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KKK-E-2810
March 8, 1993
SUPERSEDING
MIL-E-29249
21 November 1986

FEDERAL SPECIFICATION

EXCAVATOR, MULTIPURPOSE, WHEEL-UNDERCARRIAGE DIESEL-ENGINE-DRIVEN

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 hydraulic powered excavator, consisting of two axle undercarriage, revolving upperstructure, diesel engine, and a hoe-type boom.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

Federal Specification

W-B-131 - Battery, Storage: Vehicular, Ignition, Lighting and Starting

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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. *

FSC 3805

Military Specifications

MIL-P-514 - Plate - Identification Data
MIL-C-3580 - Cranes and Crane-Shovels, Truck, Crawler, and Wheel Mounted, Full-Revolving, and Their Attachments, Packaging of

Military Standard

MIL-STD-209 - Slinging and Tiedown Provisions for Lifting and Tying Down Military Equipment

2.1.2 Other Government documents. The following Government document forms a part of this specification to the extent specified herein. Unless otherwise specified, the issue shall be that 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.)

(Copies of specifications, standards, and other Government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting 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 non-Government documents which is current on the date of the solicitation.

Power Crane and Shovel Association (PCSA):

PCSA Standard No. 5 - Mobile Hydraulic Excavator Standards

(Application for copies should be addressed to the Power Crane and Shovel Association, Marina Plaza, Suite 1700, 111 E. Wisconsin Avenue, 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 Calculation and Test Procedure
SAE J1152 - Braking Performance Rubber-Tired Construction Machines

SAE J1166 - Sound Measurement - Off-Road Self-Propelled Work Machines Operator-Work Cycle
SAE J1177 - Hydraulic Excavator Operator Controls
SAE J1179 - Hydraulic Excavator and Backhoe Digging Forces
SAE J1193 - Nomenclature and Dimensions for Hydraulic Excavators
SAE J1362 - Graphical Symbols for Operator Controls and Displays on Off-Road Self-Propelled Work Machines

(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, Copley, OH 44321.)

(Non-Government 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 a bucket or a powered/non-powered attachment as required, attached to the end of a hoe-type boom assembly. The revolving upperstructure shall consist of an operator's cab, all operational controls, hydraulic system, and the boom assembly. The diesel engine shall power the hydraulic system and provide motivation for all functions including travel function. All nomenclature and dimensions referenced throughout this specification shall be in conformance with SAE J1193.

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

3.3 Standard commercial product. The equipment offered shall be in accordance with the requirements of this specification and shall be the manufacturer's standard commercial product, and shall have been marketed and in commercial field use for at least one year prior to date of bid opening. Product improvements are acceptable. When specific requirements are not stated herein, all items listed as standard equipment in the contractor's published specification brochures and catalogs, or normally furnished to commercial customers as standard equipment, shall be furnished. The item shall be equipped with optional equipment as specified herein. Optional equipment is defined as equipment not standard with the item, but which has been furnished to

the commercial customer for the purpose intended, such as special features or allied equipment. The item shall be equipped with all components necessary to enable it to function reliably and efficiently in sustained operation. The item shall conform to all applicable federal laws and regulations governing safety and pollution which are in effect for this type of equipment at the time of manufacture. Upon the request of the contracting officer, the offerer/contractor shall provide sales data verifying that the basic configuration offered under this solicitation has been sold on the commercial market and meets the definition set forth in FAR 11.001 for a commercial-type product. In addition, the contracting officer may require submission of published specifications in order to verify conformance of equipment to the specification requirements of this solicitation.

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 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.

3.6 Maintainability. The excavator shall be designed so that the components are readily accessible for repair or replacement with minimum removal or disturbance of adjacent parts or components, using general-purpose tools. Operating parts, accessories, and drain outlets shall be readily accessible for regular maintenance service.

3.7 Safety. All rotating or reciprocating parts, and all parts subject to high operational temperatures, that are of such nature or 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.

3.7.1 Noise. If the noise level in the area occupied by the operator exceeds 85 decibels (dB), in any operational mode of windows(s) and door(s) open or closed, 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 excessive noise levels. The levels of noise shall be measured in conformance with SAE J919, and SAE J1166, as applicable in transport and excavation modes. 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, in accordance with OSHA requirements, cautioning the operator about operating the excavator near electric power lines, shall be provided.

3.7.3 Strike hazard. When specified (see 6.2), the rear surfaces of the excavator shall be alternating diagonal stripes, black in color, not less than 18 inches in height from lower edge of upperstructure, alternating in equal widths on base color across rear of upperstructure and lapping around each rear corner and forward not less than 1-foot distance along each side.

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 -20 degrees Fahrenheit (oF) to 110oF, 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 feet (ft) (barometric pressure 24.89 inches mercury) and a temperature of 100oF.

3.9 Upperstructure. The upperstructure shall consist essentially of a platform complete with operator’s cab, boom assembly, hydraulic assembly, turntable, 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 200o horizontal and 90o vertical vision, when measured from top rear area of the operator’s seat. Visual access from the operator’s position to ground level, shall be not more than 5 feet forward of the tires. 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. Cab door(s), whether of the sliding or swinging type, shall be adequately restrained from accidentally opening or closing while the excavator is traveling or operating. A comfortable seat for the operator shall be provided. 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 high capacity 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 lock mechanism. A means capable of restraining the upperstructure in any desired position, with respect to the undercarriage, shall be provided. The swing lock or brake mechanism shall be in accordance with PCSA Standard No. 5, and shall be located within easy reach of the operator.

3.10 Operating controls. All functions shall be in accordance with SAE J1177, and shall be 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 in accordance with SAE J1177. All brakes shall be capable of being easily locked or unlocked. All operating controls shall be identified in accordance with SAE J1362 recommended practice.

3.11 Hydraulic system and operation. The hydraulic system shall consist of oil reservoir, pumps, full flow filtering system, manifold, hydraulic cylinders, oil temperature monitoring devices, overloading and pressure relief valves, piping, tubing, high pressure hoses and connections required to properly operate the excavator. 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. Hydraulic oil shall be of the noncorrosive type with the characteristics to withstand a temperature range from -20oF to 220oF. All functions shall be controlled from the operator's position. The following minimum functions shall be hydraulically operated and controlled:

a. Boom and bucket operation.
b. Revolving of upperstructure.
c. Operation of optional attachments and accessories (see 3.12).
d. Hydrostatic drive function (see 3.14.1).

3.12 Boom and attachments. The excavator shall be supplied with a hoe-type boom with the following characteristics and capabilities, when measured in accordance with SAE J1193 and SAE J1179 recommended practice.

a. Maximum radius at ground line (AA) not less than 30 ft.
b. Maximum digging depth, 8 ft flat floor (AB) not less than 18 ft.
c. Dumping height (BD) not less than 15 ft.
d. Swing shall be continuous.
e. Digging through a continuous range around the excavator not less than 360o.
f. Bucket digging force not less than 22,000 pounds (lb).
g. Rated arm force not less than 15,500 lb.

The following excavating attachments and accessories shall be furnished when specified (see 6.2). All dimensions are nominal, within 2 inches total, capacity nominal within 10 percent.

		Minimum Capacity (cubic yard)
h.	Bucket, excavating, 24-inch cutting width	0.56 cubic yard
i.	Bucket, excavating, 36-inch cutting width	0.88 cubic yard
j.	Bucket, excavating, 48-inch cutting width	1.00 cubic yard

k. Hydraulic impact hammer. The excavator shall be equipped with a hydraulic impact hammer which shall be capable of operating from the excavator's hydraulic system. The hammer and excavator shall be equipped with a quick disconnect system to allow rapid hookup or removal of the hammer. The necessary pins, bolts, etc., shall be furnished by the manufacturer to enable hookup of the impact hammer to the excavator arm. The quick disconnect shall be designed for one person operation, and require not more than an adjustable end wrench and/or a hammer to operate. Tools required shall be furnished with each unit. The hammer, as a minimum, shall meet the following requirements:

(1) Energy output per minute . . . . 625,000 foot-pounds minimum.
(2) Impact energy class. . . . . 1,500 lb minimum.
(3) Blows per minute . . . . . 500 minimum.

As a minimum, the hydraulic impact hammer shall be furnished with the following tools:

(1) Moil point . . . . . 3 each.
(2) Chisel . . . . . 1 each.
(3) Line cutter . . . . . 1 each.
(4) Spade . . . . . 1 each.
(5) Tamper plate assembly . . . 1 each (144 square inch minimum face area).

1. Hydraulic vibratory compactor. The excavator shall be equipped with a hydraulic vibratory compactor which shall be capable of operating from the excavator's hydraulic system. The hydraulic vibratory compactor and excavator shall be equipped with quick disconnect systems to allow rapid hookup or removal. The necessary pins, adapters, etc., shall be furnished by the manufacturer to enable hookup of the hydraulic vibratory compactor to the excavator's arm.

The hydraulic vibratory compactor as a minimum shall have the following operating characteristics:

(1) Impulse force . . . . . 20,000 lb minimum.
(2) Cycles per minute . . . . . 2,000.
(3) Compaction plate area . . . . . 9 square ft.

The excavator shall be capable of generating the compactor plate rated impulse force of 20,000 lb at 2,000 cycles per minute without loss of stick/boom function while operating the compactor plate.

3.13 Rated lifting capacity. Rated lift capacities shall be in conformance with SAE J1097. The excavator shall have a rated lift capacity at 15 ft radius and at ground level of not less than 9,300 lb without the use of stabilizers, with the largest bucket specified in the procurement in any arc 360o around the excavator. Manufacturer's load chart shall specify the rated lift capacity over side.

3.14 Undercarriage. The undercarriage for the excavator shall be a heavy-duty frame, with not less than two axles or drive units, supported by pneumatic rubber tires. The undercarriage shall have not less than one operator's entrance step to assist the operator to gain entry/exit of the upperstructure cab (see 3.9.1).

3.14.1 Transmission. Engine power shall be transmitted through either a torque converter with a transmission, or a full hydrostatic drive system with infinitely variable forward and reverse speeds throughout range capability. When a transmission is furnished, a minimum of three forward and two reverse speeds are required, and be capable of operator selected shifting under full power load, in either direction.

3.14.1.1 Drive train. The drive train shall provide power to a minimum of four (4) drive wheels and obtain 40 percent of the vehicle's weight in a drawbar pull, when on level, dry, brushed concrete. When differential-type transmissions are a part of the excavator's assemblage, a limited-slip device shall be included in the drive train. Wheel drive components shall be designed to accept the maximum deliverable torque load by the drive train without adverse effects under all pulling conditions. When furnished with hydrostatic drive, units shall deliver not less than 19,000 lb of tractive force to each wheel.

3.14.2 Speed. The excavator shall be capable of traveling on level pavement at a minimum speed of not less than 18 miles per hour.

3.14.3 Gradeability. The excavator shall be capable of negotiating a 30 percent grade on dry concrete or asphalt at a minimum speed of 1.2 miles per hour.

3.15 Outrigger(s). When specified (see 6.2), outrigger(s) consisting of beam(s) or stabilizer attached to the undercarriage (see 3.14), shall be provided. The outrigger(s) shall be hydraulically powered, operated from the revolving upperstructure cab (see 3.9.1). The total setting time and the total retractive time of the outrigger(s) in a normal application position on level ground shall not exceed one minute. Outrigger beam(s) shall have sufficient strength to accept full stability loading conditions, and shall be equipped with floats or outrigger pads attached in a manner that will provide for full retraction within the undercarriage width. Outrigger(s) shall be individually controllable and 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. The excavator, other than hydraulically driven types, shall be equipped with the manufacturer's standard braking system, in conformance with SAE J1152. Hydraulically driven types shall comply with the applicable stopping performance, holding performance, and parking system performance criteria of SAE J1152.

3.17 Steering. The manufacturer's standard steering system shall be provided. Hydraulic skid steering is acceptable.

3.18 Lighting. The excavator shall be equipped with the following as a minimum:

a. Front and rear work light(s).
b. Boom mounted work light(s).
c. Two dual stop and taillight(s), and directional turn signals.
d. Interior cab light(s).

3.19 Engine. The excavator engine shall be a commercial model diesel type having horsepower, torque, and speed characteristics to meet satisfactorily all the excavator performance requirements specified herein. The diesel engine shall start within five minutes and be ready for full load operation within fifteen minutes in any ambient temperature from -20oF to +110oF. The engine shall be equipped with an hour meter, cooling liquid temperature indicator, lubricating oil pressure indicator, liquid fuel gage, a fuel tank with sufficient capacity for 8 hours normal operation, and all necessary accessories

for efficient operation and control. When specified (see 6.2), the battery furnished in the excavator shall be of the maintenance-free type having maintenance-free characteristics listed in W-B-131.

3.19.1 Cold starting system. The excavator diesel engine shall be equipped with an engine priming system, glow plug(s), or intake manifold preheater design 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.

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. When specified (see 6.2), tires shall be foam-filled.

3.21 Lifting and tiedown attachments. When specified (see 6.2), the excavator shall be equipped with lifting and tiedown attachments. Lifting and tiedown attachments shall conform to type II and type III of MIL-STD-209. Attachments shall be indicated by a transportation plate conforming to MIL-P-514. Transportation plates shall be inscribed with a diagram showing the lifting attachments and lifting slings, the capacity of each attachment, and the required length and size of each sling cable. When spreader bars are required to meet lifting requirements, each machine shall be furnished with a pair and a permanent mounting location that does not interfere with normal operation. A silhouette of the item furnished showing the center of gravity shall be provided on the transportation plate. Tiedown attachments may be identified by stenciling or other suitable marking. Tiedown marking shall clearly indicate that the attachments are intended for the tiedown of the excavator when shipped.

3.22 Dozer blade. When specified (see 6.2), manufacturer’s standard hydraulic operated dozer blade assembly shall be provided and be capable of operating from the excavator’s hydraulic system. The hydraulic dozer blade assembly shall be equipped with quick disconnect system to allow rapid hookup or removal. Manufacturer may install the dozer blade assembly on the front or rear of the excavator’s undercarriage. Operating control(s) shall be conveniently located and arranged for the operator (see 3.10).

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. Heavy-duty decals made of material which will last and remain legible for the life of the equipment are acceptable.

3.24 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.

3.25 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.

3.26 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.

3.27 Workmanship.

3.27.1 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.

3.27.2 Bolted connections. Boltholes shall be accurately punched or drilled and shall have the burrs removed. Washers or lockwashers shall be provided in accordance with good commercial practice, and all bolts, nuts, and screws shall be tight.

3.27.3 Riveted connections. Rivet holes shall be accurately punched or drilled and shall have the burrs removed. Rivets shall be driven with pressure tools and shall completely fill the holes. Rivet heads, when not countersunk or flattened, shall be of approved shape and of uniform size for the same diameter

of rivet. Rivet heads shall be full, neatly made, concentric with the rivet holes, and in full contact with the surface of the member.

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

4.1.2 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 when a first article is required (see 3.2 and 6.2). This inspection shall include the examination of 4.3 and the tests of 4.4, and, when specified, the preproduction pack inspection of 4.7 (see 4.7 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 4.6, and the packaging inspection of 4.7. 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 4.4.8. Failure to pass any phase of these tests shall be cause for rejection.

4.4.1 Noise level tests. Operator noise level shall be verified for conformance to 3.7.1 by testing in accordance with SAE J919, and SAE J1166, in any combination of door(s) and window(s) open or closed. Exterior noise level shall be verified for conformance to 3.7.1 in accordance with SAE J88.

4.4.2 Hydraulic system test. The engine 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.

4.4.3 Brake test. The brakes of the excavator shall be tested to verify conformance to 3.16. Failure of test to show full conformance shall reject the first article.

4.4.4 Road test. The excavator shall be driven on a smooth, hard surfaced road at 8 miles per hour 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.

4.4.5 Gradeability test. The excavator shall negotiate a 30 percent grade to verify conformance to 3.14.3. Failure of test to show full conformance shall reject the first article.

4.4.6 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 and each optional powered device shall be tested for 2 hours; all other accessories shall be tested for 30 minutes each.

4.4.7 Rated lifting capacity tests. The rated lift capacity shall be determined in accordance with SAE J1097 as specified in 3.13. The tipping load shall be established without outriggers.

4.4.8 Lifting and tiedown attachments test. The excavator, when equipped with lifting and tiedown attachments, shall be tested to verify that the attachments conform to the requirements specified in 3.21.

4.5 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.

4.6 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 engine 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.

4.7 Packaging inspection. The inspection of 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 excavating and loading loose gravel, sand, or soil.

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in acquisition documents:

a. Title, number, and date of this specification
b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1)
c. When a first article is required for inspection and approval (see 3.2, 4.2.1, and 6.3)
d. When alternating black diagonal stripes on the rear surfaces of the excavator are required (see 3.7.3)

e. List of attachments and accessories for each excavator (see 3.12)
f. When outrigger(s) are required (see 3.15)
g. When battery shall be of the maintenance-free type (see 3.19)
h. When foam-filled tires are required (see 3.20)
i. When lifting and tiedown attachments are required (see 3.21)
j. When dozer blade is required (see 3.22)
k. Color of finish coat (see 3.24)
l. When a preproduction pack is required (see 4.2.1 and 4.7)
m. 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 unit. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examination, test, and approval of the first article.

6.4 Subject term (key word) listing.

Engine
Hydraulic system
Noise
Safety

6.5 Supersession data. This specification replaces military specification MIL-E-29249, dated 21 November 1986.

MILITARY INTERESTS:

Custodians

Army - AT
Navy - YD
Air Force - 99

Review Activity

Air Force - 84

CIVIL AGENCY COORDINATING ACTIVITY:

GSA - FSS

PREPARING ACTIVITY:

Navy - YD

(Project 3805-0150)

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.