

**SPECIFICATION  
FOR  
EXCAVATOR, BACKHOE, HYDRAULIC  
(RUBBER TIRED)**

(This specification is released for procurement purposes until revised or rescinded.)

**SCOPE**

This specification applies to a diesel powered, continuous rotation, rubber tired, all-wheel drive, hydraulic backhoe excavator. It does not include all types and sizes of commercially available excavators.

**I. CLASSIFICATION**

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

**TABLE 1**

**EXCAVATOR REQUIREMENTS**

*Operating Weight (Lbs.)	Highway Travel Speed MPH	Bucket Digging Force SAE J1179	** Rated Lift Capacities SAE J-1097 (Min.) Radii			Overall Width (Ft.)	Travel Height (Ft.)
(Min.)	(Min.)	(Min.)	15'	20'	25'	(Max.)	(Max.)
36,000	12	18,500	12,300	8,500	6,000	9'0"	13' - 6"

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

\*\* See section designated Rated Lift Capacities (Paragraph III.A.6.)

**TABLE 2**

**MINIMUM PERFORMANCE REQUIREMENTS\***

1. Digging Depth	18' - 6"
2. Surface Reach from C/L of Turntable	29' - 6"
3. Dumping Height	18' - 6"
4. Bucket Sweep Action	140 °
5. Swing Speed	7 rpm

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

## II. APPLICABLE STANDARDS

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

SAE J-1097 - Hydraulic Excavator Lift Capacity Rating

Society of Automotive Engineers, Inc.  
400 Commonwealth Drive  
Warrendale, PA 15096

PCSA Std. No.3 - Mobile Hydraulic Excavator Standards

Power Crane and Shovel Association  
111 E. Wisconsin Avenue  
Milwaukee, WI 53202

State Occupation Safety and Health Act Codes (OSHA)

N. C. Department of Labor  
OSHA Division  
4 West Edenton Street  
Raleigh, N. C. 27611

Federal Occupation Safety and Health Act Codes

U. S. Department of Labor  
200 Constitution Ave., NW  
Washington, DC 20210

## 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. Excavator shall be designed so as to be capable of being hauled by N.C. DOT drop deck trailers.

The excavator shall be capable of performing its functions with attachments while traveling (at the worksite) 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 or water.

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 shall include the basic machine, four (4) outriggers, the minimum 5/8 cu.yd. heaped capacity general purpose backhoe bucket specified herein (para. III.O.1), complete with hydraulic controls, manufacturer's standard accessories, excavator-type boom and dipper stick, specified size tires, standard counterweight, fully serviced, including full fuel tank and 175 pound operator and fully enclosed cab. Excavator operating weight shall not include any auxiliary lifting attachments, tire hydroinflation, or additional counterweight.

The standard counterweight shall not exceed 25% of operating weight

6. Rated Lift Capacities

Lift capacities are to be in accordance with SAE J-1097 and as specified in Table I. They are to be valid for over the side boom position at ground level with front and rear outriggers down and not to exceed 75% of tipping load or 87% of hydraulics. 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 8-hour operator exposure.

**B. ENGINE**

1. Diesel Engine

The engine shall be full diesel, air or liquid 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 oil filter system and heavy duty full flow type lubricating oil filter. Air filter shall be heavy duty dry type, dual stage (primary and safety 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 capable of cranking the excavator engine in an ambient temperature of -20°F.

- a) Water cooled - The unit shall have heavy duty radiator and blade type fan. The cooling system shall be protected to a minimum of -20°F and so tagged.
- b) Air cooled - An audible alarm and engine shut down shall be provided to protect the engine in case of overheating.

5. Engine Lubricating System

The manufacturer's current standard production lubricating system is acceptable.

**C. FUEL TANK**

The manufacturer's standard fuel tank(s) is (are) acceptable and shall be located so as not to be affected by heat from the engine, exhaust pipe, or muffler. The fuel tank shall be sufficient for a minimum of 8-hours continuous operation.

**D. TRANSMISSION**

The excavator shall be furnished with either full power shift transmission with torque converter having at least 6 forward and 6 reverse speeds or hydrostatic (or hydraulic) drive transmission with infinitely variable forward and reverse speeds up to the maximum speed.

**E. STEERING DEVICES**

The manufacturer's current power steering devices for excavators shall be provided.

**F. BRAKING SYSTEMS**

The excavator shall be equipped with foot-operated power boosted service brakes at each wheel and hand-controlled digging brakes to lock all wheels. A hand-controlled mechanical parking brake independent of the service brakes, shall be provided. The controls for the digging and parking brakes shall be located within the operator's cab.

**G. TIRES**

Tires shall be dual type and of the same size on all wheels. Tires shall be tubeless, nylon, ground grip type or equivalent and be of exact size 11.00R x 22.5 (no other sizes are acceptable), and minimum 16PR.

**H. HYDRAULIC SYSTEM**

The lift, crowd, tool, and outrigger mechanisms shall be operated by the 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 overheating, and a replaceable-type oil filter with element shall be provided. The hydraulic cooling system shall incorporate an oil radiator for positive cooling and control of the hydraulic oil temperature.

## **I. ROTATION**

The excavator shall be capable of making a continuous 360° left and right rotation. A positive upper structure travel lock shall be located within the operator's cab.

## **J. OPERATOR'S SEAT AND CONTROLS**

The operator's seat shall be located within easy reach of all controls. The seat itself shall be fully adjustable, and foam upholstered. It shall provide for comfortable riding positions and for good visibility of the work zone and bucket position. Full range controls, including locked positions for road travel, shall be accomplished from operator's seat.

## **K. TOOLS AND LUBRICATING EQUIPMENT**

Special tools normally furnished with the excavator by the manufacturer shall be provided. Greasing equipment and a tool box with hasp and padlock shall be provided.

## **L. PAINTING**

The excavator and attachments shall be painted N.C. DOT Highway Yellow, Dupont #93-54701A lead free or preapproved equivalent over a proper rust prohibitive primer. The excavator undercarriage may be painted black or N.C. DOT Yellow.

## **M. 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.

## **N. EQUIPMENT**

The excavator shall be furnished with the following:

1. Cold weather starting aid.
2. Engine hoodsides.
3. Heavy duty electrical system with heavy duty alternator.
4. Air cleaner service indicator mounted for convenient inspection.
5. Headlights, taillights, front and rear turn signals with hazard flashers, and any other markers or lights required to meet Federal, State, or ICC requirements.
6. Front pull hook.
7. Vandalism protection kit. The kit shall include locking type and lock type caps for exposed filler caps and oil dipstick pipe (less padlocks).
8. AM/FM radio, installed, complete, with antenna.
9. Fused power distribution panel, 12-volt, with a minimum of four (4) outlet terminals.
10. One (1) fire extinguisher, 5 lb., type BC, mounted in the cab.
11. Backup alarm.
12. Slow moving vehicle emblem.
13. Horn.
14. Four outriggers, independently controlled. Control either by pairs (front pair separately from rear pair, or left pair separately from right pair) or by individual outrigger is acceptable.
15. For air-cooled engines, an engine shut-off is required for high cylinder head temperature (e.g. in cases of fan belt breakage). For water-cooled engines, an audible and visual warning for high engine coolant temperature is to be provided.

16. Fuel gauge (dipstick not acceptable) mounted in convenient view of seated operator.

## O. ATTACHMENTS

Attachments shall be of heavy duty construction and capable of handling the full power output of the excavator under severe operating conditions. Unless otherwise specified, each attachment is to be provided with its own set of pins (i.e. dedicated pins). The excavator shall be furnished with the following:

### 1. Backhoe Bucket

The general purpose backhoe bucket shall be heavy duty, 30" to 36" wide, and a minimum 5/8 cu.yd. heaped capacity.

Include bucket teeth with replaceable tooth points and side cutters. Bucket shall have one (1) ANSI approved lifting eye sized for a 1/2" chain hook.

### 2. Ditch-Cleaning Bucket

The ditch-cleaning bucket shall be 60" wide, heavy duty, smooth edge, and a minimum 5/8 cu.yd. heaped capacity.

### 3. Bucket Angling Device

The bucket angling device shall provide a minimum angle of 40° each way ("Wrist-o-Twist" or equivalent). The bucket angling device shall be mounted by bidder to the stick end by means of a pin or pins (maximum two). The attaching buckets, both ditch-cleaning and backhoe, are to be attachable to the angling device and directly to the stick

by the same common pin(s). All hose connections for the angling device to be quick-disconnect type. The angling device is to be mounted to the remote end of the stick (not on the boom).

### 4. Lift Attachment

The lift attachment shall be boom mounted and similar in design and operation to the Model "E-Z Grip" as manufactured by Werk Brau Company, Findlay, Ohio 45839. The attachment shall be complete with a hydraulic valve at operator's position.

NOTE: The bucket angling device and the lift attachment are to both be mounted by the bidder on the excavator such that either can be used at will by the operator. Bidder must provide two (2) independent control circuits, each with its own valve, one circuit for the bucket angling device and one circuit for the lift attachment, so that the operator can use either the bucket angling device or the lift attachment without having to change hydraulic circuit connections from one of these attachments to the other.

## P. 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 carrier shall be mounted inside the cab. The cab shall also include bucket seat with seat belt, sunvisor, dome light, horn, throttle lock, heavy duty heater, fan type defroster, electric windshield wiper, door locks, convex inside rearview mirror, and two (2) heavy duty outside rearview mirrors, West Coast or equal, one mounted on each side of machine in a position which avoids interference with door fully opening, each West Coast mirror to have mounted on it a round convex mirror for wide field of view.

#### **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 converter, 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 representative shall be without charge to the owner.

**NOTE:** The attachment of warranty terms and conditions to the proposal may lead to nullification of the bid.

#### **V. SERVICE, PARTS, AND MANUALS**

The contractor shall furnish a qualified representative to instruct the owner's operator(s) in the operation and maintenance of the equipment for a minimum period of eight (8) hours at each destination specified in the Invitation For Bids.

An operator's manual, shop manual, complete parts book and line setting sheet shall be furnished with each unit. Additional manuals and parts books shall be furnished as specified in the Invitation For Bids.

#### **VI. ACCEPTANCE EVALUATION AND QUALITY ASSURANCE**

Upon receipt of the 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 may be required to furnish a pilot model for examination, tests and possible modification and/or adjustment 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, bucket angling device, and lift attachment installed.

#### **VIII. ORDERING DATA (For Procurement Use Only)**

Purchasers should exercise any desired option offered herein and should specify the following:

1. Title, number, and date of this specification
2. If the pilot model is definitely required, the Invitation for Bid should so state.
3. If additional manuals and parts books required.
4. Specify locations of instructions (Section V of Specification).
5. If special instruments and gauges are required.

6. If dedicated pins for each attachment are not required (see Section III.O).
7. If additional training is needed.
8. If equipment in addition to that listed under Section III.N is needed.