

O/o The Executive Engineer (E)
BSNL Electrical Division,
2nd Floor, Wireless Compound,
Santacruz, Mumbai – 400 054.
Phone – 022 - 26610270
Fax No. – 022 - 26603955

CE (E) N.I.T. NO. : 1300/ CEEM / 2009-10 / NIT / 04
DIVISION NIT NO. :

NAME OF WORK : **Part A** : Supply of 80 x 15 KVA, single phase DG set with acoustic enclosure & AMF control panel & GSM Modem.
Part B : ITC of 80 x 15 KVA, single phase DG set with acoustic enclosure & AMF control panel & GSM Modem.
at different GSM-BTS stations for phase V.1 under jurisdiction of BSNL Electrical Circle, Mumbai.

Name of the Contractor :- _____
(To be filled in by the Contractor)

Address :- _____

_____ **Pin.** _____

Phone & Mobile No - _____

Fax No. - _____

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Check list for the Tenderer

	S.No	Check	Yes / No
FIRST ENVELOPE	1	Whether the demand draft for Rs.1688/= drawn in favour of Accounts officer (Cash), Civil Division III, BSNL, Santacruz, Mumbai-54, towards the tender fee is placed in the First envelope. (In case of downloaded Tenders)	
	2	Whether EMD amounting to Rs.4,69,331/= in the form of Demand draft/FDR/Bank guarantee/CDR of a nationalized bank or Scheduled bank guaranteed by the RBI, drawn in favour of Accounts officer (Cash), Civil Division III, BSNL, Santacruz, Mumbai-54, is placed in the First Envelope.	
	3	Whether attested copies of satisfactory completion certificates in respect of at least 3 works of similar nature with equipment module of 11.25 KVA and with the aggregate capacity of works not less than 90 KVA during the last 3 years in Central Govt./ State Govt./ PSUs is reckoned from the date of NIT.(Similar nature of work means E/A Set with AMF Panel and acoustic enclosure) issued by an officer not less than the rank of Executive Engineer is placed in the first envelope.	
	4	Whether attested copies of valid chartered accountant certificate for the works execution turnover of not less than Rs.One Crore in last three years is placed in the first envelope.	
	5	Whether attested copies of license, Sales Tax, WCT, Service Tax registration & PAN No. as per page No.7 of the tender Document is placed in the first envelope.	
	6	Whether Power of attorney in favour of the signatory signing the tender and documents is placed in the first envelope.(Not applicable, in case of the tenders signed by the proprietor himself)	
	7	Whether the envelope containing credentials fulfilling the eligibility criteria is super scribed on the top as First envelope.	
SECOND ENVELOPE	8	Whether Under taking and declaration in page No.11and 13 of the tender document is signed and seal affixed	
	9	Whether the tenderer has signed in the following pages. a) Bottom left side of all the pages of the tender document with seal of the firm.	
	10	Whether the tenderer has filled up his address and phone number in the page no .1 of the tender document.	
	11	Whether the Price bid is placed in the envelope after quoting and super scribed on top as (Price bid)	
	12	Whether rates are quoted in words & figures for each of the items in schedule of work inclusive of all taxes & duties.	
	13	Whether price break-up has been filled up for calculating CENVATable credit to BSNL.	

I/ we hereby declare that no addition /deletion/correction have been made in the tender document submitted and is identical to the tender document appearing on website. (In case of downloaded tender)

(Seal of the firm)

(Signature of the contractor)



BHARAT SANCHAR NIGAM LIMITED
(A Govt. Of India Enterprise)

NOTICE INVITING TENDER

Letter no- 51 (5) BSNL/09-10/ED/MI/2196

Date: 01/08/09

Executive Engineer (E) BSNL Elect. Divn. 2nd Floor, Wireless Compound, Santacruz, Mumbai – 400 054 Phone 022- 26610270 invite tender for the work of :**Part A** : Supply of 80 x 15 KVA, single phase DG set with acoustic enclosure & AMF control panel & GSM Modem. **Part B** : ITC of 80 x 15 KVA, single phase DG set with acoustic enclosure & AMF control panel & GSM Modem. **at different GSM-BTS stations for phase V.1 under jurisdiction of BSNL Electrical Circle, Mumbai.** For further details log on to www.maharashtra.bsnl.co.in.

Last Date of application : 13/08/09
Last Date of issue of tender : 14/08/09
Last Date of Submission of tender : 17/08/09 (Up to 3.00 p.m.)
Date of opening of tender : 17/08/09 (After 3.30 p.m.)

EXECUTIVE ENGINEER (E)
BSNL ELECTL DN NO.I,
SANTACRUZ (W), MUMBAI 54.

Copy to: -

1. Notice Board.
2. The Superintending Engineer (E), BSNL Elect Circle, Mumbai.
3. D.G.M. Vigilance, O/o CGMT, M H. Telecom Circle, Mumbai.
4. All Sub Divisional Engineers (E) under BSNL Elect Dn. I Mumbai.
7. Accounts Officer Civil Division III, Mumbai
8. Accounts Officer (Works) Mumbai-54.
9. Concerned Contractors.

EXECUTIVE ENGINEER (E)
BSNL ELECTL DN NO.I,
SANTACRUZ (W), MUMBAI 54.

BHARAT SANCHAR NIGAM LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)
Electrical Wing

Electrical Division :

NIT No. : Division:

NOTICE INVITING TENDER

(As per Tendering Procedure in BSNL revised upto date)

01. Tenders in the prescribed form are hereby invited on the behalf of the BSNL for the work of :

a)	<u>NAME OF WORK</u> :- Part A : Supply of 80 x 15 KVA, single phase DG set with acoustic enclosure & AMF control panel & GSM Modem. Part B : ITC of 80 x 15 KVA, single phase DG set with acoustic enclosure & AMF control panel & GSM Modem. at different GSM-BTS stations for phase V.1 under jurisdiction of BSNL Electrical Circle, Mumbai.
b)	<u>DIVISION</u> : - BSNL Electrical Division, Mumbai.
c)	ESTIMATED COST : - Rs. 2,34,66,560/-
d)	EMD : - Rs.4,69,331/-
e)	TIME : - i. Supply & ITC portion agreement : 3 (Three) months from the date of L.O.I.
f)	PERFORMANCE SECURITY i. Supply Portion agreement : 5% of the tendered value of the work.
g)	SECURITY DEPOSIT : - i. Supply Portion agreement : 5% of the tendered value of the work. ii. ITC portion agreement : 10% of the tendered value of the work
h)	COST OF TENDER DOCUMENT : - Rs. 1688/- Tenders will be issued to eligible contractors satisfying eligibility condition

BHARAT SANCHAR NIGAM LIMITED
(A GOVT OF INDIA ENTERPRISE)
ELECTRICAL WING

ELECTRICAL DIVISION

Certified that this tender schedule contain _____ pages only

NIT No.: DIVISION

Notice Inviting Tenders
(As per Tendering procedure in BSNL revised up to date)

01. Tenders in the prescribed form are hereby invited on behalf of the BSNL for the work of

Part A : Supply of 80 x 15 KVA, single phase DG set with acoustic enclosure & AMF control panel & GSM Modem.

Part B : ITC of 80 x 15 KVA, single phase DG set with acoustic enclosure & AMF control panel & GSM Modem **at different GSM-BTS stations for phase V.1 under jurisdiction of BSNL Electrical Circle, Mumbai.**

Estimated cost : Rs. 2,34,66,560/-

02. (a) Printed forms of tender s consisting of the detailed pans, complete specifications, the schedule of quantities of the various classes of work s to be done and the set of conditions of contract to be complied and with by the persons whose tender may be accepted, can be purchased, at the Divisional / Sub divisional office between the hours of 1100 hrs and 1600 hrs. every day except on Sundays and public holidays on payment of Rs. 1688/- in cash/ DD.

(b) The site for the work is available / or the site for the works shall be made available in parts.

(c) The tender forms can also be downloaded from the web site.

(d) Before tendering, the contractor shall inspect site and fully acquaint himself about the condition with regard to accessibility of site and site nature and the extend of grounds, working conditions, including stocking of materials, installation of T & P etc., and conditions affecting accommodation and movement of labour etc., required for satisfactory execution of contract. No claim whatsoever on such account shall be entertained by the BSNL in any circumstances.

03. Tenders which should always be placed in sealed covers with the name of work written on the envelope will be received by the **Executive Engineer(Elect.)BSNL Electrical Division, Mumbai up to 1500 hours on 17/08/09 and will be opened by him in his office on the same day at 15:30 hours.**

04. The time allowed for carrying out the work will be 3 Months (Supply & ITC portion) from date of LOI..

05. Issue of tender form will be stopped two days before the date **14/08/09** fixed for opening of tenders. Tenders will be sold on working days, no tender will be sold after **16:00 hours.**

06. a) Earnest Money amounting to Rupees **4,69,331/-** in the form of demand draft/ FDR / BG/ CDR of nationalized scheduled bank guaranteed by the Reserved Bank of India, drawn in favour of **Accounts officer (Cash), BSNL Civil Division III, BSNL, Santacruz, Mumbai-54**, must accompany each tender and each tender should be in two sealed covers, one cover containing the EMD in proper form and other cover containing tender, super scribed as " Tender for the work -----

and addressed to Executive Engineer (E), BSNL, Electrical Division, Mumbai. **The Validity period of EMD is 120 days, from the date of opening of tender.** Each tender should be in two sealed covers, first containing credentials for meeting the eligibility condition along with the cost of tenders and EMD in proper form, second cover containing tender documents. The credentials shall be self attested and certified by any BSNL Executive. If not certified by BSNL Executive then original documents shall be produced at the time of tender opening. After verification of contents of this envelop then second envelope containing the bid document shall be opened.

b) The EMD of all the unsuccessful tenders shall be released on issue of award letter to the successful tenderer. This shall be done within one week of award letter.

c) Exemption from payment of earnest money and security deposit by any other unit/ department shall not hold good for BSNL.

07. a) **The contractor should submit and confirm Chartered Accountant Certificate in respect of turn over and other registration certificate (enlistment in BSNL, Electrical license, Sales tax) with attested copies (self attested and counter attested by any Executive of BSNL/MTNL or Gazetted Officer of GOI) as applicable along with the application on printed letter head for purchase of tender.**

b) **The contractor shall submit and confirm his permanent account No.(PAN) issued by the Income-tax department.**

c) The tenderer should submit the valid WCT/Sales tax/VAT registration certificate.

08. I.) **Performance Guarantee For PART A** :- The contractor is required to furnish performance guarantee for an amount equal to 5% of the contract value in the form of Bank Guarantee/CDR/FDR/DD (of Nationalized /Scheduled Bank in a standard format) with in two weeks from the date of issue of award letter. This period can be further extended by the Engineer-in-Charge up to maximum period of two weeks on return request of contractor. The validity period of performance security in the form of performance Bank Guarantee shall be one year from the date of actual completion of work.

ii) **Security Deposit : For PART A**--In addition to the performance guarantee stated above, a sum @ 5% of the gross amount of the bill shall be deducted from each running bill of the contractor till the sum be deducted with the sum already deposited as earnest money, will amount to security deposit of 5% of the tender value of the work.

Security Deposit : For PART- B a sum @ 10% of the Tendered amount shall be deducted from bills.

09. The acceptance of tender will rest with the **Chief Engineer(E)**, who does not bind himself to accept the lowest tender or any other tender and reserve to himself the authority to reject lowest or all the tenders received without assigning any reason. All tenders in which any of the prescribed conditions are not fulfilled or incomplete in any respect are liable to be rejected. Tenders with any condition including that of conditional rebate shall be rejected forthwith summarily.

10. Canvassing in connection with tender is strictly prohibited and the tenders submitted by the contractors who resort to canvassing will be liable for rejection.

11. The BSNL reserves itself the right of accepting the whole or any part of the tender and the tenderer shall be bound to perform the same at the rates quoted.

12. i) The tenderer should give a certificate that none of his/her relative is employed in BSNL units. In case of proprietorship firm, certificate will be given by the proprietor and for partnership firm certificate will be given by all the Directors of the company.

ii) Near relatives of all BSNL employees either directly recruited or on deputation are prohibited from participation in tenders and execution of works in the different units of BSNL. The near relatives for this purpose are defined as:

a) Members of a Hindu Undivided family.

b) They are husband & wife.

c) The one is related to the other in the manner as father , mother, son(s), and son's wife (daughter-in-law), daughter(s) and daughter's husband (Son-in-law), brother(s) and brother's wife, sister(s) and sister's husband (Brother-in-law).

iii) The company or firm or any other person is not permitted to tender for works in BSNL unit in which his near relative(s) is (are), posted. The unit is defined as SSA /Circle/Chief Engineer/Chief Architect/Corporate office for non-executive employees and all SSA in a circle including Circle office/Chief Engineer/Chief Architect/Corporate office for executive employees (including those called as Gazetted officers as present). The tenderer should give a certificate that none of his /her such near relative is working in the units as defined above where he is going to apply for tender /work, for proprietorship, partnership firms and limited company certificate shall be given by the authorized signatory of the firm. Any breach of the conditions by the company or firm or any other person,the

tender /work will be cancelled and earnest money/performance guarantee will be forfeited at any stage whenever it is so noticed. BSNL will not pay any damages to the company or firm or the concerned person. The company or firm or the person will also be debarred for further participation in the concerned unit.

The format of the certificate to be given is " I
..... Son of Sh..
..... Resident of.....
..... hereby certify that none of my relative (s) as defined
in the tender document is /are employed in BSNL unit as per details given in tender document.
In case at any stage, it is found that the information given by me is false /incorrect, BSNL shall
have the absolute right to take any action as deemed fit /without any prior intimation to me".

(Seal of the firm)

(Signature of the contractor)

13. No employee in BSNL/Government of India is allowed to work as a contractor for a period of two years of his retirement from service without the prior permission. The Contract is liable to be cancelled if either the contractor or any of his employees is found at any time to be such a person who had not obtained the permission as aforesaid before submission of tender and engagement in the contractors service.

14. The tender for works shall not be witnessed by the contractor who himself /themselves has /have tendered or who may and has/have tender for the same work. Failure to observe this condition would render tenders of the contractors tendering as witnessing the tender is/are liable for summarily rejection.

15. It will be obligatory on the part of the tenderer to sign each page of the schedule of work and the tender documents for all the component parts and after the work is awarded he will have to enter into a separate agreement for each component with the officer concerned.

16. Any tender not submitted in proper manner or if it contains too many corrections, overwriting of absurd rates, and absurd amount will be liable to be rejected and the BSNL will be at liberty to take such action as it may deem fit without any reference to the tenderer.

17. The tenders for the work shall remain open for acceptance for a period of 90 days from the date of opening of tenders.

If any tenderer withdraws his tender before the said period or makes any modification in the terms and conditions of the tender which is not acceptable to the BSNL shall, without prejudice to any other right of remedy be at liberty to forfeit 50% (Fifty percent only) of the said earnest money absolutely.

20. **Extension of validity:** In case, where the letter of award of work cannot be placed within the validity period of the tender, the BSNL can request all tenderers to extend the validity of their respective tenders and the earnest money deposit by a reasonable period. In such cases, extension of validity of earnest money deposit by 30 days beyond the extended validity date of tender should also be asked for. While BSNL can make the request of extension, the tenderer is free to either extend the validity or refuse the request to extend the validity.

21. Unsealed tenders will be summarily rejected.

22. The contractor should read the tender documents carefully before submitting the tender.

23. Agreement shall be drawn with the successful tenderer on prescribed form. Tenderer shall quote his rates as per various terms and conditions of the said form, which will form part of agreement.

24. The tenderer shall furnish a declaration to this effect (In case downloaded tender) that no addition /deletion/correction have been made in the tender document submitted and is identical to the tender document appearing on website. Every page of downloaded tender shall be signed by the tenderer with stamp (Seal) of his firm /organization.

25. This Notice Inviting Tender shall form part of the contract document. The successful tenderer/contractor on acceptance of his tender by the Accepting authority, shall, within 15 days from

the stipulated date of start of the work, sign the contract consisting of :-

a) The Notice Inviting Tender all the documents including additional conditions specifications and drawings if any forming the tender as issued at the time invitation of tender and acceptance thereof together with any correspondence leading thereto.

b) Standard form, BSNL EW-8.

Eligibility Criteria: -

1. BSNL (EW) approved Engine manufactures.

OR

2. OEMs authorized by BSNL (EW) approved Engine manufactures to quote against the particular tender. Authorization letter specific to the concerned tender on the printed letter head of the company in this regard will have to be produced by the dealer.

OR

3. Firms satisfying the following conditions:

a) Financial norms:

The works execution turnover of the contractor shall not be less than 1 (one) Crore in the past 3 years reckoned from the date of NIT.

b) Physical norms:

The firm should have successfully completed at least 3 works of similar nature with equipment module of **11.25 KVA** and with the aggregate capacity of works not less than **90 KVA** during the last 3 years in Central Govt./ State Govt./ PSUs is reckoned from the date of NIT. (**Similar nature of work means E/A Set with AMF Panel and acoustic enclosure**)

OR

4. Contractors enlisted under Class-I (Electrical) category in BSNL can also quote subject to the following:

a) The turnover has to be as per 3 (a) above.

The firm shall have valid service tax registration.

Attested documents proving fulfillment of eligibility criteria, valid Chartered Accountant certificate towards deposition of income tax, turn over proof and certified copy of PAN card to be furnished along with application.

Signature of Divisional Officer/Sub –Divisional Officer

.....
For and on behalf of BSNL.

BHARAT SANCHAR NIGAM LIMITED
(A GOVT.OF INDIA ENTERPRISE)

CIRCLE - _____ TELECOM CIRCLE

DIVISION –

BRANCH - EW

SUB DIVISION

(B) **Tender for the work of :**

Part A : Supply of 80 x 15 KVA, single phase DG set with acoustic enclosure & AMF control panel & GSM Modem.

Part B : ITC of 80 x 15 KVA, single phase DG set with acoustic enclosure & AMF control panel & GSM Modem.

at different GSM-BTS stations for phase V.1 under jurisdiction of BSNL Electrical Circle, Mumbai.

Issued to(contractor) _____

(I) Tender Cost _____ (II) Receipt no. _____

(III) Date of Application _____ (IV) Date of Issue _____

(VI) Signature of officer issuing the Documents _____

(V) Designation _____

(B) (i) **To be submitted by** (time) _____ hours on_(date) _____
To -----

(ii) To be opened in presence of tenderers who may be present at _____ hours
On _____ in the office of _____

TENDER

1. I /we have read and examined the notice inviting tender, schedule, Specifications applicable , Drawings & Designs, General Rules and Directions, Conditions of contract, clauses of contract , Special conditions, Schedule of Rate & other documents and Rules referred to in the conditions of contract and all other contents in the tender document for the work.
2. I/We hereby tender for the execution of the work specified for the BSNL within the time specified , schedule of quantities and in accordance in all respects with the specifications , designs, drawings and instructions and other documents and rules referred to in the conditions of contract and all other contents in the tender document for the work.
3. I/We agree to keep the tender open for ninety (90) days from the due date of submission thereof and not to make any modifications in its terms and conditions.
4. A sum of Rs. _____ is hereby forwarded in the form of deposit at call receipt/FDR/Bank guarantee of a Nationalized/Scheduled bank as earnest money if I/we, fail to commence the work specified, I/we agree that the said BSNL shall without prejudice to any other right or remedy, be at liberty to forfeit the said earnest money absolutely, and the same may at the option of the competent authority on behalf of BSNL be recovered without prejudice to any other right or remedy

CONTRACTOR

10

EE(E)

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.

5. Should this tender be accepted, I/We agree to execute all the works referred to in the tender documents upon the terms and conditions contained or referred to therein and to carry out such deviations as may be ordered up to maximum of percentage mentioned in clause 12.3 of the tender form and those in excess of that limit at rates to be determined in accordance with provisions contained in clause 12.2
6. I/We agree to furnish to BSNL Deposit at call receipt/FDR/Bank guarantee of a nationalized/scheduled Bank for an amount equal to 5% of the contract value in a standard format within two weeks from the date of issue of award letter. I/We agree to keep the performance bank guarantee valid for one year from date of actual completion of work.
7. I/We hereby declare that I/We shall treat the tender documents drawings and other records connected with the work as secret/confidential documents and shall not communicate information/derived there from to any person other than to whom I/We am/are authorized to communicate the same or use the information in any manner prejudicial to the safety or interest of BSNL.

Signature of Witness
(required in the case of
Contractor's thumb impression
Is given by the contractor in place of signature)
(Name & Postal address)

(Signature of Contractor)
Seal of Contractor

Occupation of witness

Date

ACCEPTANCE

The above tender (as modified by you as provided in the letters mentioned hereunder) is accepted by me for and on behalf of the BSNL for a sum of RS. _____
(Rupees _____)

The letter referred to below shall form part of this contract Agreement:-

- a)
- b)
- c)

For & on behalf of the BSNL

Signature _____

Dated _____

Designation _____

“IMPORTANT NOTE FOR CONTRACTORS”

The firm shall read carefully the following conditions and shall quote accordingly confirming all the points in their offer.

GENERAL TERMS AND CONDITIONS:-

1. EVALUTION OF TENDERS:-

- i) The bidder shall quote separate rates for “supply” portion & “ITC” portion. The lowest bidder shall be decided on the combined rates of supply and ITC portion (Net cost to the BSNL) inclusive of all Duties and Taxes Packing, Forwarding, Freight and Insurance charges but exclusive of CENVAT-able credit Taxes and duties i.e Excise duty and Service tax.
- ii) Letter of intent shall be issued separately for “Supply” portion & “ITC” portion and separate agreements shall be framed with same date of commencement.

2. CURRENCY OF CONTRACT: -

The contract shall be valid for issue of L.O.I for 6 months (can be extended to 12 months with the consent of firm) including 25% deviation if any, after the date of its acceptance. The ordering quantity can be increased upto the extent of 25% (deviation limit) without the consent of the firm. The firm shall execute such quantities at the rate quoted in the tender without any change in terms and conditions of the contract.

3. BSNL 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 tenderer shall be bound to perform the same at the quoted rates. BSNL also reserves the right to split up the work/quantities of items of works (schedule of work) between lowest two agencies who agree to the rates decided by the BSNL in the ratio of 70% and 30% to the 1st and 2nd lowest tenderer respectively. In case the second lowest tenderer does not agree to bring down the rates to L1 then 100% work shall be awarded to lowest tenderer.

4. COMPLIANCE OF EPF ACT:

The firm has to fulfill / compliance of the provisions of EPF & Misc. Provisions Act 1952 & Employees' Provident Fund Scheme 1952.

The each claim bill of contractors must accompany the 1) List showing the details of labourers / employees engaged. 2) Duration of their engagement. 3) The amount of wages paid to such labourers / employees for the duration in question. 4) Amount of EPF contributions (both employer's and employees contribution) for the duration of engagement in question, paid to the EPF authorities. 5) Copies of authenticated documents of payments of such contribution to EPF authorities and 6) A declaration from the contractors regarding compliance of the conditions of EPF Act, 1952.

5. CO-ORDINATION AT SITE :-

At the site of work more than one agency may be working full cooperation shall be extended to other agencies during progress of work. Further, work shall be carried out in such a way so that it may not cause abnormal noise and hindrance to the officers of the department engaged in erection as well to the normal routine work.

6. Operation of Master and Individual agreements shall be governed as follows:

- i) Master agreement (**SEPARATE FOR SUPPLY AND ITC PORTION**) shall be framed by SE (Elect) office which shall be signed by the firm within 7 days of acceptance of work. The firm shall submit EMD of proportionate amount as prescribed above in 6 (ii) of BSNL EW 6 valid up to 12 months from the date of acceptance. EMD submitted at the time of opening of tender shall be returned thereafter.
- ii) Individual Letter of Intent (LOI) shall be issued by O/o SE (E) to the firm giving details of site, number of units required, name of concern EE (E) and other details.
- iii) EE shall draw separate individual agreements for “Supply” portion and “ITC” portion based on above letter of intent and firm has to sign the agreement within 7 days of issue of award letter by EE.
- iv) Date of start of individual agreement shall be the date of issue of LOI and time allowed to carry out the work shall be three months.
- v) The contractor shall be required to deposit Performance guarantee against individual agreement for “Supply” portion only as prescribed below in Para 3 of B of Schedule D Section I.

- vi) Individual agreement shall be operated independently without co-relation with the other individual agreements for the purpose of payment, S. D., extension of time, closing of contract etc. as per terms and conditions of individual agreement.
- vii) EMD available with the master agreement shall be released after receipt of performance guarantee for individual agreements for all LOIs covered under master agreement including permissible deviation if any as per terms and conditions of master agreement or expiry of time period for issue of LOI, whichever is earlier.
- viii) S. D. and other deposits as per terms and conditions of individual agreement shall be kept with the concern EE (E) and refunded / adjusted as per relevant clause of individual agreement.

7. DECLARATION BY TENDERER

- (a) To be signed by Proprietor in case of proprietorship firm.
- (b) To be signed by all partners in case of partnership firm.
- (c) To be signed by all the directors in case of the company.

1. M/s.....

S/o

R/o

Hereby certify that none of my relatives(*) as defined below is/are employed in BSNL units(**) as defined below.

In case at any stage it is found that information given by me is false/incorrect, BSNL shall have absolute right to take any action as deemed fit, without any prior intimation to me.

(*) Definition of Relatives.

- (a) Member of Undivided family.
- (b) They are husband and wife.
- (c) They are related to the other in the manner as Father, Son(s), Son's wife (Daughter-in-law, Daughter(s) & Daughter's husband (Son-in-law), Brother & Brother's wife, Sister(s) & Sister's husband (Brother-in-law).

(**) The company or firm or any person is not permitted to tender for the work in BSNL unit in which his near relative(s) is (are) posted. The unit is defined as

- (a) For Non Executive Employees: SSA/Circle/Chief Engineer/Chief Architect/Corporate Office.
- (b) For Executive Employees (including those called as gazetted officer at present): All SSA in Circle office/Chief Engineer / Chief Architect /Corporate Office.

Place : _____

Date : _____

Signature of tenderer

8. CENVAT CREDIT

As per CENVAT CREDIT RULES – 2004, BSNL who is the output service provider, is entitled for duty credit. To avail this, the firm has to furnish the following:-

A. For supply portion agreement

An invoice favoring BSNL indicating the following at the time of delivery:

- (a) Value of goods excluding the excise duty and education cess on ED
- (b) Excise Duty
- (c) Education Cess on Excise duty

(d) Correct Excise duty tariff head.

B. For ITC portion agreement

Invoice indicating the quantum of Service tax paid on Installation, Testing and Commissioning. Invoice should indicate the name of the consignee with relevant Service tax registration no. as intimated by Executive Engineer (E) concerned.

C. If the agency fails to furnish necessary supporting documents for availing cenvat credit by BSNL or the documents furnished by the firm are not accepted by taxation department then the amount of such taxes and duties will be deducted from the payments due to the firm.

PART A : SUPPLY PORTION AGREEMENT:-

1. TAX AND DUTIES: -

For item No.1 & 2 in the schedule the firm shall quote composite price inclusive of Excise duty, Central sales tax against Form "C" or VAT as applicable **excluding octroi**. No concessional forms except FORM C for the item as specified in schedule of work and meant for use of BSNL shall be provided. Form C shall be provided by BSNL only on specific request of the contractor. The contractor / supplier shall submit to BSNL documents/proof of payment of all taxes / levies along-with exemption certificate, if any to avail CENVAT benefits BY BSNL. If the contractor /supplier fails to furnish necessary supporting documents i.e. Excise/Custom invoices etc. in respect of the duties and Taxes which are cenvatable, the amount pertaining to such duties and taxes will be deducted from the payment due to the firm.

2. OCTROI: -

The rate quoted by the firm shall be **exclusive of octroi** for DG set (item no.1 of Part A). No octroi exemption certificate will be issued. The octroi actually paid only for DG sets shall be refunded as per actual on production of valid original receipt & other concerned original documents of the octroi levying authority specifying the material.

3. PERFORMANCE GUARANTEE:-

The Contractor shall be required to deposit an amount equal to 5% of the tendered value of the contract as Performance guarantee as per clause 1 of BSNL EW- 8 amended up-to-date in the form of Bank guarantee on a Nationalized / Scheduled bank in standard format (Annexure-II) / CDR/ FDR/ DD within two weeks from the date of issue of individual award letter. This shall be refunded to the contractor on completion of the work as per 12 of B Schedule D Section I and recording of the completion certificate as per clause 8 of BSNL EW- 8 .

4. SECURITY DEPOSIT:-

Recovery of security deposit at the rate of 10% in accordance with clause 1A of BSNL EW- 8 amended up to date shall be deducted by BSNL from progressive payments made to the firm from all the running bills till the sum will amount to security deposit of 5% of the tendered value of the work. This shall be refunded to the contractor as per Clause 17 of BSNL EW- 8 amended up to date.

5. VARIATION IN EXCISE DUTY:-

In case of any statutory variation in regard to excise duty within the stipulated date of completion of individual agreement, the same shall be paid or recovered as per the actual against valid documentary proof. However, beyond this period dept. will take advantage of any reduction in excise duty but will not pay extra on account of increase in excise duty.

6. PAYMENT TERM: -

No advance payment will be made. The payment terms for all items shall be governed as under. Stipulations like levy of interest if payment is not made in specified time are not acceptable to the BSNL.

a) For supply of items 95% of the price shall be paid on receipt of goods at site by the consignee. For claiming this payment the following documents are to be supplied to the paying authority:-

- i) Excise gate pass / Invoice or equivalent document favoring BSNL shall be supplied by the supplier.
- ii) Delivery challan.
- iii) Consignee receipt.
- iv) Proof of payment of octroi / entry tax, if any.

NOTE:-100 % payment (in place of 95%) may be made on delivery, provided that an additional bank guarantee for an amount equivalent to 5% of the value of supplies valid for a minimum period of one

year is furnished by the supplier along with an undertaking that the shortages / damages as are intimated to the supplier in writing shall be made good.

b) 5% of prorata of the approved contract value after successful commissioning of equipment or 6 months from date of supply of the equipment, whichever is earlier.

NOTE :- 1) In cases where shortage / damages are intimated to the supplier in writing, the balance payment shall be released only after the cases are settled in accordance with the provisions of the P.O.

2) No payment will be made for goods rejected at the site on testing. Payment, if made for such items shall be recovered from subsequent bills or other bills.

7. STORES AND SAFETY: -

All the stores and materials required for satisfactory completion of the work shall be arranged at work site by the contractor from his own sources. Space for storing the material may be provided on request from the contractor. However, safe custody of the material stores at site will be responsibility of the contractor.

8. TEST CERTIFICATES: -

The firm shall submit following test certificates on supply of the material at site.
Manufacturer test certificates for Engine and Alternator.

9. COMPLETION DRAWINGS: -

The firm shall supply three sets of drawings/documents as detailed below:

- ❖ Schematic diagram of control wiring diagram.
- ❖ Operation and maintenance manual.

10. ENGINE GOVERNOR

Suitable to meet requirement as given under speed governing para 8 of AT test sheet.

11. GUARANTEE AND DEFECT LIABILITY: -

The guarantee shall be valid for twelve months after successful A/T. The contractor shall guarantee that all equipments shall be free from any defect due to the defective material and/or bad workmanship and also the equipments shall work satisfactorily with performance and efficiencies not less than the guaranteed values.

a) Any part found defective during this period shall be replaced free of cost by the contractor. The service of the contractor's personnel if required during this period shall be made available free of cost to the department.

b) The contractor shall depute his representative within 36 hours of notification of the defect by the department.

c) A joint report shall be prepared by the representative of department and firm regarding nature of defects and remedial action required. Time schedule for such action shall be also finalized.

d) In case the contractor fails to depute his representative within 36 hours of notification of the defect or fails to cause remedial measure within reasonable time as decided during joint inspection, the department may proceed to do so at the contractor's risk and expenses and with out prejudice to any other right.

12. DATE OF COMPLETION: -

Date of successful acceptance Testing shall be taken as completion date of the work.

PART B: ITC PORTION AGREEMENT:-

1. For item Nos.1 & 2 in the schedule the firm shall quote composite price inclusive of service tax ,works contract tax. The BSNL shall deduct TDS (for works contract tax) from payments due to the firm as per rules of the state Government. Certificate for such deductions shall be issued to the firm by the Accounts officers of the concern division. The contractor / supplier shall submit to BSNL documents/proof of payment of all taxes / levies along-with exemption certificate, if any to avail CENVAT benefits BY BSNL. If the contractor /supplier fails to furnish necessary supporting documents i.e. Excise/Custom invoices etc. in respect of the duties and Taxes which are cenvatable, the amount pertaining to such duties and taxes will be deducted from the payment due to the firm.

2. SECURITY DEPOSIT:-

Security deposit at the rate of 10% in accordance with clause 1A of BSNL EW 8 amended up to date shall be deducted by BSNL from progressive payments made to the firm from all the running bills till the sum will amount to security deposit of 10% of the tendered value of the work. This shall be refunded to the contractor as per Clause 17 of BSNL EW 8 amended up to date.

3. TESTING AT SITE: -

- a) A/T in presence of representative of T&D circle as per A/T Schedule.
- b) Resistive load and fuel for testing will be supplied by the firm without any extra cost.

4. DATE OF COMPLETION: -

Date of successful acceptance Testing shall be taken as completion date of the work.

5. VARIATION IN SERVICE TAX:-

In case of any statutory variation in regard to service tax, within the stipulated date of completion of individual agreement, the same shall be paid or recovered as per the actual against valid documentary proof. However, beyond this period dept. will take advantage of any reduction in service tax but will not pay extra on account of increase in service tax.

Subject: - Option for Deposit of Earnest Money in the form of Bank Guarantee for Air-conditioning, Engine Alternator sets, Lifts and Sub-Station Works.

1.0 In modification of the existing procedure of Deposit of Earnest Money with each Tender in the shape of Cash/Demand Draft/Pay Order, it has been decided by the Telecom Commission to provide for an option to the Contractor(s) for depositing Bank Guarantee along with the Tenders for Air-conditioning, Diesel Engine Alternator, Lifts and Sub-station works wherever the amount of EMD is more than Rs.20,000.

2.0 The Bank Guarantee shall be from a Scheduled Bank or from a Nationalized Bank/State Bank guaranteed by Reserve Bank of India.

3.0 The Bank Guarantee shall remain in force for 30 days after the period for which the tenders are valid.

4.0 The value of the Bank Guarantee to be deposited along with each Tender shall be at the rates of Earnest Money prescribed by the Government from time to time. The Bank Guarantee Bond for EMD Deposit shall be as per the Model form at Annexure-1.

5.0 The Bank Guarantee Deposit by the Contractors shall be entered in a register to be maintained by the Divisional Officer/Accounts Officer of the concerned Electrical Division and the register shall be reviewed periodically and appropriate action to be taken for extending/ encashing or release of these Bank Guarantee.

6.0 This is issued with the concurrence of Telecom Finance vide their U.O.No.274/FA-V dated 26th Sept.1996 and shall come into force with immediate effect.

Encl.: **Annexure-I**

Annexure-I

MODEL FORM OF BANK GUARANTEE

BANK GUARANTEE BOND FOR EMD FOR AIR CONDITIONING, DIESEL ENGINE ALTERNATOR, LIFTS AND SUB STATION WORKS WHEREVER THE AMOUNT OF EMD IS MORE THAN RS. 20, 000/-.

Whereas _____ (hereinafter called "The Contractor(s)") has submitted its Tender dated _____ for _____ (Name of work) _____ KNOW ALL MEN by these Presents that we _____ OF _____ having our registered office at _____ (hereinafter called "The Bank") are bound unto _____ (hereinafter called "The BSNL") in the sum of _____ for which payment will and truly to be made of the said BSNL, the Bank binds itself, its successors and assigns by these presents.

THE CONDITIONS of the obligation are:

1. If the Contractor(s) withdraws its Tender during the period of Tender validity specified on the Tender Form: or
2. If the Contractor(s) having been notified of the acceptance of its Tender by the BSNL during the period of Tender validity.
 - (a) Fails or refuses to execute the Contract in full (including 50% deviation) as per Master Agreement.
 - (b) Fails or refuses to furnish Security Deposit in accordance with the conditions of Tender document & Master Agreement.

WE undertake to pay to the BSNL upto the above amount upon receipt of its first written demand, without the BSNL having to substantiate its demand, provided that in its demand, the BSNL will note that the amount claimed by it is due to it owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force as specified in the Tender Document upto and including 30(Thirty) days after the period of the Tender validity, and any demand in respect thereof should reach the Bank not later than the specified date/dates.

Signature of the Bank

Signature of the Witness

Name of Witness

Address of Witness

ANNEXURE- II
PERFORMANCE SECURITY GUARANTEE BOND

In consideration of the CMD, BSNL (hereinafter called 'BSNL') having offered to accept the terms and conditions of the proposed agreement between _____ and _____ (hereinafter called the said contractor(s)) for the work _____ (hereinafter called "the said agreement"), having agreed to production of a irrevocable Bank Guarantee for Rs. _____ (Rupees _____ only) as a security / Guarantee from the contractor(s) for compliance of his obligations in accordance with the terms and conditions in the said agreement .

We, (name of the bank) _____ (hereinafter referred to as "the bank") hereby undertake to pay to the BSNL an amount not exceeding Rs. _____ (Rupees _____ only) on demand by the BSNL.

2. We (name of the bank) _____ do hereby undertake to pay the amounts due and payable under this guarantee without any demure, merely on a demand from the BSNL stating that the amount claimed as required to meet the recoveries due or likely to be due from the said contractor(s). Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____ (Rupees _____ only)

3. We, the said bank further undertake to pay to the BSNL any money so demanded notwithstanding any dispute or disputes raised by the contractor(s) in any suit or proceeding pending before any court or tribunal relating thereto, our liability under this present being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the contractor(s) shall have no claim against us for making such payment.

4. We, (name of the bank) _____ further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of BSNL under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till Engineer-in-Charge on behalf of the BSNL certified that the terms and conditions of the said Agreement have been fully and properly carried out by the said contractor(s) and accordingly discharges this guarantee.

5. We, (name of the bank) _____ further agree with the BSNL that the BSNL shall have fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Agreement or to extend time of performance by the said contractor(s) from time to time or to postpone for any time from time to time any of the powers exercisable by the BSNL against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor(s) or for any forbearance, act of omission on the part of the BSNL or any indulgence by the BSNL to the said contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

7. We, (name of the bank) _____ lastly undertake not to revoke this guarantee except with the previous consent of the BSNL in writing.

8. This guarantee shall be valid upto _____ unless extended on demand by the Government. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs. _____ (Rupees _____ only) and unless a claim in writing is lodged with us within six months of the date of expiry or the extended date of expiry of this guarantee all our liabilities under this guarantee shall stand discharged.

Dated the _____ day of _____

for _____
(indicate the name of bank)

SCHEDULE OF QUANTITIES

Name of Work :

Part A : Supply of 80 x 15 KVA, single phase DG set with acoustic enclosure & AMF control panel & GSM Modem.

Part B : ITC of 80 x 15 KVA, single phase DG set with acoustic enclosure & AMF control panel & GSM Modem.

at different GSM-BTS stations for phase V.1 under jurisdiction of BSNL Electrical Circle, Mumbai.

Sl. No	Description of work	Qty	Rate	Unit	Amt.								
PART A: SUPPLY PORTION													
1	<p>Supply of multi cylinder air / water cooled electric start Ready to Use (RTU) type ,diesel E.A. set in an acoustic enclosure along with AMF Control Panel ,as per the specifications attached i) Minimum full load capacity of 15 KVA at site conditions with diesel engine of minimum 20 BHP at 1500 RPM.</p> <p>BREAK-UP OF PRICE PER DG SET</p> <table><tr><td>Description of Item</td><td>Amount</td></tr><tr><td>a) Basic unit price exclusive of all levies & charges</td><td></td></tr><tr><td>b) Excise duty %</td><td></td></tr><tr><td>c) Excise duty Amount</td><td></td></tr></table>	Description of Item	Amount	a) Basic unit price exclusive of all levies & charges		b) Excise duty %		c) Excise duty Amount		80 Sets		Set	
Description of Item	Amount												
a) Basic unit price exclusive of all levies & charges													
b) Excise duty %													
c) Excise duty Amount													
2	<p>Supplying of GSM Modem on existing AMF panel, along with necessary software for transmitting the data / alarms to the base station in excel sheet, as per specifications attached.</p> <p>BREAK-UP OF PRICE PER GSM MODEM</p> <table><tr><td>Description of Item</td><td>Amount</td></tr><tr><td>a) Basic unit price exclusive of all levies & charges</td><td></td></tr><tr><td>b) Excise duty %</td><td></td></tr><tr><td>c) Excise duty Amount</td><td></td></tr></table>	Description of Item	Amount	a) Basic unit price exclusive of all levies & charges		b) Excise duty %		c) Excise duty Amount		80 Nos.		each	
Description of Item	Amount												
a) Basic unit price exclusive of all levies & charges													
b) Excise duty %													
c) Excise duty Amount													
			TOTAL OF A]										

Sl. No	Description of work	Qty	Rate	Unit	Amt.								
PART B : ITC PORTION													
1	<div>Installation, testing and commissioning of above mentioned 15 KVA Diesel E.A set along with acoustic enclosure and AMF panel ,as per the specifications attached.</div> <div><u>BREAK-UP OF PRICE PER DG SET INSTALLATION</u></div> <table><tr><td>Description of Item</td><td>Amount</td></tr><tr><td>a) Basic unit price of labour services</td><td></td></tr><tr><td>b) Service tax %</td><td></td></tr><tr><td>c) Service tax Amount</td><td></td></tr></table>	Description of Item	Amount	a) Basic unit price of labour services		b) Service tax %		c) Service tax Amount		80 Sets		Set	
Description of Item	Amount												
a) Basic unit price of labour services													
b) Service tax %													
c) Service tax Amount													
2	<div>Installation, Testing, Commissioning of GSM Modem along with necessary software for transmitting the data / alarms to the base station in excel sheet, as per specifications attached.</div> <div><u>BREAK-UP OF PRICE PER ITC OF GSM MODEM INSTALLATION</u></div> <table><tr><td>Description of Item</td><td>Amount</td></tr><tr><td>a) Basic unit price of labour services</td><td></td></tr><tr><td>b) Service tax %</td><td></td></tr><tr><td>c) Service tax Amount</td><td></td></tr></table>	Description of Item	Amount	a) Basic unit price of labour services		b) Service tax %		c) Service tax Amount		80 Jobs		Job	
Description of Item	Amount												
a) Basic unit price of labour services													
b) Service tax %													
c) Service tax Amount													
			TOTAL of B]										
GRAND TOTAL (PART A + PART B)													

Conditions :

1. In the schedule the firm shall quote composite price inclusive of all central & state's levies and taxes inclusive of octroi . The firm shall quote the basic unit price of goods / services / materials, Excise duty, Custom duty, Service tax and any other CENVATable levies / taxes in Price break up Table
2. For determining L-1 Cenvatable credit items i.e. Excise duty & Service tax will not be considered.
3. Tender without break-up of price will summarily rejected.
4. No concessional forms except FORM C shall be provided. Form C shall be provided by BSNL only on specific request of the contractor

DATA – SHEET FOR 15 KVA D.G. SET

Items covered under schedule of work:

ITEM NO. 1

A.	Engine with standard scope of supply (1500 RPM) with coupling arrangement suitable for single bearing alternator and valid CPCB certificate for EMISSION norms.		
	Make		BHP
	M/s Mahindra and Mahindra	3255GM	25
	M/s Greaves	2YWA MK5	23.6
	M/s Cummins	X 1.7 G1	20
	M/s Escorts	G 15	22
	M/s Eichar	322 ES	24
	M/s KOEL	HA 294 SR II	20.5
B.	Alternator (15 KVA Single phase & single bearing)		
	Make		
a	CROMPTON GREAVES AL SERIES		
b	NGEF		
c	KIRLOSKAR		
d	STAMFORD		
e	KOEL (Kirloskar green)		
C.	AMF Panel		
	AMF Panel	AMF panel as per specifications attached & approved by BSNL CO New Delhi	
NOTE :- For Sr. No. A,B & C any make and model with equivalent HP/ KVA and specification with valid approval by DOT/BSNL (till the date of sale of Tender) may be supplied.			
D.	ENGINE GOVERNOR: Suitable to meet requirements as given under Speed Governing under PARA 8 of Test Sheet.		
E.	Fuel tank		
a)	No.	1	
b)	Fuel Tank Capacity	Not less than 100 Litres	
c)	MS Sheet thickness	14 Gauge	
F.	Battery		
a)	1 x 12 volt, 120 AH		
G.	A.V mounting for E.A set	Not less than 4 Nos.	
H.	Fuel piping MS braided flexible PVC pipe.		
I.	Silencer -- As per CPCB approval.		
J.	Exhaust pipe -- As per CPCB approval.		
K.	4 X 10 Sq mm PVC insulated PVC sheathed copper conductor cable for interconnection between Alternator and control panel.		
L.	DG set consisting of engine, generator, fuel tank, AMF panel etc. shall be housed in an outdoor canopy having valid CPCB approval for Noise level.		

Specifications for Supplying, Testing & Commissioning of D.G Set, AMF Control Panel, GSM Modem & Sound proof enclosure. (For 15KVA)”

[A] SPECIFICATIONS FOR E/A.

1. SCOPE : The offer should cover complete supply, installation, testing, and commissioning of ready to use diesel engine alternator sets in acoustic enclosure. All minor civil works, electrical and other works associated with installation and commissioning of the set shall be carried out by the tenderer.

2. REQUIREMENT: The Engine Alternator supplied should be of ready –to –use type (RTU) ,the BHP of engine may be suitably enhanced as per site conditions in order to deliver the minimum required KVA at site, in case of water cooled engine it should be supplied with first filling of coolant and water mixture as per the manufacturer recommendation . The Engine shall be equipped with governor of class A1 accuracy and all standard fittings, flexible pipe, 12 Volt 120 AH sealed maintenance free lead acid automotive duty battery fixed between base frame, suitable capacity fuel tank for running the E/A set for atleast 24 hours continuously with steel wire braided fuel pipe, silencer, MS exhaust pipe of suitable size and length as per site requirement covered with two layers of 6 mm thick asbestos rope, instrument panel equipped with necessary instruments, directly coupled with alternator of suitable capacity on a suitable length of common base frame, channel fixed on necessary AVM pads including required length of Copper conductor unarmoured XLPE cable with cable glands and lugs for inter connection between alternator and control panel, providing tools for normal maintenance and all other accessories complete as required and as per detailed specifications attached. The Engine and the Enclosure shall conform to the latest environment (protection) act 1986 (29 of 1986) of ministry of Environment and forest notification No. dated 17th May 2002 and 12th July, 2004 and second amendment of 2002 and 2004 respectively. No set shall be accepted without the CPCB certificate of authorized agencies such as ARAI of Pune, NPL New Delhi, NSTL Vishakapatnam, FCRI Palghat and NAL Bangalore. The make and model no. of Engine and alternator shall be as per BSNL approved product directory.

3. OPERATING CONDITIONS

The engine alternator shall be capable of working at any ambient temperature between 0°C to 50°C and relative humidity up to 95% condition.

1. PERFORMANCE REQUIREMENT

- The working KVA rating at site condition after accounting for de-rating shall be obtained at 0.8 power factor.
- When there is an electrical main supply failure it will be required to work continuously for a period which may even exceed 24hour at a time.
- The set shall be capable of taking 10% overload for a period of one hour during every 12hours period while operating continuously at full load.

2. OUT PUT VOLTAGE FREQUENCY AND WAVE FORM

Nominal out put voltage shall be 230Volt with $\pm 5\%$ manual adjustment at all conditions of the load. Frequency shall be 50cycle per second $\pm 3\%$ in out put waveform.

3. DIESEL ENGINE

Engine shall be reciprocating compression ignition engine as per manufacturer standard design and conforming to IS10001-1981& BS5514

4. LUBRICATION

Lubrication shall be positive pressure type lubricating all moving parts. No moving parts shall require lubrication by hand either prior to the starting of the engine or while it is in operation. Temperature and pressure gauge shall be fitted to the lubricating system.

5. FUEL TANK

Fuel tank shall be draw out type for easy maintenance provided between base frame or separately installed in case of installation in a canopy. The tank shall have level indicators marked in litres, filling inlet with removable screen, fuel out let located at minimum of 25mm above the bottom at outer face of canopy, drain plug air vent and necessary piping, hand pump for pumping the fuel into the service tank with necessary pipe or tube shall be provided. The outlet of the pump shall be provided with 3-meter long reinforced hosepipe.

6. FUEL PIPING

Steel wire braided pipe with hydraulically compressed benzo of superior quality shall be provided for fuel piping.

7. SPEED AND GOVERNING `A1`

The engine shall operate on 1500 RPM, and be able to meet site conditions with regard to Voltage, Speed, Frequency and regulation equipped with governor of Class A1 accuracy.

8. ENGINE START

Engine shall be cold and self-starting type. The starter battery shall have suitable copper connecting lead, sufficient to meet engine starting and control gear requirement as per

manufacturer specification.

9. BATTERY CHARGING

The battery charging shall be done through alternator and solid state battery charger .

10. THE ENGINE SHALL HAVE FOLLOWING ACCESSORIES: -

- (i) Heavy duties fly wheel.
- (ii) Coupling with guard.
- (iii) Fuel Pump suitable for lifting the fuel from fuel tank provided below E/A sets.
- (iv) Governor.
- (v) Pre filter.
- (vi) Fuel Filter.
- (vii) Per-filter in lift pump/button filter.
- (viii) Lubricating oil filter.
- (ix) Residential exhaust silencer.
- (x) Starter.
- (xi) Blower fan.
- (xii) Alternator.
- (xiii) RPM indicator cum Hour meter.

11. ENGINE INSTRUMENT PANEL :-

It shall comprise of the following: -

- (i) Starting switch with key.
- (ii) Lubricating oil temperature gauge.
- (iii) Lubricating oil pressure gauge.
- (iv) Battery charging ammeter.

12. ALTERNATOR (Single phase)

- (i) The alternator shall be copper wound and totally enclosed for screen protected class-F insulation, designed and constructed to with stand tropical condition. Voltage regulation shall be $\pm 5\%$ and shall be conforming to IS 13364 (Part I):1992.
- (ii) The AC/DC wiring shall be separated from each other.
- (iii) Radio interference suppressor should be provided in case slip ring type alternator.

[B] SPECIFICATIONS FOR AMF CONTROL PANEL

Control panel shall be cubical type made of 16 gauge CRCA sheet with hinged type openable covers mounted above base frame at suitable location of E/A set and supported on both sides on base frame. Rubber pads of 6mm. thickness shall be provided between the base frame and control panel supports. All the control panel wiring should be easily accessible and shall have sufficient working space for making connections of cables etc. A manual bypass switch shall be provided on the control panel for total bypass of the AMF system . The changeover from Mains supply to EA set supply should be possible in manual mode with AMF relay totally bypassed. However in manual mode all the safeties / tripping devices of E/A Set should remain functional. A tinned copper earth stud of adequate dimension shall be provided. The panel approved by the Electrical Wing of BSNL C.O. shall only be used.

Functional Requirements :-

- All the functional requirements in Auto mode are to be achieved through microprocessor based AMF Controller. The logic for starting & stopping shall be :-

(i) If the mains fail, or one or more phase of mains is not available.

(ii) If any phase voltage of mains is out of preset limits however there should be a provision to set the limits of higher and lower phase voltages as per the site requirement. The mains supply within this range shall be considered as healthy so as to avoid continuous running of Engine Alternator Set.

(iii) The system should measure 48V battery of the telecom equipment. In case the battery voltage is above a settable limit & room temperature as measured in the AC Controllers logic is below a preset max room temperature, the engine should not start unless one of the conditions fails. This should work using the GSM network.

- As the operating range of the power plant is from 90 V to 300 V (L-N) and that of AC Voltage stabilizer is quite wide, the AMF relay should be able to trigger E/A Set for starting and stopping in accordance with this range.

- Switch the load to the engine supply after suitable time delay, after starting the engine on mains failure/ phase failure / low voltage / high voltage.

- Switch the load back to the mains supply after suitable time delay, when healthy mains supply is restored and stopping the Engine.
- Attempt to start the Engine up to three times on failure of earlier attempts with suitable time intervals.
- Two level fuel sensor for fuel should be provided at 50% & 25% respectively.
- System should provide following settable features :-
 - (a) Mains failure time - to initiate automatic EA start after 0 to 300 seconds of mains failure.
 - (b) Mains restore time - to initiate automatic stop of EA after 0 to 300 seconds of mains in stable conditions.
 - (c) Low oil pressure delay time - 0 to 99 seconds delay of the low pressure oil input alarm from engine start.
 - (d) Stop solenoid time - 10 to 99 seconds enabling time for "stop solenoid".
 - (e) Cranking up time - 0 to 99 seconds enabling time for starter. The timer is reset if the engine starts before the programmed time.
 - (f) Start attempts - 1 to 3 numbers of automatic attempts during automatic start cycle.
 - (g) Attempts interval - 1 to 99 seconds time interval between starting pulse attempts.
 - (h) Cooling down time - 0 to 300 seconds engine cooling time before stopping. During this time the engine runs without load.
 - (i) Generator voltage time - time of stable generator voltage to close EA contactor to load (0 to 300 seconds).
- AMF relay should have facility for RS 232 serial communication interface following TCP / IP Protocol and should be compatible for transferring the required data to the base station in excel sheet with necessary software through GSM modem. The responsibility of providing GSM modem along with the required software lies with vendor applying for approval of AMF Control Panel.
- In view of the fact that GPRS connectivity is not available at all the sites, the connection between the AMF Control panel and base monitoring station should have capability for both GPRS & SMS. The modem should try 1st for GPRS connectivity and in case of non availability of GPRS connectivity, the SMS should be tried as 1st priority.
- For sending alarms and designated events the SMS should invariably be generated from the site only (where the AMF Panel is installed) .
- The communication at the base monitoring station can be either with GSM Modem (with or without server) or with server based internet portal. In either case there should not be any limitation for no. of sites to be linked with the base monitoring station. Necessary hardware protection along with software protection should also be provided at base monitoring station. In case in future if BSNL wants to shift to its own server then the system should be compatible and the firm shall provide the necessary support for the same. No extra charges for any additional hardware / software requirements on this account shall be borne by BSNL.

The panel shall be consisting of: -

- (i) 4 x 20 character back lit LCD on front fascia for showing various parameters of mains & DG viz. 3 ph voltage, 3 ph current, frequency, KWH of mains, KWH generated by DG, month wise energy register, PF of all 3 phases, DG running hours, DG battery voltage, DG speed etc.
- (ii) 2Nos. of 4 pole 63A(with adjustable current setting) MCCB (This rating of MCCB is for 15 KVA EA Set only, for other EA Set ratings the same should be suitably enhanced)
- a) Contactors: - The rating of mains contactor shall be derived from KVA rating and the minimum voltage (90 V) which comes out 63 Amp for 15 KVA DG Set for AC – 3 duty cycle. Rating of DG Contactor shall be derived from the KVA rating at 200 V which comes out 45 Amp for 15 KVA DG Set for AC – 3 duty cycle. For other EA Set ratings the same should be suitably enhanced. Both the contactors shall be electrically interlocked with contactor coil.

b) The supply to the coil of the mains contactor is to be provided with the help of a static voltage regulator having wide input range from 90Volts to 300 Volts and output within the operating range of contactor coil.

c) Potential free contacts for extension of alarms- (6 Nos.) viz. lack of fuel, LLOP, Mains Fail, Engine Fail to start, Canopy door opening, high cylinder / Water temp.

d) Microprocessor based Automatic Mains Failure Controller (suitable for 12VDC),

• The following parameters are required to be transmitted to remote station in excel sheet :-

- a. Line – Neutral Voltage of all three phases of mains and DG
- b. Load current for all three phases
- c. DG Run hours
- d. DG battery voltage
- e. DG Speed
- f. Frequency
- g. Mains KWH
- h. DG KWH

• The following alarms are to be transmitted to the remote station in excel sheet :-

1. LLOP
2. DG on
3. DG battery low
4. DG fuel low
5. Under speed / Over speed
6. Stop fault
7. Start fault
8. Engine Temperature high
9. Alternator fault
10. BTS battery low
11. Mains ok / mains faulty
12. Overload
13. Over / under voltage
14. Canopy temperature high

• The following alarms are to be made available in AMF Control panel / Controller through LEDs / LCD

- a) Mains fail
- b) LLOP
- c) High cylinder / water temperature
- d) Over speed
- e) Under speed
- f) Alternator fault
- g) DG fail to start
- h) DG fail to stop
- i) Overload
- j) Fuel low
- k) Fuel very low (for stopping of engine)
- l) BTS battery low
- m) DG battery low
- n) DG fault (common for any DG fault)
- o) Canopy door open
- p) Fire Alarm
- q) Canopy temperature high
- r) Low water level (for water cooled sets)
- s) Over / Under voltage
- t) Over / Under frequency

Operational Requirement

- i. AC and DC wiring shall be separated distinctly.
- ii. Connections of control wiring shall be done with connector strips and ferrules for identification on both ends.
- iii. 1No. Multifunctional meter to indicate Voltage, Current, PF, Frequency & kWh of DG Set.
- iv. Push button for stop, reset, and acknowledge.

- v. Recess type hooter.
- vi. Audiovisual indication for LLOP, HCT / HWT, Over speed, Lack of fuel.
- vii. RYB LED indication for indicating Mains / EA Set Supply – 2 sets.
- viii. DC Ammeter [0-15A], DC Voltmeter [0-30V] of size (min.72mmx72mm)with selector switch for trickle charging through battery charger and battery charging unit
- ix. Selector switch for Auto /Manual operation .
- x. Battery Charger: Automatic trickle battery charger of SCR or SMPS type to charge the starting battery of DEA set. This charging shall be done through main supply for which a suitable incomer shall be provided in the panel with suitable range of ammeter and voltmeter on the DC side with protective fuses.

SAFETY CONTROL TRIP

- (i) Low lubricating oil pressure.
- (ii) High cylinder / water temp.
- (iii) Lack of fuel.
- (iv) Alternator Fault
- (v) Over speed
- (vi) Fire Alarm

Note :- Latest test report from any NABL accredited laboratory for protection against EMI / RFI is required to be submitted along with the application.

[C] SPECIFICATIONS FOR GSM MODEM

A] The GSM Modem should meet following functional requirements and Specifications:

- 1) The GSM Modem shall have two inputs one each for AMF & AC Controller. The data from both AMF & AC Controller should be accessible at remote station.
- 2) The GSM Modem Shall communicate with AMF (Auto Mains Failure) Controller through RS.232 port to capture various parameters every **5 seconds** (programmable).
- 3) The GSM Modem should have 16 –bit –in- built micro controller with necessary GSM / GPRS function APIs to communicate with remote server through GPRS preferably and through SMS in absence of GPRS connection.
- 4) The Modem should store minimum 8 phone numbers for communicating SMS alerts. These eight numbers should be individually configurable for the type of alert through phone number matrix. Any change in the matrix, should be possible from the server / remote station.

The sample phone number matrix is shown in Table 1 below ;

Phone No.	Alarm –1	Alarm-2	Alarm-3	SMSD	Configuration
094xxxxxxxx			X	X	
09yyyyyyyyy	X	X			X
09zzzzzzzzz			X		
So on					

OR there should be facility to generate the alerts from the centralized server as per above matrix, in that case there is no need of generation of alert from modem.

- 5) The GSM Modem should have provision for receiving configuration command on by SMS / GPRS. The device should only accept configuration command from the authorized numbers as per above matrix.
- 6) The GSM Modem should have provision for reply for SMS on demand. The device will respond for alarms, DG parameters, and mains parameters request only from the phone numbers stored in the system and configured to do so. As per phone matrix table inside the device, it will respond to SMS on demand messages to numbers authorize to have SMSD facility in matrix. It will ignore SMSD commands for all other numbers and will not reply. OR as an alternate, central server shall have the facility to directly reply to the queries by SMS from authorized persons as per the matrix.

- 7) The GSM Modem should have provision for receiving configuration command on by SMS / GPRS.
- 8) The GSM Modem should have provision for reply for SMS on demand. The device will respond for alarms, DG parameters, and mains parameters request only from the phone numbers stored in the system and configured to do so.
- 9) Various AMF alarms should be monitored every 2 minutes and communicated to the stored number through SMS by the modem directly and log them to remote server through GPRS or SMS.
- 10) The GSM Modem should have internal regulator to operate from 12 V DC supply.
- 11) The GSM Modem should have internal protection for reverses polarity of power supply.
- 12) The GSM Modem should be Tri- Band GSM / GPRS 900 / 1800 / 1900 MHz with GPRS multi- slot class 10 functionality.
- 13) The GSM Modem should work in normal operation temperature :- 0o C to 60o C.
- 14) The GSM Modem should have an embedded TCP / IP stack for GPRS communication.
- 15) Bidder shall test & give live and successful demonstration of Modem at site.
- 16) Bidder shall quote for server rentals for one year. There should not be any limitation for number of sites to be linked with the base monitoring station. Necessary hardware protection along with software protection should also be provided at base monitoring station. In case in future if BSNL wants to shift to its own server then the system should be compatible and the firm shall provide the necessary support for the same. No extra charges for any additional hardware / software requirements on this account shall be borne by BSNL.
- 17) The Modem Shall be supplied with magnetic antenna with cord to be placed over DG canopy.
- 18) Suitable SIM shall be supplied by BSNL.

[D] SPECIFICATIONS FOR SOUND PROOF ENCLOSURE

- (i) The canopy should be sound proof, weather proof & environment friendly, conforming to the latest environment (protection) act 1986 (29 of 1986) of ministry of Environment and forest notification No. dated 17th May 2002 and 12th July, 2004 and second amendment of 2002 and 2004 respectively. No set shall be accepted without the CPCB certificate of authorized agencies such as ARAI of Pune, NPL New Delhi, NSTL Visakapattanam, FCRI Palghat and NAL Bangalore.
- (ii) The canopy shall be in modular construction with the provision of assembly at site. The acoustic panels shall be fabricated in 2mm thick CRCA sheet. The finished sheet metal component shall undergo seven tank treatment process for degreasing, derusting, phosphatising etc. for longer life and should be of Polly polyester based coated inside & outside.
The nuts bolts and other hardware shall be Zinc coated. The door shall be provided with high quality EPDM gaskets to avoid leakage of sound. The door handles and hinges shall be Zinc plated & lockable type.
- (iii) The Radiator fan of the water cooled Engine shall be used for ventilation. A pusher fan (for air cooled Engines) or in addition to Radiator fan, if required shall also be provided. The motor of this fan shall be of BSNL approved make.
- (iv) Adequate ventilation shall be provided to meet the air requirement for combustion & also to expel heat to maintain temperature inside the enclosure within 5 degree Celsius above ambient at 10% overload with tripping arrangement between (50 – 60) degree Celsius.
- (v) An arrangement for adequate illumination inside the enclosure shall be provided
- (vi) Separate door with locking arrangement for easy access to D.G. set during operation & maintenance should be provided.
- (vii) The enclosure shall be guaranteed for a period of 12 months from the date of completion of work against defective materials & rust, welding, painting, smooth functioning of doors, inspection window etc. minor civil work is to be carried out without any extra cost.

(viii) Small see through window for reading meters etc. made of transparent polymer sheet of thickness not less than 10mm shall be provided.

(ix) Radiator bellows to be provided in case of Water Cooled Engines.

(x) Fuel Tank and Control Panel shall be incorporated inside the canopy.

(xi) Two point lifting arrangement.

(xii) Main base frame will be of size 100mm X 50mm X 5mm MS channel welded with 5mm thick MS sheet for bolting arrangement complete as required.

(xiii) Framework will be provided for floor made out of 3mm thick chequered plate i/c welding, painting etc complete around foundation as required.

(xiv) Sound proof enclosure in modular construction will be supplied & erected, made out of 35mmX35mmX5mm angle at every co-inside plane & support of angle 45mmX45mmX5mm at every door structure, and hinged at two points with refrigeration lock arrangement, fitted over the MS plate of 50mmX5mm with nut & bolt i/c cutting, welding, painting complete as required.

(xv) Insulation on enclosure will be provided & fixed of mineral rock wool Slabs of density not less than 96kg/M3 of 75mm thickness, covered with 22 gauge GI sheet having 3mm perforation fitted with strips of AL by hydraulic riveting to support the whole insulation rigidly complete as required. Specially designed sound attenuators shall be provided to control sound at air entry & exit points i/c louvers.

(xvi) The canopy shall be provided with emergency stop button easily approachable from outside.

(xvii) The canopy shall be provided with following meters (visible from outside): -

(a) Lub. Oil pressure gauge.

(b) Water temperature gauge (for water cooled engines only).

(c) Dial type fuel gauge with sensing arrangement.

16. GENERAL REQUIREMENT

(i) The set shall have minimum vibration and noise under all conditions of load. The set shall be properly dynamically balanced. Anti vibration mounting shall be provided for supporting the set.

(ii) The set shall be fitted with radio interference suppressers in case of slip ring type alternator.

(iii) The size of E.A. set base frame channels shall be of 100 mm X 50 mm. & not less than 5mm.

Thick. Each channel shall be provided with 3 ribs in between the ends and also holes for earth connections.

(iv) Control wiring shall be done with 1.5Sq.mm multi strand PVC insulated copper conductor cable.

(v) Earthing provision should be made for earthing all current carrying metal parts of the equipment. Earth lugs of suitable size shall be provided.

(vi) All the exposed moving parts like coupling etc. shall be provided with suitable guards covering.

(vii) All exposed metal parts shall be suitably finished to prohibit corrosion.

(viii) A nameplate showing rating connection diagram should be provided on engine and alternator. All the important and major parts should bear their catalogue number make of the parts etc. All the control wiring shall be provided with letter number ferules at both ends. Three sets of manual giving the details about design, specifications, special features of the equipment schematic and wiring diagram instructions regarding installation and maintenance etc. should be supplied. A laminated control wiring diagram should be pasted in side the control panel.

17. TESTING AND A/T

The firm shall test the set itself as per the BSNL schedule and practice before offering for acceptance test by B.S.N.L. All the relevant tests to check the performance of the set shall be conducted (A/T) by T&D Circle at site after installation as per the decision of the Engineer-incharge. Diesel and lubricant oil shall be supplied by the contractor for 8 hours successful Acceptance testing of the set. The necessary artificial load and any other necessary manpower material consumables etc will be provided free of cost by the contractor at the time of testing/A/T.

18. GUARANTEE ETC:

(i) The entire installation system shall be guaranteed against any inherent defect of faulty workmanship and for its perfect functioning for a period of one year from the date of successful AT of entire system.

(ii) Free services as per manufacturer's standard practice and norms will be provided free of cost.

(iii) The contractor shall impart training to the operator deputed by the department for operation and attending the minor fault free of cost.

(iv) All work will be executed as per CPWD (Internal / External) specification, relevant IE rules.

PRODUCT LIST FOR D.G. SET

1.	ENGINE	CUMMINS / KOEL / GREAVES / MAHINDRA & MAHINDRA / ESCORTS
2.	ALTERNATOR	KIRLOSKAR / NGEF / KIRLOSKAR GREEN / STAMFORD / CROMPTON GREAVES AL SERIES
2	ACB	L&T/Siemens/Crompton/Control & Switchgear/GE Power Controls
3	MCCB	Siemens/L&T/GE Power Controls/Control and Switchgear/Crompton
4	Contactors, Auxiliary	Siemens/L&T/GE Power Controls/Crompton/MEI/Laxmi
5	AMF Panel	M/s Vrinda Nano Technologies (P) Ltd., M/s Mark & Space Telesystem (P) Ltd, M/s Dynamic Telecom and Data System (P) Limited, M/s ACME Tele Power Ltd. M/s G.S.P.Power Projects M/s Supernova Engineers Ltd. M/s Sun Industrial Automation & Solutions M/s Control & Switchgears
6	C.T	AE/IMP/Marshall/Pactil/Kappa/L&T/Ashmor/Indcoil/Waco/Meco/Newtek/Nippen/ Aruna Electronics (upto 13/07/06)
7	P.F. Meter	IMP/AE/Rishabh/Meco/Universal/Digitron.
8	Ammeter / Volmeter	AE/IMP/Universal/Rishabh/Kaycee/Meco/Enercom/Nippen.
9	Selector switch	L&T/Kaycee/AE/IMP/Thakoor/Reco/Vaishno/Salzer/Rass control
10	Indicating lamp	Vaishno/ Siemens/L&T/AE/IMP/Rass Control/Teknic/ Crompton/Kaycee.
11	Frequency Meter	Digitron/Rishabh/Meco/Keltron/IMP/AE
12	Lead acid battery	Exide/Standard Furukawa/AMCO/Pacesetter/Prestolite/Amara Raja/ Standard/Crompton Greaves/Hitachi/ Kirloskar
13	G.I/M.S.PIPE	BST/TATA/ATL/ITC/ATC/IIA/JST/ITS/Jindal/Zenith/GSI/TTA
14	A.V.M Pads	Dunlop/Poly Bond
15	Fire Extinguishers	ISI mark
16	Rubber Matting	ISI mark
17	Cables ISI mark (a) Up to 1.1 KV grade (b) Above 1.1 KV grade	ISI mark ISI mark
18	G.I Valve	Kirloskar/Fountain/Trishul/Leader.
19	Trivector Meter	Sunco/Jaipur/IMP
20	KWH Meter	Simco/Jaipur/Universal/Rishabh/AE/IMP/Nippen.
21	a) Single phase & poly phase Electronic Energy Meter	HPL- Socomec(up to 60A,upto 31/12/06)/ Secure Meters (upto 31/12/06)
22	Panel mounted Electronic Energy meter, 3 phase, 4 wire	HPL- Socomec (up to 5 Amp, upto 31/12/06)/ Secure Meters (upto 31/12/06)/ Nippen.
23	VAF meter (Analogue/ Digital type)	Nippen.

TEST SHEET FOR DG.SET
BHARAT SANCHAR NIGAM LIMITED
(GOVERNMENT OF INDIA ENTERPRISE)

STATION:

DATE:

TESTED BY:

NAME & PARTICULARS:

ITEM	ENGINE	ALTERNATOR
Manufacturer's Name		
Type		
Serial No		
Rating		

NOTE: 1. The tests prescribed in this schedule are to be followed generally. In case they are in variation with the manufacturer's instructions/ manuals, the procedure shall be suitably modified conforming to the manufacturer's instructions.

2. Testing shall be done considering the Engine capacity as full load.

PHYSICAL VERIFICATION

Item	Remarks
(a) Check the plinth area with the approved plan.	
(b) Check whether sand is filled.	
(c) Verify level of bed	
(d) Check whether anti-vibration pads are provided.	
(e) Check firmness of mounting.	
(f) Check for verticality	
(g) Verify tightness of bolts and nuts and other fitting.	
(h) Check whether hot air pipe (if provided is properly led out)	
(i) Check whether exhaust pipe is properly lead out and lapping of asbestos rope provided for part of the run.	
(j) Check whether proper ventilation is provided.	
(k) Check exhaust fans for their proper functioning.	
(l) Check whether necessary guard wire nets are provided.	
(m) Location of oil tank at a suitable location for early flow of oil, check of loading in pipes.	
(n) Check of electrical wiring & suitability of gauge of cables.	
(o) Neatness of laying and leads are properly terminated.	
(p) Check whether the leads are properly terminated.	
(i) Check of fuses.	
(ii) Physical checking.	
(q) Location of earth for Engine Alternator set.	
(r) Type of earth.	
(s) Suitability of gauge of leads.	
(t) Resistance of Engine Alternator earth leads.	

2. LOAD TEST

The Engine shall be given a test run continuously for at least 6 hrs with the alternator on full rated load. During the load test, record the following observations:

ITEM DESCRIPTION	AFTER						
	1 ST hr.	2 ND hr.	3 RD hr.	4 TH hr.	5 TH hr.	6 TH hr.	7 TH hr.
Lubricating oil pressure							
Cylinder head temperature / Coolant water temperature							
Speed in RPM (as on panel meter)							
Fuel consumption							
Colour of exhaust gas (by visual inspection)							
Output Line current (as on panel meter)							
Output phase voltage (as on panel meter)							
Frequency							
Power factor							
Wattage(as calculated)							

3. Temperature rise test for Alternator

Run the alternator at full rated load. Record the reading of the stationary coil/half hour till three consecutive readings in the following tables.

TIME	AMBIENT TEMPERATURE	TEMPERATURE OF STATION

NOTE: Temperature rise will be taken by the thermometer from alternator body and will be recorded.

4. CHECK OF FUEL CONSUMPTION

After steady conditions have been obtained, the fuel consumption at full load for half-hour shall be checked. During this test, the load shall be maintained as early as possible at the test figure.

5. OVER LOAD TEST

Immediately after the load test an over-load test by 10% over-load for 1 hour shall be taken. At the end of the over- load run, verify the output voltage and temperature of the starter coil after restoring the load to normal full load.

6. INSULATION TEST

Immediately after the over-load test, take insulation test. The insulation resistance between the stator coil and the frame when tested with 500 V insulation tester shall not be less than

$$\left[\frac{\text{R A T E D V O L T}}{1000 + \text{Rated output in KVA or BHP}} \right] + 1 = \text{_____ Mega Ohms}$$

7. REGULATION TEST

The automatic and manual regulation of the alternator at no load, half load and full rated load shall be tested for a nominal voltage of 230 volts between phase and neutral at Pf 0.8. The variation shall not exceed +/- 5 % of the nominal voltage. The recovery time shall not exceed 3 seconds. Variation in the output frequency should not exceed +/- 3 % of the nominal frequency of 50 CPS. It shall also be verified whether the alternator is capable of being set at nominal.

8. SPEED GOVERNING

The engine shall run steadily and load upto its maximum rated load to the standards given below:

LOAD VARIATION	MAXIMUM CHANGE OF SPEED AS A PERCENTAGE OF RATED SPEED.
Load variation on suddenly taking off or throwing on the rated load	Temporary change :10% Permanent change :4%
On change of load by any step of 20 percent of the rated load.	Temporary change :3% Permanent change :2%

When the engine alternator is delivering 10% and 100% of the rated power output, the steady load speed band shall not exceed 1% of the rated speed.

The recovery time from temporary distribution to the steady load speed band at the new load shall not exceed 3 seconds after taking off or throwing on the rated load.

9. INSULATION RESISTANCE OF WIRING

Measure the insulation resistance of engine alternator O/P wiring control cubical wiring at site with respect to earth with 500V insulation tester. It should be better than one-mega ohms.

10. FUNCTIONAL TEST: Functional tests on the following shall be carried out to re-assess for its proper performance.

- 1) Mains/standby change over contactors.
- 2) Type of starting provided for the engine.
- 3) Visual and audio alarm, if provided.
- 4) Instruments: The accuracy of the indicating instruments shall be tested by comparing with a standard meter.