

**SPECIFICATION
FOR
EXCAVATOR, BACKHOE, HYDRAULIC, CRAWLER MOUNTED
50,000 LB. CLASS**

(This specification is released for procurement purposes until revised or rescinded.)

SCOPE

This specification covers a crawler-mounted hydraulic excavator with a diesel engine and capable of continuous rotation. It does not include all types and sizes of commercially available excavators, but only the size generally used by the North Carolina Department of Transportation, Division of Highways.

I. CLASSIFICATION

The excavator shall be of the size and capacity as specified in Table 1, together with meeting all of the performance requirements in Table 2.

**TABLE 1
EXCAVATOR, REQUIREMENTS**

*Operating Weight (Min.) (Lbs.)	Track Shoe Width (Nom.) (In.)	Inside Track Width (Min.) (In.)	** Rated Lift Capacities SAE J-1097 (Min.) Radii			Breakout Force (Min.) (Lbf.)
50,000	30.00	69.00	15'	20'	25'	Bucket: 28,000 Arm: 22,000
				14,200	9,000	
				6,200		

* See Excavator Operating Weight (Paragraph III.A.5.)

** See Rated Lift Capacity (Paragraph III.A.6.)

**TABLE 2
MINIMUM PERFORMANCE REQUIREMENTS***

1. Digging depth	20'
2. Surface reach (C/L of turntable @ grade)	30'
3. Dumping Height	20'
4. Crawl speed	2.0 mph
5. Swing speed	9.5 rpm
6. Bucket sweep action	170°

* Excavator equipped per paragraph III.A.5, Excavator Operating Weight.

II. APPLICABLE STANDARDS

The following documents of issue in effect on the date of the Invitation for Bids shall form a part of this specification:

SAE-J1097 - Hydraulic Excavator Lift Capacity Rating
Society of Automotive Engineers, Inc. (SAE)
400 Commonwealth Drive
Warrendale, PA 15096

PCSA-3-Mobile Hydraulic Excavator Standards
Power Crane and Shovel Association (PCSA)
111 E. Wisconsin Avenue
Milwaukee, WI 53202

Federal Occupational Safety and Health Act Standards
U.S. Department of Labor (OSHA)
200 Constitution Avenue, NW
Washington, DC 20210

State Occupational Safety and Health Act Standards
N. C. Department of Labor (OSHA)
OSHA Division
4 West Edenton Street
Raleigh, N. C. 27611

III. REQUIREMENTS

A. GENERAL

The excavator shall be of conventional design and heavy duty construction. It shall be complete with all necessary operating accessories customarily furnished by the manufacturer with this type excavator.

The excavator shall be capable of performing its functions with attachments while traveling and/or swinging.

1. Standard Product

The machine offered shall be new and the latest production model as represented in the manufacturer's current published literature intended for the general public. The specific configuration offered must be represented in such literature. Machines which are offered otherwise may be rejected.

2. Use Conditions

Design and construction shall be such that the excavator will withstand continuous service. This includes lifting and positioning pipe sections, trenching, back filling, and ditch work. It also includes storage and operation in the open air under all weather conditions for extended periods of time. Components, particularly of the electrical, fuel, and exhaust systems, shall resist harmful effects of dust and water (salt or fresh).

3. Ease of Maintenance

The design of the excavator and accessory installation shall permit ready accessibility for servicing, replacement, and adjustment of component parts and accessories with minimum disturbance of other elements.

4. Frame

The frame shall be designed to withstand maximum stresses under normal operating conditions and in addition, provide adequate support for attaching any device approved by the excavator manufacturer for use in combination with the excavator.

5. Excavator Operating Weight

The excavator operating weight for rated lift capacity shall include the hydraulic controls, boom, manufacturer's standard accessories, any dipperstick (arm) advertised in the manufacturer's current published literature intended for the general public, manufacturer's standard general purpose backhoe bucket, specified track and track shoes, standard counterweight (additional counterweight not acceptable), fully serviced, including full fuel tank and 175 pound operator and fully enclosed cab. **The standard counterweight shall not exceed 21% of operating weight.** Note that the above bucket is for use in computing operating weight and may be different from the bucket to be furnished in compliance with paragraph III.M.1, Backhoe Bucket.

6. Rated Lift Capacity

Based on the excavator at the above stated operating weight, rated lift capacities are to be in accordance with SAE J-1097. They are to be valid for 360° rotation at ground level and not to exceed 75% of tipping load. Rated Lift Capacity is the net load that can be lifted by the machine when equipped per paragraph III.A.5, Excavator Operating Weight.

7. Occupational Safety and Health Act

The excavator shall be furnished with all applicable equipment and accessories as required by the Occupational Safety and Health Act (U.S. Department of Labor and the N.C. Department of Labor). Excavator noise at ear level of the seated operator, with cab doors and windows open shall not exceed OSHA requirements for eight hour operator exposure.

B. ENGINE

1. Diesel Engine

The engine shall be full diesel, air or water cooled, and of the compression ignition type, two or four-stroke cycle, capable of operating on commercial diesel fuel as recommended by the manufacturer. The engine shall be equipped with an adequate and efficient fuel injection mechanism, heavy duty fuel filter system, and a heavy duty full flow type lubricating oil filter. The air cleaner shall either be two-stage (precleaner and dry type element), or dual element type (primary and secondary dry type elements). Air cleaner hose shall be of metal or heavy duty flexible, non-collapsible type, (wire reinforced hose not acceptable) with metal or molded rubber elbows. All connections must be banded. Exhaust pipe shall be of the deflector type. The engine, when equipped with all accessories, shall be capable of producing the power required by the excavator under full load without overheating.

2. Engine Governor

The engine governor shall be of the mechanical or hydraulic type and shall be driven from the engine. Provisions shall be made for permitting regulation of the governed speed-setting throughout the engine load range while the unit is in operation.

3. Engine Starting System

The unit shall have a heavy duty electric starting system. The engine starting system shall be of ample power to crank the excavator engine when the engine is cold.

4. Engine Cooling System

a) Water Cooled - The unit shall have heavy duty radiator and heavy duty blade type fan. The cooling system shall be protected to a minimum of -20°F.

b) Air Cooled - An audible alarm and engine shut down shall be provided to protect the engine in case of fan belt breakage.

5. Engine Lubricating System

The manufacturer's current standard production lubricating system shall be acceptable.

C. FUEL TANK

The manufacturer's standard fuel tank(s) shall be acceptable and located so as not to be affected by heat from the engine, exhaust pipe, or muffler. The fuel tank capacity shall be sufficient for a minimum of eight hours continuous operation.

D. POWER TRAIN AND POWER TAKE-OFF

1. Gears

All main machinery gears in the power train are to be enclosed in dirt tight gear cases and shall run in a bath of oil (other type lubrication will require approval); all other gears in the upper structure shall also be enclosed, and if not run in oil bath, they shall have conveniently located means for frequent lubrication. All power transmitting parts used on the revolving frame that are used in the digging cycle must be mounted on anti-friction bearings.

2. Power Take-off

Power take-off from the engine may be mechanical drive, hydrodynamic drive (fluid coupling or torque converter), or hydrostatic drive.

E. CRAWLER BASE

Independent drive to each track shall be provided. The undercarriage shall be tractor type, including sealed rollers and idlers, carriage and motor covers, hydraulic track adjustment with counter-rotation tracks. Crawler pads shall be nominal 30" triple grouser type. Operating speeds shall be as specified in Table 2. Machine without load shall be capable of climbing a 58% grade on smooth, dry surface, providing the required traction.

Undercarriage offered is to be of a configuration which is generally available by the manufacturer and which is described in the manufacturer's current published literature intended for the general public. Undercarriage configurations which are offered otherwise are not acceptable.

F. STEERING

The machine shall be capable of being steered either right or left in either direction of travel. Control shall be from the operator's position on revolving superstructure.

G. HYDRAULIC SYSTEM

The lift, crowd, and bucket mechanisms shall be operated by hydraulic cylinders. Hydraulic pump(s) shall be on a live drive from the engine or torque converter and shall provide adequate pressure for excavator operations. Ample pump and reservoir capacity shall be furnished for maximum operating cycles without over-heating. A replaceable element type oil filter and system relief valve shall be provided. The hydraulic cooling system shall incorporate an oil radiator for positive cooling and control of the hydraulic oil temperature.

H. ROTATION

The excavator shall be capable of making a continuous 360° left and right rotation.

The manufacturer's standard swing lock, swing brake, and automatic digging and traction brakes shall be provided.

I. TOOLS AND LUBRICATING EQUIPMENT

Special tools and greasing equipment normally required for servicing the excavator shall be provided. A tool box with hasp and padlock shall be provided.

J. PAINTING

The excavator upper structure and attachments shall be painted Department of Transportation, Division of Highways Yellow, Dupont #93-54701A lead free, or its acceptable, preapproved equivalent. The excavator carrier frame, platform and undercarriage shall be painted black. All finish paint shall be over a proper rust prohibitive primer.

K. INSTRUMENTS AND GAUGES

The instrument panel shall be located in view of the seated operator. The manufacturer's standard instrumentation shall be furnished unless otherwise specified in the Invitation for Bids.

L. EQUIPMENT

The backhoe excavator shall be furnished with the following:

1. Cold weather starting aid.
2. Engine hoodside.
3. Heavy duty electrical system with heavy duty alternator and engine shut off.
4. Air cleaner service indicator mounted for convenient inspection.

5. Vandalism protection kit shall include locking cab and lock type caps for exposed filler caps and oil dipstick pipe (less padlocks).
6. Slow moving vehicle emblem.
7. AM/FM radio, installed, complete, with antenna.
8. Fused power distribution panel, 12-volt, with a minimum of four (4) outlet terminals.

M. ATTACHMENTS

Attachments shall be of heavy duty construction and capable of handling the full power output of the specified excavator under severe operating conditions. The following attachments shall be furnished with the excavator unless otherwise specified in the Invitation for Bids.

1. Backhoe Bucket

The unit shall include the manufacturer's standard heavy duty general purpose backhoe bucket, but minimum 1 1/8 cu. yd. heaped capacity and 30" to 36" wide. Bucket teeth with replaceable tooth points and side cutters shall be included.

2. V-Type Bucket

The unit shall include a heavy duty v-type ditching bucket of minimum 1 1/8 cu.yd. heaped capacity. Bucket shall have approximately 18" flat bottom and be equipped with teeth with replaceable tooth points and side cutters. Unless otherwise specified, bucket slope shall be 45°.

3. Ditch Forming Bucket

The unit shall include a 60 inches wide, smooth edge ditch forming bucket of 1 1/8 cu.yd. heaped capacity.

4. Bucket Angling Device

The bucket angling device shall provide a minimum angle of 40° each way and shall be compatible with all three of the buckets specified in Section III.M. These buckets must be capable as furnished of being mounted directly to the bucket angling device, but they need not be capable of being mounted directly to the boom "stick". The bucket angling device is to be mounted, by bidder, to the stick, and is to be furnished with quick-pinned couplings on stick end and on attachment end and with quick-disconnects on all hose connections.

N. CAB

The excavator shall be furnished with an operator's cab.

The operator's cab shall be completely enclosed and constructed of heavy gauge material and shall be equipped with tinted safety glass to provide 360° visibility. All controls for ditching and excavating as well as the operation of the crawler base shall be mounted inside the cab. A horn, throttle lock, heavy duty heater, fan type defroster, electric windshield wiper, and door locks shall be furnished.

The operator's position shall have an adjustable, upholstered seat with armrests and a safety seatbelt.

IV. WARRANTY

The contractor warrants to the owner that all equipment furnished under this specification will be new, of good material and workmanship, and agrees to replace promptly any part or parts which by reason of defective material or workmanship shall fail under normal use, free of negligence or accident, for a minimum period of 12 months from date put in operation. Such replacement shall include all parts, labor and transportation costs to the location where equipment is down, free of any charge to the owner or his representative.

Under same and all conditions as above, the power train (engine, transmission, torque convertor, and final drive) shall be covered for an additional period of at least 24 months. Any periodic inspections which may be performed by the contractor or his representatives shall be without charge to the State.

V. SERVICE, PARTS, AND MANUALS

The contractor shall furnish a qualified representative to instruct the operator(s) in the operation and routine maintenance of the equipment for a minimum period of eight hours at each destination specified in the Invitation For Bids.

An operator's manual, shop manual, and parts book shall be furnished with each unit. Three additional manuals and parts books shall be furnished.

VI. ACCEPTANCE EVALUATION AND QUALITY ASSURANCE

Upon receipt of each excavator at the receiving point, the owner or his authorized representative shall arrange for an acceptance inspection for compliance with the provisions of this specification.

The contractor will be required to furnish a pilot model for inspection, tests and possible modification and/or adjustments of attachments in accordance with this specification.

VII. DELIVERY AND PAYMENT

Delivery of and payment for excavators under this specification shall be in accordance with the terms and conditions of the Invitation for Bids. The contractor shall be responsible for any packing, packaging, or protection required to insure delivery in an undamaged condition.

The excavator shall be completely serviced and ready for operation when delivered, with the backhoe bucket and bucket angling device installed.

VIII. ORDERING DATA (For Procurement Use Only)

Purchasers may exercise any desired option offered herein and should specify the following in the requisition and Invitation For Bids:

1. Title, number, and date of this specification.
2. No. of Manuals.
3. If pilot model is not required.
4. If attachments are different than specified.
5. If special instruments and gauges are required.
6. If slope required on V-bucket (para. III.M.2) is other than 45°.
7. If a maximum limit on ground pressure is necessary.
8. If additional training is needed.
9. If change in quantity of manuals is needed.

10. If equipment in addition to that listed under para. III.L. is needed.