Rain. The LST shall be capable of storage and operation during rainfall of 5-inches per hour for three consecutive hours and 10-inches per hour for 10 consecutive minutes, with winds of up to 35 knots; and with 6-inches of rain per hour impinging on the LST at angles from vertical to 45° for 30 consecutive minutes.

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2.3.3.2 Snow. The LST shall be capable of storage and operation during accretion of wet snow up to 2-inches per hour for at least 12 hours.

2.3.3.3 Ice. The LST shall be capable of storage and operation with ice accretion up to 1.5-inches on exposed horizontal surfaces. An operator may use an ice scraper for five minutes during the start-up process.

2.3.4 Solar radiation. The LST shall not be adversely affected by full time exposure to solar radiation, such as those conditions encountered in desert environments.

2.3.5 Fungus. All materials used in the LST shall be fungus resistant or shall be suitably treated to resist fungus. Materials treated for fungus resistance shall retain their original electronic and physical properties, shall not present toxic hazards, and treatment shall last for the entire service life of the part. The LST shall be suitable for operation and storage in conditions encountered in a tropical environment.

2.3.6 Salt fog. The LST shall be capable of storage and operation in high temperature, high humidity, salt laden, sea coast environments without damage or deterioration of performance.

2.3.7 Sand and dust. The LST shall be capable of storage and operation during exposure to wind-blown sand or dust without damage or deterioration of performance.

2.4 Weight and dimensions. Overall dimensions in air transport configuration (see 2.5.2) shall not exceed Table II proportions:

Table II. Overall dimensions.

DIMENSION	PROPORTION
Length	310 inches
Width	100 inches
Height	92 inches

2.5 Transportability.

2.5.1 Surface transportability. The LST shall be transportable via all modes of surface shipment (highway, rail, and water) in accordance with MIL-STD-1366, and shall be capable of withstanding the mechanical shock and vibration characteristics of highway, rail, and water transport, except that design for rail impact testing (see 5.2.5 of MIL-STD-1366) is not required.

2.5.2 Air transportability. The LST shall be transportable on the C-5, C-17, and C-130 cargo aircraft in accordance with MIL-STD-1791. In all air transport configurations, the LST 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 LST shall be equipped with pressure relief devices or configured for air transport to prevent any part from

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becoming a projectile in the event of catastrophic loss of aircraft cabin pressure. The LST shall drive on and off the aircraft, negotiating the required maximum ramp angles without shoring.

2.5.2.1 Shoring. The LST shall be air transportable without shoring.

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

2.5.2.3 Tire pressure. Tire pressure shall not exceed 100 pounds per square inch (psi) and shall not be reduced for air transport.

2.5.2.4 Equipment removal and reconfiguration. Preparation for air transport shall take no more than 2 man-hours and restoration to operating configuration shall take no more than 1 hour for 2 persons using common hand tools (see 6.3.1). All equipment removed shall be stored on the LST; caps and plugs shall permit moving and storage in transport configuration.

2.5.3 Tie downs. The LST shall be symmetrically restrained during air and ground transport. Tie down points shall be rated at a minimum of 25,000 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 LST. The tie down provisions shall be in accordance with 4.1 through 4.12 of MIL-STD-209.

2.6 Maintainability. The LST shall be designed for maintainability in accordance with 5.9 through 5.9.18 of MIL-STD-1472; forces shall not exceed those specified for both males and females.

2.6.1 Preventive maintenance. The recommended preventive maintenance interval (PMI) shall be at least 200 operating hours, or 8 weeks, whichever occurs first. Daily preventive maintenance tasks shall not require more than 1 man-hour. Other important maintenance intervals include weekly, 250 hour/monthly, and seasonal maintenance checks. The weekly preventative maintenance tasks shall not require more than 2 man-hours and the 250 hour/monthly and seasonal preventative maintenance tasks shall not require more than 8 man-hours.

2.6.2 Inspection and servicing provisions.

a. Pre-use inspections and servicing tasks shall not require tools.

b. Drain plugs and filters shall be directly accessible from the ground and oriented to have unimpeded drainage to a catch pan.

c. The LST shall be designed with maximum usage of sealed lifetime lubrication bearings.

2.6.3 Special tools. The design of the item shall minimize the requirement for special tools (see 6.3.2). All special tools shall be provided with, and stored on, the LST.

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2.6.4 Diagnostic software. A copy of any diagnostic software required or recommended for maintaining the LST shall be provided with each LST on CD-ROM or DVD-ROM.

2.7 Chassis. A commercial truck chassis shall be provided and shall be of sufficient size and capacity to support the maximum carried load. The LST manufacturer shall modify the chassis to satisfy the requirements of this document.

2.8 Vehicle cab. The chassis shall include an enclosed, heated and air conditioned cab for the vehicle driver and a passenger. Standard truck cab equipment, such as heater/defroster, lights, electric wipers and washer, rear view mirrors, turn signals, et cetera, shall be provided. A storage box shall be provided to store tools, supplies, equipment, et cetera. Each seat shall be provided with a Type 2 seat belt assembly (that is, a 3-point restraint) in accordance with Code of Federal Regulations (CFR) 49 CFR 571.209.

2.9 Shroud. A single wall, welded, stainless steel shroud (body) shall house the major operational components.

2.10 Mobility.

2.10.1 Operating terrain. The LST shall be capable of being driven over paved roads at speeds up to 55 miles per hour (mph) and over graded gravel roads at speeds up to 20 mph.

2.10.2 Tires and wheels. The LST shall be equipped with single or dual tubeless steel belted radial tires with on/off-road type tread mounted on steel disc wheel assemblies. Tire and wheel assemblies shall be identical at all wheel positions. Tires and wheels shall be in accordance with the *Tire and Rim Association Year Book* requirements for this application.

2.11 Engine and related equipment. The LST unit shall be diesel engine driven. It shall be capable of satisfactory operation when using JP-8 conforming to MIL-DTL-83133 and ultra-low sulfur fuels.

2.11.1 Engine starting system.

2.11.1.1 Starter. The engine shall be equipped with a 12-volt DC electric starter.

2.11.1.2 Engine starting aids. The engine shall start within 15 seconds cranking in any ambient temperature within the required operating range of the LST. Internal engine starting aids, fluid starting aids, and heat from the winterization system (see 2.14.3) may be used prior to and during the start period to facilitate engine starting under the following conditions in Table III:

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TABLE III. Engine starting aids.

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

2.11.2 Engine air intake system. The engine air intake system shall be in accordance with 3.13.1.4.3 of SAE ARP1247. The inlet shall not draw air from directly beneath the LST and shall not be located near the cooling system air outlet nor the engine exhaust outlet. Joints shall be minimized between the air filter outlet and the actual engine air inlet and shall be designed to ensure no leakage of unfiltered air into the engine. A differential pressure air filter service indicator shall be provided.

2.11.3 Engine cooling system. The engine cooling system shall be in accordance with 3.13.1.4.2 of SAE ARP1247. Silicone radiator and heater hoses, constant-torque clamps, a coolant filter, and a coolant recovery system shall be provided. Engine coolant shall be in accordance with A-A-52624, Type I, and of adequate strength to provide protection to -40° F. The engine out (top of radiator) coolant temperature shall not exceed 210° F or the engine manufacturer's recommendations at 125° F. The coolant filter shall be rated for one year or 2,000 hours between replacements, with supplementary coolant additives (SCA) either included in the filter or added separately.

2.11.4 Engine lubrication system. The engine lubrication system shall be designed so that the LST can be operated on a 20 degree longitudinal slope facing both up and down and on an 11.5 degree side slope facing both directions.

2.11.4.1 Engine oil. The engine shall be compatible with Grade 15W40 of MIL-PRF-2104 from 0° F to 125° F. Oil pre-heat for operation below 0° F is allowed. The engine shall be compatible with arctic engine oil in accordance with MIL-PRF-46167 from -40 F to 60° F.

2.11.4.1.1 Engine oil operating temperature. The engine oil sump temperature shall not exceed 250° F or the engine manufacturer's recommendations at 125° F.

2.11.4.1.2 Engine oil consumption. The engine oil consumption shall not exceed 0.0035 pounds per brake horsepower-hour (lbs/bhp-hr) under any operating condition.

2.11.4.2 Engine oil filter. The engine oil filter shall be in accordance with 3.13.1.4.4 of SAE ARP1247.

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2.11.5 Exhaust system. The exhaust system shall be constructed of stainless steel. The muffler(s) shall be constructed of aluminized steel or stainless steel. Exhaust system outlet(s) shall be directed away from personnel accessing any control panel or equipment compartment and the engine air intake, and shall not be directed toward the ground.

2.11.6 Engine fuels and fuel system.

2.11.6.1 Engine operating fuels. The LST shall be capable of satisfactory operation when using JP-8 conforming to MIL-DTL-83133 and ultra-low sulfur fuels in ambient air temperatures from -40° F to 125° F.

2.11.6.2 Engine emergency fuels. The following shall be emergency fuels:

Jet A, Jet A1 in accordance with ASTM D1655, all ambient temperatures.

Note:
Jet A and Jet A1 may contain corrosion inhibitor/lubricity improver and icing inhibitors which shall result in properties equal to JP-8.

2.11.6.4 Fuel system. The fuel system shall be in accordance with 3.13.1.5.1 through 3.13.1.5.11 of SAE ARP1247 except as otherwise specified herein. The fuel system shall be constructed of materials which are compatible with the fuels listed in 2.12.6.1 and 2.12.6.2. Copper shall not be used in the fuel system. The fuel system shall be equipped with a fuel shut-off valve(s) to prevent continuous spillage when fuel lines are disconnected for service.

2.11.6.5 Fuel priming pump. The LST shall be equipped with an electric fuel pump in addition to the mechanical fuel pump. The electric pump shall be used as a priming pump capable of re-priming the engine fuel system following fuel exhaustion.

2.11.6.5.1 Fuel filters. Primary and secondary fuel filters and a heated fuel/water separator shall be provided. The fuel/water separator shall include a water coalescer and a drain valve that is readily accessible by an operator or a mechanic. A combination fuel filter and fuel/water separator may be provided. Fuel filter elements shall be easily replaceable by a mechanic using nothing more than common hand tools (see 6.3.1) without loss of engine prime.

2.11.6.5.2 Fuel tank. The fuel tank shall be in accordance with 3.13.1.5.5 through 3.13.1.5.9 of SAE ARP1247. The tank shall be designed so that the LST can be operated on a 20 degree longitudinal slope facing up and down and on an 11.5 degree side slope facing both directions. The tank shall be provided with corrosion protection and baffles. A 0.25- to 0.375-inch nominal drain valve shall be provided for emptying fuel and sediment into a container underneath the LST without removal of the tank or any other major component. The fuel tank shall have a fuel fill opening of not less than three inch inside diameter and shall be designed to drain fuel spillage overboard for collection outside the LST. The fuel cap shall be equipped with a retention device to prevent loss and FOD. The fuel fill opening, fuel cap, and fuel cap retention device shall be fabricated from non-sparking material.

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2.11.7 Engine diagnostic and emergency shutdown systems.

2.11.7.1 Engine diagnostic system. If the engine is equipped with an electronic control module, a diagnostic system shall be provided with a means to indicate engine faults; it shall be equipped with a CAN buss connector. If the LST is equipped with a diagnostic or built-in-test system, the engine diagnostic system shall be integrated with it; if not, it shall be a stand-alone system.

2.11.7.2 Engine emergency shutdown system. The engine shall be equipped with an engine emergency shutdown system consisting of a fuel cutoff solenoid activated by the following conditions:

a. Low oil pressure, less than 10 psi or in accordance with the engine manufacturer's recommendations.

b. Coolant over heat or cylinder head temperature over heat condition in accordance with the engine manufacturer's recommendations.

c. Engine over speed should the engine exceed 110% rated speed. This is required for engines over 100 bhp and optional for engines less than 100 bhp rated horsepower.

2.11.8 Engine operator instruments. The following instruments shall be provided to the engine operator:

a. Tachometer.

b. Coolant temperature gauge.

c. Low coolant level indicator.

d. Oil pressure gauge.

e. Oil temperature gauge.

f. Fuel level gauge.

g. Hour meter.

2.12 Transmission. The driveline shall include an automatic transmission.

2.13 Electrical system. The LST shall have a 12-volt, negative ground electrical system in accordance with 3.13.1.2 of SAE ARP1247 except as otherwise specified herein.

2.13.1 Alternator. A single or dual alternator charging system in accordance with 3.13.1.4.9 of SAE ARP1247 shall be provided. The alternator shall be capable of restoring the energy expended during an engine start in less than 15 minutes of engine idle at -40° F.

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2.13.2 Batteries and battery compartment.

2.13.2.1 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.

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

2.13.2.3 Battery cables. The battery cables shall be sized to handle the system voltage and current levels, be clearly identified with "+" and "-" or red and black markings, and shall not be spliced.

2.13.3 Winterization system. A winterization system may be provided for starting in temperatures to -40° F. The winterization system 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 a 120V/60Hzexternal power source utilizing the external electrical connections (see 2.14.4). The winterization system shall incorporate high-temperature shutoff switches to prevent overheating of any fluid or component.

2.13.4 Plugs and connectors. The winterization systems shall be powered from a 120V/60Hz covered, polarized, insulated, labeled, recessed, male, NEMA 5-15 and NEMA 6-15, AC auto-eject receptacle. It shall be located on the exterior of the vehicle, near the towbar. A 25 foot long power cable, with straight blade (non twist-lock) connectors, shall be provided.

2.14 Aircraft compatibility. The manufacturer shall ensure that all hose end-fittings and any other required aircraft interface hardware are compatible with lavatory fittings on all models of the B-707, B-747, B-767, C-5, C-17, C-130, C-141, KC-10, KC-135, L-100, E-3A, and other military and commercial aircraft. The unit shall be compatible with and shall include one Kaiser adapter P/N M2651-133-31, cage code 86831, or equivalent. Because of the low profile requirements of some aircraft, the connections to the lavatory waste removal and flush shall be lower than in commercial aircraft. The contractor shall ensure the unit, evacuation hoses, and pumps are located and sized to ensure the contents of the aircraft lavatory can be properly removed without additional assistance from the operator.

2.15 Chemical compatibility. The LST shall be designed to withstand the possible corrosive effects of potassium acetate, propylene glycol, and lavatory system cleaners and deodorizers.

2.16 Hydraulic system. The hydraulic system shall be in accordance with 3.13.1.3 of SAE ARP1247 except as otherwise specified herein. O-ring face seal hydraulic fittings may be used in lieu of flared fittings (see 3.13.1.3.12 of SAE ARP1247). Hydraulic fluid shall be in accordance with MIL-PRF-83282. All hydraulic system components, including the hydraulic tank, shall comply with all corrosion resistance requirements specified herein.

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2.17 Pumping Systems. Both the waste and flush pumps shall be hydraulically driven off the truck chassis engine. All components having wetted surfaces within the pumping system shall be of stainless steel construction; with the exception of the diaphragm pump which may be aluminum or stainless steel. Seals shall be fabricated of materials that will resist the corrosive effects of the various chemicals used within the LST, as specified in 2.16. Each pump shall have a nameplate clearly indicating horsepower, manufacturer, model number, and serial number as well as a control to turn the pumps on and off at users discretion.

2.17.1 Waste pump. The waste pump shall be of self-priming, diaphragm design. It shall be capable of purging aircraft lavatories at the volumetric flow rate of 80 gallons per minute. This pump shall be positioned as low as reasonable on the LST, to alleviate the operator's necessity to work any residual waste from the waste hose into the pump.

2.17.2 Flush pump. A centrifugal pump shall be provided to deliver either flush water or chemical rinse from their respective tanks into the aircraft lavatory from a single hose at the rate of 25 gallons per minute or greater. The pump shall be set to achieve 30 psi at the end of the hose and fitting. A means to bleed back flush water and chemical fluid through the hose back to the level of the originating tank shall be included. Pump suction capability shall be provided.

2.17.3 Control panel. A lighted pump control panel conveniently positioned for an operator standing near the rear of the truck shall be provided.

2.17.3.1 Flow meter. A fog-resistant flow meter to measure in US gallons the amount of flush water/chemical being flushed into the aircraft lavatory system shall be located on or near the pump control panel and shall be visible from the ground.

2.18 Tanks. Three stainless steel tanks shall be provided for: 1) lavatory waste; 2) lavatory flush water; and 3) chemical rinse. The lavatory waste tank shall have a minimum capacity of 300 US gallons and shall include funneling to aid in tank drainage. The lavatory waste tank shall have a connection for the flush hose to allow rinsing of residual waste from the waste tank. The flush water and chemical rinse tanks shall each have a minimum capacity of 100 US gallons. The three tanks may be fabricated together by compartmentalizing a single stainless steel unit. The tanks and stainless steel welded components shall be passivated.

2.18.1 Baffling. Adequate baffling shall be provided within tanks to prevent significant sloshing in either the longitudinal or lateral directions.

2.18.2 Drainage. All tanks shall have stainless steel bottom drains that are easily accessible. A four (4) inch waste tank dump valve shall be provided; its handle shall be readily accessible from the rear of the LST. The flush water and chemical rinse tanks shall be designed so that the entire contents of the tank can be drawn out using the flush pump.

2.18.3 Fill ports. Two (2) inch NPT tank fill openings shall be provided; they shall include means to assure that fluid overflow is drained and stored in a fill container and does not accumulate on LST surfaces or within compartments.

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2.18.4 Portable waste opening. The waste tank shall have an unobstructed opening of at least 12 inches in diameter that is funneled down to 4-inch diameter plumbing to allow for the dumping of waste buckets or portable urinals. The urinal waste tray shall be situated and designed in such a manner that it shall minimize splashing. The covered opening shall not have corners and shall be no higher than 36 inches in height from the ground.

2.18.5 Immersion heaters. The chemical and flush tanks shall be equipped with immersion heaters appropriately sized and constructed to prevent freezing over the operational temperature range as specified in 2.3.1.

2.18.6 Hoses. A four (4) inch waste hose and a one (1) inch flush hose shall be included. Each hose shall have some degree of transparency and shall be at least 20 feet in length. Both hoses shall be heavy-duty and the waste hose shall be spring-reinforced.

2.18.6.1 Waste hose brackets. Means to secure the waste hose to the truck shall be furnished, yet the hose shall be easily removed for operations. Means to vertically secure the free end of the hose to prevent unnecessary leakage shall be included.

2.18.6.2 Flush hose reel. A spring-retractable reel, along with a manual reel, for the flush hose shall be furnished within an accessible compartment. Four-way rollers shall guide hose to/from the compartment.

2.19 Hydraulic lift and work platforms. A hydraulic lift surmounted by a work platform shall be provided to allow personnel to service aircraft that may have connections beyond the reach of personnel working from the standard unit deck atop the truck. The lift platform shall be at least 30 inches by 52 inches in size. The lift shall provide a minimum working vertical height of 140 inches measured from the pavement level to the floor level of the work platform. The hydraulic lift and work platform shall be in accordance with SAIA A92.2. The weight capacity shall be a minimum of 500 pounds and shall not settle more than 2 inches.

2.19.1 Controls. Hydraulic lift and work platform controls shall be provided that are operable from either the platform or the ground control station. Emergency manual controls, operable from the platform, shall also be provided. The ground station controls shall be able to override the platform controls. All controls shall be weatherproof and shall be illuminated with non-glare lighting.

2.19.2 Working surfaces. The floor of the hydraulic lift work platform and all other surfaces where personnel are required to work, walk, or step shall be of drainable non-skid design having a minimum average slip resistance of 0.68 when measured on a wetted surface. Rails shall be provided on the lift work platform and any other working surfaces 42 inches in elevation, in accordance with SAIA A92.2.

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2.20 Lighting.

2.20.1 Floodlights. Exterior non-glare white lighting shall be provided for night operation. Lights shall be positioned to provide adequate working light at ladder(s), access step(s), and work area(s).

2.20.2 Flashing beacon. A yellow flashing beacon shall be conspicuously mounted on the unit for night operation.

2.20.3 Compartment lights. White lighting sufficient to provide an average minimum illumination of 1.0 foot-candle shall be provided in any compartment greater than 4.0 cubic feet and having an opening greater than 144 square inches. Where a shelf is provided, this illumination shall be provided both above and below the shelf. Lights shall automatically illuminate only when the respective doors are opened.

2.21 Rail. Unit shall include a top railing system so that items may be carried on top of the unit without falling off when traveling around the flightline.

2.22 Seat cover. The LST shall come with vinyl seats to protect the seat from soilage and allow for cleaning.

2.23 Sound levels. The design shall ensure that noise created by the LST is compatible with the environment and minimize exposure of personnel to noise hazards during operations and maintenance activities. The sound levels shall be less than 80dB at a distance of 15m from the centerline of the LST.

2.24 Workmanship. The LST, 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.

2.25.1 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.

2.25.2 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.

2.25.3 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.

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2.25.4 Cleaning. The LST 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.

3. REGULATORY REQUIREMENTS.

3.1 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.

3.2 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 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.

4. 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.

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

a. First production inspection (see 4.2).

b. Conformance inspection (see 4.3).

4.2 First production inspection. The first production LST shall be subjected to the analyses, demonstrations, examinations, and tests described in 4.5.1 through 4.5.13. The contractor shall provide or arrange for all test equipment and facilities. Except as otherwise specified, all testing in which the engine is operated shall be performed using JP-8 turbine fuel.

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4.3 Conformance inspection. Each production LST shall be subjected to the examination described in 4.5.1.

4.4 Inspection requirements.

4.4.1 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.

4.4.2 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.

e. Ambient humidity.

4.4.3 Test rejection criteria. Throughout all tests specified herein, the LST 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 or in the contractor's technical proposal.

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.

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h. Interference between the LST components or between the LST, 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:

(1) Engine cooling system.
(2) Engine lubrication system.
(3) Engine protective circuits.

4.5 Test methods.

4.5.1 Examination of product. Each LST shall be examined to verify compliance with the requirements herein prior to accomplishing any other demonstrations or tests listed in 4.5. 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 LST function shall be verified. Certifications and analyses shall be provided in accordance with Table IV. Each production LST shall be inspected to a Government-approved reduced version of the checklist.

TABLE IV. Certifications and analyses.

Paragraph	Required Certifications and Analyses
2.3.3.2 Snow.	Contractor analysis of the snow load requirement (see 4.5.4.3.2).
2.3.4 Solar radiation.	Contractor certification that the LST performance is not adversely affected by full time exposure to solar radiation, such as those conditions encountered in desert environments.
2.3.5 Fungus.	Contractor certification that the materials used in construction of the LST are fungus resistant or suitably treated to resist fungus.

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TABLE IV. Certifications and analyses – Continued.

Paragraph	Required Certifications and Analyses
2.5.1 Surface transportability.	Contractor surface transportability analysis (see 4.5.6.1.1) and certification that the LST is transportable via all modes of surface shipment (highway, rail, and water) in accordance with MIL-STD-1366, and shall be capable of withstanding the mechanical shock and vibration characteristics of highway, rail, and water transport.
2.5.2 Air transportability., 2.5.2.1 Shoring.	Contractor air transportability analysis (see 4.5.6.2).
2.5.3 Tie downs.	Contractor tie down provision analysis (see 4.5.6.4.1).
2.12 Engine and related equipment., 2.11.3 engine cooling system., 2.11.4 Engine lubrication system., 2.11.6.1 Engine operating fuels., and 2.11.6.2 Engine emergency fuels.	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.

4.5.2 Noise test. A first production LST shall be tested in accordance with SAE J366 to verify that the sound levels are in accordance with 2.25.

4.5.3 Electromagnetic interference test. A first production LST shall be tested in accordance with MIL-STD-461: RE 102 and RS 103 to demonstrate compliance with 2.2.5. Any engine fuel in accordance with 2.11.6.1 may be utilized.

4.5.4 Environmental testing.

4.5.4.1 High temperature storage and operation test. A first production LST shall be tested in accordance with MIL-STD-810, Method 501.6, Procedures I and II, to demonstrate compliance with the high temperature storage and operating requirements of 2.3.1. Test duration shall be one 24-hour cycle for each procedure beginning no less than two hours after test item temperature stabilization.

4.5.4.2 Low temperature storage and operation test. A first production LST shall be tested in accordance with MIL-STD-810, Method 502.6, Procedures I and II, to demonstrate compliance with the low temperature storage and operating requirements of 2.3.1, as well as the engine starting requirement of 2.11.1 and the alternator charging requirement of 2.14.1. Test duration

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shall be one 24-hour cycle for each procedure beginning no less than two hours after test item temperature stabilization.

4.5.4.3 Precipitation.

4.5.4.3.1 Rain test. A first production LST shall be tested in accordance with MIL-STD-810, Method 506.6, Procedure I, to demonstrate compliance with 2.3.3.1.

4.5.4.3.2 Snow load analysis. An engineering analysis shall be performed to demonstrate compliance with the snow load requirement of 2.3.3.2, using a specific gravity of snow of 0.1 (Ref. 5.3 of MIL-STD-810, Part Three).

4.5.4.3.3 Ice accretion test. A first production LST shall be tested in accordance with MIL-STD-810, Method 521.4 with an ice thickness of 1.5-inches to demonstrate compliance with the ice accretion requirement of 2.3.3.3. The contractor shall identify those areas of the LST where ice removal is required prior to operation.

4.5.4.4 Salt fog test. A first production LST shall be tested in accordance with MIL-STD-810, Method 509.6, to demonstrate compliance with 2.3.6. Test duration shall be alternating 24-hour periods of salt fog exposure and drying conditions for 24-hour periods (two wet and two dry).

4.5.4.5 Sand and dust test. A first production LST shall be tested in accordance with MIL-STD-810, Method 510.6, Procedures I (12 hours) and II (90 minutes per side), to demonstrate compliance with 2.3.7.

4.5.5 Weight and dimension tests.

4.5.5.1 Weight and center of gravity test. The weight, center of gravity, and axle weights of a first production LST shall be measured to demonstrate compliance with the weight requirement of 2.4 and the axle weight requirement of 2.5.2.2.

4.5.5.2 Dimension measurement. A first production LST shall be measured to demonstrate compliance with the dimensional requirements of 2.4.

4.5.6 Transportability verification.

4.5.6.1 Surface transportability verification.

4.5.6.1.1 Surface transportability analysis. An engineering analysis shall be performed to demonstrate compliance with 2.5.1. The engineering analysis shall utilize the data for road transportation in accordance with MIL-STD-810, Method 514.6, Table 514.6C-II.

4.5.6.2 Air transportability analysis. An engineering analysis shall be performed to demonstrate compliance with the air transportability requirements of 2.5.2 and 2.5.2.1. The analysis shall include the tie downs and all major components and their ability to withstand the accelerations

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specified in 2.5.2. The evaluation shall also include a dimensional analysis for the LST while traversing the ramp and while loaded aboard C-5, C-17, and C-130 cargo aircraft.

4.5.6.3 Equipment removal and reconfiguration demonstration. A first production LST shall be configured for transport on C-5, C-17, and C-130 cargo aircraft and then reconfigured for operation to demonstrate compliance with 2.5.2.4. It shall be demonstrated that the forces required do not exceed those allowed in MIL-STD-1472.

4.5.6.4 Tie down provision verification.

4.5.6.4.1 Tie down provision analysis. An engineering analysis shall be performed to demonstrate compliance with the tie down provision requirements of 2.5.3.

4.5.6.4.2 Tie down provision test. A first production LST shall be tested to demonstrate compliance with the tie down provision requirements of 2.5.3.

4.5.6.5 Lifting provision verification.

4.5.6.5.1 Lifting provision analysis. An engineering analysis shall be performed to demonstrate compliance with the lifting provision requirements of 2.5.4.

4.5.7 Maintainability demonstration. All recommended preventive maintenance tasks shall be performed and the task times shall be recorded. The recommended frequencies of the preventive maintenance tasks and the times recorded to accomplish the tasks shall be used to develop an expected value of preventive maintenance time per measure of use, such as calendar time or hours of operation. It shall be demonstrated that the forces required do not exceed those allowed in MIL-STD-1472. All preventive maintenance tasks recommended to be performed daily and at the routine PMI shall also be performed by personnel wearing arctic mittens.

4.5.8 Mobility tests. A first production LST shall be driven at least 35 miles on paved roads and at least 10 miles on graded gravel roads to demonstrate compliance with 2.10.1 and 2.10.2.

4.5.9 Hydraulic lift operation. The hydraulic lift and its controls shall be tested for various height adjustments within its operating parameters, as described in 2.19 and 2.19.1 of this document.

4.5.9.1 Hydraulic platform load test. The hydraulic lift platform shall be loaded with 500lbs and raised to its maximum operational height for at least 30 minutes to demonstrate compliance with stability requirements of 2.19.

4.5.10 Waste pump operation. The waste pump shall be tested to demonstrate compliance with 2.17 and 2.17.1.

4.5.11 Flush pump tests. The flush pump shall be tested to demonstrate compliance with 2.17 and 2.17.2.

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4.5.12 Welders and welding. Welds shall be inspected to ensure proper penetration and verified to be in strict accordance with the Visual Inspection criteria set forth in the AWS Codes. The inspection shall be performed by an AWS Certified Weld Inspector (CWI) during and after the construction of all Aircraft Staircases. Documentation of all inspections for the first production Aircraft Staircase shall be provided to the Government. The Government reserves the right to require verification inspection at any time during construction in accordance with 6.1.2.2 of AWS D1.1, 5.1.1 of AWS D1.2, and Non-specified Non-Destructive Test (NDT) other than Visual in accordance with 6.6.5 of AWS D1.1. All welding documentation for subsequent production units shall be made available to the Government at any time during the life of the contract pursuant to AWS D1.1 and D1.2.

4.5.13 Compatibility test. The LST shall be tested at an Air Force installation to ensure compatibility with the C-17.

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

6. NOTES.

6.1 Source of documents.

6.1.1 Department of Defense and Federal documents. Department of Defense and Federal documents, except for GOST 10227-86, are available online at http://assistdoc1.dla.mil/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia PA 19111-5094. A copy of GOST 10227-86 can be obtained from the Procuring Contracting Officer (PCO).

6.1.2 AFI. Copies of AFIs are available online at http://www.e-publishing.af.mil/.

6.1.3 FAR. The 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 http://farsite.hill.af.mil/.

6.1.4 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 the ASTM documents may be obtained from http://www.astm.org/.

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

6.1.6 NEMA documents. Application for copies should be addressed to NEMA, 1300 North 17th Street, Suite 1847, Rosslyn VA 22209. Electronic copies of the NEMA documents may be obtained from www.nema.org.

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6.1.7 SAIA documents. Application for copies should be addressed to Scaffold Industry Association, Inc., 400 Admiral Blvd., Kansa City, MO 64106. Electronic copies of the SAIA documents may be obtained from http://www.scaffold.org/.

6.1.8 TRA documents. Application for copies should be addressed to The Tire and Rim Association, Inc., 3200 West Market Street, Akron, OH 44313 or online at http://www.us-tra.org/ .

6.1.9 The Code of Federal Regulation (CFR) may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC, 20402 or online at http://www.gpo.gov/ .

6.2 Ordering data. Acquisition documents should specify the following:

a. Title, number, and date of this CID.

b. Finish color required if not Forest Green, Color Number 1405 of FED-STD-595) (see 2.2.1.3).

6.2.2 National Stock Number NSN. The following is a list of NSN's assigned that correspond to this CID. The list may not be indicative of all possible NSN's associated with this CID.

NSN	1730-00-981-7605

6.3 Definitions.

6.3.1 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.

6.3.2 Special tool. A tool that is not commercially and readily available from a source other than the LST contractor.

6.4 Key words.

Commode
Latrine
Potassium acetate
Propylene glycol

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