



CSIR-NORTH EAST INSTITUTE OF SCIENCE & TECHNOLOGY

(Formerly Regional Research Laboratory)

Council of Scientific & Industrial Research

Jorhat –785006 (Assam)

NIT-D-33011/5/13-AO

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NOTICE INVITING TENDERS

Sealed tenders are hereby invited on behalf of Director, CSIR- NEIST, Jorhat in two bid system (Technical Bid and Price Bid) for the following electrical works from the original equipment manufacturers (OEMs), Authorized Dealer and all registered Licentiate electrical contractor of appropriate class of CPWD, Railways, MES, Post & Telegraph Department, State PWDs, Semi Government Organization or those who have worked for CSIR or its Laboratories and have successfully carried out preferably three similar works during the last three years. The Contractor(s) already awarded work order for similar type of work at CSIR-NEIST, Jorhat and not able to complete the contract in the allotted schedule and also not signed any agreement is (are) not eligible to submit the tender. **Tenderers must submit satisfactory work completion certificate of the contract carried-out at CSIR-NEIST, if any.**

The tender paper can be purchased in person from the office of the In-charge, Electrical Section and may also be downloaded from NEIST website www.neist.res.in. The interested parties fulfilling the above points are advised to enclose a separate demand draft / pay order as tender paper cost as mentioned below payable to 'The Director, North East Institute of Science and Technology, Jorhat-785006 if he/she uses downloaded form.

The firms are required to produce proof of fulfilling these conditions along with the copy of Sales Tax registration certificate , Income tax clearness, Labour certificate, bank solvency certificate, work completed certificates while making request for issue of Tender documents.

SI No	Name of work	Estimated cost Rs	Earnest money Rs	Cost of tender Rs	Time of completion	Date of issue	Last Date of submission
1	Supplying, Installation, testing and commissioning of 625/640 kVA DG set at CSIR-NEIST, Jorhat	5854713.00	117100.00	500.00	90 days	From 06.02.2015 to 26.02.2015	04.03.2015 (17.00 Hrs)

- 1) Time for carrying out each work will be as above and the date of commencement shall be reckoned from the tenth day of issue of award letter.
Complete contract documents to be complied with by the tenderer whose tender may be accepted can be seen at the office of the Head General Engineering, CSIR-NEIST, Jorhat (Assam)
- 2) Tenders should be on the specified form (Non transferable) which may be obtained from the office of the **In-Charge, Electrical Section, CSIR- NEIST, Jorhat** during office hours on payment of **tender fee against each work in cash or as Demand Draft of a schedule bank drawn in favour of Director, NEIST, Jorhat (Assam)** (Non refundable). Sale of tenders shall be from **06/02/2015 to 26/02/2015** up to 3.00 pm.
- 3) Tenders should be submitted with the documents as per NIT along with the Earnest money in double sealed covers super scribed with the name of the work date and time of opening written both on the inner and outer envelopes. They will be received up to 5.00 PM on **04/03/2015** and will be opened at **2.30 PM on 06.03.2015** in the office of the A.O. CSIR- NEIST Jorhat (Assam). Tenders should be dropped in the tender box, Gate No. 2 , CSIR-NEIST, Jorhat before the closing date and time indicated. In case these are sent by post these should be sent by Regd. post/ Speed post addressed to **Administration Officer, CSIR-NEIST Jorhat –785006 (Assam)**, clearly indicating the name of the work on the envelope. Tenderers are to ensure that they post the tender well in advance so as to reach before the closing time and date indicated. CSIR-NEIST shall not be responsible for postal delays. Late received tenders should be summarily rejected. The date and time stamp of CSIR NEIST receipt section shall be final and binding.
- 4) (i) The Earnest money should be accompanied with the tender documents separately for each work **as Demand Draft or pay order of schedule bank and drawn in favour of Director , NEIST Jorhat (Assam), payable at SBI, RRL Branch (Code No. 5604) Jorhat**. Tenders received without earnest money will be invalid.

(ii) The tender and earnest money shall be placed in separate sealed envelopes each marked "Tender" and "Earnest Money" respectively. In cases where earnest money in cash is acceptable, the same shall be deposited with the cashier of the division and the receipt placed in the envelope meant for earnest money. Both the envelopes shall be submitted together in another sealed envelope marked "Tender" of only those tenders shall be opened, whose earnest money placed in the other envelope is found to be in order.

- 5) Tender money, EMD and security deposited are exempted for those who are registered with DGS&D and NSIC as per Govt rule.
 - 6) The Employer does not bind himself to accept the lowest or any tender and reserves to himself the right of accepting the whole or any part of the tender and the tenderers shall be bound to perform the same at the rates quoted.
 - 7) Canvassing in connection with the tenders is prohibited and the tenders submitted by the contractor who resort to canvassing are liable for rejection.
 - 8) The tenderer shall not be permitted to tender for works in the concerned unit of CSIR in which a relative is posted in the grade between Controller of Administration and Junior Engineer. (Both inclusive) He shall also intimate the names of persons who are working with him in any capacity or subsequently employed by him and who relatives are as mentioned above.
- NOTE :** A person shall be deemed to be a relative of another if and only (a) they are members of a Hindu undivided family or (b) they are husband and wife or (c) the one is related to the other in the following manner : Father, Mother (Including step mother), son (including step son), Son's wife, Daughter (including step daughter), Father's father, Son's son, Son's daughter, Son's daughter's husband, Daughter husband, Daughter's son, Daughter's son's wife, daughter's daughter, daughter's husband, Brother (including step brother), Brother's wife, Sister (including step sister), Sister's husband.
- 9) Tender submitted shall remain valid for 90 days from the date of opening for the purpose of acceptance and award of work, validity beyond 90 days from the date of opening shall be by mutual consent.
 - 10) The tenderer shall quote rates both in figures and words. He shall also workout the amount for each item of work and writes in both figures and words. On check if there are differences between the rates quoted by the tenderer in words and in figures or in the amount worked out by him, the following procedure shall be followed:
 - I. When there is a difference between the rates in figures and in words, the rates, which correspond to the amounts worked out by the tenderer, shall be taken as correct.
 - II. When the amount of an item is not worked out by the tenderer or it does not correspond with the rate written either in figures or in words, the rate quoted by the tenderer in words shall be taken as correct.
 - III. When the rate quoted by the tenderer in figures and in words tallies but the amount is not worked out correctly the rate quoted by the tenderer shall be taken as correct and not the amount.
 - 11) The tenderer should see drawings and in case of doubt obtain required particulars, which may in any way influence his tender from the Engineer as no claim whatsoever will be entertained for any alleged ignorance thereof.
 - 12) Before tendering, the tenderer shall inspect the site to fully acquaint himself about the condition in regard to accessibility of site, nature and extent of ground, working condition of site and locality including stacking of materials, installations of tools and plants (T&P) etc., conditions affecting accommodations and movement of labour etc. required for the satisfactory execution of the work contract. No claim whatsoever on such account shall be entertained by the **Employer** in any circumstances.
 - 13) Earnest money will be forfeited if the contractor fails to commence the work as per letter of award. If any tenderer with drawn this tender within the validity period or makes any modification in terms and conditions of the tender which are not acceptable to the Department, then CSIR /NEIST shall without prejudice to any right or remedy, be a liberty to forfeit 50 % (fifty percent) of the Earnest Money absolutely.
 - 14) Except writing rates and amount, the tenderer should not write any conditions or make any changes, additions, alterations and modifications in the printed form of tenders. **Tenderers who are desirous to offer rebate the same should be brought out separately in the covering letter and submitted along with the tender.**
 - 15) Some of the provisions of General Conditions of Contract are given below. Interpretation however shall be as given in the General Conditions of Contract.
 - a) **DEFECTS LIABILITY PERIOD:** Twelve months from the date of successful installation as certified by the employer.
 - b) **SECURITY DEPOSIT:** Security deposit shall be deducted from the bills at 10 % of the gross value of work done and will be refunded only after the completion of Defect Liability Period satisfactorily.
 - c) **COMPENSATION:** Contractor shall pay as compensation an amount equal to one percent or such smaller amount as the Employer (whose decision in writing shall be final) may decide on the cost of the whole work as shown in the agreement for every week that the work remains uncompleted or unfinished or due quantity of work remains incomplete after the proper dates. Compensation to be paid shall not exceed ten percent of the estimated cost of the work as shown in the agreement.
 - 16) Stores: No material will be issued by the dept. for this work.
 - 17) Clauses No. 28 of conditions of contract i.e. "**ESCALATION**" will not be applicable in this contract since the duration of contract is less than 6 months.
 - 18) Interested party may also download the tender documents for the work. Tender paper without tender fee, earnest money, contractor documents, late tenders, unresponsive tenders, incomplete tenders will be rejected.
 - 19) Only technically qualified bidders shall be called for the price bid opening, the date and time of which shall be intimated separately through email/telephone/post.
 - 20) CSIR-NEIST is exempted from paying Custom/Excise Duty in terms of Government Notification No. 51/96-Custom date 23.07.1996 and 10/97 Central Excise date 01.03.1997 as amended from time-to-time

ADMINISTRATIVE OFFICER

Schedule of Quantities

Name of work : Supplying, Installation, testing and commissioning of 625 / 640 kVA, 415v residential type diesel generator at CSIR-NEIST, Jorhat (Assam)

Sl No	Particulars of materials	Qty	Unit	Rate in Rs.	Amount in Rs.
1.	<p>Supplying including installation, testing and commissioning of Green DG set, powered by Diesel Engine coupled to suitable alternator of 625 or more kVA , 415v, AC 3 phase 4 wires , 0.8 P.F. (lag) both mounted on a</p> <p>(a) M.S. Fabricated common base frame (b) M.S. fabricated fuel tank of required capacity of 14 SWG sheet (c) Anti vibration mounting (d) Standard manual control panel with digital metering system. (e) Suitable batteries with leads. Exide/Similar Make (f) First fill of good quality lube oil (g) Residential silencer, acoustic enclosure for control of sound complete with all accessories as required as per the direction of the deptt.</p> <p><u>Details technical specifications :</u></p> <p>Engine : Cummins/Caterpillar/Kirloskar/Volvo Make Model : As per company BHP : 750 or more with matching kVA (electric start, 1500 RPM, ISO : 58528/ISO 3046/BS:5514)</p> <p>Cooling : Water cool/radiator/heat exchanger/Bypass Thermostate. Low temperature after cooling. Aspiration : Turbocharged after cooled BS:5514 Cycle : 4 stock diesel Displacement : Minimum 19 Lts. No of Cylinders : Multi cylinder Air cleaner : Air intake manifold/Dry air cleaner/vacuum indicator</p> <p>Charging alternator : As required according to DG set Lubrication system : Oil pan/Engine mounted lub oil pump/lub oil by Pass filter/AC motor driven lub oil pumping</p> <p>Filters : Fuel and oil Exhaust : Turbocharger/Flexible fitting/Exhaust manifold/ Green DG set residential silencer</p> <p>Governor : Electronic governor of class A-1 governing. As per ISO 8528-5</p> <p>Gauges : Oil pr. , water temp. , tacho meter & Hour meter.</p> <p>Fuel system : Suitable pump with electronic governor/PTD injector/replaceable fuel filter/24v DC solenoid coil.</p> <p>Fuel Injector : Should be Electrically Step timing controlled. Safety shout off : Low oil pr./low coolant temp/battery status Noise level : Less than 75 db at 1 mtr distant at 75% load Starting : Electric batteries 24 v DC/Battery Charging unit</p>	01	Each		

Schedule of Quantities

Name of work : Supplying, Installation, testing and commissioning of 625 / 640 kVA ,415v residential type diesel generator at CSIR-NEIST, Jorhat (Assam)

Sl No	Particulars of materials	Qty	Unit	Rate in Rs.	Amount in Rs.
	Alternator :Stamford / Kirloskar Electric / Leroy Somer Make KVA : 625 minimum Type : Brush less, static excited, self Regulated.Conforming BS 2613/IS:4722 Rated Voltage : 415 volts at 40 deg ambient 3 ph. 4 wire Frequency : 50 Hz Insulation : Class H Winding Pitch : 2 / 3 pitch. Enclosure : IP-23 Voltage reg. : +/- 1 % Over speed capability : 20% for 2 min. Power factor : 0.8 (lag) Permissible over load : 10% for 1 hour in 12 hours of duration.				
2	Installation Details : (a) Making of RCC Foundation suitable for installation of DG set (b)Making of shed by iron structure with PVC sheet Cover for DG Set (c)Unloading, shifting & Placement of DG set along with Acoustic Enclose on ready foundation. (d)Structural support for exhaust pipe with IS Std. angle, channel etc. (e)Supply & laying of 10" dia /250 mm NB MS class B Tata/ Jindal make pipe with 50 mm thick insulation & 24-28 swg aluminium sheet cladding. (f)Supply & Laying of 1" dia MS pipe for fuel lines (g)Supply & Laying of 500 Sq.mm single core Alu Armoured power cable (4 Run of 40 Mtr. Each) (h)Supply & Installation of terminal box (Without Bar) to house 4 nos 500 Sq.mm power Cable. (i)Making of Earth Station by Copper plate 2" X 2", charcoal, satl, Earth Pit Cover Etc. 4 Nos. (j)Earthing conection by 50X6MM Copper strip-30 Mtr. (k)Termination of power Cable (l)Providing 50mm thick insulation & 24-28swg Alu. Sheet cladding for silencers (m)Supply & fixing of Pollution Cop & chake canopy (n)Battery Charging necessary connection (o)Transportation & out Station Expenses Annual Maintenance Contract (AMC) of the DG set after DLP for next	01	Each		
3.	consecutive 5 & 10 years (excluding materials) including 625 kvA alternator and other accessories connected to the DG set.				
	(i) First five years	5	Years		
	(ii) Second five years	5	Years		
	(Without quoting the AMC charges, the quotation will be summarily rejected.)				
	Total cost Rs.				

Rupees :

Note : The rate must be written both words and figures.

CSIR-NORTH EAST INSTITUTE OF SCIENCE & TECHNOLOGY :JORHAT:ASSAM
(Council of Scientific & Industrial; Research)

TECHNICAL SPECIFICATIONS FOR SILENT D.G. SET (625/640 kVA)

A. DIESEL ENGINE : Engine suitable for constraint speed operation and capable of producing constraint torque at minimum variation of engine speed with low and ease of maintenance.

- 1.1 BHP : 750 or more and with matching kVA (water cooled diesel engine, electric start, 1500 RPM, four stroke, multi cylinder conforming to ISO : 58528/ISO 3046/BS:5514)
- 1.2 The engine shall be equipped with required standard accessories. Broadly these are :
 - II. Heavy duty radiator fan.
 - III. Flywheel to suit flexible/direct coupling
 - IV. Flywheel housing
 - V. Air intake manifold
 - VI. Heavy duty Air cleaner with replaceable element
 - VII. Exhaust gas turbocharger & after coolers (wherever required)
 - VIII. Exhaust manifold
 - IX. Coupling Gourd
 - X. Lubricating oil pump
 - XI. Fuel injection pump
 - XII. Cooling water centrifugal pump
 - XIII. Nozzles
 - XIV. Fuel filter
 - XV. Lubricating oil filters
 - XVI. Fuel tank
 - XVII. Fuel line
 - XVIII. Bypass filter
 - XIX. Electronic Governor Control
 - XX. 24 V electrical system with electric starter and battery charging alternator
 - XXI. Safety switches for high coolant temperature and low lubricating Oil pressure
 - XXII. 24 V stop solenoid-energized to run
 - XXIII. Engine maintenance manual, parts catalogue, warranty card, routine test certificate
 - XXIV. Microprocessor based generator set monitoring and control system.
 - XXV. AVM Pads
 - XXVI. Acoustic Enclosure: Noise level less than 75 db @1 mtr at 75% load

I. LATEST STATE-OF-ART INSTRUMENT PANEL WITH PROVISION FOR REMOTE MONITORING AND DATA LOGGING COMPRISING OF:

1. Starting/Stop key with proper arrangement of switch
2. Digital display to indicate all important parameters like :
 - I. Battery Voltage
 - II. Coolant water temperature
 - III. Lubricating oil pressure
 - IV. Engine speed
 - V. Engine running hours
 - VI. Diagnostic and engine protection for :
 - VII. High coolant temperature (alarm & trip)
 - VIII. Low lubricating oil pressure (alarm & trip)
 - IX. Engine over speed
 - X. Sensor fault
 - XI. Oil pressure safety switch
 - XII. Battery charging status
 - XIII. 3 Ph AC volts/kW/kVA/Power Factor/Frequency digital metering
3. **Desirable feature** : Provision for conversion to Gas run for future use.

B. ALTERNATOR:

1. The alternator rating shall be capable of generating 625 kVA or more rating at 415 volts. $\pm 1\%$, 3 phase, 50Hz, 4 wire system A.C supply for 0.80 lagging power factor load for continuous operation at 1500 rpm. Manual adjustment at all conditions of load with coarse and fine controls to obtain voltage variation of $\pm 1\%$ shall be available. The frequency shall be maintained at 50 Hz. The alternator should be suitable for tropical climate and shall generally conform to BS 5514, ISO 3046
2. The alternator rating including and above 625 KVA shall be provided with automatic voltage regulator in order to hold the out put voltage constant and provided fast response to sudden load changes.
3. The alternator shall be capable of sustaining 10% over load for one hour in every 12 hours continuous operation at full load.
4. All the terminal points of the alternator shall be enclosed in a terminal box for connecting the load. The size and shape of the terminal box shall be such as to receive the armoured AI cables / flexible jumper connection between panel & alternator.
5. The terminal box if fabricated at site shall be made of minimum 1.6mm thick M.S. Sheet painted in matching colour.
6. The excitation system consists of an electronic automatic voltage regulator having very fast response to load changes. The salient features of the alternator are :
 - I. $\pm 1.5\%$ voltage regulation under static conditions
 - II. Class "H" insulation
 - III. Enclosure IP 23

C. CONTROL PANEL :

Control panel of cubical shape , power coated and should be fabricated out of 14/16 gauge. thick CRCA sheet provides :-

- I. MCCB/ACB of suitable rating with overload and short circuit protection.
- II. Digital Voltmeter, Ammeter with selector switch
- III. kW/PF Meters
- IV. Frequency meter 0-60 Hz.
- V. kWh meter.
- VI. Indicating lamp for "Load On" and set running
- VII. Aluminium bus bar of suitable capacity with incoming and outgoing terminations.
- VIII. Power cables for interconnection between DG set and control panel
- IX. Control cabling as per requirement.
- X. Push button for engine start and stop
- XI. Cyclic cranking
- XII. High Coolant Temperature (Warning And Shutdown)
- XIII. Low Lube Oil Pressure (Warning and Shutdown)
- XIV. Fail to crank (Shutdown)
- XV. Fail to Start (Shutdown)
- XVI. Over speed (shutdown)
- XVII. Low ? High Battery Voltage (Warning)
- XVIII. Low Coolant level (Shutdown)
- XIX. Over frequency (Shutdown)
- XX. Over Current (Shutdown)
- XXI. Over Voltage (Shutdown)
- XXII. Under Voltage (warning)

D. ACCESSORIES :

AVM PADS:

Set of specially designed AVM Pads affixed between the engine/alternator feet and the base frame.

BASE FRAME:

Heavy duty base frame of sturdy designed made of MS steel with necessary reinforcement and lifting arrangement.

FUEL TANK :

Daily service base fuel tank of sheet metal (minimum 14 SWG thickness) suitable for 835 Litre capacity with drain valve, air vent, inlet and out let connection with dip stick to measure fuel level.

BATTERY:

180 AH , 2 x 12 V battery with lead.

E. ACOUSTIC ENCLOSURE:

The acoustic enclosure shall be made of 14 gauge sheet steel. The silent features of the acoustic enclosure are:-

The enclosure is to be of modular construction with the provision of assemble and dismantle easily at site.

- I. The sheet metal components should be hot dip and pretreated
- II. The enclosure should be powder coated (inside as well as out side) with pure polyester base powder. All nut & bolt/ external hardware are made from stainless steel.

- III. There should be provision for filling the fuel from out side the enclosure with locking arrangement.
- IV. Battery should be accommodated in separate tray in the enclosure.
- V. External drain plugs should be provided for draining lubricant oil and diesel.
- VI. The doors should be gasket of high quality to prevent leakage of sound.
- VII. Sound proofing of the enclosure should be done with high quality rock wool/mineral wool conforming to IS : 8183.
- VIII. A special residential silencer to control exhaust noise.
- IX. Latest designed attenuators to control sound at air entry and exit points.
- X. Adequate ventilation to meet air requirement for combustion and heat removal. If required, a blower should be provided to meet total air requirement.
- XI. Temperature of enclosure should not exceed beyond 5 deg. C of ambient temperature.
- XII. There should be provision of emergency shut down from out side the enclosure.
- XIII. An arrangement for illuminating the enclosure from inside.
- XIV. Sound level should not be more than 75db @ 1 metre at 75% load..

F. COUPLING & MOUNTING ARRANGEMENT:

The engine and alternator shall be directly coupled by a latest design flange coupling for durability and accuracy in alignment and mounted through AVM pads on a heavy duty steel base frame for total control of vibration. The manual control panel shall be mounted on the base frame of the enclosure.

TECHNICAL PARTICULARS:

The bidders shall provide the following particulars in Technical documents with all other particulars

1. ENGINE / ALTERNATOR:

A. ENGINE

- i. Name of manufacturer.
- ii. Engine model.
- iii. Engine capacity :
 - a. At NTP conditions.
- iv. Rated speed.
- v. No. of cylinders.
- vi. Arrangement of cylinders.
- vii. Whether 2 stroke or 4stroke.
- viii. Type & grade of fuel.
- ix. Specific Fuel consumption rate (gms./BHP/Hr.)
- x. Fuel Consumption in Liter / Hr
 - a. At NTP conditions.
- x. Type & grade of lubricant oil.
- xi. Lubricating oil consumption (% of fuel).
- xii. Lubricating oil change interval.
- xiii. Method of cooling of Engine.

- xiv. Rate of raw water at full load in case of heat exchangers.
- xv. Type of silencer.
- xvi. Overall dimensions of Engine:
 - a. Length (mm)
 - b. Width (mm)
 - c. Height (mm)

B. ALTERNATOR

- i. Name of manufacturer.
- ii. Type of Alternator
- iii. Model No.
- iv. Rated output
 - a. At NTP conditions.
- v. Rated speed.
- vi. Rated output voltage
- vii. Rated output frequency
- viii Efficiency & power factor at -
 - a. 110% of full load
 - b. Full Load
 - c. 75% of full load
 - d. 50% of full load
- ix. Voltage regulation from full load to no load
- x. Excitation current at 0.8 p.f. & full load.
- xi. Type of excitation provided.
- xii. Class of insulation
- xiii Whether radio interference suppressor is provided
- xiv Whether neutral is brought out.

2. TEST PROFORMA

2.1 SCOPE

- 1. This section lays down the procedure for conducting test on the installation. In general the procedure laid down here shall be followed. However, if manufacturers of the equipment has prescribed different procedure which is at variance, the same may be adopted.

2.2 CAPACITY

- 1. The operating capacity of E.A. Set shall be arrived, considering a load with power factor of 0.80 lagging and after taking into consideration suitable de rating as per B.S. 649/5514.

2.3 PHYSICAL CHECKS

- 1. Particulars such as name plate details of all major components/equipments shall be recorded and compared with what has been offered by the contractor as per the concluded agreement.
- 2. Physical visual inspection of the installations specially on the following aspect shall be conducted.
 - 1. Firmness of mounting
 - 2. Verticality of installed set.
 - 3. Tightness of nuts & bolts.
 - 4. Proper installation of exhaust pipe.
 - 5. Insulation of exhaust pipe.
 - 6. Provision of guards on EA Set coupling joint.
 - 7. Proper location of fuel tank.
 - 8. Size of electrical cables as per approved plan.
 - 9. Termination of cables.
 - 10. Ratings of various fuses.
 - 11. Termination of earth leads on neutral & body.

2.4 EARTH RESISTANCE

- Measurements shall be taken in respect of earth resistance of earth stations provided for grounding of neutral and body. The resistance shall be measured by isolating the connecting earth lead in respect of all earth stations individually. The results shall be recorded as under:

Sr. No.	Identification of earth station	Used for	Earth stations (ohms)
1	2	3	4

2.5 RUN TEST:

- The engine shall be given a test run continuously for atleast six hours with alternator supplying full rated load. During this run following observations shall be recorded:

	Item	Time (After start of run test)							
		1 Hr.	2 Hr.	3 Hr.	4 Hr.	5 Hr.	6 Hr.	7 Hr.	8 Hr.
1.	Lubricating oil pressure								
2.	Exhaust gas colour								
3.	Speed of Engine								
4.	Output voltage								
5.	Load current								

2.6 STATOR TEMPERATURE RISE TEST:

- The alternator shall be loaded at full rated load and stator (alternator body) temperature be recorded as under at interval of 30 minutes till such time three consecutive readings are same.

Sr. No.	Time (Hrs.)	Ambient Temp. (Deg. C)	Stator Temp. (Deg. C)
1	2	3	4

- The temperature rise shall be maintained within 60 Deg. C above the ambient.

2.7 FUEL CONSUMPTION TEST:

- Fuel consumption for half an hour shall be measured after the full load operating conditions have stabilized..
- During the measurement the load shall be maintained unchanged.
- The fuel consumption shall be compared with values given in technical particulars.

2.8 OVERLOAD TEST:

- Overload test to the extent of 10% over the rated load shall be conducted immediately after the fuel load run test.
- The various parameters as in the case of run test shall regularly be monitored and recorded.
- After the overload test the load shall be normalized to rated value and all parameters recorded accordingly in addition to recording stator body temperature.

2.9 INSULATION TEST:

- i. Insulation test shall be conducted after testing the EA Set at overload.
- ii. The insulation resistance between the stator coil and frame shall be measured with 500volts megger.
- iii. The insulation resistance of alternator winding shall be noted below:
Rated output voltage + 1 Mega ohms
1000 + Rated output in KVA
- iv. Insulation resistance of control wiring with 500 volts megger shall be measured which shall be not less than one mega ohms

2.10 REGULATION TEST:

- i. The voltage regulation from no load to full rated load at 0.8 p.f. and from no load to half the rated load at 0.8 p.f. shall be measured between phase & neutral under automatic and manual regulation mode which shall not exceed 5% of the nominal rated output voltages.
- ii. In automatic regulation mode the recovery time shall be noted which shall not exceed 3 seconds.
- iii. The frequency of output supply of various load conditions shall be noted and recorded. The variation shall be compared with the accuracy standards specified.
- iv. Change in speed of engine with change in load shall be observed and compared with standards laid down for the speed governor.

2.11 FUNCTIONAL TEST:

- i. Functional tests in respect of various components like controls, interlocks, measuring devices, battery charger and annunciation devices shall be considered.

2.12 BATTERY TEST:

The battery shall be tested for six successive attempts for starting of engine in order establish healthy condition of battery.

ADDENDUM

TENDER FOR SUPPLYING AND INSTALLATION OF 625/640KVA D.G. SET

LIST OF APPROVED MAKE

Item	Approved make
Diesel Engine	Cummins, Kirloskar, Caterpillar, Volvo
Alternator	Stamford, Kirloskar, Leroy Somer Make
Batteries	Exide, Pace-setter, Standard
Battery Charger	Statcon or Equivalent
Pump set	Kirlosker, Beacon, Jyoti
MS Pipes	Tata, Jindal
Butterfly valves	Audco or Equivalent
Gate/NRV/Check valves	Learder, Sant, Kirloskar
Strainer	Emerald, Sant
Pressure / Temperature gauge	Fiebig, Guru
Insulation	UP Twiga, Lloyd
MCCB	L & T, Siemens, ABB, Havells
Cable Gland	Peco, Comment or equivalent
Cable lug	Reputed make
Axial fan	ABB

We have noted the above and confirm that our tender is based on approved makes stipulated above.