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* INCH-POUND *

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SUPERSEDING
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30 April 1986

FEDERAL SPECIFICATION

EXCAVATOR, MULTIPURPOSE, TRUCK MOUNTED, TWO CABS

This specification is approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE

1.1 Scope. This specification covers a truck mounted, two cab, two diesel engine, telescoping boom type multipurpose excavator.

1.2 Classification. The excavator shall be one of the following sizes and classes as specified (see 6.2):

Size 1 - Lifting capacity (with bucket) not less than 5,100 pounds (lb) at 15 foot (ft) radius, bucket at ground level, measured by SAE J1097

Size 2 - Lifting capacity (with bucket) not less than 6,650 lb at 15 ft radius, bucket at ground level, measured by SAE J1097

Class B - 6 by 4 (3 axles, rear tandem axle driven)

Class C - 6 by 6 (3 axles, rear tandem, all wheel drive)

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Beneficial comments (recommendations, additions, deletions) and any pertinent
*data which may be of use in improving this document should be addressed to: *
*Commanding Officer (Code 156), Naval Construction Battalion Center, *
*621 Pleasant Valley Road, Port Hueneme, CA 93043-4300, by using the *
*Standardization Document Improvement Proposal (DD Form 1426) appearing at *
*the end of this document or by letter. *
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FSC 3805

2. APPLICABLE DOCUMENTS

2.1 Government documents.

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

Federal Standard

FED-STD-297 - Rustproofing of Commercial (Nontactical) Vehicles

Military Standard

MIL-STD-1474 - Noise Limits for Military Material

Military Specification

MIL-C-3580 - Cranes and Crane-Shovels, Truck, Crawler, and Wheel Mounted, Full-Revolving, and Their Attachments, Packaging of

2.1.2 Other Government documents and publications. The following other Government documents and publications 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 Labor (DoL):
Occupational Safety and Health Administration (OSHA):

Occupational Safety and Health Standards

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

Department of Transportation (DoT):

Federal Motor Carrier Safety Regulations

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

Code of Federal Regulations (CFR):

Applicable portions as specified

Paragraph 1926.601

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

(Copies of specifications, standards, handbooks, publications, 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 activity.)

2.2 Other publications. The following document(s) 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 specified in the solicitation. Unless otherwise specified, the issues of the documents not listed in the DODISS shall be the issue of the nongovernment documents which is current on the date of the solicitation.

American Welding Society (AWS):

D14.3 - Welding Earthmoving and Construction Equipment

(Application for copies should be addressed to American Welding Society, 550 N. W. LeJeune Road, P.O. Box 351040, Miami, FL 33135.)

Power Crane and Shovel Association (PCSA):

Standard No. 5 - Mobile Hydraulic Excavator Standards, Applications for

(Application for copies should be addressed to the Power Crane and Shovel Association, Marina Plaza, Suite 1700, 111 E. Wisconsin Ave., Milwaukee, WI 53202-4879.)

Society of Automotive Engineers, Inc. (SAE):

SAE J88 - Sound Measurement - Earthmoving Machinery - Exterior
SAE J517 - Hydraulic Hose
SAE J534 - Lubrication Fittings
SAE J919 - Sound Measurement - Earthmoving Machinery - Operator - Singular Type
SAE J1097 - Hydraulic Excavator Lift Capacity Rating
SAE J1152 - Braking Performance - Rubber-Tired Construction Machines
SAE J1177 - Hydraulic Excavator Operator Controls
SAE J1193 - Nomenclature and Dimensions for Hydraulic Excavators

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

Tire and Rim Association, Inc. (TRA):

TRA Yearbook

(Application for copies should be addressed to the Tire and Rim Association, Inc., 175 Montrose West Avenue, Suite 150, Copley, OH 44321.)

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

2.3 Order of precedence. In the event of a conflict between the text of this 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 Description. The excavator shall consist essentially of a revolving upperstructure, operating with a bucket, ripper, or grading blade attached on the end of a telescopic boom, mounted on a pneumatic-tired truck type carrier. The revolving upperstructure shall consist of operator's cab, all operational controls, hydraulic system, and the telescopic boom. The diesel engine power unit, through the hydraulic system, shall provide motivation for all functions, except travel, with the travel function motivated by a separate diesel engine and mounted on the carrier.

3.2 First article. When specified (see 6.2), the contractor shall furnish an excavator of the classification specified for first article inspection and approval (see 4.2.1 and 6.3).

3.3 Standard commercial product. The excavator shall, as a minimum, be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this specification but which are a part of the manufacturer's standard commercial product, shall be included in the excavator being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs, or brochures, and represents the latest production model.

3.4 Materials. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this specification are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specified.

3.5 Identical items. All units of the same classification furnished under a specific contract shall be physically and mechanically identical. Parts, accessories, assemblies, and components are included in this requirement. Written approval for deviations must be obtained in advance from the contracting officer.

3.6 Interchangeability. All units of the same classification furnished with similar options under a specific contract shall be identical to the extent necessary to insure interchangeability of component parts, assemblies, accessories, and spare parts.

3.7 Safety. All rotating or reciprocating parts, and all parts subject to high operational temperatures, that are of such nature or are so located as to be or become a hazard to the operating or attending personnel, shall be substantially guarded or insulated to the extent necessary to eliminate the hazard. Walking or working surfaces and platforms shall be of an anti-skid type. Hand holds and/or steps shall be provided to allow safe entrance and exit from the operator's cab and the truck cab. The excavator shall meet current safety standards of OSHA and PCSA guidelines.

3.7.1 Noise. If the noise level in the area occupied by the operator or driver exceeds category D of MIL-STD-1474 (85 decibels (dB)(AT)), when tested in accordance with MIL-STD-1474, a caution plate shall be permanently posted on the excavator in a conspicuous protected location and shall be clearly visible and legible to all personnel exposed to the excessive noise levels. The caution plate shall read: CAUTION - HEARING PROTECTION REQUIRED. The plate shall have a yellow background with black lettering and plate shall be made of corrosion-resistant material. Exterior noise shall not exceed 88 dB (A) and be verified in accordance with SAE J88.

3.7.2 Electrical warning decal. An electrical warning decal shall be provided, in accordance with OSHA requirements, cautioning the operator or driver about operating the excavator near electric power lines.

3.7.3 Strike hazard. The back end of the revolving upperstructure, and the telescoping portion of the boom, shall be painted with black stripes to denote a hazard to personnel on the ground.

3.7.4 Backup alarm. The excavator shall be furnished with a reverse alarm signal meeting requirements of CFR, paragraph 1926.601.

3.7.5 Radioactive material. Radioactive material shall not be used in any form in this vehicle.

3.7.6 Asbestos. Asbestos material shall not be used in any form in this vehicle.

3.8 Environmental conditions. The excavator shall start and maintain constant performance characteristics as specified herein under any of the following conditions or combination of conditions:

a. Temperature conditions. In any ambient temperature from 110 degrees Fahrenheit (oF) to -20oF, except as specified in 3.8b below.
b. Elevation conditions. At any elevation from sea level (barometric pressure 29.92 inches mercury) and a maximum ambient temperature of 110oF to 5,000 ft (barometric pressure 24.89 inches mercury) and a temperature of 100oF.

3.9 Revolving upperstructure. The upperstructure shall consist essentially of a platform complete with operator's cab, machinery, telescoping boom and controls mounted on a revolving platform.

3.9.1 Cab. The cab shall be fabricated of sheet metal or sheet fiberglass and shall have sufficient windows and glazed doors to permit 270o vision for the operator. All glass shall be of the safety type, and shall be held in place by channels of rubber composition or other suitable weatherproof materials for easy replacement. The front window shall be arranged for easy opening or removal. Provision shall be made to fold or store the front window clear of the operator. Cab doors, whether of the sliding, folding, or swinging type, shall be adequately restrained from accidently opening or closing while the excavator is traveling or operating. A comfortable seat for the operator, with four-way adjustment within easy reach of the control levers and pedals shall be provided for maximum unobstructed visibility of the work by the operator without leaving the seat. When specified (see 6.2), the cab shall be provided with a fan type defroster and a diesel fired heater. The heater shall direct a steady flow of heated air to the operator's feet, and the defroster shall be capable of defrosting at least 75 percent of the window area. A large heater used for dual purpose as a heater and a defroster combination is permissible. The defroster and heater shall be mounted and positioned to permit routine maintenance and quick removal.

3.9.2 Swing stop device. A means capable of locking the upperstructure in any desired position shall be provided. The swing stop device control shall be either of the friction or dynamic operated type in accordance with PCSA Standard No. 5, with provisions made for easy adjustment, and shall be located within easy reach of the operator.

3.10 Operating controls. All functions shall be in accordance with SAE J1177 and controlled by the least possible quantity of hand levers and foot pedals necessary for efficient operation. The levers and pedals shall be conveniently located and arranged for easy access and operation by the operator while in a seated position and be in accordance with SAE J1177. All brakes shall be capable of being easily locked or unlocked. All marking and instructions shall be in the English language and/or international type symbols.

3.11 Hydraulic system and operation. The hydraulic system shall consist of oil reservoir, pumps, full flow filtering system, manifold, hydraulic pistons, overloading and pressure relief valves, piping, tubing, high pressure hoses and connections required to properly operate the excavator. All high pressure hydraulic hoses and fittings shall be capable of withstanding a bursting test pressure of four times the working pressure. High pressure hydraulic hoses shall have the physical qualities equal to or conforming to SAE J517, 100 R2, type A. Hydraulic oil shall be of the noncorrosive type with the characteristics to withstand a temperature range from -10oF to 220oF. All functions shall be controlled from the operator's position. The following functions shall be hydraulically operated and controlled:

a. Telescoping boom.
b. Rotation of bucket or boom.
c. Vertical control of boom.
d. Revolving of upperstructure.
e. Operation of attachments.

3.11.1 Hydraulic monitoring system. The excavator shall be furnished with a monitor system which will alert the operator, either by audio or visual lights, of problems which may damage hydraulic components, and as a minimum shall include excessively high oil temperatures and restricted oil flow.

3.12 Boom and attachments. The excavator shall be supplied with a rigid, telescoping boom with the following characteristics and capabilities when measured in accordance with SAE J1193 recommended practice.

a. Extended length (AU) not less than 21 ft for size 1 excavator, and not less than 24 ft for size 2 excavator.
b. Retracted length (AV) not more than 13 ft for size 1 excavator, and not more than 15 ft 8 inches for size 2 excavator.
c. Maximum digging depth (AB) not less than 15 ft (below ground level) for both size 1 and size 2 excavator.
d. Digging reach (AA) not less than 26 ft for size 1 excavator, and not less than 29 ft for size 2 excavator.
e. Dumping height (BD) not less than 15 ft for size 1 and size 2 excavator.
f. Digging through a range around the excavator not less than 270o.
g. Swing shall be continuous.
h. Boom or bucket rotation or tilt (AX) not less than 45o to right and left.
i. The boom telescoping action shall be supported by adjustable hardened steel rollers which shall provide full support for all vertical and horizontal forces applied to the boom during excavating and lifting operations.

The following excavating attachments shall be furnished as specified (see 6.2):

	Minimum capacity (struck) (cubic yard)
j. Size 1 excavator:	
Bucket, excavating, 24-inch cutting width.	3/8
Bucket, ditch cleaning, 60-inch width.	1/2
Bucket, excavating, 30-inch width.	1/2
Bucket, sidewalk removal, 30-inch minimum width.	
Blade, grading, 8-ft width, with straight edge.	
Boom extension, not less than 4 ft, complete with necessary control gear.	
k. Size 2 excavator:	
Bucket, excavating, 24 inch.	3/8
Bucket, excavating, 36 inch.	1/2
Bucket, dredging, 72 inch.	3/4
Bucket, ditching, cleaning, 60 inch.	5/8
Bucket, concrete pouring.	1/2
Bucket, pavement removal, not less than 40 inch.	
Ripper, single tooth, heavy duty.	
Blade, grading, 8-ft width, with straight edge.	

Boom extension, not less than 4 ft, complete with necessary control gear.
Boom extension, not less than 6 ft, complete with necessary control gear.

The above listed attachments shall fit and operate on the excavator and shall be replaceable without the use of special tools.

3.13 Lifting capacity and tipping load. Lift capacities shall be calculated and in compliance with SAE J1097. Loads shall not exceed 87 percent of hydraulic lifting capacity or 75 percent of tipping capacity. A load chart for the entry digging range must be shown. The excavator lifting capacity shall be measured at ground level and at 15 ft radius from centerline of rotation (without bucket). When outriggers are specified (see 3.15), the (*) lift capacity shall apply as follows:

	Without outriggers	Size 1 - Not less than 5,100 lb.
	Without outriggers	Size 2 - Not less than 6,650 lb.
*	With outriggers	Size 1 - Not less than 6,700 lb.
*	With outriggers	Size 2 - Not less than 9,100 lb.

3.14 Carrier. The carrier for the excavator shall be a heavy framed, 3-axle supported, pneumatic, rubber-tired type having the characteristics of a heavy-duty motor truck, including fenders for front wheels, upon which is mounted a revolving upperstructure. Unless otherwise specified (see 6.2), wheels on all axles shall be disk type. The revolving upperstructure shall be positioned on the carrier. The carrier shall be of the manufacturer's current production model. The engine and cab assembly shall be located over, or forward of, the front axle. When specified (see 6.2), the carrier cab shall be provided with a fan type defroster and a heater. When specified (see 6.2), controls, located in the excavator's cab, shall be provided to permit the excavator operator to operate the carrier brakes, steering, and the movement of the carrier in the forward and reverse directions. The drive train gear ratio shall allow the excavator to operate in the lowest gear forward or reverse at maximum engine governed revolutions per minute at not more than 10 miles per hour (mph). Such controls shall not interfere with the operation of the conventional carrier controls.

3.14.1 Drive axles. The drive axles shall be the conventional gear reduction type, driven by the carrier engine and transmission(s). The class B type shall consist of a rear tandem axle, dual drive assembly. The class C type shall include a rear tandem axle, dual drive assembly and a driven front steering axle assembly. As a minimum, one rear drive axle assembly shall be furnished with an increased traction type differential.

3.14.2 Speed. The excavator shall have not less than five forward speeds and one reverse speed, and shall be capable of traveling on level pavement at a maximum speed in high gear of not less than 40 mph.

3.14.3 Gradeability. The excavator shall be capable of negotiating a one percent grade in the fourth gear and 30 percent grade in the lowest gear.

3.14.4 Classes B and C. Rear driving wheels shall be mounted on tandem axles. Bogies shall be complete with axles, suspension and all other necessary parts. The bogie shall be provided with means permitting differential action between the axles, and a manually or automatically controlled lockout assuring equal power to each rear axle, and be designed to permit the wheels on either axle of the fully equipped and loaded excavator to mount an obstacle 6 inches high with the remaining bogie wheels still contacting the ground and maintaining traction. With blocks 6 inches high under diagonally opposite bogie wheels, distortion shall not cause interference between members or permanent deformation. Stops shall be provided at the maximum limits of motion to prevent damage to any components.

3.14.5 Boom rack. A suitable boom rack shall be provided for stabilizing the boom when in the travel position. The boom shall be rigidly secured to prevent swinging and striking the carrier cab. Horizontal but not vertical oscillation shall be held to a minimum.

3.15 Outriggers. When specified (see 6.2), outriggers, consisting of beams or stabilizers attached to the chassis frame, shall be provided. The outriggers shall be hydraulically powered, locally operated or operated from the revolving upperstructure cab, and shall be capable of being set or retracted independently or simultaneously. The total setting time and the total retractive time of the outriggers in a normal setting position on level ground shall not exceed 1 minute. Outrigger beams shall have sufficient strength to accept full stability loading conditions, and shall be equipped with floats attached in a manner that will provide for full retraction within the carrier width. Outriggers shall be capable of being adjusted at least 4 inches below ground level and 3 inches above ground level to compensate for uneven terrain. A device to accurately determine when the excavator is level shall be provided.

3.16 Brakes. Brake shall be in accordance with SAE J1152.

3.16.1 Service brakes. The excavator shall be provided with service brakes. The service brakes shall stop the excavator in accordance with SAE J1152 recommended practice.

3.16.2 Parking brake. The excavator shall be provided with a parking brake. Control of the parking brake shall be independent of the service brakes. The parking brake shall hold the excavator in accordance with SAE J1152 recommended practice.

3.17 Steering. The carrier shall be equipped with power steering.

3.18 Lighting. The excavator shall be equipped with two recessed sealed beam headlights, two dual stop and taillights, instrument panel light, and directional turn signals. When specified (see 6.2), dual floodlights shall be provided. All lighting shall be in accordance with applicable DoT Federal Motor Carrier Safety Regulations.

3.19 Engines. The excavator engines shall be commercial model diesel type having horsepower, torque, and speed characteristics to meet satisfactorily all the excavator performance requirements specified herein. The diesel engines shall start within 5 minutes and be ready for full load operation within 15 minutes in any ambient temperature from 110oF to -20oF. The engines shall be

equipped with an hour meter, tachometer, cooling liquid temperature indicator, thermostat, lubricating oil pressure indicator, liquid fuel gage, a fuel tank with sufficient capacity for 8 hours normal operation, and all the necessary accessories for efficient operation and control.

3 19.1 Cold starting system. Each excavator diesel engine shall be equipped with an engine priming system or glow plug type for cold temperature engine starting. When an ether priming system is furnished, it shall be of the measured shot type with a reservoir of not less than 12 fluid ounces, and shall be furnished for each engine.

3.20 Tires. Tires shall be of the tube or tubeless type, of high commercial quality, and shall have individual rated load-carrying capacities equal to the maximum individual tire loading imposed by the operation in accordance with TRA recommendations. Tires shall have nondirectional traction type tread.

3.21 Toolbox. The excavator shall be equipped with a metal toolbox. The toolbox shall have a hinged lid with a padlock closing device less lock and key. The toolbox shall be securely fastened to the excavator in a readily accessible and protected position.

3.22 Fire extinguisher. When specified (see 6.2), a fire extinguisher shall be provided and shall be as specified.

3.23 Instruction plates. The excavator shall be equipped with instruction plates suitably located, describing any special or important procedures to be followed in operating and servicing the equipment. Plates shall be of a material which will last and remain legible for the life of the equipment. Plates shall be securely affixed to the equipment with nonferrous screws or bolts of not less than 1/8-inch diameter. All instructions shall be in the English language.

3.24 Identification plate. An identification plate will be furnished by the contracting officer for each excavator (see 6.2). The contractor shall stamp all necessary data in the blank spaces of the plate provided for that purpose, and securely affix a plate to each excavator in a conspicuous place with nonferrous screws, rivets, or bolts not less than 1/8-inch in diameter. The applicable nomenclature contained in the contract item description shall be placed in the top blank. All attachments shall be permanently marked with the I.D. or USN number of excavator furnished.

3.25 Cleaning, treatment, and painting. Surfaces normally painted in good commercial practice shall be cleaned, treated, and painted as specified herein. The color of the finish coat shall be as specified (see 6.2). Surfaces to be painted shall be cleaned and dried to insure that they are free from contaminants such as oil, grease, welding slag and spatter, loose mill scale, water, dirt, corrosion product, or any other contaminating substances. As soon as practicable after cleaning, and before any corrosion product or other contamination can result, the surfaces shall be prepared or treated to insure the adhesion of the coating system. The painting shall consist of at least one coat of primer and one finish coat. The primer shall be applied to a clean, dry surface as soon as practicable after cleaning and treating. Painting shall be with manufacturer’s current materials according to manufacturer’s current

processes and the total dry film thickness shall be not less than 2.5 mils over the entire surface. The paint shall be free from runs, sags, orange peel, or other defects.

3.26 Lubrication. Means for lubrication shall be in accordance with the manufacturer's standard practice. The lubricating points shall be easily visible and accessible. Hydraulic lubrication fittings shall be in accordance with SAE J534. Where use of high-pressure lubricating equipment, 1,000 pound-force per square inch or higher, will damage grease seals or other parts, a suitable warning shall be affixed to the equipment in a conspicuous location. The unit shall be lubricated prior to delivery with type of lubricant specified in the operator's manual and grade of lubricant recommended for ambient temperature at the delivery point. The unit shall be conspicuously tagged to identify the lubricants and their temperature range.

3.27 Servicing and adjusting. Prior to acceptance of the excavator by the Government, the contractor shall service and adjust the excavator for immediate operational use as required in the operator's manual. The servicing and adjusting shall include at least the following:

a. Inflation of all tires.
b. Adjustment of brakes.
c. Proper functioning of all lighting and electrical systems.
d. Wheel alignment.
e. Adjustment of engine to include tune-up.
f. Complete lubrication with grades of lubricants recommended for ambient temperature at the delivery point.
g. Cooling system filled to capacity with a clean solution of equal parts by volume of water and antifreeze (ethylene glycol).

The excavator shall be conspicuously tagged to identify the lubricants and their temperature range.

3.28 Workmanship.

3.28.1 Steel fabrication. The steel used in fabrication shall be free from kinks, sharp bends, and other conditions which would be deleterious to the finished product. Manufacturing processes shall not reduce the strength of the steel to a value less than intended by the design. Manufacturing processes shall be done neatly and accurately. All bends shall be made by controlled means to insure uniformity of size and shape.

3.28.2 Welding. Welding procedures shall be in accordance with AWS D14.3. The surface of parts to be welded shall be free from rust, scale, paint, grease, or other foreign matter. Welds shall be of sufficient size and shape to develop the full strength of the parts connected by the welds. Welds shall transmit stress without permanent deformation or failure when the parts connected by the weld are subjected to proof and service loadings.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified

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

4.1.1 Component and material inspection. Components and materials shall be inspected in accordance with all the requirements specified herein and in applicable referenced documents.

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

a. First article inspection (see 4.2.1).
b. Quality conformance inspection (see 4.2.2).

4.2.1 First article inspection. The first article inspection shall be performed on one excavator of the classification specified when a first article is required (see 3.2 and 6.2). This inspection shall include the examination of 4.3, the tests of 4.4, and, when specified, the preproduction pack inspection of 4.6 (see 4.6 and 6.2). The first article may be either a first production item or a standard production item from the supplier's current inventory provided the item meets the requirements of the specification and is representative of the design, construction, and manufacturing technique applicable to the remaining items to be furnished under the contract.

4.2.2 Quality conformance inspection. The quality conformance inspection shall include the examination of 4.3, the tests of 4.5, and the packaging inspection of 4.6. This inspection shall be performed on the samples selected in accordance with 4.3.

4.3 Examination. Each excavator shall be examined for compliance with the requirements specified in section 3 of this specification. Any redesign or modification of the contractor's standard product to comply with specified requirements, or any necessary redesign or modification following failure to meet specified requirements shall receive particular attention for adequacy and suitability. This element of inspection shall encompass all visual examinations and dimensional measurements. Noncompliance with any specified requirements or presence of one or more defects preventing or lessening maximum efficiency shall constitute cause for rejection.

4.4 First article tests. The first article shall be subjected to the tests specified in 4.4.1 through 4.4.7. Failure to pass any phase of these tests shall be cause for rejection.

4.4.1 Road test. The excavator shall be driven on a smooth, hard surfaced road at maximum speed for at least 30 minutes to verify conformance to the requirements specified in 3.14.2. Excavator shall be checked for performance and handling ability.

4.4.2 Service brakes test. The service brakes of the excavator shall be tested to verify conformance to 3.16 and 3.16.1. Failure of test to show full conformance shall reject the first article.

4.4.3 Parking brake test. The parking brake of the excavator shall be tested to verify conformance to 3.16 and 3.16.2. Failure of test to show full conformance shall reject the first article.

4.4.4 Hydraulic system test. The engine(s) and all operating components shall be given a warmup operation for a continuous period of not less than 30 minutes, during which all of the functions enumerated in 3.11 shall be checked to ascertain the reliability of the hydraulic system.

4.4.5 Operational tests with accessories. The excavator, together with bucket, located in rough terrain, shall be tested under full load conditions to ascertain compliance with the requirements of 3.12. During these tests, observance shall be made to ascertain any instability, improper functions, leakages, and overloading in the hydraulic system of the excavator. Each accessory furnished under the contract shall be assembled on the boom and operated throughout its functional range under full load simulating intended service conditions. Any failure of components or distortion of parts shall be cause for rejection. The first accessory shall be tested for 2 hours; all other accessories shall be tested for 30 minutes each.

4.4.6 Lifting capacity and load stability tests. Load stability tests shall be conducted on the excavator in accordance with SAE J1097. The balance point capacity in the least stable direction shall be determined at each radius specified in 3.13. Balance point capacities shall be determined without outriggers. Rated lifting capacities shall be determined by multiplying the balance capacities, at maximum and minimum boom lengths, by 75 percent to determine conformance to 3.13.

4.4.7 Noise level tests. Operator noise level shall be verified for conformance to 3.7.1 by testing in accordance with SAE J919. Exterior noise level shall be verified for conformance to 3.7.1 by testing in accordance with SAE J88.

4.4.8 Production sample. Upon acceptance of the first article, the first article shall remain at the manufacturing facility as a production sample, and shall be the last excavator delivered on the contract. The first article shall be reconditioned prior to delivery, including replacement of abnormally worn parts and paint touch-up or repainting, to enable it to be accepted as a contract item. The contractor shall maintain the first article in a serviceable condition for the duration of the contract.

4.5 Production unit operational test. Each excavator produced in fulfillment of a contract or order shall be completely assembled, adjusted, lubricated, and otherwise serviced for operation. The engines shall be started and subjected to a warmup period as recommended by the manufacturer. The excavator shall be given a run-in test and all controls operated a sufficient number of times to ascertain that all components and mechanisms actuated by the controls operate promptly, fully, and without restriction or malfunction. Failure to pass any phase of this test shall be cause for rejection.

4.6 Packaging inspection. The inspection of the preservation, packing, and marking shall be in accordance with the requirements of section 4 of MIL-C-3580. When specified (see 6.2), a preproduction pack shall be furnished for examination and test.

5. PACKAGING

5.1 Preservation, packing, and marking. Preservation, packing, and marking shall be in accordance with the requirements of MIL-C-3580 with the level of preservation and the level of packing as specified (see 6.2).

6. NOTES

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

6.1 Intended use. The excavator is intended for use in digging, moving, or loading loose gravel, sand, or soil.

6.2 Ordering data. Acquisition documents should specify the following:

a. Title, number, and date of this specification
b. Size and class of excavator required (see 1.2)
c. When a first article is required for inspection and approval (see 3.2, 4.2.1, and 6.3)
d. When defroster and heater for revolving upperstructure cab are required (see 3.9.1)
e. List of attachments required for each size of excavator (see 3.12)
f. When other than disk type wheels are required (see 3.14)
g. When remote truck control is required (see 3.14)
h. When defroster and diesel fired heater for carrier cab is required (see 3.14)
i. When outriggers are required (see 3.15)
j. When floodlights are required (see 3.18)
k. When fire extinguisher is required and the type and size thereof (see 3.22)
l. When identification plates will be furnished by the contracting officer (see 3.24)
m. When color of finish coat is specified (see 3.25)
n. When a preproduction pack is required (see 4.2.1 and 4.6)
o. Level of preservation and level of packing required (see 5.1)

6.3 First article. When a first article inspection is required, the item will be tested and should be a first production item or it may be a standard production item from the contractor's current inventory as specified in 4.2.1. The first article should consist of one complete excavator or it may be a standard production item from the contractor's current inventory as specified in 4.2.1. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examination, test, and approval of the first article.

6.4 Supersession data. This specification replaces military specification MIL-E-22901F dated 30 April 1986.

6.5 Classification cross reference. Classifications used in this specification (see 1.2) are identical to those found in the superseded military specification, MIL-E-22901F.

MILITARY INTERESTS:

Custodians

Army - AT
Navy - YD
Air Force - 99

Review Activity

Air Force - 84
DLA - CS

User Activity

Navy - MC

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - FSS

PREPARING ACTIVITY:

Navy - YD

(Project 3805-0148)

Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein.