

**ANNEXURE A**

**Specification for Diesel Generator Set 10 kVA**

Sl. No.	Technical Specifications of DG set of Capacity - 10 kVA	BHEL Technical Requirements	Confirmation by Vendor	Deviations to be mentioned (if any)
1	Standards Conformance:			
	ENGINE:	BS 5514 / IS 3046		
	ALTERNATOR:	BS 5000 / IS 4722		
2	Specification of Engine:			
2.1	Make	Vendor to mention		
2.2	Model	Vendor to mention		
2.3	No. of Cylinders	2		
2.4	Aspiration	Natural		
2.5	RPM	1500		
2.6	BHP (Prime Mover)	Vendor to mention		
2.7	Cooling	Water Cooled		
2.8	Bore (mm) * Stroke (mm)	Vendor to mention		
2.9	Fuel	HSD		
2.10	Compression Ratio	Vendor to mention		
2.11	Displacement	Vendor to mention		
2.12	Fuel Oil consumption at 75% Loading with Recommended Lubricating Oil	should be less than 2.5 Litres / Hour (with tolerance of + 5 %)		
2.13	Lubricating Oil consumption	CH4 15W40		
2.14	Lube Oil Sump capacity	0.3% of fuel consumption		
2.15	Total Coolant Capacity	Vendor to mention (First Fill of Lube Oil and Coolant in vendor scope)		
2.16	Exhaust Pipe Size (mm)	Vendor to mention		
3	Specifications of Governing System	Electronic/Mechanical		
4	Method of Starting	12 V DC Electrical Starter Motor Battery Capacity - 32 AH 12 Volt		
5	Battery Type & Condition	Semi-sealed Maintenance free. Preferably in Dry & Uncharged condition. A separate tray for battery to be provided inside the enclosure.		
6	Mounting	AVM Pads		
7	Documentation Required	O & M Manual of Diesel Engine O & M Manual of Alternator Spare parts catalogue of diesel engine Spare parts catalogue of Alternator Test Certificate of diesel engine Test certificate of Alternator Test Certificate of D.G. Set		
8	Alternator			
8.1	Make	Vendor to mention		
8.2	Rating	10 kVA/ 8 kW		
8.3	Frame Material	Vendor to mention		
8.4	Power Factor	0.8 lag		
8.5	Rated Voltage	415 Volt AC +/- 1.5%		
8.6	RPM / Frequency	1500 RPM / 50 Hz		
8.7	Class of Insulation	H		
8.8	Degree of Protection	IP-23		
8.9	Bearing	Permanent lubricating type		
8.10	No. of Phases	3 Phase		
9	COUPLING & MOUNTING ARRANGEMENT:	The Engine & alternator should be directly coupled by SAE Flange and mounted through AVM Pads on a common channel iron Heavy Duty Base Frame with pre-drilled holes. The arrangement should ensure that there is no change in alignment of DG Set and vibration of DG Set are not transmitted to the Base Frame or to the enclosure.		
10	Control Panel	It should consist of the following: 1. Standard Engine Instrumentation. 2. Control Panel that measures: a) Individual phase current (Amps) b) Phase voltages (V) c) Generator output frequency (Hz) d) Engine water temperature (Deg.C) e) Lube oil pressure (kpa) f) Working hours 3. MCB of suitable rating 4. Push button (Starter) 5. LED indications for main functions 6. Current transformers 7. Instrument fuses duly wired and ferruled		
11	ACOUSTIC ENCLOSURE:	Weather Proof Acoustic Enclosure ( Noise level 75db Max at 1 mtr at 75 % Loading under free field conditions). The Acoustic Enclosure should be made of 2 mm thick CRC Sheet. Should be of Modular construction with provision to easily assemble / dismantle at site. The Sheet metal components should be pre-treated with Hot Dip Seven Tank Process before powder coating. The enclosure should be powder coated (inside & outside) with special pure polyester based powder. There should be provision for filling Fuel from outside the enclosure, with locking arrangement and Fuel Theft protection by means of grill or suitable alternative. External Drain Plugs should be provided for draining Lube Oil & Diesel. The Doors should be gasketed with high quality EPDM Gaskets to prevent leakage of sound. The Door handles should be of Lockable type. A Special residential silencer to be provided with the enclosure to reduce exhaust noise. Temperature of enclosure should not exceed beyond 5 degree Celsius to that of ambient. The enclosure should be provided with high enclosure temperature safety trip. There should be provision of emergency shutdown from outside the enclosure. There should be arrangement to illuminate the enclosure from inside. Enclosure should have provision for Fire Extinguisher.		
12	EMISSION NORMS:	The DG Set should be fully compliant with CPCB emission & other norms .		
13	Scope of Inspection :			
13.1	Physical Inspection:	Check for all the various accessories & attachments specified in the Purchase Order/ Offer and their satisfactory working, various faults to be simulated at works to check the safety control trips in the control panel.		
13.2	Load Test:	1. Half Hour for 50% Load 2. Two Hour for rated capacity. All fuel / Lube Oil expenses will be borne by the vendor at the time of load testing at their works.		
14	Fuel Consumption Test:	Check the consumption of fuel in liters per hour. Specific Fuel Consumption shall match with those specified. The total fuel Tank Capacity also to be verified. Lube Oil Sump Capacity to be verified. All fuel Oil expenses will be borne by the vendor at the time of load testing at our works.		
15	Power Cable: ( in vendor scope)	Outgoing Cable from alternator up to electrical panel of customer – 1.) 4C x 10 sq. mm Copper cable – 20 meter for 10 KVA DG Set		