

## **20 TON WHEELED MOUNTED HYDRAULIC EXCAVATORS**

A Wheeled Hydraulic Excavator with operating mass of approximately 20,000kg and equipped with a backhoe bucket with a capacity of not less than 1.0m<sup>3</sup> (SAE). Fitted with a diesel engine, developing not less than 100kW power.

### **OPERATING SPECIFICATION**

- Rated operating mass of approximately 20,000kg
- Travel speed (forward or reverse) not less than 35km/h
- All direction visible climate controlled ROPS cab with air suspension seat, air conditioner and heater. The cab must be equipped with defroster, radio and seat belt.

#### **1. ENGINE**

- The machine is to be diesel powered engine with liquid cooling having a minimum gross engine output power of not less than 100kW.
- Engine to be naturally aspirated or turbocharged
- Emission certification to be compliant to EPA-T3 (EU St3A) or equivalent
- Turbo 2 Pre-Cleaner and Modification of Intake Higher
- Full flow disposable fuel and lubricating oil filters as well as a fuel/water separator must be fitted.
- The fuel/water separator must be positioned where it can be inspected on a regular basis, and thus easily accessible for maintenance

#### **2. TRAVELLING**

- Automotive driving using accelerator pedal, cruise control function: storage of variable accelerator pedal positions, both off-road and on-road.
- Two speed power shift transmission with creeper speed on both sides
- A maximum travel speed of not less 35km/h
- Manual or automatic hydraulically controlled front axle oscillation lock.

#### **3. STEERING AND BRAKES**

- A hydraulic steering system must be fitted with emergency capabilities.
- The Steering wheel must be fitted to a tiltable steering column.
- A turning radius of not more than 40° is required.
- Two brake systems must be available
  - Service brakes used for travelling
  - Automatic digging brake
- Service brake system: functional brake valve on both sides.
- An automatic digging brake must be fitted that ensures the manual actuation of the brake pedal is no longer required during digging operations.

#### **4. HYDRAULICS**

- The maximum hydraulic pressure in the main circuit shall not be higher than 38.0 MPa.
- The hydraulic pumps shall be of the variable displacement piston type and the control system shall permit automatic variation of pressure and flow to meet demand.
- Full flow heavy duty hydraulic oil filters shall be provided, able to screen out min 10 micron and larger particles.
- Each filter unit shall preferably incorporate a magnetic core to attract metallic particles.
- Oil coolers suitable for a 40°C ambient temperature shall be fitted.
- Controls shall operate through hydraulic servo-mechanisms and shall require minimum operator effort.
- A warning buzzer operated by excessive oil temperature and low oil pressure shall be fitted

## **5. UNDERCARRIAGE**

- A robust undercarriage fitted with a dozer blade and outriggers for safe footing and maximum stability is required.
- Dual pneumatic tyres, 10.00 – 20 16ply must be fitted.
- The travel motors shall be protected by rock guards.
- The minimum ground clearance shall not be less than 300 mm.

## **6. BLADE AND OUTRIGGERS**

- A stabilizing blade as well as the outriggers must be designed for all operations.
- The blade length must be approximately the width of the undercarriage
- Two, individually controlled, outriggers must be fitted on the rear of the undercarriage.
- Load holding valves on all outriggers

## **7. SUPERSTRUCTURE**

- The superstructure shall be mounted on a slewing ring which rotates on roller bearings.
- It shall be possible to lock the slewing action for transport.
- Steps and handrails shall be provided to facilitate the operator for entering the cab and for maintenance and repair work.
- Access to all necessary points shall thus be obtained.
- All cables, wires and pipes shall be protected where exposed on the superstructure.

## **8. CAB**

- ROPS - must meet the requirements of SAE-J1040 and ISO 3471:1994
- FOPS - must meet the requirements of SAE-J1043 and ISO 3449:1992 Level I
- The cab shall be rubber mounted and lined with acoustic insulation wherever possible.
- Fully enclosed, Sealed pressurized cab with heater/defroster, Air conditioning,
- An instrument panel should be fitted in clear view of the operator, warning the operator with a light and audible warning horn if a problem occurs.
- Side windows with all round vision,
- Mechanical and air suspension seats with seat belt, radio
- Internal lighting in the cab is required.
- The Windscreen and roof windows must be fitted with laminated glass.
- Window protection grills must be fitted.
- Licence disc and number plate holder must be fitted.

## **9. ATTACHEMENTS**

- Backhoe buckets shall have a minimum capacity, measured according to SAE standards of 1, 0m<sup>3</sup>.
- Backhoe buckets shall be of the rock type, manufactured from ROQ-TUF or equivalent steel designed for heavy duty applications (Class 5 to 7) and shall have a minimum mass of 750 kg. Bucket width (bite) shall be approximately 1 100 mm. Pin to point distance shall not exceed 1 500 mm.
- Bucket design shall incorporate a heavy duty boxed main beam and under bridge, two low profile inverted T support beams inside the bucket in line with the inner teeth, ROQ-TUF or better wear strips on the outside in the transverse directions, fixed pins and replaceable bushes, a 30 mm Roqlast lip and pinned replaceable protectors on cheek corners and between teeth.
- Four or five teeth of the Bofors 3031334 type or equivalent are required, splayed in a spade nose formation with the centre two leading the corner teeth by at least 75 mm. Corner teeth shall be angled so as to project sideways further than any part of the bucket or protection plates.
- A lifting eye and vacuum release holes are required on the bucket.
- The buckets shall be specifically designed for the duties described.
- It is essential that maximum breakout force is developed within the parameters specified.
- Boom, stick and bucket pins and bushes shall preferably be sealed to prevent ingress of dirt.
- Sideways play on bucket pins shall be externally shimmed.
- The excavators shall be able to perform all of the requirements given below with the buckets offered laden with material of loose density 1.6 t/m<sup>3</sup> without exceeding 75% of their rated tipping loads.

- The excavators shall be fitted with attachments which comply with the following requirements:
- With backhoe:
  - Maximum digging reach at ground level: 8.6 m
  - Maximum digging depth: 5.1 m
  - Maximum dumping height: 6.3 m
  - Stick length shall not exceed: 2.0 m
- Maximum breakout force shall not be less than 138 kN
- Maximum digger stick force shall not be less than 138 kN
- Cylinder forces shall be quoted.
- The crowd force shall not exceed 0, 75 X operating mass

#### **10. LIGHTING AND ELECTRICAL**

- Floodlights of 200 W rating shall be mounted on the boom, front and rear of the machine to enable independent operation at night.
- An orange revolving light must be fitted on the roof of the machine offered.
- Cab mounted instrument panel with ignition, fuel gauge, hour meter and electronic throttle
- Incorporate into the instrument panel a warning light cluster which also has audible alarms for:
  - Low charge pressure,
  - Engine water temperature,
  - Hydraulic oil pressure,
  - Blocked air filter,
  - Engine oil pressure,
  - Alternator
  - All lights must be covered and protected.
  - An hour meter and fuel gauge should also be fitted.

#### **11. PAINT COLOUR**

Machines or equipment are to be painted golden yellow unless otherwise specified.

#### **12. BUCKET SIZES**

Addition bucket sizes of the following must be catered for:

- I. 1.2 m<sup>3</sup>
- II. 1.5 m<sup>3</sup>
- III. 1.0m<sup>3</sup> reinforced bucket for rocks

#### **13. PRICES TO INCLUDE THE FOLLOWING:**

One each of the following is to be supplied with each machine:

- (i) Spare parts list (in book form)
- (ii) Workshop repair manual
- (iii) Operator's instruction.

## **COMPULSORY SPECIFICATION QUESTIONNAIRE**

The Technical Schedule must be completed in full; failure to comply will invalidate your bid

### **A. SIELENT POINTS**

Make

\_\_\_\_\_

Model

\_\_\_\_\_

Operating weight

\_\_\_\_\_

### **1. ENGINE**

Net power output

\_\_\_\_\_ kW

Net torque output

\_\_\_\_\_ Nm

Emission certification

\_\_\_\_\_

Permissible exposure limits for noise

\_\_\_\_\_ dB

What pre-cleaning system is fitted?

\_\_\_\_\_

What fuel/water separator id fitted?

\_\_\_\_\_

Fuel tank capacity

\_\_\_\_\_ L

### **2. TRAVELLING**

Type of transmission

\_\_\_\_\_

Automotive driving using an accelerator pedal?

\_\_\_\_\_

Number of forward speeds

\_\_\_\_\_

Number of reverse speeds

\_\_\_\_\_

Maximum travel speed

\_\_\_\_\_ km/h

### **3. STEERING AND BRAKES**

Type of steering system, hydraulic or electric

\_\_\_\_\_

Is it fitted with emergency capabilities?

\_\_\_\_\_

What type of braking system is on offer?

\_\_\_\_\_

Service Braking

\_\_\_\_\_

Automatic digging brake

\_\_\_\_\_

Turning radius (in Degrees)

\_\_\_\_\_ °

### **4. HYDRAULICS**

What is the maximum main circuit pressure?

\_\_\_\_\_ MPa

What type of pumps is fitted?

\_\_\_\_\_

What filtration system is fitted?

\_\_\_\_\_

Is a warning buzzer fitted for excessive oil temperature?

\_\_\_\_\_

### **5. UNDERCARRIAGE**

What stabilizers are fitted: Front

\_\_\_\_\_

What stabilizers are fitted: Rear

\_\_\_\_\_

What size tyres is fitted?

\_\_\_\_\_

What is the ground clearance?

\_\_\_\_\_ mm

**6. BLADE AND OUTRIGGERS**

Is a stabilizing blade fitted? \_\_\_\_\_

What is the blade length? \_\_\_\_\_ mm

How many outriggers is fitted? \_\_\_\_\_

**7. SUPERSTRUCTURE**

Does the superstructure rotate on roller bearings? \_\_\_\_\_

Is it possible to lock the slewing action for transport? \_\_\_\_\_

**8. CAB**

Are the cab ROPS certified? (SAE-J1040 and ISO 3471:1994) \_\_\_\_\_

Are the cab FOPS certified? (SAE-J1043 and ISO 3449:1992 Level I) \_\_\_\_\_

Is the cab fully enclosed and lockable? \_\_\_\_\_

Is the cab sealed pressurized? \_\_\_\_\_

Is the cab fitted with heater/defroster or Air conditioning? \_\_\_\_\_

Does it have sound protection? \_\_\_\_\_

What level? \_\_\_\_\_

dB (A)

Is it fitted with a windscreen and side windows with all round vision? \_\_\_\_\_

Are windshield wipers fitted? \_\_\_\_\_

Type of operators' seat? \_\_\_\_\_

Is a seat belt fitted? \_\_\_\_\_

**9. ATTACHEMENTS**

(a) Bucket capacity (CECE) \_\_\_\_\_

m<sup>3</sup>

(b) Type of steel \_\_\_\_\_

(c) Manufacturer \_\_\_\_\_

(d) Tooth manufacturer \_\_\_\_\_

(e) Tooth type \_\_\_\_\_

(f) Length of boom \_\_\_\_\_

m

(g) Length of stick \_\_\_\_\_

m

(h) Percentage of tipping load at maximum reach \_\_\_\_\_

%

(i) Maximum dumping height \_\_\_\_\_

m

(j) Maximum digging depth \_\_\_\_\_

m

(k) Maximum digging reach \_\_\_\_\_

m

(l) Crowd force (penetration force) \_\_\_\_\_

kN

(m) Breakout force \_\_\_\_\_

kN

(n) Bucket width mm \_\_\_\_\_

mm

(o) Bucket tip radium (pin to point) mm \_\_\_\_\_

mm

**10. LIGHTING AND ELECTRICS**

Detail of all lights

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Is an orange revolving light fitted?

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Indicate the instruments fitted in the cab:

Fuel gauge

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Hour meter

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Engine temperature

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Is audible alarms fitted for:

Engine oil pressure

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Low charge pressure

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Engine water temperature

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Hydraulic oil pressure

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**11. PAINT COLOUR**

What colour is the machine painted?

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**12. BUCKET SIZES**

1.2m<sup>3</sup>

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1.5m<sup>3</sup>

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1.0m<sup>3</sup> reinforced bucket for rocks

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**13. PRICES TO INCLUDE THE FOLLOWING:**

Are the following supplied with the machine?

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