

## Annexure-A

Sub: - TECHNICAL SPECIFICATION

### **1. General:-**

Supply, installation, testing and commissioning of 500KVA, 600BHP, 400KW, Silent AMF Diesel generator set at our site, at Kalakot,(Distt. Rajouri complete with engine and alternator mounted on a common base frame, acoustic enclosure as per CPCB norms, AMF panel, battery and self-starter, alternator coupled to the engine for battery charging, diesel day-tank with required fuel capacity, specially designed residential silencer, etc. The DG set should be provided with necessary Tool Kit for both engine and alternator. DG set should be provided with necessary service manual, electrical circuits for both engine and alternator.

### **2. Diesel Engine:-**

The Diesel engine shall be multi-cylinder, turbo charged after cooled 4 stroke diesel cycle developing required BHP at 1500 rpm, radiator cooled by water with fan etc. The engine shall be capable of delivering specified prime power rating at variable loads for p.f of 0.8 lag with 10% overload available in excess of specified output for 1 hour in every 12 hours. Necessary certificate indicating the compliance of above capacity requirement for the engine model so selected along with compliance of noise emission norms as per latest CPCB guidelines shall be furnished from manufacturer.

### **3. Air System-Intake & Exhaust:-**

- i) Residential Silencer suitable optimized to meet stringent sound emission standards laid down by MOEF/CPCB.
- ii) Stainless steel exhaust flexible coupling for long life.
- iii) Air intake manifold.
- iv) Turbo charge-after cooled.
- v) Dry type replaceable air cleaner with restriction indicator.

### **4. Cooling System:-**

- i) Radiator cooled.
- ii) Self contained piping.
- iii) Engine mounted water pump.
- iv) Engine driven fan.
- v) Corrosion inhibitor.
- vi) Thermostat.

### **5. Fuel System:-**

- i) Fuel Pump.
- ii) Injectors.
- iii) Fuel filters.
- iv) Self contained piping.

### **6. Lubricating system:-**

- i) Oil pump.
- ii) Stainer.
- iii) Lubricating oil cooler.
- iv) Bypass filter.
- v) Self contained piping.

**7. Exhaust system:-**

- i) Exhaust manifold.
- ii) Flexible piping.
- iii) Silencer (Residential).

**8. Governing System:-**

- i) Electronic governor with over speed cutout.

**9. Starting System:-**

- i) Starter 24 Volt D.C.
- ii) Engine driven battery charging alternator with in built regulator.
- iii) Two nos. of 12 Volts, 180AH. Battery with suitable connection terminals and leads for proper battery connection.

**10. Dynamically balance fly wheel**

**11. Control Panel:-**

- i) Ignition Switch (lockable type).
- ii) Lub Oil pressure indication and low lub Oil pressure cut off.
- iii) Water temperature indication and high water temperature cut off.
- iv) R.P.M indication and over speed safety.
- v) Engine Hour Meter.
- vi) Battery charging indication.
- vii) Under Voltage, over Voltage, under frequency, over frequency and overload protection for alternator.
- viii) Engine over speed.
- ix) Over current and Earth fault aided suitable relays.
- x) Microprocessor based AMF controller.
- xi) 1Nos. 1000A, TPN ONLOAD change over switch (For AMF panel by pass).
- xii) 2Nos. 800A, 4Pole ACB for mains and DG set incomer.
- xiii) 800A TPN tinned copper bus bar with colour coded PVC installation sleeves.
- xiv) Battery charging arrangement with trickle and boost mode, DC ammeter and voltmeter etc. 1Nos. (1 No. For DG set starting batteries).

NOTE: - The shut down and trip shall have visual and audible alarms.

**12. Fuel System:-**

1 No. separate day fuel tank fabricated out of 3mm thick M.S CRCA sheet and complete with necessary supports connecting pipes, valves etc. for min. 8hrs. run capacity should be located in the D.G Set enclosure to ensure free flow of diesel.

Also 1 no. hand driven semi rotary pump with flexile pipe shall be provided to transfer fuel from portable drums to day fuel tank. The first filling of day tank is included in the scope of work.

### **13. Alternator:-**

Brushless, synchronous, single bearing alternator of 500KVA at 0.8 p.f (lag). 50 Hz rating at 1500 rpm, suitable for 3 phase, 4 wire system having following features:-

Voltage regulation: +/-1% (the alternator should be self regulated through on AVR).

Insulation: Class H.

Standard enclosure: IP 23 (Screen protected, drip proof).

Rotor: Dynamically balanced.

Excitation: Self excited, self regulated.

Over loading capacity:- Overload of 10% for one hour in 12 hours of operation.

### **14. Base Frame:-**

The base frame should be of as per norms prescribed by ARI and as per CPCB.

### **15. Acoustic Enclosure:-**

The enclosure should be fabricated out of 16 SWG MS CRCA sheet and door shall be min. 16 SWG thick and shall be made air tight with neoprene rubber/ foam type gasket and heavy duty locks.

The enclosure shall be provided with suitable size and no. of hinged doors along the length of enclosure on each side for easy access inside the enclosure for inspection, operation and maintenance purpose. The door in front of engine controller shall have viewing window for visual inspection of parameters. Sufficient space shall be provided inside the enclosure on all sides of DG set for inspection, easy maintenance and repairs.

The enclosure shall be modular construction and free standing type. The enclosure shall be given 7 tank chemical treatments and thereafter finished with UV resistant powder coating of shade as per manufacturer standards. The material, thickness and density of acoustic insulation inside the canopy shall be as per manufacturer standard to limit overall noise levels to 75 db (A) at a distance of 1m from enclosure as per CPCB norms.

The batteries shall be accommodated inside the enclosure in battery rack. An additional exhaust hood shall be provided on top of enclosure at radiator end for directional dissipation of radiator exhaust.

Adequate lighting shall be provided inside enclosure.

Canopy shall be provided with enclosure high temperature safety device. The temperature rise inside enclosure should not be more than 5 deg.C.for max ambient above 40 deg. C and should be below 10 deg. C. for ambient below 40 deg.C.

**16. Earthing:-**

Supply, installation, testing and commissioning of tinned copper earth plate electrode 600x600x3.15mm earth station 2.5mtr. below ground level conforming to IS 3043 and complete with all required materials like coke/ charcoal, salt, brass nut bolt and washers, watering arrangement, GI pipe, masonry chamber, 8mm thick MS chequered cover plate , associated materials like 40x40x5mm angle iron framework, hinged, locking ,arrangements etc. and excavation in ground, refilling and as per instruction of EIC.

**17. Guarantee:-**

The contractor shall warrant that the work is carried out in accordance with the specification. The equipment, structure etc., supplied will be free from defects in materials and workmanship. The contractor shall furnish performance guarantee for a period of twelve months from the date of commissioning or eighteen months from the date of dispatch whichever is earlier. All equipments supplied and installed shall be covered by warranty for 12 months effective from the date acceptance of the work by the department on handing over by the successful tenderer, against defective workmanship and materials. If any equipment/ part is found to be defective due to faulty workmanship,the whole installation or any part thereof found defective during the guarantee period shall be replaced /repaired by contractor at free of charge as decided by the department.

**18. Drawings:-**

- i) Assembly drawing: - This should incorporate dimensions, weight and feeder arrangement.
- ii) Foundation drawing.
- iii) Insulation instructions.
- iv) Maintenance instructions spare parts catalogues for component.
- v) Wiring diagram.

**19. Supply of 3<sup>1</sup>/<sub>2</sub> core armoured aluminium:-**

Conductor Power Cable size-300mm<sup>2</sup> = 50mtrs.

Grade 1.1KV

Note: - The civil work required for the installation of D.G.Set and control panel etc. will be carried out by the Corporation itself.

Manager (P&S)