NCSC TECHNICAL SPECIFICATION for PURCHASE of ~~BACK SHOVEL EXCAVATOR~~ BULL DOZER | 2023

1. Scope: -

- It is the intent of these specifications whether or not specifically mentioned herein, to describe a diesel engine drive, hydraulically operated, articulated ***Bull Dozer*** equipped with minimum **8.7 m^3** Rock bucket.
- It shall be tropicalized & dependable in rough working terrains especially in quarry and dusty as well as sandy areas
- Basic operating weight of minimum **37,557kg**.
- Bucket capacity shall be minimum **8.7m^3** Rock, when handling an average material density of **1800 kg/m^3**.
- All items to be fully assembled with the entire necessary fittings and attachments & tested ready for immediate use.

2. Engine-

2.1 General: -

- The diesel engine shall perform smoothly and efficiently under all conditions of operation & shall develop the rated horsepower when operating on commercial diesel fuel with sulfur content of **1%**.

2.2 Type: -

- The engine shall be four stroke cycle, water-cooled, direct injection, diesel, turbo charged, preferably after cooled, with not less than **6** cylinders & shall be equipped with replaceable wet type cylinder sleeves/liners.

2.3 Horsepower

- The engine shall deliver minimum **320 HP** net at fly wheel at rated RPM, equipped with fuel pump, water pump, cooling fan, heavy duty radiator, lubricating oil pump, air cleaner, alternator, hydraulic pump & any required engine accessories.

2.4 Required Engine Data

- The supplier shall submit manufacturer certified engine data according to **SAE** standard showing net power, torque and specific fuel consumption curves, at governed **RPM**, at sea level and **2500m** elevations.
- Specify certified average fuel consumption per hour when the Excavator is working under:-
  - Heavy workload conditions ..... Lit/hr

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2.5 Lubrication System

- Engine lubrication system shall be of the full force-feed type, by a gear driven, rotor type or equivalent type oil pump.
- Pump shall be strainer protected.
- Oil clarification shall preferably be wi' -eplaceable cartridge filters (filters through full flow & by – pass cartridge filters or filters of better filtration system.)
- Oil cooler shall be incorporated in the lubrication system.

2.6 Starting system

- The engine shall be equipped with heavy-duty **24V** direct electric starting system.
- An electric motor shall start the engine satisfactorily at temperatures as low as 0^0**C** without recourse to any auxiliary heating or starting device, or fluid priming system is required.

2.7 FUEL SYSTEM

2.7.1 Fuel Tank

- The fuel tank shall be properly ventilated, protected both internally and externally from corrosion and any damage.
- Fuel tank cap shall be self –closing type permanently fixed on the filler neck
- Fuel tank made from plastic will is not acceptable.

2.7.2 Injection pump

- The injection pump shall preferably be mechanically driven with all necessary regulatory & controlling attachments or shall be mention.

2.7.3 Injectors

- Injectors shall be accessible, interchangeable, and readily removable.

2.7.4 Fuel Filters

- The fuel filters shall be dual with water & sediment trap and shall be accessible, replaceable and readily removable for quick maintenance.

2.7.5 Water Separator

- A water separator shall be installed in the diesel supply system to prevent water from going into the fuel system. It shall also retain rust, metal chips & dirt particles.

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3. COOLING SYSTEM

- The cooling system shall be of tropicalized, closed pressurized, pump forced type, water medium, with ample capacity to permit continuous full load operation of the engine.
- The cooling system shall incorporate efficient tropicalized thermostat.
- Cooling system should include corrosion resistor element replaceable type.

3.1 Radiator

- The radiator shall be tropicalized, of the heavy – duty construction, properly mounted to withstand shock and strains, likely to be encountered in operation.
- Upper & lower channels/tanks, as well as core shall be made from brass and / or copper of repairable type.
- The radiator shall have adequate capacity & flow area, plus a compensation for the altitudes & temperatures in Ethiopia.
- The radiator shall be easily removable & accessible for maintenance.
- Radiator core protection grill & radiator cap with strong chain permanently attached to the radiator shall be furnished.
- A device for preventing collection of rust & dust, which gives unfavorable effect on cooling system, shall be provided in the system.
- Plastics will not be acceptable in manufacture of any part of the radiator.
- It is required to install water filter within the cooling system for trapping foreign materials.

3.2. Cooling Fan

- The cooling system shall be fitted with an adequate size direct drive, cooling fan blowing away from the engine in forward direction to the radiator.
- The fan shall be made from steel (metal) & driven by belt or other alternative has to be stated.

4. ELECTRICAL SYSTEM

- The electric system shall be composed of, but not limited to, a complete **24V** electric starting, charging & lighting systems, electric switches with two keys, etc.
- The system shall be protected with fuses from damage caused from over loads & shorts.
- All wiring shall be enclosed in non-metallic loom.

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4.1 Batteries

- The batteries shall be heavy duty, of ample power to start the engine when cold at sufficient speed down to ambient temperature of 0^0C.
- Batteries shall be **2x12V** in series system, each **120 AH** (minimum) at **24** hours rating.
- Proper cushion shall be provided for battery seat.

5. AIR CLEANER

- Shall be of heavy duty of a two stage dry-type.
- Shall be fitted with pre-cleaner.
- Shall be fitted with automatic dust evacuator
- Dust indicator with a well-protected restriction gauge/indicator of ample capacity, shall be furnished.
- Air cleaner shall be well protected from external damage & strong enough to withstand shocks & impacts.

6. LIGHTING SYSTEM

- Lighting system shall comply to vehicular traffic regulation
- The lighting system shall consist of but not limited to:-
  - ✓ Back up light
  - ✓ Turn signal with emergency **4**-way flashers
  - ✓ Work light (front & rear)
  - ✓ Two lights with stop and taillights
  - ✓ Panel lights
  - ✓ Cab interior light

7. TRANSMISSION

- The transmission shall be fully hydrostatic type of the full power shift, with torque converter, with variable two speed travel and forward travel speed ranges from **3.5 to 10.8 km/h.**

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8. 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.

9. BRAKES

- Foot operated hydraulic or air over hydraulic power actuated service brake, the brake system should meet the requirements according to ISO **10265:2008** standards.
- The parking brake shall be of hand operated mechanical type and automatically applied when brake pressure fails during operation.
- Service brake and parking brakes shall be with built-in safety features for emergency.

10. Undercarriage

- Long, Double grouser, low ground pressure shoes, with sealed track links, sealed and lubricated track rollers, front and rear guiding guards, hydraulic track adjusters and track control pedal.

11. OPERATOR'S CONSOLE

11.1 Controls

- All operating control shall be easily accessible to a normal sized operator and shall not require exorbitant amount of effort for activities.

11.2 Operator's Seat

- Upholstered, adjustable suspension seat with arm rests, placed for good visibility of the operator and for efficient operation of the machine is required.

11.3 Cab

- A cab shall be shock & sound proof fully enclosed steel cabin with safety glasses, windows lockable service doors & necessary mirrors.
- The windshield glasses shall be equipped with Dual, multiple speeds, automatic type washer wipers.
- The cab location shall offer maximum all around visibility & safe operation of the machine.
- Should SAE standard fully enclosed ROPS cab.
- Should be air-conditioned and equipped with FM/AM radio modulator.

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12. INSTRUMENTATION

The instrument panel shall include but not limited to:-

- **Gauges**: -
  - Air pressure (if applicable),
  - Water temperature.
  - Engine oil pressure.
  - Fuel level.
  - Torque converter temperature, (if applicable).
  - Oil temperature.
  - Hour meter.
  - Voltmeter or Ammeter.
  - Tachometer.
  - Speedometer and etc.
- **Indicator / warning lights:-**
  - Converter overheats. (If applicable)
  - Engine coolant over heat & level.
  - Engine oil low pressure.
  - Transmission & hydraulic filter service indicators.
  - Emergency steering system.
  - Air cleaner service indicator. And Etc.

13. HYDRAULIC SYSTEM

- The hydraulic system adequate amount and capacity pumps, oil tanks, line filters, strainers, and relief valves.
- Hydraulic oil cooler shall be incorporated in the system.

13.1 BOOM and ARM Cylinders

- Should be made of strength steel and cylinders of adequate size, and joints and fittings has to withstand wear and crack.

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13.2 Hydraulic Pressure Hose

- The hose shall consist of a seamless oil resistant synthetic rubber tube, one brand of high tensile steel wire & a weather & oil resistant rubber cover with hydraulic hose fittings at either end. Fittings shall be threaded to standard pipe threads & equipped with swivel fittings at one hose end. Hose shall be clip fastened so that wear due to rubbing or entanglement does not occur.

14. BUCKET

- The bucket shall be rock type of high quality alloy steel (high grade steels designed to handle hard & abrasive materials) electric arc welded at all seams.

14.1 Capacity

- The bucket capacity for average material density of **1800 kg/m3** shall be minimum **8.7m^3** cubic meter heaped.

15. OPERATING SPECIFICATIONS

- Operating weight minimum **37,557 kg.**
- Maximum travel speed at rated RPM **10.8 km/h**
- Track shoe width **610mm**
- Fuel tank refill Capacity minimum **625 L**

16. ADDITIONAL ESSENTIAL ACCESSORIES REQUIRED

- Full length steel crankcase guard
- Front and rear hook
- Vertical heavy duty muffler with rain protection cap
- Cap locks for fuel and hydraulic tanks.
- Fan guard
- Pre - cleaner
- Back – up Alarm.
- Transmission guard & power train guard.
- Lockable door type engine hood side cover
- Horns

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17. TOOLS, spare part and Manuals

- Set of ordinary & special tools with lubrication gun, hydraulic jack 50 ton, filter wrenches, as required for maintenance & repair with lockable toolbox, shall be supplied with the machine. (Tools to be supplied shall be listed).
- Average life expectancy separately for major assembles, namely engine, transmission, hydraulic pumps, steering pumps, torque converter, etc. should have to be listed and their warrant period should be mentioned.
- List of line items and quantity of Field kits of spare parts required Minimum for Three Years.
- At least two sets of English version manuals and technical literatures of the units shall be included
    - The sets of manuals shall consists but not limited to: -
    - Operators instruction and maintenance manual
    - Diagnostics & workshop repair manual
    - Spare parts catalogue
    - Others such as hydraulic circuit diagram, electric circuit/ wiring diagram, safety instructions etc.

Note - *Any additional feature other than specified above that the machine has can be stated by supplier*

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