



ENQUIRY SPECIFICATIONS
FOR
1 X 750 KVA EMERGENCY DG SETS AND ACCESSORIES
2 x 660MW UDANGUDI STPP, STAGE-I
TANGEDCO, TAMILNADU
CUSTOMER : TAMIL NADU GENERATION AND DISTRIBUTION CORPORATION LTD.

Indent
Specification
Number
IS-1-17-2002/16

ENQUIRY SPECIFICATIONS

**1X750 KVA,415V,1500RPM,
EMERGENCY DG SET AND ACCESSORIES**

2X660MW UDANGUDI SUPER THERMAL POWER STATION STAGE-I

CONSULTANT: TATA CONSULTING ENGINEERS, BENGALURU



**INDUSTRIAL SYSTEMS GROUP
BANGALORE-560 012.**

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BHEL- ISG,
BANGALORE

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Bidders should note that the annexure are the integral part of this specification and the signed/stamped copy of the same shall be submitted with the offer.

NOTES FOR THE BIDDER:

- All equipment shall be new and unused (not reconditioned) and of recent manufacture which shall in no case be of a date of manufacture older than one year of the date of delivery.
- The list of items mentioned in the Scope of supply is not exhaustive. Anything over and above the items mentioned in the scope of supply required for making the system reliable and functional shall be in Bidder's scope.
- Design for all equipment supplied by vendor shall be in accordance with the statutory norms and accordingly all drawings to be prepared and submitted by vendor for approval considering latest statutory norms of Explosive, pollution control board, Electrical, Civil design etc applicable for DG Set and its accessories in respective states.
- Preservation of DG Set up to the commissioning date shall be in Bidder's Scope.

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5. If commissioning gets delayed beyond the scheduled date, preservation activities to be carried out shall be clarified in detail to BHEL.
6. Bidder to provide all necessary technical documents in obtaining approval on drawings documents and datasheets during engineering from customer/consultant and shall also visit customer/consultant offices for the same if required.
7. It shall be responsibility of the supplier to convince the customer about the completeness of the parts and quantity offered under mandatory spares. Bidder shall supply all part numbers as required by customer. No item shall be written as not applicable. Similar/ related item shall be provided. Deviation in description shall be clearly brought out in the offer.
8. No item shall be manufactured / dispatched without prior written clearance from BHEL.
9. Battery, Tools and Tackles and Mandatory Spares, B-Check Kit and Lube oil and coolant as per the BOM given in this specification shall be supplied during commissioning on intimation by BHEL.
10. Make of all components to be submitted along with the offer failing which it will be presumed that any makes as required by customer shall be supplied by supplier. Reputed vendors shall be considered for all items. Minor changes shall be accommodated by the supplier in the make of accessories in case same is not getting approved by customer.
11. For any technical queries please write to piyush.anand@bhel.in with CC to hemant.udupa@bhel.in
12. BHEL logos/engraved name plate shall be fixed on the equipment in prominent places. Soft copy of the logo shall be furnished to the successful bidder.
13. Bidder to upload all the documents as mentioned in the below checklist along with the offer.

S NO.	DOCUMENTS
1	BHEL Enquiry specifications along with annexure, duly stamped
2	Data Sheet of Engine.
3	Data Sheet of Alternator
4	Deration calculations for Engine and Alternator
5	Data Sheet of DG set controller.
6	GA drawing of Acoustic Enclosure
7	OEM certificates from Engine and Alternator manufacturers.
8	List of makes of all items as per enquiry.

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SECTION- I**SALIENT POINTS OF CONTRACT:**

1. It shall be bidder's responsibility to ensure that the offered equipment is suitable for motor starting as mentioned in SECTION- IV of this enquiry.
2. Bidder to arrange for to and fro flight tickets, conveyance and boarding and lodging for 2 nos. officials from customer's end (TANGEDCO) who shall witness testing and inspection of DG Set and DG Control Panels at Bidder's works. Preferably, inspection of DG Set & Panels shall be conducted together

SECTION - II**GENERAL INFORMATION:**

1.1	Project Title	2 x 660MW Udangudi STPP Stage-I
1.2	Owner	Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO)
1.3	Plant site location	Near Tuticorin
1.4	Meteorological Condition	The details given are arbitrary and may vary. The contractor should collect the actual data from the Meteorological Department pertaining to the site location and design the plant accordingly.
1.5	Climate	Tropical, very dry and hot summer, dry and cold winter and good rain-fall in monsoon accompanied with strong wind
1.6	Maximum Temperature	41 °C
1.7	Minimum Temperature	17 °C
1.8	Maximum Humidity	97%
1.9	Mean wind speed	20.6km/h
1.10	Seismicity	Zone: II as per IS : 1893
1.11	Design ambient temperature	50 °C

POWER SUPPLY:

S N	LT Supply	VALUE
1.	Plant LT emergency supply	415V, ± 10% 3 phase 3 wire, Resistance earthed.
2.	Plant LT auxiliary supply	415V, ± 10% 3 phase 3 Wire 4 wire solidly earthed
3.	Frequency	50 Hz, -5% to 3%
4.	System fault level	50 kA R.M.S. for 1 SEC
5.	DG Neutral Earthing	Earthing through VT
6.	Panel space heater and light	230 V AC ± 10% 1 PH with one point earthed

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7.	AC Control Supply	110 V AC \pm 10% PT Voltage
8.	Control Supply for panel	220 V DC+10% to (-)15%, 2wire, Unearthed
9.	Control supply for breakers	220 V DC +10% to (-)15%, 2wire, Unearthed
10.	Control Supply for Engine	24V DC Battery Supply
11.	Short circuit rating for 220 V DC System	20 KA for 1 sec.

SECTION – III**APPLICABLE CODES AND STANDARDS**

- The equipment & accessories covered by this Specification shall be designed, manufactured and tested in accordance with the latest relevant standards and codes of practice as applicable including the below mentioned list but not limited to it.
- The DG Set & Electrical accessories shall be also confirm to the latest Electricity Rules & other related Statutory agencies as regards explosive, electrical, safety, earthing and other essential provisions specified(RESPECTIVE STATE)
- The installation work shall confirm to Indian electricity Act and Indian electricity rules as amended up to the date this specification is issued. Nothing in this specification shall be construed to relieve the contractor of this responsibility.
- In the event of any conflict between the codes and standards referred, and the requirements of this specification, the requirements, which are more stringent, shall govern.

APPLICABLE STANDARDS	COMPONENTS/ITEMS
BS : 5514, ISO : 3046 ,SAE J1349, IS – 10000, DIN 6270,BS 649/195B	ENGINE
IS- 1271, 2253, 4722, 4728, 4889, 6362, 7132, 7306, 7816, 12065, 12075, 12802, 13364, 13118, IEC- 60034	ALTERNATOR
VDI 2063	Measurements and evaluation of mechanical vibrations of reciprocating piston engines and piston compressors.
IS-5, 2007	Color for ready mixed paints & enamels

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IS-694, 2010-2012, IS-1554 Part 1, IS 7098 for XLPE	PVC Insulated cables for working voltage up to and including 1100 Volts.
IS-1248, Part - 1 to 9, 1991-2003	Direct acting indicating analogue electrical measuring instrument & their accessories
IS-2026, Part-1, 1991-2011	Power Transformers (General)
IS-2551, 1990	Danger Notice Plates.
IS-2705, Part-1, 2,3,4, 1992-2002	Current Transformers
IS-3156, Part-1, 2,3,4, 1992-2002	Voltage Transformers
IS-3231, Part-0, 1,2,3, 1987-2001	Electrical Relays for Power System Protection.
IS-5082, 1998-2003	Wrought Aluminum & Aluminum alloy bars, Rods, Tools & Sections for Electrical purpose
IS-5578, 1984-2001	Guide for marking of Insulated Conductors
IS-7372, 1995	Lead Acid storage batteries for Motor vehicles.
IS-60947, Part-1-5, 2007-2012	Low voltage Switchgear & Control Gear assemblies.
IS-60947, Part-1-5, 2007-2012	Low Voltage Fuses: Supplementary requirement for fuses for Industrial applications.
IS-8183	Bonded mineral wool
IS-1460 -1995	HSD
IS-60034, 750	Classification of degree of protection provided by enclosures of electrical equipments
IS 2629	Recommended practice for HOT-DIP galvanization of Iron and Steel
IS 2623	Methods for testing uniformity of coating of Zinc coated articles.
OSID-GDN-180	OSID standard on lightning protection.
IS 4722	DG starting motor

SECTION – IV**OPERATING PHILOSOPHY:**

1. One No. Emergency DG set of 750 KVA, prime power, 415 V, 1500 RPM, 0.8 PF at 50 degree Celsius ambient has been envisaged for this Project.
2. The DG Set shall be of **Prime rating** while the Alternator shall be of **continuous duty**.
3. The worst case full load running duration of the DG can be considered to be 12 hours.
4. Emergency DG Set shall have AMF start facility and shall be capable of starting automatically on mains failure and take up the load within 30 seconds. The DG I/C circuit breaker should close automatically to energize the essential loads. Loads connected through SFU/MCCB will get applied



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directly on closing the DG I/C breaker and balance loads will be switched on as per process requirement.

5. The DG set shall be capable of starting the largest emergency motor (90KW) DOL while the DG is operating at its base load (10KVA). Starting power factor of 0.3 and starting current of 7.7 times of full load current (including tolerance) to be considered for calculating voltage drop at motor terminals during DOL start of motor which should be within 15% . $X_d' = 13.0\%$ and design ambient temperature of 50 degrees Celsius to be considered for above calculations. **From DG Set to Emergency section of RO DM PMCC 2 runs of 1C*630 Sq.mm/phase ,AL,XLPE insulated, armoured cable is considered. Emergency section of RO DM PMCC to RO DM Flushing Pump Motor of 90 KW 2 runs of 3C*240 sq.mm AL,XLPE insulated, armoured is considered. Supplier to confirm the suitability of the DG for this motor starting. Running pf of the 90kW motor =0.86, Motor efficiency =0.95.**
6. Manual control of engine speed and generator voltage shall be provided through raise/lower control switches located on AMF panel and ECP/DCS in control room.
7. On resumption of the Mains supply the DG shall be momentarily synchronized with Mains supply and the load shall be transferred to the Mains supply so that there is no break in power to the load.
8. Provision for auto as well as manual synchronization shall be provided.
9. Provision shall be provided to synchronize the DG to the EMCC Bus to take the load of the Mains supply and run in parallel for some time for testing purposes.
10. Two sets of Potential free contacts shall be provided for all major alarms and indications to be taken to Central control Room.
11. The fuel oil system and lubricating oil system shall also start simultaneously as soon the engine receives starting impulse.
12. There shall be a provision for Remote Start/ Stop of the DG set. The DG set shall have facility to stop manually from Remote/Local.
13. The DG set shall have suitable control arrangement so as to meet functional and control requirement mentioned elsewhere in the specifications.

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SECTION V**BILL OF MATERIALS:**

Sl. No.	ITEM DESCRIPTION	QTY	UNIT
1	750 KVA (e) 1500 RPM, 415V 0.80pf (lag) DG with Radiator and accessories on common Base Frame.	1	Set
2	Fuel Day tank of 990 Liters capacity with accessories.	2	Set
3	24VDC, Lead Acid Type automotive Battery with accessories and stand, to be supplied at the time of commissioning.	2	Set
4	Float cum Boost Battery Charger Panel with stand.	2	Set
5	Heavy duty Changeover switch for selecting one out of two set of batteries	1	Set
6	Necessary Fuel Piping, supports, accessories for DG.	1	Set
7	Silencers , exhaust piping and stack, silencer supports and accessories like bellows, flanges, gaskets, bends , insulation and aluminium cladding and hardware. Galvanized exhaust pipe support structure	1	Set
8	Acoustic enclosure for DG.	1	Set
9	LT Power, Control, Instrument and screened cable including all accessories like lugs, glands, ties etc for DG.	1	Set
10	B-Check kit for ENGINE, to be supplied at the time of commissioning.	1	Set
11	First fill of lube oil, coolant and coolant conditioner at site for one DG, to be supplied at the time of commissioning.	1	Set
12	Tools & Tackles specific to offered DG Set.	1	Set
13	Phase side and Neutral side terminal box for Alternator	1	Set
14	AMF Panel with ACB for one DG	1	Set
15	NGR PANEL with isolator	1	Set
16	Commissioning Spares for control panels.	1	Set
17	Supervision of Erection of DG Set with exhaust piping and structure, fuel piping, control panels and cabling.	1	Set

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18	Supervision of testing, pre commissioning checks, and commissioning and load trial of DG SET with Control Panels as per operating philosophy.	1	Set
19	Supervision of Performance Guarantee Test for DG.	1	Set
20	Factory Training for customer/BHEL personnel	10	Mandays
21	Mandatory spares for DG Set and Panels.(As per technical spec Section-VI Clause-21)	1	Lot

SECTION VI

DETAILED SCOPE OF SUPPLY AND TECHNICAL SPECIFICATIONS FOR ITEMS MENTIONED IN BOM.

Also see attached customer specification.

1. DG SET:

1. The Generating Set shall be Prime Power of 750 KVA (e) 1500 RPM 415V 0.80pf (lag) at 50°C ambient temperature at Alternator terminals excluding auxiliaries , capable of 10% over load at rated speed once in every 12 hours of operation, complete with all accessories, suitable for battery start.
2. The DG set shall be complete with Electronic Governor, with pre lube pump/motor (if required) with coupling, with QDCT, with AMF feature, with engine mounted radiator on common base frame, with elastic fastening equipment ,battery charging alternator, fly wheel cover, AVMS, turbochargers, residential Silencer, flexible bellows and reducers & water/fuel/lube oil/exhaust/air piping on skid including all erection hard ware, lube oil filters , fuel filters, heavy duty air filters, lube oil, coolant and conditioner, jacket cooling water and fuel oil etc required for factory testing.
3. The entire DG Set shall be mounted on a common base frame and the same shall be mounted on anti vibration mounting system.
4. Two nos. ground pads shall be provided on base frame for earthing.
5. The DG Set shall be housed inside acoustic enclosure (suitable for outdoor installation, if required) for noise reduction. However the entire equipment shall be inside a DG Building.
6. The governor shall have capability to maintain speed constant in case of sudden variation of load.
7. The engine shall be radiator cooled while the Alternator shall be air cooled.
8. Automatic pressure lubrication shall be provided by a shaft driven gear type pump. In addition to same hand driven/ AC motor driven lube oil priming pump (If applicable) shall be provided.



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9. The Alternator shall be brushless type, self regulated, self excited, drip proof and screen protected. The terminal box should have IP 54 protection.
10. The AC generator shall be supplied with its excitation system, AVR and include all necessary auxiliaries.
11. The generator shall be star connected 3- phase 50 Hz synchronous generator and shall have continuous rating.
12. Alternator shall be of class H insulation with temperature rise limited to class F temperature type limits. In line with IEC 60034 part1. AVR shall be DIGITAL type.
13. Suitably rated 240 V single phase 50 Hz space heater shall be provided in the alternator to prevent moisture condensation during idle period.
14. RTD's and BTD's shall be provided in the alternator as per attached TANGEDCO customer specification.
15. The critical speed of the machine shall not be less than 120% and all coupling shall be capable of withstanding the maximum generator sudden short circuit torque.
16. The serial communication port of the DG controller shall communicate with Plant control system with Modbus /OPC protocol. All software and hardware required for the same shall be in supplier's scope.
17. The DG shall be suitable for HSD as fuel.

2. FUEL TANK

1. Fuel Day Tank of 990 liters capacity along with pre-fabricated stand shall be supplied for each DG. The thickness of the tank shall be 3mm.
2. The tank shall be mounted on **pre fabricated steel platform**, with fuel pipes on tank, level indicator marked in liters .
3. The tank shall be mounted on pre fabricated steel platform, with one common level indicator (heavy duty tubular level gauge marked in litres) with channel protection for two tanks.
4. 3 nos. Level switches with NO contacts for indicating Low, very low and high level shall be provided common for two tanks. Air vent, drain plug and required hardwares shall be provided for each tank.



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5. The height of the steel platform/stand shall be finalized during detailed engineering and shall be as per manufacturer's standards.
6. The fuel tank shall be painted with oil resistant paint and all pipe joints shall be brazed / welded.
7. Hand operated pumps (one for each DG Set) with Hose pipes of length 10 meters for transferring fuel from barrels/drums to 990 Litres Day tank shall be supplied by the bidder. Inlet of the pump shall have 5m long armoured hose with suitable filter.
8. The paint shade of the tank shall be finalized during detailed engineering.

3. BATTERY

1. The DG set shall be suitable for battery starting.
2. The minimum rating of battery shall be 24 V DC 180 AH or as per actual sizing calculation whichever is higher, heavy duty Lead Acid type automotive maintenance free battery suitable for Engine starting shall be supplied by the bidder at the time of commissioning.
3. Two sets of battery has been envisaged for this project which shall be in parallel operation. Each battery set shall be 100% Stand By to the other.
4. The battery shall be suitable for 6 consecutive start of the Engine without recharging and shall also be used for control supply of DG AMF Panel for at least 8 hours and should be inclusive of 10% design margin.
5. The bidder shall also supply **prefabricated battery stand**, battery leads, nuts and bolts, hand gloves etc for maintenance purpose.

4. BATTERY CHARGER

1. Suitable Float cum Boost battery Charger for recharging Engine starting battery shall be supplied. Two chargers meant for one DG may be housed in one panel.
2. The charger shall be suitable to automatically switch from Float to Boost mode depending upon the state of the battery.
3. Input supply to Battery Charger shall be single phase 230 V AC.
4. The charger shall be protected by current limiting device. The charger shall be capable of recharging the discharged battery within 08 hours.



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5. In auto mode the charger shall operate in either float or boost mode depending upon the state of battery.
6. In manual mode , the operator may switch to either float or boost mode depending upon the requirement.
7. Potentiometer for voltage and current adjustment to be provided in the charger.
8. The battery charger shall operate in Float / Boost mode depending on the state of the battery and shall have Auto/Manual SS and Voltage and current adjusting potentiometer.
9. Necessary filters and chokes and suitable input transformer to automatically reduce charging current, as battery gradually charges up and to prevent overcharging of battery
10. The charger shall be housed inside a small cabinet with the front facia having flush mounted 96 sq mm, Class 1 digital type DC Voltmeter, DC Ammeter, AC Voltmeter and Selector switches and indicating LEDs.
11. The charger shall be mounted on a stand to meet the minimum operating height criteria (750mm). Prefabricated stand if required to be supplied with the charger.
12. The degree of protection of battery charger panel shall be IP 42.
13. The charger shall have protection for over voltage, over current and short circuit.
14. The paint shade of the Battery Charger panel shall be finalized during detailed engineering.

5. HEAVY DUTY CHANGEOVER SWITCH FOR SELECTING ONE OUT OF TWO BATTERIES

1. One no. change over switch suitable for selection between the two sets of batteries of DG shall be provided. Engine starting supply and Control supply for panels shall be taken after this switch. The switch and connecting cables shall be adequately rated to ensure that the protection relays/ auxiliary relays/ contactors/ other components do not drop/reboot during the engine starting time.

6. FUEL PIPING

1. Necessary Fuel Piping with hardwares, U clamps, valves, pipe fittings, pipe support, flanges, gaskets, drain and vents from day tank to engine(Supply and Return line) as required for the DG Set.
2. MS channels, angles and plates, anchor fasteners to support fuel pipes inside the trenches shall also be in bidder's scope.
3. Hose pipe with accessories for connecting Fuel Lines to Engine Fuel inlet and outlet with necessary adapters/connectors to be provided by the bidder.



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7. EXHAUST PIPING AND ACCESSORIES

1. **Exhaust piping** with flanges, bellows, gaskets, necessary nuts and bolts, hangers, starting from engine exhaust outlet to total height as per applicable norms.
2. The **entire length** of exhaust pipe and stack along with silencers to be provided with **50mm thick thermal insulation** and 24 gauge **aluminum cladding** to maintain the temperature within required limits.
3. The exhaust stack height should meet the requirement given by gazette notification of Ministry of Environment and forest, CPCB guidelines, and state pollution board guidelines for the offered rating of the DG.
4. Stack shall be complete with sampling point and carbon pockets at suitable location.
5. Erection materials like ISMC Channels, angles, base plates, anchor fasteners to support exhaust pipes and its support inside as well as outside the DG room shall be in scope of the bidder.
6. **Galvanized exhaust support structure (minimum 610g/sq.m)** (height as per applicable norms) shall be in Bidder's scope.
7. Foundation bolts for exhaust support structure in bidder's scope.
8. Platforms at suitable height in the exhaust support structure to be considered by the bidder.
9. Bidder to submit the CPCB guidelines for the height of the Stack.
10. Bidder may refer to tentative DG layout drawing **Annexure-1** to get an idea of the exhaust piping layout.
11. Bidder shall also consider miscellaneous channels and angles for erecting control panels/pipes/ fuel tank etc.
12. Lightning arrester for exhaust structure shall be in bidder's scope

8 . ACOUSTIC ENCLOSURE:

1. For details please refer attached customer specification.
2. The enclosure shall be fabricated out of 2mm CRCA steel for load bearing parts.
3. Enclosure shall be provided with adequate number of doors with heavy duty hinges and handles and shall have adequate lighting arrangements.
4. Suitable louvers on fresh air intake side and radiator side with acoustic treatment shall be provided. The hot air from radiator shall be discharged through modular duct.



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5. Any type of ducting required inside or outside of the enclosure for discharge or intake of air shall be in bidder's scope.
6. The acoustic enclosure shall be suitable enough to prevent leakage of sound and bidder shall ensure that noise measurement shall not exceed 85 db(A) at a distance of 1 meter around the machine or as per CPCB norms whichever is more stringent. Noise level measurement shall be carried out using applicable and internationally acceptable standards. The measurement shall be carried out with a calibrated integrating sound level meter meeting the requirement of IEC 651 or BS 5969 or IS 9779.
7. All lighting fixtures inside the acoustic enclosure shall be in bidder's scope.
8. Paint shade of acoustic enclosure shall be finalized during detailed engineering.

9. CABLES AND ACCESSORIES:

1. LT Power & Control Cables including all accessories like lugs, Double Compression nickel plated brass glands, ties etc, Special Cables, instrument Cables, inside DG Room between equipments supplied by DG supplier (Cables between DG Supplier supplied equipment and other equipment is not in DG Supplier scope) . **However all glands, lugs and ties required on generator panels and any other equipment supplied by the bidder shall be in Bidder's scope.** List of glands/lugs required for terminating external cables (not in scope of bidder) shall be provided during detailed engineering.
2. **LT Power cables** shall be 1100V grade single/multi core, stranded H4 grade aluminum conductor, XLPE insulated, armored, with PVC inner sheath, armoured & outer sheath made of FRLS PVC compound. Minimum conductor cross section for power cables shall be 10sq mm for aluminum cables.
3. **Control cables** shall be 1100V grade, multicore, min. 2.5sq mm cross section, stranded plain annealed copper conductor having minimum 7 strands, PVC insulated, PVC inner sheathed/galvanized steel wire armored, overall FRLS,PVC outer sheathed generally confirming to IS 1554 part 1. From charger to battery minimum 6sq.mm copper cable shall be considered and from battery to engine minimum 120sq.mm copper cable shall be considered. CT circuits shall have minimum 4sq.mm Cu wire,
4. **Instrumentation cables** shall be annealed, tinned, 7-stranded copper conductor, 0.5 sq mm, PVC insulated, armoured, FRLS sheathed and twisted into pairs.
5. **Screened cable** to be provided to connect RTD and BTM in alternator to temperature Scanner and for AVR and GOVERNOR connections for voltage and speed raise/lower.

10. COMMISSIONING SPARES/ B-CHECK KIT:

1. Commissioning Spares/B-Check kit shall be supplied by the bidder at the time of commissioning.



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2. Lube oil filters /Bypass lube oil filter /Fuel oil filter kit & its seal rings, air filters and accessories, coolant filters, coolant testing kit, alignment check of the engine and alternator and any other commissioning spares recommended by the manufacturer shall be in bidder's scope and to be supplied at the time of commissioning.
3. The B-check of the Engine shall be carried out in the presence of Bidder's experts / engine experts and the service charges towards the same to be borne by the bidder.

11. LUBE OIL AND COOLANT:

1. First fill of lube oil, coolant and coolant conditioner at site at the time of commissioning shall be in the scope of the bidder.
2. Lube oil and coolants for first fill to be supplied at the time of commissioning only and shall not be sent along with the DG Sets.
3. Manufacturer recommended coolant and lub oil shall only be supplied.

12. TOOLS AND TACKLES:

1. Bidder to supply new set of tools and tackles of reputed make specific to the supplied DG set for the maintenance of the equipment exclusively by customer.
2. These tools should be separately packed and shipped. Tentative List of tools is enclosed. Vendor to confirm suitability of the following tools for their equipment. If any addition / deletion / new list are required for the DG, it may please be furnished and will be decided during detailed engineering.

S. No	Description	S. No	Description
1	Torque Wrench (2-8 ft-lb),3/8" square drive	15	Double ended box spanners in 16 sizes with sliding bar and wallet: 6 x 7mm, 8 x 9mm, 10 x 11mm, 12 x 13mm, 14 x 15mm, 16 x 17mm, 18 x 19mm and 20 x 22mm.
2	3/8" to 1/2" square drive	16	Combination pliers – 8" long
3	Screw driver socket 1/2" square drive	17	Nose pliers –6" long
4	Ring and open end combination wrench (1/2",3/4,"9/16", 7/8", 15/16", 7/16"	18	Plastic hammer 0.1/2" diameter and iron hammer.
5	Ring Spanner Set (The ring sizes include 6X7 8X9 10X11 12X13 14X15 16X17 18X19 20X22 21X23 24X26 25X28 30X32 and are 12 in number.)	19	Half moon spanner – 3/4" x 5/8"



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6	Double ended Spanner set- (12 nos in 1 set)	20	Measuring Scale and tape(3m)
7	Tool box for the above	21	5 piece file set.
8	Socket 7/8" – ½" square drive	22	Socket 9/16" – ½" square drive
9	Socket 7/8" – ½" square drive	23	Extension – ½" square drive, 3" long
10	Dial gauge – 1" Travel, Least count 0.001" with magnetic base	24	Socket 5/8" – ½" square drive
11	Extension – ½" square drive, 5" long	25	Cable splicing knife.
12	Socket 1/2" – ½" square drive	26	Screw driver Set
13	Adjustable wrench – 10" long	27	Electrical Tester
14	Allen Key Set	28	Insulation tapes (R,Y,B,N) - 2 each.

13. ALTERNATOR TERMINAL BOXES

1. Neutral Side and Phase side terminal Box shall be supplied by the bidder.
2. The terminal box shall have IP 54 protection class.
3. The terminal box shall be suitable to connect NSPBD. Dimensions will be given during detailed engineering.
4. The terminal Box shall be suitable to house protection CTs with necessary supports.
5. The paint shade of the terminal box shall be same as that of the DG Set.

14. AMF PANEL

AMF panel shall receive power supply from alternator and feed to emergency MCC of Owner. It shall be provided with required air circuit breakers, CTs, PTs, protection relays, multi-function meters, indication etc.

The following are the necessary list of components in each DG AMF Control panel. However any other components required making the system operate as per the approved operating philosophy shall be in Bidder's scope.

A. CURRENT /POTENTIAL TRANSFORMER

SNO	DEVICE NO.	DESCRIPTION	MAKE	TYPE	RATING	QTY
A. CURRENT/POTENTIAL TRANSFORMER						
1	CT with mounting arrangements.	CT FOR METERING	As per customer approved list	Cast resin	Cl-0.5, ISF<5, VA as required.	3

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SNO	DEVICE NO.	DESCRIPTION	MAKE	TYPE	RATING	QTY
2	CT with mounting arrangements.	CT FOR DG SET CONTROLLER, if required	--do--	Cast resin	As required.	3
3	PT	Potential Transformer Draw out	--do--	Protection & Metering. Insulation E or better.	$415 / \sqrt{3} V$ $110 / \sqrt{3} V$ 100VA, CL 0.5/ 3P, Cast resin	3
4	PT	OPEN DELTA Potential Transformer for earth fault sensing.	--do--	Protection.	$415 / \sqrt{3} V$ $110 / \sqrt{3} V$ CL 0.5/ 3P, Cast resin, VA as required	3
5	PT	For earthing alternator neutral	--do--	Protection.	$300/ 110 V$	1
6	CONTROL TRANSFORMER		--do--	For distribution	$415/230$	1
B. TRANSDUCERS (current and voltage ratings shall be as per respective DG ratings)						
1	CTD 1,2,3	Current Transducer	---do---	Aux. Supply: 220 V DC. Accuracy Class-1	Dual Output: 4 – 20mA	3
2	PFTD	Power Factor Transducer	---do---	(For 3 Ph, 3 Wire System) Self-Powered. Aux. Supply: 220 V DC. Accuracy Class-1	Range: 0.8 Lag – 0.8 Lead Dual output: 4 – 20 mA	1
3	KWTD	Watt Transducer	---do---	3 Ph,3Wire un-balanced load. Aux. Supply: 220 V DC Accuracy Class-1	Dual Output: 4 – 20mA	1
4.	VTD1,2,3	Voltage Transducer 1,2,3	---do---	Aux. Supply: 220 V DC Accuracy Class-1	Dual Output: 4 – 20mA Input: 0 – 500 V AC	3
5.	FTD	Frequency Transducer	---do---	Self Powered. Aux. Supply: 220 V DC Accuracy Class-1	Range: 45 – 50 – 55 Hz Dual Output: 4 – 20mA Input: 0 – 55 Hz	1
C. TEMPERATURE SCANNER						
1	TC	Temperature Scanner	---do---	PT 100 (RTD)	0 – 150 deg C 16- CHANNELS	1
D. MEASURING INSTRUMENT DETAILS.						
1.	M	Digital Ammeter Digital Voltmeter Digital frequency meter	---do---	FLUSH MOUNTED. DIGITAL	110 V AC CL 1.0, with push buttons.	1 each

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SNO	DEVICE NO.	DESCRIPTION	MAKE	TYPE	RATING	QTY
		Electronic kWh meter sealable type with counter display Digital kW meter Pf meter				
E. AUXILIARY CONTACTORS						
1	K	Auxiliary / Power Contactors	---do---		220V DC with 4NO+4NC	As required.
2	R	Auxiliary Relay	---do---		220V DC with 4NO+4NC	As required.
F. SELECTOR SWITCHES						
1	S/S	Selector switches	---do---		16A DC, 1/2 pole. 4 positions, lockable, Changeover etc as per the requirement.	As required.
G. PUSH BUTTONS						
1	S	PUSH BUTTONS	---do---	RED /GREEN / BLACK	2NO+2NC	As required
H. INDICATING LAMPS (LED TYPE)						
1	L	INDICATION LAMPS	---do---	CLUSTER LED TYPE	220 V DC/ 24V DC	As required
I. HOOTERS						
1	H	Hooters	---do---	Industrial type	220 V DC	1
J. CONTROL AND POWER FUSES, NEUTRAL LINKS WITH BASE						
1	F	Fuses with base and N- links with base	---do---	HRC cartridge fuse link type	220 V DC/230 V AC/ 24V DC	As required
K. MCB						
1	Q	MCB with Base Plate	---do---		3/4 pole, 2 Pole, 10A, 6A, AC/DC AS REQUIRED	As required
L. OTHERS						
1	ANNUN	Annunciator (min 16 channel)	---do---	Static annunciator, with acknowledge, reset and lamp test push buttons.	The sequence of operation shall be similar to ISA-2A	1 No.
2	T	Toggle Switch	---do---	1/2POLE	10A	As required
3	L	Limit Switch with Base	---do---	2NO+2NC	220 V DC /230V AC	As required

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SNO	DEVICE NO.	DESCRIPTION	MAKE	TYPE	RATING	QTY
4		Plug & Sockets, space heater(with thermostat)	---do---	2 Pin with Earth	10 A , 230V AC	As required
5	T	Any Matching Transformer if required	---do---		415V/110V 415V/24V 230V/24V	As required
6	L	Panel Lamp	---do---	CFL lamp	230 V AC	1 No.

M. MOTORIZED POTENTIOMETERS

1	Motorized Potentiometer/ or suitable provision for Voltage Control from AMF Panel/Remote				Aux supply:220 V DC	1 No.
2	Motorized Potentiometer/ or suitable provision for Speed Control from AMF Panel/Remote				Aux Supply, 220 V DC	1 No.
N.	Provision shall be provided for starting / stopping , voltage raise / lower and speed raise / lower commands from remote along with the local operation (from DCS)					
O.	Master trip relay					
P.	PT Fuse fail indication using MPCB					
Q.	Three attempt starter/cool down timer shall be included					
R.	220 V DC supervision relay					
S.	24 V DC Supervision relay					
T.	Under voltage relay VAG11 or comparable equivalent					
U.	Under/Over frequency relay P94V8 or comparable equivalent					
	<i>Bidders to note that the above components are tentative, any other item or protection required for safe and reliable operation of the DG as per the operating philosophy shall be considered by the bidder in his offer and shall be supplied without any commercial implications to BHEL. Also, the components required as per customer specification attached shall also be provided.</i>					

- Components for the satisfactory working of the system and to achieve overall functional requirement are in the scope of the supplier .All CT/PT's shall be cast resin type. All standard accessories like test terminal blocks, disconnecting TB's etc. is in the scope of the supplier.
- The Panel shall have a rigid welded structural frame smooth finished and free from all flaws, enclosed completely by CRCA sheets of minimum 1.6mm for no loadbearing members and 2 mm thickness for load bearing members and 3mm thickness for gland plates/4mm for Al gland plates.. All doors panels, removable covers shall be gasketed properly with neoprene rubber gasket. The panel shall have openable front and back door with concealed hinges. Suitable shrouding arrangement shall be provided inside the panel for safety of maintenance personnel. Doors shall be provided with lockable knob.
- Enclosure Protection shall be IP 54.
- 4 sqmm cables to be used for CT and PT connection. 2.5/1.5 sq mm cables to be used for voltage connections & control wiring. Wiring shall be 1100 grade, single core stranded copper conductor wires with PVC insulation
- Maximum operating height shall be less than 1800 mm and minimum operating height more than 750 mm. adequate clearances shall be provided between all live parts and structure etc., as per relevant Indian standards.



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6. Earthing bus of 50 x 6 mm Al shall be provided at the bottom of the cubicle. All non-current carrying metal work of the panel shall be effectively connected to the earth bus. Earth bus shall be extended out of the panel.
7. Panel wiring and termination: Panel shall be supplied completely wired internally to equipment and terminal blocks and ready for purchaser's external cable connection, at the terminal blocks. The wiring shall be securely supported, neatly arranged, readily accessible and connected to equipment terminals and terminal blocks. Wiring should run through PVC slotted channel with covers. Wiring terminations shall be made by solder less crimping fork type lugs on equipment side and pin type lugs on terminal side. Engraved tightly fitting plastic ferrules shall be provided for wire identification. These shall be suitably located for ease in external wiring.
8. **20% spare terminals shall be provided.** Window facia annunciation system shall be provided for centralized registration and indication of fault conditions. Potential free contacts are to be wired for indication. Audible alarm shall be provided. Push buttons for acknowledge, reset and test shall be provided. The facia windows shall have multiple LEDs and not incandescent lamps for illuminations in case of faults. List of faults will be finalized during drawing approval.
9. Two sets of potential free contacts to be given for all major alarms, annunciations and indications to be taken to plant control Room. Same shall be decided during detailed engineering.
10. The DG Set supplier shall provide engine governor and Automatic Voltage Regulator, which will have some signal, interlocks to the DG Control panel. Same shall be finalised during detailed engineering.
11. AMF Panel shall be provided with thermostatically controlled space heaters to keep the air inside the AMF panel enclosure sufficiently above the dew point to prevent condensation. The heaters shall be located such that wiring, buses and control devices do not get over heated.
12. **The panel shall also have feeders for all auxiliaries of the DG Set and Battery Chargers.**
13. Necessary transparent shrouding shall be provided for live parts , CT and PT terminals.
15. **NGR PANEL:**
 1. Diesel Generator's neutral shall be earthed through resistance such that the 415V system earth fault current is limited to 1A when supplied from DG. NGR shall be suitable for continuous duty. Resistor shall be punched stainless steel grid type with suitable enclosure and isolator. NGR panel shall be IP-55, suitable for outdoor installation.
 2. Isolator shall be provided with interlock from DG AMF panel so that the isolator opens when DG and Mains are running in parallel.
 3. Paint shade of NGR panel shall be finalized during detailed engineering.



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16. COMMISSIONING SPARES (PANELS)

1. Control Fuses only – 1 set (2 Nos. of each type as used in the complete set of panels above)
2. Indicating Lamps – 1 set (2 Nos. of each type as used in the complete set of panels above).
3. Timer – 1 no. of each type.
4. Auxiliary Contactor- 1 set (1 no. of each type used in DG AMF panel above).
5. Auxiliary relay- (1 no. of each type used in DG AMF panel above).
6. MCBs - 1 set (1 no. of each type used in complete set of panels above).
7. Door Lock: - 4 nos. of each type as used in AMF and Aux DB.

17.SUPERVISION OF ERECTION

1. Supervision of Erection of DG Set Package shall be in Bidder's scope.
2. Bidder shall send his supervisor for supervision of erection of the DG Set, acoustic enclosure, fuel lines, exhaust piping, exhaust structure, Control panels, Terminal boxes, CTs, cabling etc. as and when informed by BHEL.
3. At least one week prior notice shall be provided to bidder for deputation of his engineer/supervisor.
4. Bidder's supervisor shall support BHEL officials in getting the necessary erection protocols accepted by the customer/consultant.
5. Boarding and Lodging and conveyance of bidder's supervisor/engineer is not in BHEL's scope.

18.SUPERVISION OF TESTING & COMMISSIONING:

1. Supervision of pre commissioning checks, testing of DG and accessories and control panels and supervision of Commissioning of the same as per the approved operating philosophy shall be in Bidder's scope.
2. The test equipments and manpower for testing shall be provided by BHEL at site. However the Bidder's supervisor is expected to carry his basic testing kits and tools.
3. Load trials of one entire DG Set Package on maximum available plant load. This shall also include proper training for customer's O&M team at site.



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4. Bidder's supervisor shall support BHEL officials in getting the necessary commissioning protocols accepted by the customer/consultant.
5. Supervision of testing and settings of generator protection relay through primary/secondary injection at site either by manufacturer/bidder's engineer shall be in scope of bidder. Secondary injection kit shall be provided by BHEL.

19.SUPERVISION OF PG TEST

1. Supplier to depute its representative to carryout supervision of PG Test as and when required by BHEL. Load/ Fuel not in supplier's scope.
2. The procedure for carrying out the PG Test shall be mutually decided by the supplier, BHEL and end customer/consultant.
3. The bidder shall provide support in the form of required copies of as-built drawings, documents, datasheets, protocols or any other information required by BHEL for obtaining statutory clearances from CPCB, CEA,CCOE and other applicable bodies for the supplied DG Sets (If applicable). Necessary approvals shall be taken by BHEL.

20. TRAINING

1. High quality hands on training regarding various modes of operation including parallel operation, as given in BOQ shall be provided to BHEL/customer so that they can operate & maintain the DG Sets confidently. Boarding/ Lodging of BHEL/ customer engineers not in supplier scope.

Training at respective manufacturer's works on following:

- a. Diesel Engine –Operation & Maintenance, Settings for various modes of operation including parallel operation, Trouble shooting- 2 mandays
- b. Alternator & AVR –Operation & Maintenance, Settings for various modes of operation including parallel operation, Trouble shooting- 1 mandays
- c. DG Set Controller – Programming, testing, Configuring for various modes of operation, parallel operation, data transfer to remote(networking) -3 mandays.
- d. Numerical relay – relay setting, parametrization and testing of relays -4 mandays.

21. MANDATORY SPARES

- Bidder to supply one set of mandatory spares for DG set package. These mandatory spares should be separately packed and shipped (refer to packing instructions).

A. Diesel Generator

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S.No	ITEMS	QTY	UNITS
1	Fuel injection nozzles	2	Set*
2	Crank shaft with standard size journals	1	Set
3	Main Bearings	1	Set
4	Big end bearings (Conrod big end)	1	Set
5	Diesel filter packs (filter elements)	20	Nos.
6	Mobile oil filter packs (lube oil filter elements)	20	Nos.
7	V-belt for radiator fan	5	Nos.
8	Fuel injector	5	Nos.
9	Fuel injection piping	1	Set
10	Ring gear for flywheel	1	Set
11	Starter	1	Set
12	Nozzle tester, barring bar, slings, eyebolts	1	Set
13	Pressure Switch	1	Set
14	Temperature Switch	1	Set
15	Pressure Sensor	1	Set
16	Temperature Sensor	1	Set
17	Rotating diodes and fuse for main field excitation of each rating	2	Nos.
18	Temperature Scanner	2	Nos.
19	CT of each type and rating	1	Set
20	Protective relay of each type	1	No.
21	Auxiliary relay of each type	1	No.
22	Timer of each type	1	No.
23	Indicating instruments of each type	1	No.
24	Fuses of each rating	1	No.
25	Indicating lamps of each type	1	No.
26	Terminal Blocks of each type	1	No.

(*One set corresponds to actual quantity of components and devices as installed for the equipment at Site – i.e as used in one DG Set)

SECTION – VII

PAINTING

- All painting shall be in accordance with approved QAP and shade as per customer's approval. All painting shall be of high quality for long lasting, shall include mechanical cleaning, chemical cleaning for derusting, phosphating, application of primer and final paint of required thickness.
- Painting procedure followed by supplier for all items shall be furnished as and when required by BHEL, failing which it will be presumed that any painting procedure as required by customer will be acceptable to supplier.



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- The paint shade and thickness for DG set, Acoustic Enclosure, Fuel tanks, Battery Charger, Control Panels etc shall be decided during detailed Engineering.

SECTION – VIII

INSPECTION AND TESTING

- All equipments to be supplied should be of type tested design. During detailed engineering the contractor shall submit for approval the reports of all the type tests as per relevant standards and carried out on machine and equipment of same capacity within last 5 years from the date of bid opening. Failing to do so the supplier shall conduct the entire test under this contract at his own cost either at third party lab or in presence of owner's representative and submit the reports for approval.
- Type test certificates and reports of the Engine, Alternator, Control Panels and all individual components as applicable of similar rating as per standards shall be submitted during detailed engineering for review and acceptance.
- Routine test report of the Engine and Alternator shall be furnished at the time of inspection of the DG Set by BHEL and Customer. Witness of routine test of alternator and engine has not been envisaged as of now. However all documentation as per customer QAP shall be submitted. Optional prices have been asked for witness of routine tests of engine and alternator, in case required.
- All routine/acceptance tests on DG Set and accessories and control panels shall be carried out as per relevant standards. Inspection of DG Set, accessories and control panels shall be conducted as per approved QAP.
- For Factory Test, each DG set shall be tested for four hours. Fuel for testing shall be in bidder's scope and included in the price of the DG Set.
- Control panels shall be tested with secondary injection kit.
- TC for other items mentioned in BOM to be submitted by the supplier as and when required by BHEL.
- One set of manufacturer's Test certificate and Internal Test reports to be made available at the time of inspection.



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SECTION IX

PACKING AND TRANSPORTATION

1. Supplier shall be entirely responsible for ensuring that the packing suits the mode of shipment. Customer/BHEL may require inspecting and approving the packing before the materials are dispatched.
2. The bidder/supplier shall be responsible for any damage/loss of material during transit on account of improper packing.
3. Any material found short on opening the intact packing case shall have to be supplied by the bidder at no extra cost to the purchaser.
4. DG Set shall be fully packed in air tight polythene and shall be placed inside the container. All the openings on DG Set like exhaust opening, Air opening, Fuel openings to be capped tightly with metallic materials to prevent entry of water, moisture or dust.
5. All loose accessory of the engine shall be properly packed in a wooden box and shall be placed inside the container.
6. Loose erection materials shall be properly packed in sacks and supplied in wooden boxes only.
7. Control panels shall be fully packed in polythene and cushion and shall be supplied inside Plywood cases, suitable for outdoor storage.
8. Acoustic Enclosure shall also be packed in wooden crate with cushion to ensure no scratches during transportation and handling and shall be suitable for outdoor storage.
9. Mandatory Spares shall be packed in proper wooden/Tin box, suitable for long and safe storage.
10. Cables shall be supplied in cable drums. While accessories like glands and lugs shall be properly packed in wooden boxes only suitable for outdoor storage.
11. All boxes shall bear the relevant stamp, name of project, package, BHEL unit, and name of supplier.
12. Proper packing list mentioning the name and quantity of each and every item shall accompany all boxes. It shall be Bidder's responsibility to get the packing list verified and vetted by BHEL Stores in charge at Site.
13. In absence of signed packing list, it shall be Bidder's responsibility to supply any missing/damaged item at later stage.



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14. All packing material shall become the property of the customer.
15. Bidder to take extreme care while packaging and transportation of materials to Site. Any damage to items due to lack of suitable packing shall be attributable to the bidder.
16. Bidder shall send its representatives for unloading and verifications of major items and shall collect required documents from BHEL-Stores for submission to BHELISG, Bangalore office along with the invoices.

SECTION – X **DOCUMENTATION**

The following documentation shall be supplied to BHEL at different stages of the Project. In preparing and submitting the documentation, the requirements given in subsequent clauses shall be strictly adhered to.

The documents shall be in English language and MKS system of units.

All documents shall be submitted through BHEL's Document Management System "WRENCH" for which BHEL shall provide single login id and password to the successful bidder. Successful bidder shall receive all commented/ approved documents through "WRENCH" only.

Any documents submitted through mails will not be considered.

Procedure for uploading and downloading of documents from the portal and the list of documents to be submitted shall be informed after the award of contract.

All soft copies (except where specifically mentioned Wrench) shall be provided though pen Drive/DVD/CD as decided by Customer/BHEL.

List of Drawing / Documents:

TYPE OF DOCUMENTS	TYPE OF DOCUMENTS	STATUS	TIME SCHEDULE
Sizing Calculations for battery & battery charger and catalogue of Engine, Governor, Alternator, and AVR.	Soft copy	For Technical scrutiny and Approval	Within 2 weeks on intimation by BHEL.
DG Building Layout and Cross Section considering acoustic enclosure, exhaust piping, cable trenches, cable trays, fuel trenches etc.	Soft copy	For Approval	Within 2 weeks on intimation by BHEL.
GA / OGA Drawing of Diesel Engine, Controller, Associated accessories, Alternator. Terminal Box /Adopter Box; DG Set, Base Frame.	Soft copy	For Approval	Within 2 weeks on intimation by BHEL.
GA of 990 liters fuel tank and P&ID of fuel line/system	Soft copy	For Approval	Within 2 weeks on intimation by BHEL.
QAP For all major items.	Soft copy	For Approval	Within 2 weeks on

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CUSTOMER : TAMIL NADU GENERATION AND DISTRIBUTION CORPORATION LTD.

IS-1-17-2002/16

			intimation by BHEL.
Field Quality Plan	Soft copy	For Approval	Within 2 weeks on intimation by BHEL.
Data Sheets of Engine, Alternator, DG Set and Battery and Exhaust Structures..	Soft copy	For Approval	Within 2 weeks on intimation by BHEL.
Foundation Plan & Loading Details of DG Set.	Soft copy	For Approval	Within 2 weeks on intimation by BHEL.
GA drawing of exhaust stack with support structures, STAAD input files and calculations.	Soft copy	For Approval	Within 2 weeks on intimation by BHEL.
GA /Schematic/ BOM for AMF panel, Auxiliary Distribution Board, Battery charger panel, DG Local Isolator. Along with CT and Vt sizing calculations.	Soft copy	For Approval	Within 2 weeks on intimation by BHEL.
Proper Calculations for protections settings in Generator protection Relay.	Soft copy	For Approval	Within 2 weeks on intimation by BHEL.
GA, BOM & wiring diagram of Engine Control Panel	Soft copy	For Approval	Within 2 weeks on intimation by BHEL.
Total Integrated Cable Schedule for total integrated system which includes Electrical Panels.	Soft copy	For Approval	Within 2 weeks on intimation by BHEL.
TEST CERTIFICATES of all major items	Soft copy	For Information	Within 2 weeks on intimation by BHEL.
CATALOGUE/Manual of all electrical items.	10 Sets	For Information	Within 4 weeks on intimation by BHEL.
O&M, Storage & Erection instruction manual.	10 Sets + 2 CD	Documentation	Within 4 weeks on intimation by BHEL.
As built & Commissioned Drawings / final document	10 Sets + 2 CD	Final Documentation	Within 4 weeks on intimation by BHEL.

1. The GA / OGA drawing shall contain elevation, section, foundation / mounting for Civil Assignment and Layout.
2. Details of Exhaust Silencer; OGA/GA of, Lube oil priming pumps; Locations of total DG Auxiliaries; Location of Heaters; height; Mounting faces for vibration monitoring sensors; Heat loss data i.e., heat dissipation from engine surface/Ventilation Requirement.; Applicable codes and Standards.
3. Master Drawing list and Title Block for all the drawings and documents shall be provided to bidder immediately after award of contract.
4. Resubmission of drawings/documents shall be done within 2 weeks from the receipt of comments from BHEL/Customer.

1190052/2022/ISG-ELECTRICAL ENQUIRY SPECIFICATIONS



FOR
1 X 750 KVA EMERGENCY DG SETS AND ACCESSORIES
2 x 660MW UDANGUDI STPP, STAGE-I
TANGEDCO, TAMILNADU

Indent
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5. Bidder may note that the drawings, data and manuals listed herein are minimum requirement only. The bidder shall ensure that all other necessary write-up, information, etc required to fully describe the equipment are to be submitted with the bid.
6. Test Certificates shall be strictly in A4 size.
7. Test certificates shall have all the information as per relevant IS.
8. Test Certificates shall be marked "Certified" and shall be signed by competent authority from bidder's side.

SECTION XI

EXCLUSIONS

1. Load/ Fuel for commissioning, load trials and PG test of the DG at Site are not in Bidder's Scope.
2. Cable trays, supports and accessories are not in Bidder's scope.
3. Cable trench covers are not in Bidder's scope.
4. Earthing materials and plates are not in Bidder's scope.
5. Any Kind of Civil works at site is not in Bidder's scope.
6. Cables between Bidders' supplied equipments/panels and remote switchgear/DCS/Control Room is not in Bidder's Scope. However All lugs and glands on Bidder's supplied equipment shall be in bidder's cope.
7. Storage of materials, loading and unloading is not in Bidder's scope.
8. Transportation of materials from Stores to DG area is not in Bidder's scope.
9. Any kind of painting at site is not in bidder's scope.
10. Testing equipments like Primary injection kit, secondary injection kit, Megger etc at site are not in Bidder's scope.
11. Obtaining statutory clearance for DG Set is not in bidder's scope. However bidder to provide all necessary drawings and documents to get the clearance.
12. DG building lighting and fire protection is not in Bidder's scope.