

ADDITIONAL TERMS& CONDITIONS (ATC)

No. 40(1) /EE(E)/BSNL/RYP/2024-25/598

dated: - 10.04.2024

The Executive Engineer (Elect.), BSNL Electrical Division, Raipur invites on behalf of Bharat Sanchar Nigam Limited online item rate e-tender on GEM Portal for the following work from the eligible contractors satisfying the following conditions: -

Name of Work:	SITC of 1 No. 380 KVA Diesel Generator Set & CCTV System (Second Floor) for Telephone Exchange Compound at Auto Exchange Raipur (Planned phase 9.2 Core Equipment) (SH- SITC of 1 No. 380 KVA DG set with acoustic enclosure at Auto Telephone Exchange Bldg., Raipur).(Recalled 1st)
ESTIMATED COST Rs	₹ 43,08,807.00 Including GST
NIT No.	51/EE(E)/BSNL/RYP/2023-24
EMD AMOUNT Rs	₹ 86,176.00

Note- Physical copy of the tender document would not be available for sale. For online bid submission etc. bidders have to mandatorily register (if not already registered) **on GeM portal** <https://gem.gov.in> and follow all steps as per functionality of GEM Portal.

1. Eligibility Criteria: - The bidder should have-

(a) Financial norms:

Turnover: Average annual turnover during the last 3 years, ending 31st March of the previous financial year, should be at least 30% of the estimated cost put to tender.

AND

(b) Physical norms

The bidder satisfying the following conditions:

The Contractors should satisfy the following conditions:

- (i) BSNL Enlisted contractors in Electrical category of respective class as per their tendering limits.

OR

BSNL CO (Electrical) approved engine manufacturer with the approved capacity of engine not less than the DG Set capacity proposed in the NIT.

OR

OEM authorized by the BSNL (Electrical) approved Engine manufacturer with the approved capacity of engine not less than the DG Set capacity proposed in the NIT. The letter of authorization in original from the Engine Manufacturer will have to be produced by the OEMs.

OR

Experience of having successfully completed similar works in central government /state government/central autonomous body/central public sector undertaking during last 7 years ending last day of month previous to the one in which applications are invited should be either of the following:-

Three similar successfully completed works costing not less than the amount equal to 40% of the estimated cost put to tender with DG Set capacity not less than 80% of individual capacity of the DG set proposed in the NIT

OR

Two similar successfully completed works costing not less than the amount equal to 60% of the estimated cost put to tender with DG Set capacity not less than 80% of individual capacity of the DG set proposed in the NIT

OR

One similar successfully completed works costing not less than the amount equal to 80% of

the estimated cost put to tender with DG Set capacity not less than 80% of individual capacity of the DG set proposed in the NIT

NOTE-1 :

- Similar work means Supply, Installation, and Testing and commissioning of required capacity [i.e. 80% of 380KVA=304KVA or above capacity] DG Set work.
- The work completion certificate issuing authority in respect of above shall not be below the rank of Executive Engineer (E).

2. The Seller shall possess and **upload the following along with BID.**

- a) EMD in prescribed form as per on-line /off-line as per **Sl. 6** given below.
- b) Near-Relationship Certificate as per **Sl. 8** given below.
- c) Vendor information form as per **Sl. 9** given below.
- d) Proof for financial norms (With CA certificate) and Physical norms as per eligibility criteria as per 1(a) & (b) given above.
- e) GST Registration Certificate.
- f) Copy of PAN Card.
- g) Valid MSME Registration Certificate (if applicable)
- h) Bank Transaction Details with UTR Number towards the successful e-payment for EMD.
- i) Duly filled Technical Details of 380KVA DG set offered in this Bid as per Annexure-III.

The bidders shall submit & upload the above necessary documentary proof , showing that they meet the eligibility criteria, along with bid.

3. Payment terms

Payment to the contractors during progress of work is regulated as below:

- i) 85% of the approved price shall be paid on the receipt of equipment at site by the consignee and after satisfactory physical inspection.
- ii) 10% payment shall be made after Successful Installation, Commissioning and Trial run.
- iii) The balance 5% payment shall be made after Final acceptance testing of equipment.
- iv) In cases where shortages / damages are intimated to the supplier in writing, the balance payment shall be released only after the cases are settled in accordance with the provision of the agreement.

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 / other bills / Performance Guarantee submitted by contractor.

4. a) Time Period allowed for completion of work: 60 Days from award of work.

b) Milestones for S.I.T.C. of 380KVA DG Sets and associated items of work-

STAG E	ACTIVITY	Duration(reckoned from Award of work)
1	Submission of working Drawing as per Site requirement.	Within 7 days.
2	DG Foundation ,Earthing work, cable laying and other associated work	within 30 days
3	Supply of 380KVA DG Set and associated items for installation	within 40 days

4	Installation ,Testing and Commissioning of DG Set	within 50 days
5	Trial Run[PT]/Acceptance testing[AT]	within 60 days

5. **Consignee/Engineer In charge**(Note; The 380KVA DG Set is to be transported to site as per the details given below i/c loading and unloading irrespective of the location of the building/premises and installation shall be done at site)

Sl no	Name of site	Business Area	No of 380 KVA DG Set	Consignee	Remarks
1	BSNL Telephone Exchange Building, Auto Exchange, Raipur [CG]	RAIPUR TELECOM DISTRICT	1	Name - Shri RAJESH KUMAR SONTAKE Designation – SDE(E), BSNL Electrical Sub Division, Raipur Mobile No. - 9425201567 Consignee office address. - O/o the Sub Divisional Engineer (Electrical), BSNL Electrical Sub Division, Telephone Exchange Bldg., Fafadih, Raipur (CG) - 492001.	BSNL reserves the right to vary the specified quantity of 3.5x240sqmm Power Cable to the extent of site requirement during execution of the contract without any change in unit price or other terms & conditions.

a) **Engineer In Charge**

Name	Shri SURESH LAXMAN RAO KAKDE
Designation	Executive Engineer (Electrical)
BSNL Email id	eee.ryp@gmail.com
Mobile No (Service)	9422931803
Complete Office Address	O/o the Executive Engineer (Electrical), BSNL Electrical Division, Telephone Exchange Bldg., Fafadih, Raipur (CG)- 492001
Fixed Line Telephone	0771-2430072
Pincode	492001

Note: 1) The Seller shall confirm the billing details and the GST number before invoicing for the item.

6. **Earnest Money Deposit**

(a) An amount of **Rs. 86,176 I-** (as in the GeM bid document) as EMD in favor of “The Account Officer (Cash),O/o GMTD BSNL, Raipur” and payable at Raipur” required to be submitted by bidders in the form of RTGS/NEFT in BSNL A/c whose details are as mentioned below or in the form of Demand Draft/FDR/ Bankers Cheque / Bank Guarantee of a scheduled Bank or Nationalized Bank / State Bank guaranteed by Reserve Bank of India on GeM portal in the prescribed format (Annexure-I).

(b) Scanned copy of the same shall be uploaded by Seller in the online bid and Originals of bank instruments such as DD or EMBG towards EMD/ Bid Security /UTR details (if not submitted through e-payment mode) shall be submitted by bidder on any date before or within 5

days of bid submission end date failing which the bid shall be rejected.

(c) Sellers/firms who have been exempted as per GeM GTC clauses need not to pay EMD. However proof of their eligibility for exemption shall be furnished.

(d) Account details of AO for online payment

Name: Accounts Officer (Cash), O/o GMTD, BSNL, Raipur

Account No: 1066002100026253

Bank : PUNJAB NATIONAL BANK, Station Road, Raipur

IFSC Code: PUNB0106600

7. PERFORMANCE SECURITY

(a) All sellers (including MSEs who are registered with the designated MSME bodies, like National Small Scale Industries Corporation etc. shall furnish performance security to the buyer for an amount equal to **5%** of Contract Value within 10 days from the date of award of Contract through GeM.

(b) The performance security Bond shall be in the form of Bank Guarantee issued by a scheduled Bank and in the Performa provided in 'ANNEXURE-II" of this Bid Document or In the Form of DD/BC/FDR.

(c) **Security deposit:** A sum @ 10% of the gross amount of the bill shall be deducted from each running bill of the contractor till the sum will amount to security deposit of 10% (i/c 5% PBG) of the Contract value of the agreement for supply & ITC.

(d) NOTE: The security deposit deducted during running bills (except 5% Performance Bank Guarantee (PBG) shall be refunded after satisfactory completion of warranty period.

8. NEAR-RELATIONSHIP CERTIFICATE

(i) The bidder should give a certificate that none of his/ her near relative, as defined below, is working in the units where he is going to apply for the tender. In case of proprietorship, a firm certificate will be given by the proprietor. For partnership firm certificate will be given by all the partners and in case of limited company by all the Directors of the company excluding Government of India/ Financial institution nominees and independent non-Official part time Directors appointed by Govt. of India or the Governor of the state and full time Directors of PSUs both state and central. Due to any breach of these conditions by the company or firm or any other person the tender will be cancelled and Bid Security will be forfeited at any stage whenever it is noticed and BSNL will not pay any damage to the company or firm or the concerned person.

i. (ii) The Company or firm or the person will also be debarred for further participation in the concerned unit.

ii. (iii) The near relatives for this purpose are defined as:-

a. Members of a Hindu undivided family.

b. They are husband and wife.

c. The one is related to the other in the manner as father, mother, son(s) & 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 format of the certificate is given below.**

NEAR-RELATIONSHIP CERTIFICATE

(To be typed on Firm's letter head)

(Format of the Certificate by the bidder in respect of status of employment of his/ her near relation in BSNL)

The format of the certificate to be given is "I.....s/o.....r/o.....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."

Signature of the tenderer
With date and seal

9. VENDOR INFORMATION FORM.

The required vendor details for processing of bills in the format (Annexure A) under GST regime shall be furnished to the Executive Engineer (E) concerned before execution of agreement.

(GST-Annexure-A)

VENDOR INFORMATION FORM	
Vendor name (Legal Entity Name)	
Constitution of business	
Communication address	
State	
PAN	
Vendor type :	
GST registration Number.	
Existing tax registration number (Please specify)	
Contact Person	
Designation	
Telephone Number	
Fax No.	
Email-ID	
BANK DETAILS	
Name of Bank	
Name of Branch	
Swift Code	
Account Number	
Account Name	
Provide the following information for all GST registrations :	
Total no. of GST Registration (pan India)	

				Contd...
For each of the registration, kindly provide the following information				
REGISTRATION FOR STATE-1				
Date of registration		GSTIN/UIN Number		
Registered address				
PIN Code		State name		State code
Composition scheme availed				
Declaration by :	Name :			
	Designation:			
	Date :			
Note: In case you have multiple registration, please insert the details in additional page.				

10. Store and Materials:

All the stores and materials required for the satisfactory completion of the work shall be arranged at work site by the contractor from his own sources/open market. It should be clearly understood that no claim whatsoever shall be provided. However safe custody will be the contractor's responsibility. In case of major accident / loss on account of negligence on part of contractor, the contract shall be terminated and SD deposited shall stand forfeited.

11. Termination of Contract on Death of Contractor:

Without prejudice of any of the rights or remedies under this contract, if the contractor dies, the Engineer in charge on behalf of the BSNL shall have the option of terminating the contract without compensation to the contractor.

12. Indulging of Contractor in Criminal / Antisocial Activities and Cases under Investigation/ Charge sheeted by CBI or any other Government Agencies:

If the CBI / Independent External Monitor (IEM) / Income tax / GST/ Central Excise / Custom Departments recommend such a course – Action will be taken as per the directions of CBI or concerned department.

13. STANDARDS

The goods supplied under this contract shall conform to the standards prescribed in the Technical Specifications.

14. PATENT RIGHTS

The supplier shall indemnify the purchaser against all third-party claims of infringement of patent, trademark or industrial design rights arising from use of the goods or any part thereof in Indian Telecom Network.

15. TRAINING (Suitable clause regarding training of manpower may be inserted if required as per following guidelines)

- a. The bidder shall provide training for installation and maintenance staff of the purchaser free of cost where required.

- b. The bidder shall specify in its bid the number of trainees, quantum of proposed training, pre-training qualifications required of the trainees and duration of the proposed training.
- c. The bidder shall provide all training material and documents.
- d. Conduct of training of the purchaser's personnel shall be at the suppliers' plant and/or on-site in assembly start-up operation, maintenance and/or repair of the supplied goods.

16. **INCIDENTAL SERVICES**

The supplier may be required to provide any or all of the following services:

- (a) Performance or supervision of on-site assembly and/or start-up of the supplied Goods;
- (b) Furnishing of tools required for assembly and/or maintenance of supplied Goods;
- (c) Performance of supervision or maintenance and/or repair of the supplied Goods, for a period of time agreed by the parties provided that this service shall not relieve the supplier of any warranty obligations under this contract.

17. **SPARES**

The supplier shall be required to provide a list of the following material and notifications pertaining to spare parts manufactured or distributed by the supplier of spares including cost and quantity considered for arriving at the price of spares.

- a) Such spare parts as the purchaser may elect to purchase from the supplier provided that such purchase shall not relieve the supplier of any warranty obligation under the contract.
- b) In the event of termination of production of the spare parts, the supplier shall:
 - (i) give advance notification to the purchaser pending termination (not less than 2 years), in sufficient time to enable the purchaser to procure life time spare; and
 - (ii) following such advance intimation of termination, furnish at no cost to the purchaser, the blue prints, drawings and specifications of spare parts, if and when requested.

18. **WARRANTY**

a) The supplier shall warrant that the stores to be supplied shall be new and free from all defects and faults in materials used, workmanship and manufacture and shall be of the highest grade and consistent with the established and generally accepted standards for materials of the type ordered and shall perform in full conformity with the specifications and drawings. The supplier shall be responsible for any defect that may develop under the conditions provided by the contract and under proper use, arising from faulty material, design or workmanship such as corrosion of the equipment, inadequate quantity of material to meet equipment requirements, inadequate contact protection, deficiencies in circuit design and/ or otherwise and shall remedy such defects at its own cost when called upon to do so by the Purchaser who shall state in writing in what respect the stores are faulty. This warranty shall survive inspection or payment for/ and acceptance of goods, but shall expire (except in respect of complaints notified prior to such date) **AS PER general terms and conditions.**

b) If it becomes necessary for the Supplier to replace or renew any defective portion(s) of the equipment under this clause, the provisions of the clause a) shall

apply to the portion(s) of the equipment so replaced or renewed or until the end of the above mentioned period of twelve months, whichever may be later. If any defect is not remedied by the supplier within the time, the Purchaser may proceed to get the defects remedied from other supplier etc., at the suppliers risk and expenses, but without prejudice to any other rights which the purchaser may have against the supplier in respect of such defects.

c) Replacement under warranty clause shall be made by the supplier free of all charges at site including freight, insurance and other incidental charges.

19. SETOFF

Any sum of money due and payable to the supplier (including security deposit refundable to him) under this contract may be appropriated by the purchaser or the BSNL or any other person(s) contracting through the BSNL and setoff the same against any claim of the Purchaser or BSNL or such other person or person(s) for payment of a sum of money arising out of this contract or under any other contract made by the supplier with the Purchaser or BSNL or such other person(s) contracting through the BSNL.

20. DETAILS OF THE PRODUCT

The bidder should furnish the name of its collaborator (if applicable), brand name, model number and type of the products offered in this tender. The technical literatures of the products should also be submitted. No change in either technology or product shall be permitted after opening of bids.

21. According to letter No. BSNLCO-MMT/12(13)/1/2020-MMT dated 15.09.2021 in respect to Public Procurement [preference to MAKE IN INDIA] order 2017 – notification of Telecom Goods, Services or works, it is included that-

a) The bidder has to comply with the Public procurement [Preference to Make in India] order 2017 and subsequent Amendments / Revision in PPP-MII order 2017.

b) Any bidder from a country which shares a land border with India will be eligible to bid in any procurement whether of goods, services (including consultancy services and non-consultancy services) or works (including turnkey projects) only if the bidder is registered with the competent authority specified in Annexe-I of the O.M No. 6/18/2019-PPD dated 23.07.2020 issued by the Department of Expenditure, Ministry of Finance

SCHEDULE OF ITEMS

Name of Work - SITC of 1 No. 380 KVA Diesel Generator Set & CCTV System (Second Floor) for Telephone Exchange Compound at Auto Exchange Raipur (Planned phase 9.2 Core Equipment) (SH-SITC of 1 No. 380 KVA DG set with acoustic enclosure at Auto Telephone Exchange Bldg., Raipur).

Sl. No	Item Description	Qty	Unit	Basic Rate	Total
01	Supply ,Installation , testing and Commissioning of factory assembled, factory tested diesel engine alternator set with an acoustic enclosure , conforming to the Environment (Protection) Act, 1986, and Environment (Protection) Rules, 1986, latest as amended upto date for noise and emission norms and the latest CPCB Norms as and when amended by Ministry of Environment and Forest , Capable of delivering not less than 380KVA / 304 KW at typical site conditions including all accessories like common base frame, AVMs, Starting Batteries of low maintenance type suitable for cranking duty and capacity not less than 150AH for 12V/24V DC system (or manufacturer recommended AH in case the battery is same make as that of Engine and supplied by the Engine manufacturer only) with leads and terminals, including battery charging dynamo, residential type silencer and suitable Exhaust piping up to silencer with supports, 900 liters fuel tank, with braided flexible fuel piping and MS piping (B-class) wherever required of suitable size etc with valves and other fittings for supply and return lines, hand fuel transfer pump with suitable hose pipes and clips, with suitable manual control panel and comprising the following as per the detailed specifications, General Technical requirement(GTR)/Commissioning ,Installation details and warranty details as attached complete as required. The agency/seller has to carry out associated work as per General Technical Requirement attached as part of their scope of work without any extra cost for these works like construction of PCC Foundation for DG set of required size,, Providing / making earthing system [02 Copper Plate earth for Body and 02 Copper Plate earth for Neutral] and necessary connections, supplying /laying Power Cable 3.5 corex240sqmm size of required numbers as per current rating and its end terminations , etc as required.	1.0	SET		
	[a] ENGINE- Liquid cooled continuous rated engine of suitable BHP at 1500 RPM suitable for above output of alternator typical site conditions and conforming to BS 5514/ IS 10000 or latest, capable of taking 10% over loading for one hour after 12 hours of continuous operation. The engine will be fitted complete with all the required accessories. The Engine shall be of any of the BSNL approved make as per product list and as per detailed specifications attached and suitable for coupling with below mention alternator.				
	[b] ALTERNATOR- Any of the BSNL approved make as per product list, brushless and single bearing type alternator capable of delivering a minimum 380 KVA/304 KW (Corresponding to typical site condition) at 415V 0.8 Power factor 50 Hz, 3 Phase, 1500 RPM and capable to feed up to 152 KVA non-linear (Thyristor) loads along with linear loads. And close coupled to the above engine,. The alternator shall be having Screen Protected Drip-Proof enclosure, brushless, continuous duty, self-excited and self-regulated through AVR conforming to IS: 4722/BS 2613 suitable for tropical conditions and with class -F/H insulation. And suitable size PVC insulated copper conductor interconnection cable in suitable pipe between alternator and standard control panel should be laid as per detailed specifications attached.				

UN-PRICED SCHEDULE

	[c] Standard Manual Control Panel - Standard Manual Control Panel comprising of 1 No. 4 Pole, 630A MCCB with Overload & Short-circuit Protection having breaking capacity not less than 50 KA at 415 V with no-voltage release ,And Digital multi-display meter for current ,voltage, frequency ,power factor and power etc, with necessary CTs and indicating LED lamps, With SCR/SMPS type 10A,12 V (in case of 12V starting system)/10A , 24V(in case of 24V starting system) inbuilt static battery charger with automatic trickle and boost charging and auto cutoff facility etc., as per detailed specifications attached.				
	[d] ACOUSTIC ENCLOSURE- Prefabricated factory built, free standing, floor mounting type acoustic enclosure of modular construction suitable for accommodating the 380 KVA Engine Alternator set with standard control/ instrument panel, fuel tank etc as per specifications and conditions 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 2nd Amendment of 2002 and 2004 respectively and Environment (Protection) (Third Amendment) Rules, 2014 dt 31st March 2014 and 11th Nov. 2014, in respect of noise and emission norms , as amended up-to-date. No set shall be accepted without the latest CPCB certificate of authorized agency such as ARAI of Pune, NPL New Delhi, NSTL Vishakapatnam, FCRI Palghat and NAL Bangalore. The make and model number of Engine and alternator shall be as per BSNL approved product Directory.				
	[e] I.T.c.of 380KVA DG Set- Installation Testing and Commissioning of the above 380 KVA E/A set with acoustic enclosure and control panel with all equipments, accessories and associated items on the cement concrete floor / foundation including providing necessary fuel MS piping and conducting Acceptance Testing of the Engine Alternator by arranging necessary consumables like Lube oil, fuel oil ,providing artificial resistive load with cabling ,switching arrangements etc. for pre Acceptance Testing (i.e, 2 hours full load, 1 hour 10% overload and 1 hour at no load) and final Acceptance Testing of E/A set (i.e. running of E/A set on full load for 6 hours and running on 10% overload for 1 hour) including topping up of lube oil up to full mark and filling of extra fuel up to a level suitable for 2 hours full load working etc. as per specifications as required. The Construction of DG Set's PCC Foundation , Earthing work for body/neutral of DG set ,Supply /fixing of suitable Control/Power Cable and other materials as required for ITC of DG Set shall be in the scope of Seller as detailed in General Technical Requirement(GTR)/Commissioning attached.				
02	Supply and Laying in open duct of 1 No. cable of ISI marked heavy duty PVC insulated, armored cable, with PVC outer Sheath of Type ST-2 (FR Grade, Category C1), with aluminum conductor having insulation of PVC compound type -C, suitable for rated voltage up to and including 1100 volts and conforming to IS: 1554 (Part-1) latest. For 3-Phase Power Generators, 3.5 core x 240 sqmm size complete as required.[Note-This shall be extra legth of LT Cable required for connecting DG Set supply to existing MV Panel ,over and above the Length of LT Cable to be supplied by Seller as per GTR details given]	4.0	Metre		
03	Supply and Laying in existing RCC/Hume/Metal pipe of 1 No. cable of ISI marked heavy duty PVC insulated, armoured cable, with PVC outer Sheath of Type ST-2 (FR Grade, Category C1), with aluminum conductor having insulation of PVC compound type -C, suitable for rated voltage up to and including 1100 volts and conforming to IS-1554 (Part-1) latest. For 3-Phase Power Generators, 3.5 core x 240 sqmm size complete as required. (Note-This shall be extra legth of LT Cable required for connecting DG Set supply to existing MV Panel ,over and above the Length of LT Cable to be supplied by Seller as per GTR details given)	3.0	Meter		

UN-PRICED SCHEDULE

UN-PRICED SCHEDULE

04	Supply and Laying on existing cable tray of 1 No. cable of ISI marked heavy duty PVC insulated, armoured cable, with PVC outer Sheath of Type ST-2 (FR Grade, Category C1), with aluminum conductor having insulation of PVC compound type -C, suitable for rated voltage up to and including 1100 volts and conforming to IS-1554 (Part-1) latest. For 3-Phase Power Generators, 3.5 core x 240 sqmm size complete as required. (Note-This shall be extra length of LT Cable required for connecting DG Set supply to existing MV Panel ,over and above the Length of LT Cable to be supplied by Seller as per GTR details given)	4.0	Meter		
05	Supply and Laying on surface of 1 No. cable of ISI marked heavy duty PVC insulated, armoured cable, with PVC outer Sheath of Type ST-2 (FR Grade, Category C1), with aluminum conductor having insulation of PVC compound type -C, suitable for rated voltage up to and including 1100 volts and conforming to IS- 1554 (Part-1) latest. For 3-Phase Power Generators, 3.5 core x 240 sqmm size complete as required. (Note-This shall be extra length of LT Cable required for connecting DG Set supply to existing MV Panel ,over and above the Length of LT Cable to be supplied by Seller as per GTR details given)	3.0	Meter		
Total					

Note:-

- 1) The above schedule is for reference of Item Description & scope of Item. Prices shall be quoted in Gem BID as per the Items in BOQ.
- 2) The DG set offered shall be factory made by reputed manufacturers / OEMs with approved certificates and type drawings from Designated Agencies as per Environment and Pollution Control Act. BSNL reserves the right to inspect the E/A set at the manufacturer's place prior to dispatch.
- 3) Cladding for the exhaust pipe and silencer should be done inside the acoustic enclosure. Exhaust pipe up to silencer has to be provided by the firm without any additional cost as per CPCB test conditions.
- 4) The rates for all items of work shall, include cost of all labour, materials and other inputs involved in the execution of the terms as specified in the scope of work.

Executive Engineer (E)

IMPORTANT NOTE

1.1 INPUT TAX CREDIT:

In order to avail input Tax credit as per GST law, BSNL is entitled for input tax credit. In order to avail the INPUT TAX CREDIT, the contractor/firm has to furnish an invoice* favouring BSNL indicating the GSTIN No of the firm and BSNL along with SAC code:-Invoice*- indicating the quantum of goods & Service tax. (as per GST Law).

1.2 QUOTING OF RATES:

The rates quoted shall be inclusive of all levies and taxes, packing, forwarding, freight and insurance and GST.

1.3 The entire scope of work shall be awarded to LOWEST bidder without any splitting.

1.4 Duties, taxes & Cesses for which the firm has to furnish GST Challans / Tax Invoices will be indicated separately in the PO / APO.

1.5 Contractor should furnish the correct HSN / SAC classification / Customs tariff Head in the invoice.

If the credit for the Duties , Taxes and Cesses under provision/ rules under GST law is found to be not admissible at any stage subsequently owing to wrong furnishing of Tariff Head, then the contractor will be liable to refund such non-admissible amount, if already paid, along with penalty and interest if Charged by the concerned authority.

1.6 In case the Duties , Taxes and Cesses which are not eligible for input tax credit as per the quotes indicated in the price schedule by the suppliers/contractor and subsequently at any stage it is found that Credit for such Duties , Taxes and Cesses is admissible as per provision of GST law, then the suppliers/contractor will be liable to refund the amount equivalent of such Duties , Taxes and Cesses if already paid to them provided the credit can be claimed within the time prescribed under the applicable legislation and BSNL has all documents to claim such credit. The refund is also subject to the bidder performing necessary act for enabling BSNL to claim the credit viz. upload the information on GSTN. However, the purchaser may allow the supplier to submit necessary documents in this regard which may enable the purchaser to avail the input tax credit provided such credit is still available for the amount so paid as per provision of GST law.

1.7 BSNL reserves the right to ask the bidders to submit documentary proof confirming the correct HSN or SAC classification/ Customs Tariff Head from the CGST/SGST/IGST officer or Customs authority where the HSN or SAC classification/ Customs Tariff Head furnished against the particular tendered item by different bidders, differs from each other or the same is found apparently not furnished in accordance with GST Act/Customs Tariff notifications.

1.8 If the contractor fails to furnish necessary supporting documents i.e. Tax invoices / Customs invoices etc. in respect of the Duties , Taxes and Cesses which are eligible for input tax credit, the amount pertaining to such Duties , Taxes and Cesses will be deducted from the payment due to the firm.

1.9 If the contractor fails to perform necessary compliances which would any manner restrict BSNL to claim input tax credit, then the amount pertaining to such Duties , Taxes and Cesses will be deducted from the payment due to the contractor.

1.10 If the contractor does not disclose the correct details on the invoice or on the GSTN viz. GSTIN, Place of Supply, etc. which restricts BSNL to claim input tax credit, then the amount pertaining to such Duties, Taxes and Cesses will be deducted from the payment due to the supplier.

Tax Indemnity clause: BSNL has the right to recover Input Tax Credit loss suffered by it due to any mis-declaration on invoice by the supplier.

ANNEXURE – III
(Technical Particulars of DG set)

The following information shall be furnished by the tenderers in their offers.

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. Any other data. :

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
7. Class of Insulation of rotor:
8. Class of Insulation stator:

III) General:

1. Overall Length of DG set :
(L x W x H)
2. Overall Weight of DG set :
3. Noise Level of DG Set at one Meter with Acoustic Enclosure:

IV) Generator Control Panel:

1. Make :

V) Acoustic Enclosure:

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

Note: For the item No. 1 of schedule of quantity [BOQ], the make mentioned in list of approved make and any subsequent approval by the Corporate office of BSNL for 380 KVA Engine and Alternator ,at site condition, till the last date of submission of tender shall be accepted. If approval for the above quoted make & model of E/A Set is not available on date of tender opening, the same make/model will not be accepted.

13. COMPUTERISED MEASUREMENT BOOKS (CMB'S) AND BILLS TO BE SUBMITTED BY THE CONTRACTOR

1. **Application and format of the computerized MB:** A bound volume of computerized measurements to be furnished by the contractor, duly machine numbered for the pages, and with an MB number given by the Division Office. The pages of these Measurement Books shall be of A-4 size. All these Measurement Books belonging to a Division shall be serially numbered, and a record of these Computerized Measurement Books shall be maintained in a separate Register in Form CPWA 92. The same format as in existing Measurement Books shall be used for the Computerized Measurement Books. The measurements shall be carried forward from the previous recorded measurements as per the existing procedure.

2. **Mode of Measurements:** The measurements shall be recorded and entered in computerized format in the first instance by the contractor, and a hard copy shall be submitted to the Department. These measurements shall then be 100% checked by JTO (E). If JTO (E) is not available, SDE (E) shall perform 100% check of the measurements. The contractor shall incorporate all such changes or corrections, as may be done during these checks, to his draft computerized measurements, and submit to the department the corrected computerized measurements in the form of a book, duly hard bound in red colour on the lines of the conventional Measurement Books now in use, and with its pages machine numbered. The SDE (E) and the Executive Engineer (E) shall test check these computerized measurements as per the existing instructions. This book shall be treated as a Computerized Measurement Book. JTO (E), SDE (E) and EE (E) shall record the necessary certificates for their checks and test checks as per the existing procedure in this Computerized Measurement Book. The Computerized Measurement Book shall be allotted a serial number as per the Register of Computerized Measurement Books.

3. **Cutting or over-writing in the computerized MB not allowed:** The Computerized Measurement Book given by the contractor, duly bound, with its pages machine numbered, shall have no cutting or over-writing. It is the responsibility of JTO (E) or SDE (E) as the case may be to ensure that the checks and test checks done by them in the initial draft measurements are correctly incorporated in the Computerized Measurement Book before they record their certificates. In case of any error, the Computerized Measurement Book shall be canceled, and the contractor shall re-submit a fresh Computerized Measurement Book. This should be done before the corresponding computerized bill is submitted to the Division for payment. The contractor shall submit as many copies of Computerized Measurement Books as may be required, and as are specified in the NIT/contract, for the purpose of reference and record in the various offices of the department.

4. **Computerized Bill to be submitted by the contractor:** The contractor shall submit his running and final bills in a computerized form in the same format as the existing conventional bills, with all the pages machine numbered, and hard bound, and with all the entries made as per the existing procedure. The contractor shall submit as many copies of the computerized bills as may be required for the purpose of reference and record in the various offices of the department. The bill shall be carried forward from the previous running account bill and these computerized bills shall be processed by the various offices for payment.

Note: If the Agency fails to submit CMB, BSNL will proceed with the processing of CMB based on the invoice submitted by the firm as measurements. The measurements made by BSNL in CMB for the work done will be final and at later date no claims will be entertained on this account.

MODEL FORM OF BANK GUARANTEE

(For submitting EMD)

Whereas(hereinafter called “the contractor(s)”) has submitted its Tender dated
__for the 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.

(b)Fails or refuses to furnish security Deposit in accordance with the conditions of Tender
document.

We undertake to pay to the BSNL up to 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 up to and including
Thirty (30) 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:

PERFORMANCE SECURITY GUARANTEE BOND

1. In consideration of the CMD, BSNL (hereinafter called "BSNL") having agreed to exempt _____(hereinafter called "the said contractor(s)") from the demand under the terms and conditions of an agreement/Advance Purchase Order No. _____ dated _____ made between _____ and _____ for the supply of (hereinafter called "the said agreement"), of security deposit for the due fulfillment by the said contractor (s) of the terms and conditions contained in the said Agreement, on production of the bank guarantee for _____ we, (name of the bank) _____ (hereinafter refer to as "the bank") at the request of _____ (contractor(s)) do hereby undertake to pay to the BSNL an amount not exceeding _____ against any loss or damage caused to or suffered or would be caused to or suffered by BSNL by reason of any breach by the said Contractor(s) of any of the terms or conditions contained in the said Agreement.

1. We (name of the bank) do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the BSNL by reason of breach by the said contractor(s)" of any of the terms or conditions contained in the said Agreement or by reason of the contractors(s)" failure to perform the said Agreement. Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee where the decision of BSNL in these counts shall be final and binding on the bank. However, our liability under this guarantee shall be restricted to an amount not exceeding_____.

2. We undertake to pay to the BSNL any money so demanded notwithstanding any dispute or disputes raised by the contractor(s)/supplier(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 valid discharge of our liability for payment there under and the contractor(s)/supplier(s) shall have no claim against us for making such payment.

3. 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 the BSNL under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till _____(office/Department) BSNL certifies that the terms and conditions of the said Agreement have been fully or properly carried out by the said contractor(s) and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before the expiry of TWO/TWO AND HALF/THREE YEARS (as specified in P.O) from the date hereof, we shall be discharged from all liabilities under this guarantee thereafter.

4. We (name of the bank) further agree with the BSNL that the BSNL shall have the 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 or 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 or 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.

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

6. We (name of the bank) lastly undertake not to revoke this guarantee during its currency except with the previous consent of the BSNL in writing.

Dated the _____ day of _____
For

(Indicate the name of bank)

General Technical Requirements (GTR) / Commissioning

General Technical Requirements (GTR) / Commissioning (Part-1)

- a) Power Generator shall be complete with Diesel Engine, Alternator and AMF/MANUAL Control Panel along with Acoustic Enclosure. Diesel engine and alternator shall be closely coupled or provided with flexible coupling and mounted on a base plate / M.S. frame of robust in construction.

General Technical Requirements (GTR) / Commissioning (Part-2)

- b) Anti-Vibration mountings shall be provided for complete Power Generator in case of flexible coupling. In case of direct coupling Anti-Vibration mountings shall be provided for the Engine as well as the alternator.

General Technical Requirements (GTR) / Commissioning (Part-3)

- c) Power Generator should have protection against under voltage, over voltage, under frequency, over frequency, low battery voltage, over current, earth-fault, short circuit, phase sequence change etc.

General Technical Requirements (GTR) / Commissioning (Part-4)

- ~~d) Automatic Mains Failure (AMF) control panel, where applicable, shall be able to start up the Power Generator and transfer the load on to the Power Generator on mains failure without requiring any human intervention. Similarly on restoration of mains supply, it shall be able to transfer the load to mains supply and switch o the Power Generator automatically.~~

MANUAL CONTROL PANEL WITH ALL ACCESSORIES AND FEATURES AS PER SCHEDULE OF QUANTITY[BOQ] AND TECHNICAL SPECIFICATION , HAS TO SUPPLY WITH DG SET.

General Technical Requirements (GTR) / Commissioning (Part-5)

- e) Control Panel (Manual /-AMF), where applicable, shall be equipped with suitable Voltmeter, Ammeter, Frequency meter, power factor meter (these items can be alternatively supplied in one multifunctional digital display meter), battery charger, indicators, various switches and cutout / MCB / MCCB / Contactor / Circuit breaker for the DG output of appropriate rating and accuracy class as per trade practice for better utility.

General Technical Requirements (GTR) / Commissioning (Part-6)

- f) Supply and installation of a change-over Switch / MCCB of suitable rating for Power Generator with manual control panel, where applicable, is inclusive in the scope of supply.

General Technical Requirements (GTR) / Commissioning (Part-7)

- g) Acoustic Enclosure shall be made of Pre-treated and Powder coated CRCA Sheet. The sheet shall be Pre-treated and Powder coated with weather-proof paint. The Acoustic Enclosure shall be vermin proof. The enclosure shall accommodate the (daily service) fuel tank of the Power Generator to make the system compact.

General Technical Requirements (GTR) / Commissioning (Part-8)

- h) Power Generators shall meet the requirements of Environmental (Protection) Rules 1986 as laid down by Min. of Environment & Forests read with GSR 371 (E) dated 17.5.2002,GSR 520(E)dated 1.7.2003 , No.448 (E)dated 12.07.2004 , GSR 771(E) dated 11.12.2013 GSR 232(E)dated 31.03.2014,Gazette Notification No.167 dated. 31.03.2014 and Gazette Notification No. 578 dated. 11.11.2014 in respect of noise and emission norms. The latest amendments to above GSRs shall be applicable as and when amended by Ministry of Environment and Forest.

General Technical Requirements (GTR) / Commissioning (Part-9)

- i) Standard set of tools consisting of a set of 3 spanners, one screw driver, one standard plier and one nose plier of appropriate size shall be provided along with each Power Generator.

General Technical Requirements (GTR) / Commissioning (Part-10)

- j) Supply of Fuel tank of suitable capacity, sufficient for minimum 8 hours running/900 liters (whichever is lower) the Power Generator, is inclusive in the scope of supply. Fuel Tank shall be complete with fuel piping (between fuel tank and diesel engine), valves, level indications and all standard accessories. MS pipes, heavy class of suitable dia conforming to IS 1239 (Part-1) - latest shall be used for fuel piping.

General Technical Requirements (GTR) / Commissioning(Part-11)

Buyer's Responsibilities:

- i.
- ii. Distribution board and Extra civil work (excluding DG foundation), shall be provided by the buyer.
- iii. Consumables such as lters, lube oil at the time of servicing during warranty period shall be provided by the buyer.
- iv. Obtaining necessary approvals, if any, is the responsibility of the buyer.

Above General Technical Requirements (GTR) / Commissioning have been seen, read, understood and agreed to comply by bidder/seller- Yes

Installation with installation - inclusive in the scope of supply

Scope of installation for Diesel Generating Set - inclusive in the scope of supply(Part-1)

- a) Installation of Power Generator when offered by the vendor is inclusive in the scope of supply and shall be done by the seller. The installation work of Power Generator and its constituent parts shall be generally conforming to CPWD General Specification for Electrical Works, Part - VII - latest. b) Foundation shall be constructed by the seller. Foundation shall be of PCC type with the ratio of 4:2:1. The length and breadth of the foundation shall be 300 mm more from the respective length and breadth of the Power Generator. The height of the foundation shall be 400 mm, i.e., 200 mm below and 200 mm above the ground level. All the materials / labor required for foundation work shall be supplied by the seller.

Scope of installation for Diesel Generating Set - inclusive in the scope of supply(Part-2 & 3)

- b) Supply, laying and termination of interconnecting power and control cable shall be done by the seller. The cable supplied shall be ISI marked heavy duty PVC insulated, armored cable, with PVC outer Sheath of Type ST-2 (FR Grade, Category C1), with aluminum conductor having insulation of PVC compound type -C, suitable for rated voltage up to and including 1100 volts and conforming to IS: 1554 (Part-1) latest. For 3-Phase Power Generators, 3.5 core or higher core cables shall be used. Total length of the cable supplied by the seller shall be within 30 meters for each Power Generator with manual control panel. The current rating of the cables shall be as indicated below:
- c) 3.5C, 2 Run of 240 Sq mm for Three Phase, 380 KVA

Scope of installation for Diesel Generating Set - inclusive in the scope of supply(Part-4)

- d) Construction of suitable earthing station and necessary connections shall be done by the seller. All the materials / labour required for construction of earthing station shall be supplied by the seller. The total number of earthing pits/stations shall be 4, i.e., 2 for neutral and 2 for body-earthing. Neutral earthing shall be done with copper Plate and Body earthing shall be done with Copper plate. The consignee should choose installation site in such a way that the earthing stations can be made within 10 metres of the Power Generator. Earthing station shall be typically constructed as per prevalent standard practices and shall be generally conforming to CPWD General Specification for Electrical Works, Part - VII & Part - I - latest. e) Installation of Fuel Tank including foundation / stand shall be done by the seller. f) The warranty is applicable up to specified value of month/hours whichever occurs first.

Above Scope of installation for Diesel Generating Set has been seen, read, understood and agreed to comply by bidder/seller-Yes

WARRANTY/SERVICES

- a) Warranty on Complete power generator/DG Set-24 month
b) Warranty in running hours-5000 hour
c) Number of preventive maintenance visits covered in an year during warranty period (Supply of all consumables is the buyer's responsibility)-2
d) Response Time to attend the complaint during Warranty-7 day
e) Time Duration for Repairing /Replace the defect during Warranty-30 day

TEST REPORTS

Type of lab which carried out Test of Complete Product to prove the conformity of product as per specification-

- a) Certificates required as per CPCB, Govt Lab, NABL accredited lab

Test report Available for (Test/approval)

- b) Type Approval Certificates for the specified rating of the Power Generator from any of the designated agency authorized by CPCB,COP Certificates for engine, Type test report and Endurance test report for Engine as per IS: 10001 latest / IS: 10002 latest, Type test report for Alternator as per IS:13364 (Part-1) latest / IS:13364 (Part-2) latest to prove conformity to the specifications

Agree to provide all relevant documents Test Report/supporting document /reports etc to the buyer at the time of bidding or on demand by the bidder/seller-YES

TECHNICAL SPECIFICATIONS

SECTION-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 civil works for DG Set's PCC Foundation, Earthlings, Cabling, electrical, Acceptance Testing and other works associated with installation and commissioning of the set shall be carried out by the tenderer. The tenderer would quote for complete lot to be executed for work as per Schedule of quantity [BOQ].

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 A2 accuracy or better, and all standard fittings, flexible pipe, low maintenance lead acid battery suitable for cranking duty and capacity not less than 12V,150 AH (1 No in case of 12V starting system)/2 nos 12V ,150AH lead acid batteries(in case of 24V starting system)/ manufacturer recommended AH in case the battery is same make as that of Engine and supplied by the Engine manufacturer only, fuel tank capacity not less than 900 Ltrs with steel wire braided/ hydraulic fuel pipe, silencer, MS exhaust pipe of suitable size and length as per site requirement, 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 suitable size Copper conductor unarmored XLPE cable with cable glands and lugs in PVC flexible conduit, for inter connection between alternator and control panel inside the canopy, 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 and amended up to the date. No set shall be accepted without the CPCB certificate of authorized agencies such as ARAI of Pune, NPL New Delhi, NSTL Vishakhapatnam, FCRI Palghat and NAL Bangalore. The make and model no. of Engine and alternator shall be as per BSNL approved product directory available at Enclosure. The battery shall be fixed between the base frame on a suitable angle iron frame / MS sheet including providing suitable rubber pads below the battery.

2. OPERATING CONDITIONS

The Engine alternator set shall be capable of working at any ambient temperature between 0°C to 50°C. and relative humidity up to 95% condition. However for calculation of the capacity these operating conditions will not apply. For calculation of the capacity, the condition shall be of Kolkata [W.B.] site condition.

3. THE PERIOD OF OPERATION

The Engine Alternator set offered shall be continuous duty type conforming to BS 5514 & DIN 6271 for generator set applications. The set may be idle for a long period except for routine test periodically

5. OVERLOAD

The set shall be capable of taking 10% overload for a period of one hour during any 12 hours period while operating continuously at full rated load. Over load test shall be however subject to the manufacturer's recommendations.

6. OUTPUT VOLTAGE, FREQUENCY AND WAVE FORM

Normal output voltage shall be 415 volts with ± 1 % with AVR at all conditions of load. Frequency shall be 50 cycles per second ± 4 %. Output waveforms shall be sinusoidal at all load conditions. Alternator shall be of brush less type provided with AVR suitable for voltage regulations ± 1 % or better at all load conditions and with prime mover speed drop up to 4% of nominal speed and with frequency rollover protection.

7. EARTH BUS PROVISION

Provision shall be made for earthing all non-current carrying metal parts of the equipment. Earth lugs of suitable size shall be provided wherever earth connections to the apparatus are necessary. Earthing work shall be

carried by bidder/seller as per IE rules/IS specifications amended up to date.

8. SAFETY PROVISIONS

All exposed moving parts like fan blades, couplings etc., shall be provided with suitable guards/covering to avoid the chances of accidents

9. FINISHING

All exposed metal parts i/c base channel radiator cover, air filter, oil filter, dynamo, starter etc., shall be in single colour suitably finished to prohibit corrosion under climatic conditions prevailing at site and the colour shall be preferably of light GREY colour or as per engine manufacturer.

10. NAME PLATE MARKING AND INSTRUCTION MANUALS

A nameplate showing rating, connection diagram, year of manufacture etc., should be provided on engine and alternator; all the important major parts should bear their catalogue number, name of the parts etc. All the control wiring shall be provided with letter/number ferrules at both ends. Three sets of manuals giving the details about design specifications, special features of the equipment, schematic and wiring diagram, instructions regarding installation, maintenance /operation etc., should be supplied.

The Electrical control wiring diagram, operation and maintenance instructions shall be framed and displayed in the enclosure. The important name plate details of Engine & Alternator, date of commissioning etc shall be displayed in the enclosure.

SECTION -B

SPECIFICATIONS FOR FACTORY ASSEMBLED EA SET WITH STANDARD CONTROL PANEL

1. BASE FRAME AND AVMs:

1.1 Base frame shall be fabricated out of minimum 5mm thick CRCA sheet steel/channel iron made to suitable shape to impart superior strength and good appearance.

1.2 AVMs shall be provided in between the above base frame and Engine/Alternator for vibration isolation and smooth working of the set.

1.3 Vibration isolation pads also shall be provided for elimination of vibration transmission to the set mounted control panel.

2. DIESEL ENGINE:

2.1 Engine shall be multi cylinder, reciprocating compression ignition (Diesel type) as per manufacturer's standard design and confirming to relevant IS specifications and suitable for Gen set application. It shall be suitable for close coupling with alternator. The engine should comply the latest emission & noise norms on pollution (CPCB-IV) as required by pollution control Board for engine alternator sets supplied after 01-04-2014. A certificate to this effect must be supplied along with the E/A set.

2.2 Provision of Generator Control Unit (GCU) for Engine monitoring (including control wiring) and control for the following protections:

- (i) Safety control auto cut off for low lube oil pressure.
- (ii) Safety control (trip) high water temperature for water cooled Engine/high Cylinder head temperature for air-cooled engines.
- (iii) Safety control for over speed / frequency.

2.3 Engine associated items:

- (i) Speed governor.
- (ii) Residential type silencer (as per clause 6.5) with MS 'B' class exhaust piping and bellow type flexible piping
- (iii) Fuel tank (as per clause 6.2) with fuel piping and fuel level sensors.
- (iv) Engine driven fuel feed pump.
- (v) Hand fuel pump with 5m long flexible hose pipe for transferring fuel from barrel to tank.
- (vi) Electric self starting motor.
- (vii) Engine driven battery charger.
- (viii) Starting battery, with terminals and leads to be accommodated in base frame.
- (ix) Lub oil filters, fuel oil filter and air filters suitable for minimum operation up to 250 hours/ First service.
- (x) Heavy-duty flywheel. Coupling with guard.
- (xi) Blower fan/ Radiator fan.
- (xii) Dynamo Alternator.

2.4 Engine Governor:

The engine shall operate on 1500 RPM and be able to meet site conditions with regard to voltage, speed, frequency and regulation and shall be equipped with electronic governor of Class A2 accuracy or better. The Engine Governor shall suitable to meet requirement as given under speed governing of AT test sheet.

Speed Governing:

The engine shall run steadily and load up to its maximum rated load to the standards given below: Load variation
Maximum change of speed as a percentage of rated speed 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 second after taking off or throwing on the rated load.

2.5 Air-Pollution norms:

2.5.1 The Gen-set supplied should be within the emission limits:

2.5.2 Requirement of certification

The manufacturer of engine or the importer of the engine or product should have valid certificates of Type Approval and Certificates of Conformity of Production for each year, for all engine models being manufactured or for all engine or product models being imported with the emission limit as specified in 2.5.1.

2.5.3 Requirement of conformance labeling:-

[i] All the engines, individually or as part of the product shall be clearly engraved 'Gen-set Engine' on the cylinder block.

[ii] The engine or the product shall be affixed with a conformance label meeting the following requirements, namely:-

(a) The label shall be durable and legible.

(b) The label shall be affixed on a part necessary for normal operation of the engine or the product and not normally requiring replacement during the product life of the engine or the product.

[iii] The conformance label must contain the following information namely:

(a) Name and address of the manufacturer of engine or product, as the case may be.

(b) Statement that "this engine or product conforms to the environment (protection) Rules, 1986".

(c) Type approval certificate number.

(d) Date of manufacture of engine and the product or in case of import, the date of import of the engine and the product; and

(e) Rated speed and corresponding gross power in kW.

2.5.4 Authorized agencies for certification.

The following institutions are authorized to carry out such tests as they may deem necessary, for giving certificates of Type Approval and Conformity of Production tests for diesel engines or products and to give such certificates, namely:-

(i) The Automotive Research Association of India, Pune (Maharashtra);

(ii) The International Centre for Automotive Technology, Manesar (Haryana);

(iii) The Indian Oil Corporation, Research and Development Centre, Faridabad (Haryana);

(iv) The Indian Institute of Petroleum, Dehradun (Uttarakhand); and

(v) The Vehicle Research Development Establishment, Ahmednagar (Maharashtra).

2.5.5 Compliance and testing procedure:

(i) The Compliance and Testing Procedure, as published by the Central Pollution Control Board shall be followed by all concerned.

(ii) The authorized agencies for certification shall submit the testing and certification details in respect of the emission to the Central Pollution Control Board annually.

2.5.6 Fuel Specification.-

The specification of commercial fuel applicable for diesel gensets shall be the same as applicable for commercial High Speed Diesel applicable for diesel vehicles in the area where product would be operated, from time to time, as per policy of Government of India.

2.5.7 Engine component or parts identification.-

All the details of engine components or parts responsible for the emission performance shall be clearly marked in English language."

2.6 Engine Panel

The engine panel shall comprise of the following

- a) Lub.oil pressure gauge
- b) Lub. OIL temp gauge for air cooled engine and Radiator water temperature gauge for water cooled engines.
- c) Starting switch with key
- d) Stopping switch
- e) Hour meter cum RPM meter.

NOTE: Digital/Multi display digital meter may be used in lieu of analog meters. The above items are indicative only, Also acceptable as per Engine manufacturer standards.

3. ALTERNATOR:

3.1 The alternator shall be brushless type, suitable for close coupling, copper wound, totally enclosed screen protected with class F/H insulation, designed and constructed to withstand tropical conditions, self regulating type and conforming to IS 4722/BS 2613 amended up to date as applicable.. It should satisfy the performance requirements of specifications.

They shall conform to capacity ratings wherever so specified. The alternator shall be suitable for parallel operation among them without any quadrature droop compensations. The AVRs shall be suitable for voltage regulation of +1 % or better against all loads and prime mover drop up to 4% of the nominal speed.

3.2 Alternator terminal, neutral points and connections: In case of three phase alternator the winding shall be star connected and neutral point shall be brought out to the terminal box and suitable for earthing with independent earths. The terminal shall be mounted in an accessible position on the alternator with necessary cable gland plates suitable for extension of the supply to the control panel. The AC/DC wiring shall be separated from each other.

3.3 Each alternator shall be provided with its own exciter. When separate units are provided for this purpose, they shall be driven by the alternator shaft itself.

3.4 The temperature rise of the alternator of DG set mounted in enclosure shall meet the requirement of IS and this shall be verified from type test report of alternator as under:

Let TC = Temperature rise permitted as per IS for class of insulation

T1 = Actual temperature rise observed and recorded in type test report.

T2 = Final ambient temperature inside the enclosure

T A = Ambient temperature as per IS= 400 C

Then $T1 < (TA + TC) - T2$

4. STANDARD MANUAL CONTROL PANEL:

4.1 E/A set mounted control panel shall be compartmentalized and fabricated out of minimum 1.6 mm (16 G) thick CRCA sheet steel with hinged type open able covers mounted above base frame at suitable location of EA 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.. The panels shall have easy accessibility to all components. Control wiring shall be with 1.5 sq. mm. PVC insulated multi strand copper conductor with WAGO type screw less connector strips and identification ferrules on both ends. AC and DC wiring shall be clearly separated. Panel shall have sufficient working space for connection of cables etc.

Necessary glands for connecting incoming and outgoing cable shall be provided. Earth studs shall be provided on both sides of the panel and shall be interconnected with tinned copper earth bus of 25 x 5 mm size minimum.

4.2 Suitable rated MCBs for instruments and control circuits shall be provided. Necessary individual gland plates to receive power cable, control cable and neutral earthing strips etc shall be provided. The control panel should be having all interconnections with suitable PVC insulated copper conductor cable to make the set ready to use, by giving necessary earth connections, mains cable and load cable. Sufficient space should be provided in power chamber for termination of load cable and neutral earthing leads.

4.3 Standard panel shall comprise of the following:

- (i) 1 No 630 A 4 pole MCCB with release range of (315 – 630) Amps. having breaking capacity not less than 50KA at 415 volt and as per the following specifications,
- (ii) Multi Display digital meter provided with RS 485 communication port for majoring following electrical parameters included supplying and fixing of suitable ratios CTs shall be provided -
 - a) AC Voltage Three phase up to 500) V.
 - b) AC Current.
 - c) Frequency from 45-55 Hz
 - d) Power factor
 - e) Active power in KW
 - f) Active energy consumption in KWH.
- (iii) Necessary protective MCBs.
- (iv) Pilot lamp (LED type) with “ON & OFF” toggle switch with RED for set running, GREEN for load on set or as per manufactures standards.
- (v) Suitable knockouts for receiving bus-bars/cables of required size..
- (vi) Audio visual alarm with alarm acknowledgement and reset push buttons with engine contactor trip and engine stop at appropriate alarms for following major and minor faults.
 - 1. for high cylinder head /high coolant water temperature.
 - 2 Quarter fuel level,
 - 3 Low fuel level alarm and trip,
 - 4 Low Lube oil pressure and trip,
 - 5 Over speed trip,
 - 6 Engine failed to stop,
 - 7 Starting battery unhealthy.
- (vii) Earth bus bar of 25X5 mm size minimum connected on both size of the panel.
- (viii) Start and stop push button with necessary solenoid switches, wiring etc or as per manufactures standard.
- (ix) Recess type hooter.
- (x) RYB PHASE Indication Lamp.
- (xi) . Static battery charger: Automatic trickle / boost battery charger of SCR/SMPS Type to charge the starting battery of DG set. The charging shall be done through main supply for which a suitable incomer shall be provided in the panel with protective fuses.
- (xii) Connection of control wiring shall be done with suitable connector strips and ferrules for intensification on both ends.

5. STATIC BATTERY CHARGER:

5.1 The inbuilt 10A,12 V (in case of 12V starting system)/10A , 24V(in case of 24V starting system) static battery charger (in addition to the battery charging alternator associated with the engine) shall be of SMPS type with automatic trickle and boost charging facility, current and voltage limiting circuits to avoid over charging, short circuit, reverse polarity protection and auto cut off facility when Gen-set is ON. DC voltmeter and ammeter of approved make, SP DC MCB on DC side and SP MCB on AC side shall also be provided. DC wiring of the battery charger shall be with 2.5 sq. mm multi strand flexible copper conductor cable in heat resistant conduit/armored cable. The battery charging current in Amps shall be 10 hours rating current as per battery AH capacity.

5.2 The battery charging should be done through dynamo during running of E/A set and through battery charger when E/A set is in off condition. The change over from battery charger to dynamo and vice versa shall be automatic.

6. GENERAL REQUIREMENTS:

6.1 LUBRICATION

Lubrication shall be positive pressure type lubricating for all moving parts. No moving parts shall be required lubrication by hand either prior to the starting of engine or while it is in operation. Lubrication oil shall conform to relevant IS amended up to date. Necessary lubricating oil filter shall be provided for operation at normal conditions for a period of 250 hours. Temperature and pressure gauges shall be fitted to the lubricating system. Lube oil sump shall be topped up to full level after successful completion of the acceptance testing.

6.2 FUEL SYSTEM / FUEL TANK

Fuel tank shall be made of 3 mm thick M.S sheet steel with capacity not less than 900 Ltrs having inlet, outlet connections air vent tap, drain plug and level indicator (linear scale type submerged in fuel tank) 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 is to be provided. The location of the tank shall depend on standard manufacturers design. Braided pipe with hydraulically compressed banjo of superior quality shall be provided for fuel piping.

6.3 ENGINE START

Engine shall be cold and self-starting type. The starter battery shall be of Low maintenance lead acid type conforming to IS 7372 amended up to date with sufficient capacity to meet the engine starting and control gear requirements. The starting battery shall have suitable copper connecting lead.

6.4 QUIETNESS OF OPERATION:

The set shall have minimum vibration noise under all conditions of load. The set shall be properly statically and dynamically balanced.

6.5 SILENCER

Efficient heavy-duty residential type silencer for the exhaust shall be provided. A test certificate to this effect from the manufacturer shall be furnished.

SECTION –C

SPECIFICATION FOR ACOUSTIC ENCLOSURE FOR ENGINE ALTERNATOR

1. Scope:

This section covers technical requirements of the acoustic enclosures. As per CPCB norms, restriction has been imposed for new DG sets up to 1000 KVA for noise level. Therefore, in terms of these norms, acoustic enclosure should be type tested through one of the authorized laboratory. The canopy should be sound proof, weather proof & environment friendly. The Engine and the Enclosure shall conform to the Environment (Protection) Act 1986 (29 of 1986), and Environment (Protection) Rules, 1986, latest as amended from time to time, of Ministry of Environment and forest, and the agency shall provide all the relevant certification (including, but not exclusively, certificate of adhering to latest applicable noise limit; and certificate for type approval and COP (Conformity of Production) as per the latest applicable emission norms) to establish conformance of the DG Set as required by this act, and these rules, latest as amended from time to time. ,

2. Installation:

2.1 Acoustic enclosures are supplied with built in Anti Vibration Mountings (AVMs). As such Genset can be installed directly on the leveled surface.

2.2 Exhaust piping outlet should not be turned towards window / ventilator of home or occupied building. Provision of rain cap should be ensured.

2.3 The acoustic enclosure placement should be such that there is no restriction in front of air inlet and outlet from canopy.

3. Service Accessibility:

3.1 Genset / Engine control panel should be visible from outside the enclosure.

3.2 Routine / periodical check on engine / alternator (filter replacement and tappet setting etc.) should be possible without dismantling acoustic enclosure.

3.3 For major repairs / overhaul, it may be required to dismantle the acoustic enclosure.

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

4. General Design Guidelines:

4.1 To avoid re-circulation of hot air, durable sealing between radiator and canopy is must.

4.2 Exhaust piping inside the enclosure must be lagged (except bellow).

4.3 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.

4.4 There should be provision for oil, coolant drain and fill. Fuel tank should have provision for cleaning.

4.5 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.

5. Specifications for Acoustic Enclosure

- (i) The canopy shall be of modular construction with the provision of assembly at site. The acoustic panels shall be fabricated by not less than 1.6 mm thick CRCA sheet. The finished sheet metal component shall undergo seven tank treatment process for degreasing, derusting, phosphatising etc. for longer life and should 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. The enclosure should be powder coated.
- (ii) 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.
- (iii) 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. Adequate ventilation shall be provided to meet the air requirement for combustion & also to expel heat to maintain temperature inside the enclosure within afore mentioned limits even at 10% overload with tripping arrangement between (50 – 60) degree Celsius.
- (iv) Lighting inside the canopy shall be provided with minimum 2 nos.1 x 11 W CFL fitting including lamp. 5 Amps switch & socket outlet for connecting battery charger inside the enclosure shall be provided. The lighting and 5 Amps socket shall be powered from the control panel by suitable wiring / cabling arrangement.
- (v) The batteries should be accommodated in the enclosure in battery rack.
- (vi) 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.
- (vii) Separate door with locking arrangement for easy access to D.G. set during operation & maintenance should be provided.
- (viii) Small see through window for reading meters etc. made of transparent polymer sheet of thickness not less than 5mm shall be provided.
- (ix) Radiator bellows/sealing arrangement to be provided in cases of water cooled engines to avoid hot air leakage inside canopy.
- (x) All fuel piping connections, electrical connections etc. shall be done as per standards.
- (xi) Two point lifting arrangement.
- (xii) Main base frame size and thickness of MS sheet welded for bolting arrangement will be as per manufacturer's recommendation complete as required.
- (xiii) The bottom portion of the canopy shall be covered with 2mm thick MS plate i/c welding, painting etc complete around foundation as required.
- (xiv) Insulation on enclosure will be provided & fixed of: Mineral / rock wool Slabs of density not less than 96 kg/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. (OR) Polyurethane foam / PUF of minimum 26Kg / m³ density acoustic foam of dark grey / black color, fire retardant and not less than 20 mm thickness.
- (xv) The canopy shall be provided with emergency stop button easily approachable from outside.
- (xvi) The canopy shall be provided with following meters (visible from outside): -
 - (a) Lub. Oil pressure gauge. (When part of controller of engine, not reqd.)
 - (b) Water temperature gauge (for water cooled engines only).(when part of Controller of engine, not reqd.)
 - (xv) Fuel gauge with sensing arrangement. (or as per manufacturer standards)
 - (xvi) 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.

SECTION -D

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 of BSNL at site after installation as per the decision of the Engineer-in-charge. 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.

(i) Initial testing for 2 hours at full load, one hour at 10% overload and one hour at no load prior to fixing up of regular A/T.

(ii) A/T in presence of representative of T&D circle as per A/T Schedule ie. For 6 Hours on full load and One hour on 10% over load.

(iii) Resistive load, Fuel and lube oil for testing shall be arranged by the firm without any extra cost. The test shall be with artificial resistive load only and non-linear load will not be arranged for A/T purpose. Lub.oil sump shall be topped up to full level after successful completion of the acceptance testing. Extra fuel sufficient for the operation of the set on full load for 2 hours shall be left in the fuel tank after the successful completion of the Acceptance testing. Nothing extra will be paid for the subsequent A/Ts in case of failure of first A/T.

1 INSULATION TEST:

Immediately after the load test, the insulation resistance between stationary coil and the frame is tested with 500 Volts megger.

2 ACCURACY OF METERS

The accuracy of meters shall confirm to relevant IS.

3 FUNCTIONAL TEST:

Performance of incoming switch/circuit breaker, starting arrangement for the engine, safety features, instruments and control panel etc shall be verified. The battery shall be tested as per the general method.

4. Completion Reports:

The contractor after successful installation, testing and commissioning of the Engine Alternator sets including all the accessories like Manual control panel, shall submit a self-certification to the BSNL that the work has been completed successfully as per specifications drawings and other terms and conditions of the agreement and tender document.

The following details should be submitted along with the above certificate.

Self Certification details of Engine Alternator

- a. Rated capacity of Engine Alternator
- b. Make of Engine/Alternator
- c. Serial number of Engine/Alternator
- d. Year of Manufacture

- e. Supplied by:
- f. Proof of purchase(Invoice/Bill)
- g. Details of other components provided
- h. Testing and commissioning report
- i. Date of commissioning.

TEST SHEET FOR ENGINE ALTERNATOR SET

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 all type 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 lead 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 :
- (j) 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. :

1) LOAD TEST (A/T)

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 readings every hour:

Time	RPM	LOP	LOT	Voltage			Current			Freq	PF	Water Temp.	TEMP	
				RY	YB	BR	R	Y	B				ER	SC

LOP : Lube Oil Pressure

LOT : Lube Oil Temperature
5

PF : Power Factor

ER : Engine Room/Canopy

SC : Stator Coil

Calculation of load required:

Two types of loads can be utilized – Inductive loads or Resistive loads

FOR 380 KVA EA SET

a) When load used is inductive (Assuming Cos Φ=0.8)

$$KW = \sqrt{3} \times V \times I \times \text{Cos } \Phi \text{ (When E/A set is 380 KVA; KW = 304)}$$

$$304000 = \sqrt{3} \times 415 \times I \times 0.8 \Rightarrow I = 528.67 \text{ Amp. i.e. Load of 528.67 Amp. is required for 380 KVA E/A set for load test}$$

b) When load used is Resistive:

Here Cos Φ = 1

Hence I = 422.93 Amp. required.

2) TEMPERATURE RISE TEST FOR ALTERNATOR:

At full rated load, during the six hours, the last three readings taken should be stationary (constant). The temperature rise of stationary coil w.r.t. Ambient should not exceed 60 degree Celsius. Only two thermometers are used – one at the stationary coil and the other for the ambient. Record the reading of the stationary coil for every half hour till three consecutive stationary readings are recorded in the following tables.

TIME	AMBIENT TEMPERATURE	ALTERNATOR TEMPERATURE	TEMPERATURE INSIDE THE CANOPY

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

3) CHECK OF FUEL CONSUMPTION

After steady conditions have been obtained, the fuel consumption at full load for half-hour shall be checked. The consumption limit for acceptance depends upon manufacturer's specifications.

4) OVER LOAD TEST

Immediately after the load test an over-load test by 10% over-load for 1 hour shall be taken. The test results as for the load test should be taken. Also the temperature rise of stationary coil w.r.t. the ambient should not exceed 60oC.

5) 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 5 MΩ

6) 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

7) FUNCTIONAL TEST:

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

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

8) 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 more than one-mega ohms.

9) FIRE EXTINGUISHERS:

Adequate number of fire extinguishing equipments should be ensured. Also, the periodic checking certificate pasted on the extinguisher should be verified.

10) OPERATING INSTRUCTIONS/DRAWINGS:

Clear cut and easy to understand, boldly written/drawn operating instructions should be verified to be available for prominent display. Also fire fighting instructions and protection in such cases have also to be verified to be available.

11) GENERAL OBSERVATION:

A clear environment with adequate provision for ready availability/storage of requisite quantity of fuel is to be ensured. Also, relevant sign-writings should be available in required places.

12) LIST OF TESTING INSTRUMENTS USED BY A/T TEAM:

- a) 500 V Megger for insulation test

- b) Earth tester for measuring earth resistance
- c) Digital clamp tester for measuring DC & AC voltage and current.

ANNEXURE –I V

LIST OF RELEVANT INDIAN / INTERNATIONAL STANDARDS

(A) Generating Set

ISO 8528 Part - I Application, rating and performances.

Part - II Engines

Part - III A.C. Generator for generating set

Part - IV Control gear & switch gear

Part - V Generating Sets

Part - VI Test methods

Part - VII Technical declaration for specification and design

Part - VIII Low power general purpose generating sets

Part - IX Measurement and evaluation of mechanical vibration

Part - X Measurement of Airborne Noise - Enveloping surface method

Part - XI Security generating sets with uninterruptible power system

(B) Engines

ISO 8528IS 10000 (Naturally Aspirated)

Part - I 1980 Methods of tests for I.C. Engines Part - I - Glossary of terms relating of test method

Part - II 1980 Standard reference condition

Part - III 1980 Measurements for testing units and limits of accuracy.

Part - IV 1980 Declaration of Power, Efficiency, fuel consumption, Lubricating oil consumption.

Part - V Preparation for tests and measurement of wear

Part - VI Recording of test results.

Part - VII Governing test for constant speed engines and selection of engines for use with electrical generators.

Part - VIII Performance tests

Part - IX Endurance test

Part - X Tests for smoke level, limit and correction for smoke level for variable speed.

Part - XI Information to be supplied by the purchaser to the manufacturer and information to be supplied by the manufacturer along with the engine.

Part - XII Specimen test certificates

Part - XIII Recommendations on nature of tests required for functional changes in critical components.

(C) Alternator

IS 4889/BS - 269		For declaring efficiency of electrical machines.
IS 4722 - 1992		Capability of machine to withstand over current/overload
IS – 13364		Part I 1992 Alternator - Voltage Regulation upto 20 KVA
IS – 13364	Part II 1992	Alternator - Voltage Regulation above 20 KVA to 80 KVA
IEC 34 -1 - 1983		Rotating Electrical machines - Rating & Performance
IP – 21 IS - 4691/85		Alternator (Degree of Protection)

(D) Acoustic Enclosure

IS – 8183		Insulation material for sound absorption.
ISO 3744	1998 (E)	Acoustics - Determination of sound power levels of noise sources.
ISO 8528	Part – 10 1998 (E)	Measurement of Air borne noise by enveloping surface method.
ISO 9614	1993 Part - I	Requirement of grade - II. Accuracy for insulation.
ISO 9614	1996 Part - II	Requirement of grade - II. Accuracy for Insulation.

(E) Control Panel/ AMF Panel

IS -2147 1962		Degree of protection
IS – 4722		H.V. testing for panel

LIST OF APPROVED MAKES- BSNL ELECTRICAL WING

S. No.	Item	Makes
1	Engine	Ashok Leyland /Cummins/ Cater pillar / KOEL/ Volvo Penta / Mahindra & Mahindra (up to 40 KVA) /Escorts (up to 30 KVA)/ Eicher (up to 20 KVA)
2	Alternator(Brushless)	Crompton Greaves (AL. series) / KEC / Leroy Somer / Stamford/Jyoti Ltd
3	Battery (Lead Acid / Mntc. Free)	Amara Raja / AMCO / Farukawa / Hitachi / Exide/ Prestolite / Standard
4	HV Switchgear (Vacuum Circuit Breaker/SF6)	Biecco Lawrie / Crompton / Kirloskar / MEI / Jyoti Ltd
5	Transformer (Oil filled / Dry type)	ABB / Schneider Electric /Andrew Yule / Bharat Bijlee / Crompton / EMCO / Kirloskar/ Siemens
	a) Above 400 KVA	
	b) Up to 400 KVA	In addition to above makes, Uttam/Automatic Electric Gear(AEG)/Patson/Rajasthan Transformer and Switchgear
6	Air Circuit Breaker	L&T/ Schneider Electric / Siemens
7	MCCB(lcs=lcu)	L&T/ Schneider Electric / Siemens
8	SDF units	L&T/ Schneider Electric / Siemens/ HPL/Havells
9	Power Contactors	L&T/ Schneider Electric / Siemens/ Lakshmi(LECS)
10	Change Over Switch	HPL / Havells / H-H Elcon
11	Intelligent APFC Relay	L&T/EPCOS(Siemens)/ Schneider Electric / Neptune Ducati/Syntron/ABB
12	Bus Bar Trunking/ Sandwiched Bus Duct	Moeller/L&T/Schneider Electric/ABB/Legrand/Zeta
13	Power Capacitors (MPP/APP)	L&T/EPCOS(Siemens)/ABB/Crompton/ Schneider Electric/Neptune Ducati

14	Digital/ KWHr meter	Schneider Electric/ AE/ Digitron / IMP/ Meco / Rishabh / Universal/HPL/L&T/ABB
15	Cold shrink HT/LT Cable Joint	Denson / 3M(M-Seal)/ Raychem
16	Rubber Matting	ISI mark
17	MCB/ Isolator /ELCB/RCCB/ Distribution Board	Crompton / Havells / Indokopp / MDS Legrand/ L&T / Schneider Electric/ Siemens / Standard/ C&S/ABB/HPL
18	MS/ PVC Conduit	ISI mark
19	Cable Tray	MEM/Bharti/Ratan/Slotco/Profab
20	HT/LT Cables	ISI mark
21	PVC insulated copper conductor wire	ISI mark
22	Centrifugal Pump	Amrut / BE / Beacon / Batliboi / Crompton / Jyoti / Kirloskar / KSB / Mather & platt / WASP/Grundfos
23	Submersible Pump	Crompton/Amrut / BE / Calama / Kirloskar / KSB
24	Motors	ABB/ Bharat Bijlee / Crompton Greaves / Schneider Electric / HBB / KEC / Siemens/Jyoti Ltd
25	Fresh Air Fans	GE / Khaitan/Almonard/Crompton
26	Starter	ABB / BCH / Schneider Electric / L&T / Siemens /
27	Single Phase Preventer	L&T / Minilec / Siemens / Zerotrip
28	GI/MS Pipe	ATC / ATL / BST / GSI / ITC / ITS / IIA / JST / Jindal /TTA / Tata/Zenith
29	Foot Valve	ISI mark
30	Gate Valve	Advance/Audco/Johnson Controls/Zoloto/Annapurna / Fountain / Kirloskar / Leader / Sant / Trishul
31	Compressors	Carrier/Emerson copeland/York/Danfoss (for chillers only)
32	Resin Bonded Glass wool	Fibre Glass / Pilkington / UP Twiga
33	Expanded Polystyrene	BASF(India) Ltd.
34	Gauge	Feibig / H.Guru / Pricol
35	Controls	FLICA / Honeywell / Indfoss / Penn-Danfoss / Ranco / Ranutrol / Sporland
36	Fine Filters	Anfiltra Effluent / ARW / Athlete/ Airtake/ Dyna / Kirsloskar/ Puromatic/ Purafill/ Purolator / Tenacity
37	GI Sheet	HSU Jindal / National / Nippon Denro / Sail / Tata
38	Heat Detector	Appollo / Chemtron/ Edward / Fenwal/Hochiki / Nitton /System Sensor/Wormald/Honeywell Essar/Notifier
39	Ionization Detector	Appollo / Cerebrus / Edward / Fenwal /Hochiki / Nitton / System Sensor /Wormald
40	Photo Electric Smoke Detector	Appollo / Cerebrus / Edward / Fenwal/ Hochiki / Nitton / Wormald / System Sensors
41	Fire Panel (Microprocessor based)	Agni Instruments / Agni Devices/ Aruna Agencies/ Carmel Sensor / Ravel Elect./Honeywell/ Essar/Notifier/Navin Systems
42	Sprinkler/ Hose Reel & Hose Pipe	ISI mark
43	Fire Extinguisher	ISI mark
44	Lift	OTIS, Kone, Mitsubishi ,Schindler, Johnson, Thyssenkrupp Elevator(India)

NOTE:

1. The accessories such as CT/PT/measuring instrument/relays provided by approved make in respect of Transformer /HT Panel/DG /AC Package Units as supplied by approved manufacturer along with the equipments are also acceptable in addition.
2. Any additional makes may be approved by concerned PCEs/Sr. CEs/CEs(Elect) for the work under his jurisdiction as already accorded vide letter no. 3-2-5/EW/VEP-1/2007 dated 05-07-2007
3. Any other make approved by BSNL EW, corporate office till the last date of sale of tender is also acceptable.