



TECHNICAL BID

TENDER FOR SUPPLY & INSTALLATION OF 100 KVA

DIESEL GENERATOR SET AT Electronics and

Communication Engineering Dept., ASSAM UNIVERSITY

SILCHAR.



ASSAM UNIVERSITY, SILCHAR

(A Central University Established by an Act of Parliament)

Silchar-788011, Assam, India.

Certified that this Technical Bid contains (37) pages including the cover page.



APPLICATION FORM FOR TENDER

UNDERTAKING

I / We have read and understood the instructions and the terms and conditions contained in the application form. I / We do hereby declare that the information furnished in the application and in the supplementary sheets is correct to the best of my/our knowledge and belief.

Name (in Block Letter):

Designation:

Complete Postal Address:

E-mail:

Phone No.:

Mobile No.:

Place:

Date:

Signature of Applicant:

Seal of Office:

To

The Head of Department

Electronics and Communication Engineering

Assam University, Silchar

Silchar – 788 011.



ASSAM UNIVERSITY, SILCHAR

(A Central University Constituted under Act. XIII of 1989)
Silchar – 788011, Assam, India.

No. AU/TSSOT-ETE/23/2013

Date: 23/12/2015

NIT/ TENDER PAPER

**Name of work: - SUPPLY AND INSTALLATION OF 100 K.V.A D.G SET AT ECE
DEPT., ASSAM UNIVERSITY, SILCHAR.**

- Cost of Tender Paper: **Rs.1000/-**
- Estimated Cost: **Rs. 8,00,000/-**
- Earnest Money: **Rs. 16,000/-**
- Last date of submission of tender paper : 18/01/2016 up to 2:00 PM
- Date and Time of Opening Technical Bid : 18/01/2016 at 2:30 PM
- Date and Time of Opening Financial Bid : 20/01/2016 at 2:30 PM

CONTENTS

- ❖ SECTION-1 : Notice Inviting Tender & Tender Condition.
- ❖ SECTION-2 : Performa Of Submission Of Quotation.
- ❖ SECTION-3 : Technical Conditions and Information.
- ❖ SECTION-4 : General Rules and Directions.
- ❖ SECTION-5 : Terms & Conditions Governing the Tender and Execution of Contract Thereof.



CHECK LIST OF DOCUMENTS

1. OEM/ Authorised Dealers Certificate : Yes/No

2. Experience certificate:
Experience for supply of 100 KVA and above capacity
D.G Set in Government departments/PSU during the
last 03(three) years : Yes/No

3. Necessary certificates as per CPCB Noise and Emission should
be furnished from manufacturers. : Yes/No

4. Financial Solvency certificate @ 40% or more of the estimated
cost for each work , issued in the current financial year from
any nationalised bank, as per pro forma 2(b). : Yes/No

5. PAN /VAT/ TIN Details (Xerox copy self-attested) : Yes/No

6. Technical Particulars of the equipments to be furnished
as per the format enclosed (ref. page no-26) : Yes/No

Signature of Agency / Contractor



SECTION -1

No. AU/TSSOT-ETE/23/2013

Date: 23/12/2015

NOTICE INVITING TENDER

Sealed Item rate tenders in two bid system valid for 90 days are invited from OEM and Authorised dealers of appropriate class and category for the "**SUPPLY AND INSTALLATION OF 100 K.V.A D.G SET AT DEPT. OF ELECTRONICS & COMMUNICATION ENGINEERING, ASSAM UNIVERSITY, SILCHAR.**" The NIT and detailed tender document can be downloaded from Assam University`s website www.aus.ac.in.

Last Date of submission of bid is 18/01/2016 up to 2:00 PM.

Sd/-
HOD, ECE



TENDER CONDITIONS.

1. The Tenderer shall quote his rate as per NIT & the Terms and Conditions enclosed in the Tender document.
2. Completed tender documents should invariably be submitted along the cost of tender document in the form of Demand draft drawn in the favour of Assam University, Silchar, payable at Silchar.
3. **The Earnest Money Deposit (EMD) of Rs. 16,000/- (Rupees Sixteen Thousand) only** mentioned above is absolutely mandatory and shall be enclosed along with the tender in the form of **Call Deposit drawn in favour of the Finance Officer, Assam University, Silchar** from a scheduled /nationalized bank only, failing which the tender will not be accepted.
4. **Mode of Submission of tender Document:**
 - A. **EMD to be sealed in Envelop No-1**
 - B. **Technical Bid along with the cost of tender document in the form of Demand Draft in favour of the Finance Officer, Assam University, Silchar payable at Silchar is to be sealed in Envelop No-2**
 - C. **Price Bid is to be sealed in Envelop No-3**
 - D. **Envelop No-1,2&3 to be inserted in a single Envelop-4 , properly sealed and super scribing Name of Work, Closing Date & Name of Agency/Contractor on the cover of the Envelop-4**
 - E. **N.B Sealed Means: Sealing by Wax/Gum/Any Type of Adhesive Tape etc. but not pinned or stapled.**
5. Tenders should be valid for 90 days from the date of opening of the tenders and may have to be extended further if considered necessary by the University. No reasons will be assigned for extension and no withdrawal shall be allowed. If any tenderer withdraws his tender before the said period or issue of letter of acceptance, which-ever is earlier, or makes any modifications in the terms and conditions of the tender which are not acceptable to the University, then the University shall, without prejudice to any other right or remedy, be at liberty to forfeit the said Earnest Money Deposit.
6. **The time allowed for completing the work will be 45 (Forty Five) days from the day of written order to commence the work.**
7. Tenderer are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their tender. A tenderer shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed. The tenderer shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the



contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the University and local conditions and other factors having bearing on the execution of the work.

8. No Telex/ Tele fax/ Telegram/ E-mail of the Techno-Commercial and Price bids will be accepted. The University is not responsible for Postal. Courier delays. The parties have to ensure the receipt of bids well in time.
9. If the date of tender submission and opening happens to be unforeseen holiday, the same will be postponed to the next working day without any further intimation.
10. The University does not bind itself to accept lowest tender and reserves the right to reject any or all the tenders received without assigning of any reason thereof. All tenders in which any of the prescribed condition is not fulfilled or any condition put forth by the tenderer shall be summarily rejected.
- 11. Canvassing whether directly or indirectly, in connection with tenders is strictly prohibited and the tender submitted by the contractors who resort to canvassing will be summarily rejected.**
12. The competent authority on behalf of the University reserves to himself the right of accepting the whole or any part of the tender and the tenderer shall be bound to perform the same at the rate quoted.
13. This Notice Inviting Tender shall form a part of the contract document.
14. The successful tenderer/ contractor, on acceptance of his tender by the University, shall within 15 days from the stipulated date of start of the work sign the contract agreement in standard form consisting of the notice inviting tender, all the documents including additional conditions, specifications and drawings, if any, forming the tender as issued at the time of invitation of tender and acceptance thereof together with any correspondence leading thereto.
15. No materials will be supplied by the University.
16. In case of delay in completion of the work within the stipulated time due to reasons attributable to the contractor, Standard Liquidated Damage @ 1% of the tender accepted value shall be recovered for each month of delay from the final bill or the part there of.
17. The contractor shall obtain a valid license under the contract labour (R&A) Act, 1970, and the contract labour central rules 1971, before the commencement of the work, and continue to have a valid license until the completion of the work. The contractor shall also abide by the provisions of the Child Labour (Prohibition and Regulation) Act, 1986 and other labour laws. Any failure to fulfill this requirement shall attract the penal provisions of this contract arising out of the resultant no execution of the work. No labour below the age of fourteen years shall be employed on the work.
18. During Opening of tender only representative duly authorized by the agency / contractor will be allowed to be present.
19. All relevant documents submitted with the tender should be self attested (by the agency/ contractor) and on demand original copy must be produced failing which tender will not be considered.
20. Authenticity of signatory (contractor) of tender document will be verified before finalization of tender document.



21. Tax at higher of prescribed rate or 20% will be deducted on all transactions liable to TDS, where the permanent Account Number (PAN) of the deductee is not available.
22. In case of any dispute, it would be referred to a sole Arbitrator to be appointed by the University authority. The decision of the sole Arbitrator will be final and binding to both the parties.
23. 10% security money will be retained by the University from the bill value which shall be released after 01(one) year of satisfactory completion of work.
24. EMD of unsuccessful bidder shall be released within 02 (two) months after issue of work order to the successful bidders.
25. If the work is found not as per specification or abandoned by the executing contractor/agency, same will be cancelled and remaining work will be done through other contractor/agency at their cost & risk.
26. **Those bidders who accept the above terms and conditions, may submit their tender along with all relevant documents and a copy of above terms and conditions of the tender duly signed**
27. List of mandatory **self attested** copies of documents should be submitted along with Technical Bid in the following serial:

Sl no	Mandatory Self Attested copy of Documents	Issuing Authority
1	All types of registration/authorised dealers/O.E.M certificate of the contractor of appropriate class and category	Appropriate authority of respective department
2	All other necessary valid registration certificate/License.	Appropriate authority of respective department
3	PAN Card	Department of Income Tax, GOI.
4	Financial Solvency certificate @ 40% or more of the estimated cost for each work , issued in the current year.	Scheduled /Nationalized bank
5	Certificate in respect to satisfactory completion of similar nature of works under Govt. or Semi Govt. department during last 3(three) years ending 31.12.2014. A) Three works costing not less than the amount equal to 40 % of estimated cost. Or B) Two works costing not less than the amount equal to 50 % of estimated cost. Or C) One work costing not less than the amount equal to 80 % of estimated cost.	Officer not below the rank of Executive Engineer or equivalent.

**Sd/
HOD, ECE**



SECTION-2

PROFORMA -2(b)

FORM OF SOLVENCY CERTIFICATE FROM A SCHEDULED BANK

This is to certify that to the best of our knowledge and information M/S/ Sri -----
----- having marginally noted address, a customer of our bank are /is respectable
and can be treated as good for any engagement up to a limit of Rs----- (Rupees-----
-----)

This certificate is issued without any guarantee or responsibility on the Bank or any of the officers.

**(Signature)
For the Bank**

Note : In case of partnership firm, certificate to include names of all partners as recorded with the bank .

Signature of agency / contractor



PROFORMA – 2(a)

DETAILS OF CONTRACTOR'S REGISTRATION

1. Name of Agency/ Contractor :
2. Name of the Department issued contractor's registration :
3. Registration No :
4. Class of Registration :
5. Category of Registration :
6. Valid Electrical License Registration No :
7. Tender limit :
8. Validity period :

Copy of Registration certificate to be enclosed

Signature of Agency/ Contractor



PROFORMA – 3(a)

List of Similar nature of works executed during preceding 3 years

Sl. No	Name of work with brief particular thereof	Date of Commencement	Date of Completion as per work order	Actual date of completion	Contract Amount (Rs)	Name of client, contact with his complete address Phone No.

Add extra sheet if required

Sign of the company/Contractor

Date :

Note: Original or self-attested copies of work order & completion certificates from client shall be attached .



PROFORMA – 3 (b)

3. B List of ongoing works:-

Sl.No	Name of work with brief particular thereof	Date of commencement	Date of completion as per work order	Contract Amount (Rs)	Name of client , contact with his complete address and Phone No.

Add extra sheet if required.

Seal & Signature of the
company/Contractor

Date:



Note : Original or self-attested copies of work order from client shall be attached.

TENDER

I/We have read and examined the notice inviting tender, schedule, specifications applicable, General Rules and Directions, Conditions of contract and special conditions , schedule of rate and other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work .

I/We hereby tender for the execution of the work specified for AU , Silchar within the time specified and in accordance in all respects with the specification, designs drawings and instructions in writing referred to in General Rule and Directions and in the conditions of contract and with such materials as are approved by the University Authority, and in respects in accordance with, such conditions so far as applicable .

I/We agree to keep the tender open for 90 days from the due date of submission thereof and not make any modifications in its terms and conditions.

A sum of **Rs.16,000/-** is hereby forwarded in Call deposit in favour of Assam University, Silchar of scheduled Bank as earnest money. If I/We, fall to commence the work specified I/We agree that the A.U., Silchar or his authorized officer successors in office shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely otherwise the said earnest money shall be retained by him towards security deposit to execute all the works referred to therein and to carry out such deviations as may or orders, up to maximum of the percentage mentioned in the conditions of contract and those in excess of limit at the rates to be determined in accordance with the provision mentioned in the tender form.

I/We agree that should I/We fall to commence the work specified in the above memorandum, an amount equal to the amount of the earnest money mentioned in the form of the invitation of tender shall absolutely be forfeited to the Silchar and the same may be the option of the competent authority on behalf of the A.U. Silchar be recovered without prejudice to any other right or remedy available in law out of the deposit in so far as the same may extend in terms of the said bond and in the event of deficiency out of any other money due to me/ us under this contract or otherwise.

Date

Signature of Contractor

Postal Address & Tele No.



SECTION –3

Technical Conditions.

- A. **Scope:** This section deal with unloading procedures, location, standard capacities and climatic conditions for DG set installation.

1. Unloading: Genset without Acoustic Enclosure:

Genset should not be lifted from engine and alternator hooks. These are designed for lifting individual items only. Normally, provision for Genset lifting is provided on base-rails. The Genset should be unloaded from base rail by lifting with proper Genset lifting tackle or nylon sling/steel rope of suitable capacity and crane so as to ensure no damage to oil sump, air cleaner, radiator pipes etc.

Genset should be covered with polyethylene or tarpaulin during installation to ensure that water does not enter inside.

Spreader bar/ spacer plate of suitable size may be required to avoid damages to Genset components.

DG set with Acoustic enclosures are provided with lifting hooks.

2. Location: DG Sets with acoustic enclosure

DG sets up to 1000 KVA capacity are required to be supplied with acoustic enclosures per CPCB norms. DG Set with acoustic enclosure shall preferably be installed outside the building (including terrace subject to structural feasibility) & location should be finalized in consultation with the Architect. However, DG set should be as near to the substation as possible i.e. as near to Essential LT Panel as possible. Associated AMF panel/ Electrical panel of the DG Set can be located inside the acoustic enclosure or outside the acoustic enclosure as per manufacturer standard. In case, AMF/ Electrical panel has to be installed outside the acoustic enclosure, location of room to house AMF/ Electrical panel should be decided in consultation with the Architect so that it shall be as near to the acoustic enclosure as possible. Specially, in case of connection through bus trunking, care should be taken for aesthetics.

3. DG Sets without acoustic enclosure

In case of DG Sets beyond 1000KVA capacity i.e. when DG set is supplied without acoustic enclosure, room of appropriate size should be provided to house the DG Set. The DG set room should be as near to the substation as possible (i.e. as near to Essential LT Panel as possible). While deciding the room layout, typical 2-meters free space around Genset is recommended for proper heat dissipation and ease of service. However, to avoid hot air re-circulation, radiator cooled engines should have



maximum possible space in the front. Minimum 1.5 meter free space is must. As far as possible, installation of DG Set should be avoided in basement. In Cases where installation of D.G. Set in basement is unavoidable, due care of supply of adequate amount of air required for proper operation of D.G. Set shall be taken.

4. Climatic Conditions:

The output of DG Set shall be specified in tender documents under actual site conditions. The tenderer has to certify that the engine & alternator meets the capacity requirement after de-ration as per IS/ BIS.

DG Set up to 1000 KVA capacity should be type tested for Noise and Emission norms/standards as per CPCB.

B. Diesel Engine

Scope: This section covers engine rating, standard components of a diesel engine including exhaust piping.

1. Diesel Engine: Engine Rating

The engine shall be of standard design of the original manufacturers. It should be 4 stroke cycles, water cooled, naturally aspirated/ turbo charged (as per manufacturer standard), diesel engine developing suitable BHP for giving a power rating as per ISO 8528- Part-1 in KVA at the load terminals of alternator at 1500 rpm at actual site conditions.

The engine shall be capable for delivering specified Prime Power rating at variable loads for PF of 0.8 lag with 10% overload available in excess of specified output for one hour in every 12 hours. The average load factor of the engine over period of 24 hours shall be 0.85 (85%) for prime power output.

The engine shall conform to IS;10000/ ISO 3046/ BS;649 /BS 5514 amended up to date.

Necessary certificate indicating the compliance of the above capacity requirement for the engine model so selected along with compliance of Noise and Emission norms as per latest CPCB guidelines for DG set capacity up to 1000KVA, should be furnished from the manufacturers along with the technical bid. However above 1000 KVA DG set, manufacturers shall furnish certificate that the Engine for the DG set complies with the CPCB Emission norms.

The engine shall be fitted with following accessories subject to the design of the manufacturer:

- (i) Dynamically balanced Fly wheel



(ii) Necessary flexible coupling and guard for alternator and engine (applicable only for double bearing alternator)

(iii) Air cleaner(dry/ oil bath type) as per manufacturer standard,

(iv) A mechanical/ electronic governor to maintain engine speed at all conditions of load.

(v) Daily fuel service tank of minimum capacity as per Table below, fabricated from M.S. sheet with inlet, outlet connections air vent tap, drain plug and level indicator (gauge) M.S. fuel piping from tank to engine with valves, unions, reducers, flexible hose connection and floor mounting pedestals, twin fuel filters and fuel injectors. The location of the tank shall depend on standard manufacturers design.

Table -I Recommended minimum capacity of daily fuel service tank:

S.No	Capacity of DG set	Minimum Fuel Tank Capacity
(i)	Up to 25 KVA	100 Liters
(ii)	Above 25 to 62.5 KVA	120 Liters
(iii)	Above 62.5 KVA to 125 KVA	225 Liters
(iv)	Above 125 KVA to 200 KVA	285 Liters
(v)	Above 200 KVA to 380 KVA	500 Liters
(vii)	Above 500 KVA to 750 KVA	900 Liters

(vi) Dry exhaust manifold with suitable exhaust residential grade silencer to reduce the noise level.

(vii) Suitable self-starter for 12 V/ 24 V DC.

(viii) Battery charging alternator unit and voltage regulator, suitable for starting batteries, battery racks with interconnecting leads and terminals.



(ix) Necessary gear driven oil pump for lubricating oil, priming of engine bearing as well as fuel systems as per manufacturer recommendations.

(x) Naturally aspirated/ turbo charger (as per manufacturer standard)

(xi) Lubrication oil cooler

(xii) Lubrication oil filters with replaceable elements.

(xiii) Crank case heater as per manufacturer recommendations.

(xiv) Fuel injection: Engine should have suitable fuel injection system in order to achieve low fuel consumption.

(xv) Fuel control solenoid

(xvi) Fuel pump with engine speed adjustment.

(xvii) Engine Control Panel: fitted and having digital display for following:-

(a) Start/stop key switch. (b) Lube oil pressure indication

(c) Water temp. indication (d) RPM indication

(e) Engine Hours indications (f) Battery charging indication

(g) Low lub. Oil trip indication (h) High water temp. indication

(i) Over speed indication.

(xviii) All moving parts of the engine shall be mechanically guarded in such a manner that a human finger cannot touch any moving part.

(xix) Radiator/ Heat Exchanger System/ Remote Radiator (delete whichever is not applicable)

(xx) Any other item not included/ specified but is a standard design of the manufacturer

2. Governor:

Mechanical governor/Electronic governor of appropriate class as per ISO 3046/ BS5514 with actuator shall be provided as per standard design of manufacturer. Governor shall be a self contained unit capable of monitoring speed.



3. Frequency variation:

The engine speed shall be so maintained that frequency variation at constant load including no load shall remain within a band of 1% of rated.

4. Fuel System:

It shall be fed through engine driven fuel pump. A replaceable element of fuel filter shall be suitably located to permit easy servicing. The daily service tank shall be complete with necessary supports, gauges, connecting pipe work etc. In case of Top Mounted tanks, non return valves are must in fuel supply and return line of specified value. Pipe sealant should be used for sealing for all connections. No Teflon tape to be used. If piping length is more than 10 meters, detail engineering is required in consultation with OEM/ Manufacture.

5. Lubricating oil system:

It shall be so designed that when the engine starts after a long shut down lubrication failure does not occur. Necessary priming pump for the lub. oil circuit as per recommendation of manufacturer shall be installed, to keep bearings primed. This pump shall be normally automatically operative on AC/ DC supply available with the set.

6. Starting system:

This shall comprise of necessary set of heavy duty batteries 12V/ 24V DC (as per manufacturer standard), and suitable starter motors, axial type gear to match with the toothed ring on the fly wheel. A timer in the control panel to protect the starter motor from excessively long cranking runs shall be suitably integrated with the engine protection system and shall be included within the scope of the work. Battery capacity shall be suitable for meeting the needs of starting system (as three attempt starting), as well as the requirements of control panel, indications and auxiliaries such as priming pump as applicable etc. The scope shall cover all cabling, terminals, including initial charging etc. The system shall be capable of starting the DG set within 20-30 sec., even in winter condition with an ambient temperature down to 0.0C.

7. Battery Charger:

The battery charger shall be suitable to charge required numbers of batteries at 12V/ 24 volts complete with, transformer, rectifier, charge rate selector switch, indicating ammeter & voltmeter etc. Connections between the battery charger & batteries shall be provided with suitable copper leads with lugs etc.

8. Piping Work:

All pipe lines and fittings and accessories requirement inside the room/ enclosure and outside for exhaust piping shall be provided by the contractor. This shall include necessary flexible pieces in the exhaust, fuel, lub. Oil and water lines as are necessary in view of the vibration isolation requirement in the installation. Piping of adequate size shall be used for lub. oil of the material as per manufacturer standard. However,



only M.S. pipes for the exhaust shall be used. For fuel lines within the acoustic enclosure, PVC braided pipe as per manufacturer recommendations can be used. However, for fuel lines outside the acoustics enclosure only MS pipe be used. The pipe work shall be inclusive of all fittings and accessories required such as bends, reducers, elbows, flanges, flexible connections, necessary hardware etc. The installation shall cover clamps, supports, hangers etc. as are necessary for completing the work. However, the work shall be sectionalized with flanged connections as are necessary for easy isolation for purposes for maintenance of unit as approved by Engineer-in-charge.

9. Exhaust Piping:

All M.S. Pipes for exhaust lines shall be conforming to relevant IS. The runs forming part of factory assembly on the engine flexible connections up to exhaust silencer shall be exclusive of exhaust piping item. The work include necessary cladding of exhaust pipe work using 50mm thick Loosely bound resin(LBR)mattress / mineral wool/ Rockwool, density not less than 120kg/m³ and aluminium cladding (0.6mm thick) for the complete portion. The exhaust pipe work includes necessary supports, foundation etc. to avoid any load & stress on turbo charger / exhaust piping. The exhaust pipe shall be *run along the existing wall of the building duly clamped/ *supported on independent structure for which, the design and Drawing for such structure shall be got approved from the Engineer in charge.

- (a) Exhaust system should create minimum back pressure.
- (b) Number of bends should be kept minimum and smooth bends should be used to minimize back pressure.
- (c) Pipe sleeve of larger dia. should be used while passing the pipe through concrete wall & gap should be filled with felt lining.
- (d) Exhaust piping inside the Acoustic Enclosure/ Genset room should be lagged with asbestos rope along with aluminium sheet cladding / insulated to avoid heat input to the room.
- (e) Exhaust flexible shall have it's free length when it is installed. For bigger engines, 2 flexible bellows can be used.
- (f) For engines up to 500KVA, only one bellow is required. However, if exhaust pipe length is more than 7 m then additional bellow/ provision for expansion should be provided.
- (g) 'Schedule B' MS pipes and long bend/elbows should be used.



(h) The exhaust outlet should be in the direction of prevailing winds and should not allow exhaust gases to enter air inlet/ windows etc.

(i) When tail end is horizontal, 45 Degree downward cut should be given at the end of the pipe to avoid rain water entry into exhaust piping.

(j) When tail end is vertical, there should be rain trap to avoid rain water entry. If rain cap is used, the distance between exhaust pipe and rain cap should be higher than diameter of pipe. Horizontal run of exhaust piping should slope downwards away from engine to the condensate trap. Silencer should be installed with drain plug at bottom.

C. Alternator

Scope : This section covers technical requirement of the alternator.

1. Synchronous Alternator :

Self excited, screen protected, self regulated, brush less alternator, Horizontal foot mounted in Single/Double bearing construction(specify one only) suitable for the following:

Rated PF.	: 0.8 (lag)
Rated voltage	: 415 volts
Rated frequency	: 50 Hz
No. of Phases	: 3
Enclosure	: SPDP
Degree of protection	: IP-23
Ventilation	: Self ventilated air cooled
Ambient Temperature	: 40° C Maximum
Insulation Class	: F/H
Temperature Rise	: Within class F/H limits at rated load
Voltage Regulation	: +/- 1%
Voltage variation	: +/-5%



Overload duration/capacity: 10% for one hour in every 12 hours of continuous use.

Frequency variation : As defined by the Engine Governor (+/- 1%)

Excitation : Self / separately excited (Self excitation up to 750 KVA and separately excited system above 750 KVA)

Type of AVR : Electronic

Type of Bearing and : Anti-friction bearings with Grease lubrication.

Lubrication arrangement
Standard : IS-4722 & IEC: 34 as amended up to date.

2. Alternator should be able to deliver output rating at actual Site conditions.
3. The alternator above 500KVA capacity shall be fitted with suitable Nos. Resistance Temperature Device (RTD) & Bearing Temperature Device (BTD) along with space heaters. The terminal of space heaters will be wired to terminal box and the temperature scanner shall be provided in control panel for scaling the winding and bearing temperature.
4. Excitation: The alternator shall be brushless type and shall be self/ separately excited, self-regulated having static excitation facility. The exciter unit be mounted on the control panel or on the alternator assembly. The rectifier shall be suitable for operation at high ambient temperature at site.
5. Automatic Voltage Regulators (AVR): In order to maintain output terminal voltage constant within the regulation limits i.e. +/- 1%, Automatic voltage regulator unit shall be provided as per standard practice of manufacturer.
6. Fault tripping: In the event of any fault e.g. over voltage/ high bearing temperature/ high winding temperature or an external fault, the AVR shall remove the excitation voltage to the alternator. An emergency trip shall also be provided.
7. Standards: The alternator shall be in accordance with the following standards as are applicable.
 - (i) IS: 4722/BS: 2613/1970. The performance of rotating electrical machine.
 - (ii) IS: 4889/BS: 269 rules for method of declaring efficiency of electrical machine.
8. Performance: Voltage dip shall not exceed 20% of the rated voltage for any step load or transient load as per ISO: 8528 (Part-1). The winding shall not develop



hot spots exceeding safe limits due to imbalance of 20% between any two phases from no load to full load.

9. The generator shall preferably be capable of withstanding a current equal to 1.5 times the rated current for a period of not more than 15 seconds as required vide clause 14.1.1 of IS 4722:1992.

10. The performance characteristics of the alternator shall be as below:

- (a) Efficiency at full load 0.8 P.F.
- (i) Up to 25 KVA – not less than 82%
 - (ii) Above 25 KVA and up to 62.5 KVA -not less than 86%
 - (iii) above 62.5 KVA & up to 250 KVA – not less than 90%
 - (iv) above 250 KVA – not less than 93.5%
- (b) Total distortion factor Less than 3 %
- (c) (i) 10% overload -One hour in every 12 hrs of continuous use.
(ii) 50% overload -15 seconds.

11. Terminal Boxes:

Terminal boxes shall be suitable for U.G. cables/ Bus Trunking. The terminal box shall be suitable to withstand the mechanical and thermal stresses developed due to any short circuit at the terminals.

12. Earth Terminals :

2 Nos. earth terminals on opposite side with vibration proof connections, non-ferrous hardware etc. with galvanized plate and passivated washer of minimum size 12mm dia. hole shall be provided.

13. Battery/ Electrical System

Batteries supplied with Genset are generally dry and uncharged. First charging of uncharged batteries is very important and should be done from authorized battery charging centre. Initial charging should be done for 72-80 hours.

14. Batteries should be placed on stands and relatively at cool place.

15. Battery capacity and copper cable sizes for various engine capacity are recommended as indicated in the table below. Cable sizes shown are for maximum length of 2m. If length is more, cable size should be selected in such a way that voltage drop does not exceed 2V. However capacity as recommended by manufacturer may be taken. This shall be in the scope of the successful tenderer.



DG Set Capacity	Battery Capacity(AH)	Cable Size(Material Copper)Sq. mm	Electrical System(Volts)
Above 500 KVA	360	70	24
Above 125 KVA up to 500 KVA	180	70	12
Above 82.5.KVA up to 125 KVA	180	50	12
Above 62.5 KVA up to 82.5 KVA	150	50	12
Above 25 KVA up to 62.5 KVA	120	50	12
Up to 25 KVA	88	35	12

D. Acoustic Enclosure

Scope : This section covers technical requirements of the acoustic enclosures.

1. As per CPCB norms, restriction has been imposed for new DG sets up to 1000KVA for noise level. Therefore, in terms of these norms, acoustic enclosure should be type tested at the climatic conditions through one of the authorized laboratory.

2. Installation

- a) Acoustic enclosures are supplied with built in Anti Vibration Mountings (AVMs). As such Genset can be installed directly on the leveled surface.
- b) Exhaust piping outlet should not be turned towards window / ventilator of home or occupied building. Provision of rain cap should be ensured.
- c) The acoustic enclosure placement should be such that there is no restriction in front of air inlet and outlet from canopy.

d) Service Accessibility

- Genset / Engine control panel should be visible from outside the enclosure.
- Routine/periodical check on engine / alternator (filter replacement and tappet setting etc.) should be possible without dismantling acoustic enclosure.
- For major repairs / overhaul, it may be required to dismantle the acoustic enclosure.



- Sufficient space should be available around the Genset for inspection and service.

3. General Design Guidelines

- a) To avoid re-circulation of hot air, durable sealing between radiator and canopy is must.
- b) Ventilation fans are must for the Gensets cooled by heat-exchanger/cooling tower system.
- c) Exhaust piping inside the enclosure must be lagged (except bellow).
- d) Temperature rise inside the enclosure should not be more than 5°C for maximum ambient above 40°C and it should be below 10°C for ambient below 40°C.
- e) There should be provision for oil, coolant drain and fill. Fuel tank should have provision for cleaning.
- f) The enclosure should be designed to meet the total air requirement for the D.G. Set at full load at site conditions as recommended by the engine manufacturer.

4. Specifications for Acoustic Enclosure:

- a) The acoustic enclosure shall be designed and manufactured conforming to relevant standards suitable for outdoor installation exposed to weather conditions, and to limit overall noise level to 75 dB (A) at a distance of 1 mtr. from the enclosure as per CPCB norms under free field conditions.
- b) The construction should be such that it prevents entry of rain water splashing into the enclosure and allows free & quick flow of rain water to the ground in the event of heavy rain. The detailed construction shall conform to the details as under:
- c) The enclosure shall be fabricated out the CRCA sheet of thickness not less than 1.6mm on the outside cover with inside cover having not less than 0.6mm thick perforated powder coated CRCA sheet.
- d) The hinged doors shall be made from not less than 16 SWG (1.6mm) thick CRCA sheet and will be made air tight with neoprene rubber gasket and heavy duty locks.
- e) All sheet metal parts should be processed through 7-tank process.
- f) The enclosure should be powder coated.
- g) The enclosure should accommodate the daily service fuel tank of the D.G. Set to make the system compact. There should be provision of fuel gauge, which should show the level of the fuel even when the DG Set is not running. The gauge should be calibrated. The fuel tank should be filled from the outside as in automobiles and should be with a lockable cap.
- h) The batteries should be accommodated in the enclosure in battery rack.
- i) The canopy should be provided with high enclosure temperature safety device.
- j) The acoustic lining should be made up of high quality insulation material i.e. rock wool/ glass/ mineral wool/ PU foam of appropriate thickness & density for sound absorption as per standard design of manufacturer's to reduce the sound level as per CPCB norms. The insulation material shall



be covered with fine glass fiber cloth and would be supported by perforated M. S. Sheet duly powder coated / GI sheet/ aluminium sheet.

- k) The enclosure shall be provided with suitable size & No. of hinged type doors along the length of the enclosure on each side for easy access inside the acoustic enclosure for inspection, operation and maintenance purpose. Sufficient space will be provided inside the enclosure on all sides of the D.G. set for inspection, easy maintenance & repairs.
- l) The canopy should be as compact as possible with good aesthetic look.
- m) The complete enclosure shall be of modular construction.
- n) The forced ventilation shall be as per manufacturer design using either engine radiator fan or additional blower fan(s). If the acoustic enclosure is to be provided with forced ventilation then suitable size of axial flow fan (with motor and auto-start arrangement) and suitable size axial flow exhaust fan to take the hot air from the enclosure complete with necessary motors and auto start arrangement should be provided. The forced ventilation arrangement should be provided with auto stop arrangement to stop after 5 minutes of the stopping of D.G sets.
- o) The acoustic enclosure should be suitable for cable connection/connection through bus-trunking. Such arrangements on acoustic enclosure should be water proof & dust-proof conforming to IP-65 protection.
- p) The inside of enclosure should be provided with at **least two nos. 28W- T5 fluorescent tube light luminaire controlled by a 5A switch for adequate lighting during servicing etc.** of the DG Set. The power supply to this luminaries should be from the load side of the AMF Panel so that it can remain energized under all conditions.

E. AFTER SALES SERVICES:

The contractor shall ensure adequate and prompt after sales service free of cost during guarantee period, and against payment after the guarantee period is over, in the form of maintenance, spares and personnel as and when required during normal life span of the equipments and shall minimize the breakdown period. In case of equipment supplied by other manufacturers the *firm shall furnish a guarantee from the manufacturer for the same before the DG Set installation is taken over.*

F. INDEMNITY:

The successful tenderer shall at all times indemnify the department , consequent on this works contract. The successful tenderer shall be liable , in accordance with the India law and regulation for any accident occurring due to any cause and the contractor shall be responsible for any accident or damage incurred or claims arising there from on the department during the period of erection , construction and putting into operation the equipment and ancillary equipment under the supervision of the successful tenderer in so far as the latter is responsible. The successful tenderer shall also provide all insurance including third party insurance as may be necessary to cover the risk. No extra payment would be made to the successful tenderer on account of the above.



G. TECHNICAL PARTICULARS TO BE PROVIDED BY TENDERERS.

Sl. No.

I. Engine

1. Make
2. Model/ISS reference
3. No. of cylinders
4. Rated R.P.M.
5. Method of Starting
6. Aspiration Method
7. BHP
8. Specific Fuel oil consumption(gm/BHP/hr.)
9. Lub. Oil recommended
10. Lub. Oil pressure
11. Qty. of lub. oil required.
12. Time required for starting
13. Lub. oil sump capacity
14. Nos. of exhaust pipe required.
15. Dia. Of exhaust pipe
16. Whether meets CPCB norms for Emission
17. Fuel Consumption at full load
18. Governor(Mechanical/Electronic)
19. Fuel tank capacity(ref. Diesel Engine Table-1)



II. Alternator

1. Make
2. Enclosure Details
3. Full Load output in KVA
4. Full Load output in KW at 0.8 PF
5. Designed over load capacity at max. ambient temp.
6. Efficiency at full load(ref. clause 10 of Alternator section)
7. Class of Insulation of rotor
8. Class of Insulation stator

III. General:

1. Overall Length of DG set LxWxH
2. Overall Weight of DG set
3. Noise Level of DG Set at one Metre
With Acoustic Enclosure

IV. Generator Control Panel:

1. Make
2. Electrical accessories of (Legrand/L&T/ Schneider make only)

V. Acoustic Enclosure:

1. Make
2. Size
3. Details of Acoustic lining Material & Make.



FORMAT FOR TESTING OF DG SET AT SITE.

Sl No.	Description of item	
01	Name of work	
02	Name of Agency	
03	Name of OEM	
04	Address of OEM	
05	Mean height from Sea Level	
	a) of site	
	b) of OEM works	
06	Max. ambient Temperature	
	a) at site	
	b) at OEM Works	
07	Relative Humidity	
	a) of site	
	b) at OEM Works.	
08	Make, model & capacity of engine	
	a) Requirement of de-rating/up	



	rating of engine of DG set and alternator	
09	Make, model & capacity of the alternator	
10	De-rating/ up-rating capacity of the alternator at OEM works	
11	Theoretical Full load current in Ampere sat power factor of testing load.	



		Hr. of operation	Voltage (V)	Power factor	Frequency	Engine oil pressure	Radiator water temp	Test	Current	in Amp	Any other observation during testing of DG set
								R	Y	B	
12	Test Result on various Parameters	1 st Hr									
		2 nd Hr									
		3 rd Hr									
		4 th Hr									
		5 th Hr									
		6 th Hr									
		7 th Hr									
		8 th Hr									
		9 th Hr									
		10 th Hr									
		11 th Hr									
		12 th Hr									
13	Balancing of DG Set	Satisfactory/not satisfactory									
14	Battery used (make, AH)										



	rating & Capacity	
15	Fuel tank capacity	
16	Calibrated fuel gauge provided	Yes/No.
17	Exhaust piping works along with rain cap provided as per the direction of the department	Yes/No.
18	Battery charging alternator unit complete	Yes/No
19	If acoustic enclosure is provided db 7 Level at 1.0 distance from DG set.	

Note: All the tool, machineries, manpower etc. required for checking & inspection of the supplied diesel generator should be provided/arranged by the successful tenderer in discussion with the department. In addition to the above if department asks for additional test at site for its satisfaction , the tenderer shall make necessary arrangement for the same and shall not have any financial claims thereof.

Deptt. Officer's Signature Contractor's Signature Signature OEM's Engineer



SECTION-4

GENERAL RULES AND DIRECTIONS

1. SUBMISSION OF TENDER

- (a) The General Conditions of Contract for Central PWD /APWD Works shall be the guiding principles for this work. Tenderer are advised to procure the same and familiarize themselves with the provisions of the above mentioned Conditions of Contract.
- (b) The University reserves the right to alter, modify any Tender Conditions, technical specifications etc., before tender opening and may seek fresh quotation depending upon necessity, and may even withdraw/ cancel the tender, without assigning any reason.
- (c) All amendments/ revisions to tender documents issued by the University, if any, must be signed and submitted along with the tender. The tenderer are advised to submit the tender based strictly on the terms and conditions and specifications contained in the tender documents, and not to stipulate any deviations.

2. (a) Tenders shall be prepared and submitted in sealed envelope super scribed as “**Tender No..... Dated:..... DUE FOR OPENING ON FOR THE WORK** “. The full name, Postal address, telegraphic address and telex/ telefax /telephone No. of the tenderer shall be written at the bottom left corner of the sealed envelop.
- b) Insertion, postscript, addition and alteration shall not be recognized unless confirmed by the Tender’s signature.

In the event of the tender being submitted by a firm, it must be signed separately by each partner thereof or in the event of the absence of any partner, it must be signed on his behalf by a person holding a power of attorney.

3. TENDERER TO INFORM HIMSELF FULLY:

The tenderer is required to carefully examine the technical specifications and other details relating to the work given in the Tender documents and fully inform himself as to all conditions and matters that may in any effect the work or the cost thereof. The tender shall be deemed to have himself independently obtained all necessary information for the purpose of preparing the tender and his tender as accepted shall be deemed to have taken into account all contingencies as may arise due to such information or lack of the same.



PARTICULARS OF TENDER:

Last Date and Place of Tender Submission	: ECE Dept., Assam University, Silchar by 18/01/2016 (up to 2.00 P.M).
Date and Place of opening of Technical Bid	: ECE Dept., Assam University, Silchar on 18/01/2016 at 2.30 P.M
Date and Place of opening of Financial Bid	: ECE Dept., Assam University, Silchar on 20/01/2016 at 2.30 P.M

Validity of tender: Tender shall remain valid for acceptance for a period of not less than **90 days** from the date of opening of tenders which may be required to be extended in public interest at the discretion of the University Authority.

CLARIFICATIONS:

The Tender Document issued is complete in all respect and no further clarifications are elaborated. However, in so far Technical Clarifications if any are concerned even though not binding on University can be ascertained from the University.

QUOTATION OF PRICE / RATES

This is Item Rate Tender, the tenderer shall state at what rate he will be willing to undertake the work. Rate should be quoted both in figure & words.

COMPLETION TIME:

The completion time is the essence of the contract. The Tenderer shall complete the work within the period indicated in the Notice Inviting Tender.

In case delay in completion of the supply within the stipulated time due reasons attributable to the contractor, **standard liquidated damaged @1% of the work accepted work value** of shall be recovered for each day of delay from the final bill.

TRANSFER OF TENDER DOCUMENTS/ TENDERS:

Transfer of tender documents purchased by one tenderer to another is not permissible. Similarly transfer of tenders submitted by one tenderer to another is not permissible under any circumstances. The alteration of essence of tender once submitted is also not permissible.

**LANGUAGE:**

The Tender shall be submitted in English language only.

EARNEST MONEY DEPOSIT:

1. The tender must be accompanied by the Earnest Money Deposit pledged in favour of **Finance Officer, Assam University, Silchar**, in the form of Call Deposit as indicated in the Notice Inviting Tender. If the tenderer after submitting his tender resiles from his offer or modify the Terms and Conditions thereof in a manner not acceptable to the University, the Earnest Money will be forfeited. Tenders not accompanied by the earnest money deposit will not be considered and will be summarily rejected.
2. On Non-acceptance of tender, but in any case not earlier than the expiry date of the period for which the tender is kept open, the Earnest Money shall be discharged.
3. Should the Tender in question be withdrawn or cancelled by the University, which the University shall have the right to do at any time, Earnest Money will be discharged.
4. Should the successful tenderer fail or refuse to duly sign the contract within the period fixed by the University or fail/refuse to commence the work within the stipulated time, the Earnest Money shall be forfeited without prejudice to his being liable for any further loss or damage incurred in consequence by the University.

NO CLAIM FOR COMPENSATION FOR SUBMISSION OF TENDER:

The Tenderer whose tender is not accepted shall not be entitled to claim any costs, charges and expenses of any incidental to or incurred by him thorough or in connection with his submission of tender, even though the University may modify/ withdraw the Tender.

LOWEST TENDER NOT NECESSARILY TO BE ACCEPTED:

The University reserves the right to accept any Tender it considers advantageous / superior and is not bound to accept the lowest alone and need not assign any reasons for non-acceptance.

TENDER EVALUATION:

The Tenders received and accepted will be evaluated to ascertain the best and lowest workable tender in the interest of the University, for the complete work covered under the technical specifications and documents.



SECTION – 5.

TERMS AND CONDITIONS GOVERNING THE TENDER AND EXECUTION OF CONTRACT THEREOF.

1. DEFINITIONS:

a) Unless otherwise required by the subject or context the terms herein below shall have the following meanings.

The **Contract** means the documents forming the tender and acceptance thereof and the formal agreement executed between the competent authority on behalf of Assam University and the Contract, together with the documents referred to therein including these conditions, the specifications, designs, drawings and instructions issued from time to time by the Registrar, Assam University and all the these documents taken together, shall be deemed to form one contract and shall be complementary to one another.

b) **Client** means Assam University acting through The Executive Engineer Assam University, Silchar.

c) The **Contractor** shall mean the individual, firm or company, whether incorporated or not, undertaking the works and shall include the legal personal representative of such individual or the persons composing such firm or company, or the successors of such firm or company and the permitted assigns of such individual, firm or company,

d) The expression **works** or **work** shall, unless there be something either in the subject or context repugnant to such construction, be construed and taken to mean the works by or by virtue of the contract contracted to be executed whether temporary or permanent, and whether original, altered, substituted or additional.

e) The **site** shall mean the land/ or other places, on, into or through which work is to be executed under the contract or any adjacent land, path or street which may be allotted or used for the purpose of carrying out the contract.

f) **Tender Value** means the value of the entire work as stipulated in the letter of award.

g) Where the context so requires, words imparting the singular only also include the plural and vice versa. Any reference to masculine gender shall whenever required include feminine gender and vice versa.

h) As stated in Section III, Clause 1.1, the General Conditions of Contract for Central PWD Works shall be the guiding principles for this tender. The Clauses of Contract mentioned therein shall also be applicable herein and only those Clauses that need addition, emphasis and modification in context of this tender are enumerated below. Contractors are once again advised to familiarize themselves with the General Conditions of Contract for Central PWD Works.



2. SIGNING OF CONTRACT AGREEMENT

i. On the tender being accepted by the Client, a formal contract may be signed and executed by and between the Client and the successful tenderer within a time to be fixed by the Client, which shall anyhow be within 15 days from the stipulated date of start of the work.

ii. The contractor shall be furnished, free of cost one certified copy of the contract documents except standard specifications, Schedule of Rates and such other printed and published documents, together with all drawings as may be forming part of the tender papers. None of these documents shall be used for any purpose other than that of this contract.

3. SCOPE OF WORK

i. The work to be carried out under the Contract shall, except as otherwise provided in these conditions, include all labour, materials, tools, plants, equipment and transport which may be required in preparation of and for and in the full and entire execution and completion of the works. The descriptions given in the Schedule of Quantities shall, unless otherwise stated, be held to include wastage on materials, carriage and cartage, carrying and return of empties, hoisting, setting, fitting and fixing in position and all other labours necessary in and for the full and entire execution and completion of the work as aforesaid in accordance with good practice and recognized principles.

ii. The contractor shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the rates and prices quoted in price bid which rates and prices shall, except as otherwise provided, cover all his obligations under the Contract and all matters and things necessary for the proper completion and maintenance of the works.

4. DISCREPANCIES AND ADJUSTMENT OF ERRORS

i. The several documents forming the Contract are to be taken as mutually explanatory of one another, detailed drawings being followed in preference to small scale drawing and figured dimensions in preference to scale and special conditions in preference to General Conditions.

ii. If there are varying or conflicting provisions made in any one document forming part of the contract, the Registrar, Assam University shall be the deciding authority with regard to the intention/ interpretation of the document and his decision shall be final and binding on the contractor.

iii. Any error in description, quantity or rate in Schedule of Quantities or any omission there from shall not vitiate the contract or release the Contractor from the execution of the whole or any part of the works comprised therein according to drawings and specifications or from any of his obligations under the contracts.



5. TERMS OF PAYMENT

Subject to any deduction, which the client may be entitled to make under the Contract, all payments to contractor for the work would be made by Cheque / Demand Draft in favour of the contractor on **satisfactory completion report of Site (i/c) of the proposed work.**

6. SECURITY DEPOSIT

10% Security Deposit will be retained by the University from the bill value, which shall be released after one year from the date of completion of the work. During this defect liability period, any defect(s) in the work done shall be rectified by the Contractor at his/her own cost and expenses, failing which the Security Deposit will be forfeited.

7. RELEASE OF SECURITY DEPOSIT

Release of the security deposit will be done after 12 months of final acceptance of the work by the Assam University, Silchar.

8. SUB CONTRACTING OF THE WORK

The Contractor is not permitted to assign or transfer his/ their obligation or benefit under the contract either in full or in part to other individuals/ firms / agencies. However, under extreme circumstances where sub-contracting of part of the work is unavoidable, prior written permission of Client shall be taken by the Contractor.



PRICE BID

TENDER FOR SUPPLY & INSTALLATION OF 100 KVA
DIESEL GENERATOR SET AT DEPT. OF
ELECTRONICS AND COMMUNICATION ENGG.,
ASSAM UNIVERSITY SILCHAR.



ASSAM UNIVERSITY, SILCHAR

(A Central University Established by an Act of Parliament)

Silchar-788011, Assam, India.



Certified that this Price Bid contains (03) pages including the cover page.

SUPPLY OF 100 KVA D.G SET AT DEPT. OF ECE,AUS

Sl no	Item description	Unit of material	Unit Rate (Rs)	Quantity	Amount (Rs)	
1	Supplying including installation, testing and commissioning of D.G Set ,powered by Diesel Engine (Radiator Water Cooled) coupled to suitable alternator of 415 V, AC 3 Phase ,0.8 p.f (lag) both mounted on a fabricated base frame as directed by the deptt.	Nos.		1		
	Continuous power KVA					100
	Electric Power KW					80
	Rated Current A					130
	No. Phases & Voltage					3-Phase/415 V
	Battery capacity					150 AH
	Alternator Brushless, Single Bearing,IP 23 ,Class H insulated , 50 Hz,					
Voltage Regulation	(+/-) 1 %					

Total amount =

(Amount in words)=Rs.....

Signature of the Bidder(with seal)



Signature of the Bidder:-

Name of the Bidder:-

Postal Address:-

E-mail:-

Ph No:-