



STATE LIFE

INSURANCE CORPORATION OF PAKISTAN
JHANG ZONE

State Life Zonal Office
Near District Court,
Civil Line, Jhang Saddar
Fax : 047-9200391
Phone : 047-9200390
UAN : 111-555-888

Dated: 4th August, 2016

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SUBJECT: - STATE LIFE INSURANCE CORPORATION OF PAKISTAN

Tender Notice P&GS/JG/11/2016

**INVITATION OF TENDER FOR SUPPLY, INSTALLATION, COMMISSIONING & TESTING OF 100
KVA DIESEL GENERATOR SET AT STATE LIFE INS. CORP. OF PAKISTAN, ZONAL OFFICE,
NEAR DISTRICT COURTS, UBL, CHOWK, BEHIND BOOK SOURCE, JHANG.**

**Niazi)
Manager (P&GS)**

STATE LIFE INSURANCE CORPORATION OF PAKISTAN
Tender Notice P&GS/JG/11/2016
INVITATION OF TENDER FOR SUPPLY, INSTALLATION, COMMISSIONING & TESTING OF 100 KVA
DIESEL GENERATOR SET AT STATE LIFE INS. CORP. OF PAKISTAN, ZONAL OFFICE, NEAR DISTRICT
COURTS, UBL, CHOWK, BEHIND BOOK SOURCE, JHANG

1. Jhang Zone, State Life Insurance Corporation of Pakistan invites sealed tenders from firms dealing in Electrical Works, Supply, Installation, Commissioning & Testing of 100 KVA Diesel Generator Set at State Life, Jhang Zone and having proven relevant experience.

Title of Work	Tender Cost (Rs)	Bid Security	Tender Purchasing Date on or Before	Tender submission Date	Tender Opening Date	Time Period for Completion
Supply, installation commissioning & testing of 100 KVA Diesel Generator Set at State Life Ins. Corp. Of Pakistan Jhang Zone.	Rs.500/-	2% of Total Quoted Amount	29/08/2016 2:00 Pm	30/08/16 12:00 Noon	30/08/16 12:30 p.m	Forty (40) Days

2. Tender will be "Post Qualified" on the basis of information provided with the Tender. Tender(s) who fails to qualify in this respect shall not be considered.

3. Tender(s) may obtain the Tender and Post Qualification Documents from the office of the undersigned upon payment of a non-refundable Tender cost in shape of Pay Order / Bank draft in favor of M/s State Life Insurance Corporation of Pakistan.

4. Two-envelope Tender Return procedure will be adopted. One Envelope containing information regarding Post Qualification of Tender shall be clearly marked as **"TECHNICAL QUALIFICATION INFORMATION"**. The second envelope containing the price documents shall be clearly marked as **"FINANCIAL BID DOCUMENTS"** with original Pay Order.

5. Partial and incomplete Tenders will not be considered. **"TECHNICAL QUALIFICATION INFORMATION"** and **"FINANCIAL BID DOCUMENTS"** (both envelopes) are to be submitted at the under-mentioned address by **30/08/16 at 12:00 noon**. The envelope containing **"TECHNICAL QUALIFICATION INFORMATION"** shall be opened on the same date i.e **30-/08/2016 at 12:30 pm** in the presence of those Tender(s) who wish to be present. Tender received after the prescribed time and date shall be rejected.

6. The Financial Bid Documents of Tender (s) who fails to qualify shall be returned to them unopened.

7. The envelope of the "Financial Bid Documents" of Post Qualified Tender will be opened in the presence of their representative on a specified time which shall be intimated accordingly. Conditional Tenders & Bids without Bid security will not be accepted.

8. In detail documents of the tender containing instructions to bidders/suppliers, special terms and conditions, General Terms, Criteria for evaluation/ pre qualification, General Specification and scope of work, Application, Instructions, Technical Bid post Qualification Documents etc are being attached and will be available on PPRA and State Life website.

9. Interested Parties can download these complete document from PPRA and State Life website or can purchase these documents from the office of State Life, Jhang Zone.

10. State Life reserves the right to accept or reject any or all the tenders under the provision of PPRA rules.

Manager (P&GS)
State Life Insurance Corp of Pakistan,
Zonal Office,
Near District Courts, UBL Chowk,
Behind Book Source, Jhang
047-9200390,9200169

Date: _____ .

Manager (P&GS)
State Life Ins. Corp. of Pakistan
Near District Courts,
UBL Chowk, Behind Book Source
Jhang
047-9200390,9200169

**Subject: Supply, Installation, Testing & Commissioning of 100 KVA Diesel
Generator Set at State Life Ins. Corp. Of Pakistan Jhang Zone.**

Dear Sir,

Having gone through the Tender Documents / Post Qualification Criteria for the subject work, we hereby submit our tender consisting of Technical & Financial Bid for your consideration please.

Pay Order / Demand Draft having no: _____ drawn on
: _____

Bank Dated: _____ consisting of 2% Bid Security is placed in Financial Bid Envelope.

Thanking You,

Yours Sincerely,

Signature: _____

Name: _____

Designation: _____

M/s : _____

APPLICATION

INSTRUCTIONS - TECHNICAL BID

Tender Notice # P&GS/JG/11/2016

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**INVITATION OF TENDER FOR SUPPLY, INSTALLATION, COMMISSIONING &
TESTING OF 100 KVA STANDBY DIESEL GENERATOR SET AT STATE LIFE
INSURANCE CORPORATION OF PAKISTAN, JHANG ZONE.**

Tender Notice # P&GS/JG/11/2016

POST QUALIFICATION DOCUMENTS

(ZONAL HEAD)

STATE LIFE INSURANCE CORPORATION OF PAKISTAN

Zonal Office, Near District Courts,

UBL Chowk, Behind Book Source

Jhang

047-9200390,9200169



STATE LIFE

INSURANCE CORPORATION OF PAKISTAN

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**SUPPLY, INSTALLATION, COMMISSIONING AND
TESTING OF 100 KVA DIESEL GENERATOR SET**

AT

**STATE LIFE INSURANCE CORP OF PAKISTAN,
ZONAL OFFICE
JHANG**

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POST QUALIFICATION DOCUMENTS
Tender Notice # P&GS/JG/11/2016

TENDER FOR SUPPLY, INSTALLATION, COMMISSIONING & TESTING OF 100 KVA
STANDBY DIESEL GENERATOR SET AT STATE LIFE INSURANCE CORPORATION OF
PAKISTAN, JHANG ZONE.

APPLICATION INSTRUCTIONS FOR THE POST QUALIFICATION

All Tenderers desiring to qualify for this contract should complete the post qualification documents.

All inquiries related to this document and or / post qualification forms should be addressed in writing to:

(ZONAL HEAD)

Jhang Zone ,

Ph: 047-9200390,9200169

Basic Conditions for Post -Qualification

1. Information supplied by the Tenderers for the post qualification statement must apply to the company named on the statement. The substitution of background information pertinent to post qualification will not be considered for another company related to the applicant company through a "Group Ownership". Contracts will be awarded only to the post qualified companies.
 2. The SLIC will review the information supplied by the firms for post qualifications. Financial Bids of only those tenderers which pass the Post Qualification process will be opened in the presence of tenderers representative who chooses to attend at a time to be determined later. The Financial Bid Documents of the Tenderers who fail to post qualify shall be returned to them unopened.
 3. Firms applying for registration individually are advised that any variation of constitution or membership from that put forward in response to this notice, without prior approval of the SLIC may result in disqualification of the firm of any tender it may submit.
 4. The response to this notice' must be sufficiently detailed to convince the SLIC that the firms applying for registration have the experience as well as the technical administration and financial qualifications necessary for the execution of the subject works and they must prove that they have carried out similar works.
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5. Firms submitting post qualification applications may be required during the review process to make personal presentation of their qualifications to the SLIC. If so, the authorized representative of the firm will be required to be present.
 6. All post qualification statement documentation including financial statement, auditor's report and bank references shall be in English Language (a legally attested copy shall be required with the post qualification forms).
 7. Firm shall submit copies of the following certificate:
 - i. Pakistan Engineering Council
 - ii. License to Electrical Contractor (Electric Inspector Govt. of Sind)

- iii. GST Registration Certificate.
- iv. SST Registration Certificate from SRB.
- v. NTN Number
- vi. Company Profile

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STATE LIFE INSURANCE CORPORATION OF PAKISTAN
POST QUALIFICATION BROCHURE

RETURN TO:

(ZONAL HEAD)

State Life Ins. Corp. of Pakistan
**Near District Courts,
UBL Chowk, Behind Book Source
Jhang**
047-9200390,9200169

Please complete the following:

- 1. a. SUBMITTED BY.....
- b. REGISTERED ADDRESS.....

2. COMPANY INFORMATION

- a. FULL/FIRM NAME OF THE COMPANY.....
- b. REGISTERED OFFICE ADDRESS.....
- c. DESCRIPTION OF COMPANY FIRM.....
- d. TELEPHONE NUMBER.....
- e. E-MAIL.....FAX.....
- f. CONTRACT'S NAME/ TITLE.....
- g. NAME OF PRESENT EXECUTIVE
DIRECTOR AND THEIR POSITION.....

IN THE COMPANY WITH BIODATE.....

PROVIDE COPY OF MEMORANDUM AND ARTICLE OF ASSOCIATION OR PARTNERSHIP DEED, WHICH EVER IS APPLICABLE.

3. ORGANIZATION AND FINANCIAL DATA:

- a. TYPE OF BUSSINESS ORGANIZATION (CORPORATION/ JOINT VENTURE/ PARTNESHIP ETC.).....
.....
- b. IF JOINT VENTURE, NAMES OF THE JOINT VENTURE PARTNERS WITH NAME OF THE LEAKING PARTNER

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- ❖ IF PARTENERSHIP, NAMES OF THE PARTNERS WITH POSITION HELD BY EACH PARTNER
- ❖ Officially attested latest balance sheet
- ❖ Latest Income Statement
- ❖ If joint venture, financial statement of each firm must be submitted. No statements will be considered unless these are attested by a Competent Authority of the particular country and unless certified as being audited by an independent Public Accounting Firm.

4. PERFORMANCE RECORD

- a. Please provide a brief resume of works completed by your firm in the last five years including all jobs involving similar nature of works (see attached Form)
- b. List of Projects currently in progress of similar nature of works. (see attached form)

5. ORGANIZATION

- a. What is the size of your permanent, full time work force?
- b. Provide organization chart of your firm indicate lines of communication and reporting responsibility.
- c. Detail of key technical staff with their qualification and experience including of those who would be deputed for the proposed project.
- d. Name of Bankers to the organization with Account Number and address. Bankers report on the credit worthiness of the organization must accompany under a sealed cover.

6. LITIGATION ETC.

Provide detail of all cases: Present and past under dispute or litigator arbitration.

7. LIST OF REFERENCES:

- a. From Clients (attach certificate).
 - 1.
 - 2.
 - 3.

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8. CERTIFICATION- SIGNATURE

I hereby certify to the best of my knowledge that the information hereby submitted in this brochure is correct.

NAME : _____

TITLE : _____

SIGNATURE : _____

DATE : _____

SEAL : _____

POST QUALIFICATION FORM – 1

List of Previous Experience of Similar Nature of Works (For Past Five Years)

Tender No. P&GS/JG/11/2016

NAME OF PROJECT & LOCATION	FULL NAME & ADDRESS OF CLIENT	TYPE OF CONTRACT/ PERIOD OF CONTRACT	CONTRACT VALUE (INDICATE CURRENCY IN PAK RS. ONLY)	STATE ANY PENALTIES, CLAIMS, ARBITRATION	TYPE OF WORK	CARRIED OUT ALONG OR IN PARTNERSHIP (IF IN PARTNERSHIP STATE SHARE & NAME OF PARTNER)	START DATE	DATE OF COMPLETION

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POST QUALIFICATION FORM – 2

List of All Projects of Similar Nature, Which Your Firm Has Under Way at This Time.

Tender No. P&GS/JG/11/2016

NAME OF PROJECT & LOCATION	FULL NAME & ADDRESS OF CLIENT	TYPE OF CONTRACT/ PERIOD OF CONTRACT	CONTRACT VALUE (INDICATE CURRENCY IN PAK RS. ONLY)	STATE PENALTIES, CLAIMS, ARBITRATION	TYPE OF WORK	CARRIED OUT ALONG OR IN PARTNERSHIP (IF IN PARTNERSHIP STATE SHARE & NAME OF PARTNER)	START DATE	EXPECTED DATE OF COMPLETION

STATE LIFE INSURANCE CORPORATION OF PAKISTAN
POST QUALIFICATION BROCHUR

**INSTRUCTION TO BIDDERS/SUPPLIERS OF EQUIPMENTS & MATERIAL
RELEVANT TECHNICAL DATA ON WHICH THE TENDER IS BASED
(To be filled in and signed by the Bidder)**

1. The Bidder shall fill the name of only one manufacturer for the equipment on which the Tender is based. He shall be bound to supply the equipment from the same manufacturer.
2. The Bidder should preferably be the sole/authorized agent of the equipment and have complete back-up services i.e. spare parts, tools and trained Engineers.
3. The equipment should be of Perkin/Cummins/Caterpillar or equivalent brand however, China make shall not be considered.
4. The Bidder must fill the following list of equipment/material and manufacturer's Technical data.

Sr. No	Equipment / Material for Generator 100 KVA with in Built AMF Panel	Name of Manufacturer	Country of Origin
1	Diesel Engine		
2	Alternator		
3	ATS Panel		
4	Canopy		
5	L.T Cables Pakistan Cable or equivalent		
6	MCCB, Terasaki / Schneider /ABB /Germany/ Japan/ France/ Italy		
7	Conduits/ Accessories (if required)		
8	Cables Tray, Trucking (if required)		
9	Earthing		

TENDERER'S SEAL & SIGNATURE

Note: TO BE SUBMITTED BY THE CONTRACTOR ON THEIR LETTER-HEAD

Manager (P&GS),
State Life Insurance Corporation of Pakistan,
Zonal Office, Near Distt Court, UBL Chowk,
Behind Book Source,
JHANG.

Subject: SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF 100
KVA DIESEL GENERATOR SET AT STATE LIFE, ZONAL OFFICE,
NEAR DISTT COURT, BEHIND BOOK SOURCE, JHANG.

Dear Sir,

1. Having examined the Bidding Documents including Instructions to Bidders, Bidding Data, Conditions of Contract, Contract Data, Specifications and visiting the site for execution of the above mentioned works, we the undersigned, being a Company doing business under the name of and address _____ and being duly incorporated under the laws of Pakistan hereby offer to execute and complete such works and remedy and defects therein in conformity with the said documents including Addenda thereto for the Total Bid Price of Rs. _____ (Rupees _____ only) or such other sum as may be ascertained in accordance with the said documents.
2. We undersigned all the Schedules attached hereto from part of this Bid.
3. As security for due performance of the undertakings and obligations of this Bid, we submit herewith a "Bid Security" in the amount of _____ drawn in you favour.
4. We undertake, if our Bid is accepted, to commence the works and the deliver and complete the works comprised in the contract within the time(s) stated in "Contract Data".
5. We agree to abide by this Bid for the period of **150** days from the date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
6. Unless and until a formal agreement is prepared and executed, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

Thank you,

Yours Sincerely,

For and Behalf of Contractor/Firm
(with official seal)

Encl: Pay Order/CDR.

SPECIAL TERMS & CONDITIONS

1	Amount of Bid Security	2 % of quoted amount in the form of (Pay order/Bank Draft/Insurance Guarantee from a AA + Rating Insurance Firm) in the name of State Life Insurance Corporation of Pakistan.
2	Release of Bid Security	i. Shall be released to unsuccessful bidders after the acceptance of bid. ii. To the successful bidder on satisfactory completion of entire work.
3	Retention Money	05 % of amount of work done.
4	Release of Retention Money	Retention Money 05% will be released on completion of defects liability period.
5	Liquidated Damages in case of non-completion of work within the stipulated period.	Rs. 500/- (Five Hundred) per day.
6	Limit of Liquidated Damages	10% of Contract Sum
7	Method of Mode of Payment	Final Bill Only @ 95% (05% Retention Money exclusive.
8	Date of Commencement	Within Seven (07) Days from the Date of Issuance of Letter of award.
9	Time of Completion of work from the date of Commencement of work.	Forty (40) Days from commencement of work (Saturdays & Sundays included)
10	Period of honoring Interim Bill	Within Fifteen (15) Days of Engineer's Certificate.
11	Validity of Tender	One Hundred Fifty (150) Days from the date of opening of Tender.
12	Defects Liability Period	One (01) year/ (12 Months) from the Date of Commissioning.
13	Agreement	Rs. 200/- stamp paper within Three (03) Days after signing of Letter of Award

TENDERER'S SEAL & SIGNATURE

GENERAL TERMS:

- 1.1 Tender is invited for supply installation, commissioning and testing of 100 KVA D.G Set at State Life, Zonal Office, Near Distt Court, UBL Chowk, behind Book Source, Jhang.
- 1.2 Tender shall be submitted in sealed envelopes.
- 1.3 Bidders are requested to visit the site and ensure that their offers are completed in all respect and that all terms & conditions mentioned in this document shall be strictly complied with. The Bidder must ensure/study the specification schedules and B.O.Q as are attached with offer to avoid any debate/discussion/dispute during/after execution of work.
- 1.4 Tender documents (all papers) must be signed and stamped to signify the acceptance of Tender's conditions.
- 1.5 Technical services and operating conditions for achieving the performance shall be the responsibility perfect of the Bidder. The successful Bidder/supplier will be required to submit the schedule of supply and installation within (03) Days from the acceptance of Letter of Award.
- 1.6 State Life Insurance Corporation of Pakistan (SLIC) has right to accept/reject the lowest or any Tender received for this job in the interest of Corporation.
- 1.7 Any conditional Tender will not be accepted and will be liable to rejection.
- 1.8 Tenders without Bid Security will not be accepted/entertained.
- 1.9 Contractor has to clean the site in every respect from unused material debris and tools on completion of work.
- 1.10 State Life Insurance Corp of Pakistan (SLIC) will not be responsible for any loss to life or theft to tool/equipment or consumable material and will not accept any claim, liable or compensation.

2. PRE-BID VISIT:

- 2.1 Bidders are requested to visit the site before submission of Tenders/Bids and ensure that their offers are completed in all respect and that all terms & conditions mentioned in this documents shall be strictly complied with Bidder must ensure & study the specifications schedules.
- 2.2 No. TA.DA will be given to Bidders for pre-Bid Visit.

3. PRICE AND ESCALATION:

- 3.1 Quoted price shall be inclusive of supply, transportation, insurance, octari, loading, unloading, lifting and fixing of equipment of site, as specified in the Tender.

- 3.2 No price escalation claim will be entertained in any reason clue to change in Taxes, Levy, Wages, Currencies fluctuation or any other change announced by the Central Government/Provincial Government or any local authority.
- 3.3 The contractor/firm will be bound to pay all Federal/Provincial Government taxes levied on the job i.e GST, Income Tax and any Tax in future if imposed by the Government during the current contract and the quoted rates will be inclusive of all taxes.
- 3.4 Contractor will arrange N.O.C permission or any other requirement as per site if required from any Government Authority / Corporation. Official estimate/actual bill will be paid by State Life Insurance Corp of Pakistan (SLIC) separately.
4. **MODE OF PAYMENT:**
As per special Terms & Conditions.
5. **DEFECT LIABILITY PERIOD AND CERTIFICATE:**
 - 5.1 The contractor shall furnish a completion certificate that the work has been completed and materials supplied strictly confirm to the specification as laid down in the contract. The contractor will also submit single line diagram and as built drawing after completion of works.
 - 5.2 The contractor will replace the components if not found according to specification or found defective due to faulty design, material of workmanship/
 - 5.3 Cost of removal, rechecking and cartage charges for defective materials sent back to place of manufacturing will be done by the contractor.
6. The installation, in General, shall be carried out in conformity with the Pakistan Electricity Rules, 1973 and the latest edition of the Regulations for the Electrical Equipment of Building by the Institution of Electrical Engineers, London (I.E.E). However in case of conflict between these specifications and the I.E.E Regulations, these specifications shall be followed.
7. The Contractor shall be responsible for submitting the test certificate and getting the installation passed by the Electric Inspector, Government of Punjab. Any special requirements of the FESCO shall be complied with.
8. PPRA Rules will be applicable.

CRITERIA EVALUATION / PRE QUALIFICATION

Subject: SUPPLY, INSTALLATION, TESTING & COMMISSIONING OF 100 KVA DIESEL GENERATOR SET AT STATE LIFE, ZONAL OFFICE, NEAR DISTT COURT, UBL CHOWK, BEHIND BOOK SOURCE, JHANG.

A.	COMPANY PROFILE	
	i. The Company established before more than 10 years marks (Full).	10
	ii. The Company established within 1 to 10 years (Proportionate)	Marks
B	SIMILAR ELECTRICAL MAINTENANCE PROJECTS HANDLED	
	04 Marks per Contract	20
		Marks
C	SIMILAR ELECTRICAL MAINTENANCE PROJECTS IN PROGRESS	
	04 Marks per Contract	20
		Marks
D	CIRTIIFICATIONS	
	ISO 9000 Certified Supplier 2.5 Marks	10 Marks
	ISO 14000 Certified Supplier 2.5 Marks	
	3-SIGMA Certified Manufacturer 2.5 Marks	
	6-SIGMA Certified Manufacturer 2.5 Marks	
E	TECHNICAL STAFF	
	i. Engineer 03 Marks each	15 Marks
	ii. D.A.E 02 Marks each	
	iii. Electrician/Technician 01 Marks each	
F	ENLISTMENT WITH OTHERS	
	03 Marks each company/letter	15
		Marks
G	FINANCIAL POSITION	
	i. Balance Sheet 05 Marks each	10 Marks
	ii. Banker Certificate 05 Marks each	
H	DISQUALIFICATIONS	
	i. Firms which are not registered with License Electrical Contractor, Government of Pakistan, NTN Income Tax (FBR), S.S. T. (SRB), Professional Tax Dept., etc.	
	ii. Firms black listed by any Government, Semi Govt. Corporation, Multinational Department and Private Companies.	

GENERAL SPECIFICATIONS AND SCOPE OF WORKS

GENERAL SPECIFICATIONS AND SCOPE OF WORKS

1. SCOPE

The work under this section consists of supplying, installing, testing and commissioning of all material and services of the complete D.G. Set including inbuilt AMF and ATS Panel with required Interlocking and other equipment, as given in the Bill of Quantities.

The Bidder shall be deemed to have considered the scope of work, all the conditions, obligations and requirements by visiting the site before quoting rates against items of bill of quantities, inspected the site and satisfied himself as to the nature of work, ground, the hydrological and climatic conditions, availability of materials, means of access to the site for manpower/machinery, risks, contingencies and other circumstances which may influence or affect his tender.

The Contractor shall discuss the electrical layout with the Engineer/client and co-ordinate at Site with other services for exact location and position of the Diesel Generator Test, ATS Panel with required Interlocking, underground fuel storage tanks with piping network and routing of cables.

The D.G Sets, with inbuilt AMF and ATS Panel etc., and accessories shall comply with the relevant provisions of the Tender Document.

2. GENERAL

The Diesel Generator set shall be of a standard design of reputed manufacturer, who shall have similar units in operations for similar applications and field conditions. The manufacturer shall also have adequate maintenance facilities in vicinity of the Project with technically qualified and experienced personnel trained for operation and on-site maintenance of equipment offered by the Contractor in the tender bid.

The Sets shall be with sound proof canopy of residential type where specified and rated for continuous duty and suitable for outdoor/indoor installation as specified with protection class rating accordingly. It shall be capable for unbalance loads upto 30% of actual load and for continuous part load operation. The set shall be capable of starting and operation at the rated output at 50 Centigrade and at an altitude of 15 meters above mean sea level. The ratings must be substantiated with manufacturer's standards published data.

The Diesel Generator set shall, after reducing the power absorbed by the auxiliaries. Deliver continuously rated power output with overload capability for operation at least 10% above the rated capacity for 1 hour continuously in any 12 hours operating in accordance with ISO 3046, AS 2789 & 5514 under the site conditions. All auxiliaries, accessories and connections between system along with all necessary cables, fitting, however, etc., for complete installation of Diesel Engine, Generator, Control/ Installation Panel with required interlocking, Fuel and Oil Storage, Batteries, Exhaust System with acoustic and residential silencer etc., shall be furnished by the Contractor.

The engine shall be directly coupled to the Generator, and shall have a rated speed of 1500rpm. The set shall be capable of sustaining without damage, 25% over speed under any abnormal operating condition.

The Engine-Generator set shall be mounted on suitable rigid steel frame skid with vibration isolators. Heavy duty lifting eyes and jacking screws shall be provided on the skid. The foundation bolts and all other material/hardware for complete

installation of the set shall be furnished with the set. Any excessive torsional vibration shall be avoided for both Engine and Alternator.

The set shall be suitable for full load starting. When the Generator is operating at no-load, the application of full load current, taking into account the surge due to starting of equipment, should be possible with maximum transient voltage drop of 15% of the rated voltage, and the time restore the Generator voltage to 97% of rated should not exceed 1.5 seconds.

The Set shall be capable for starting and accepting full load within 30 seconds after receipt of starting signal.

The D.G Set shall be of following make or equivalent but not of China.

- Perkin
- Caterpillar
- Cummins
- Stamford
- Meccalte
- Leroy Somer

The contractor shall submit the equipment layout and other installation details as per manufacturer's as per manufacturer's recommendations for approval of the Engineer at least 15 days prior to the installation of the set.

Necessary provision, including connections and a Local/Off/Remote control switch shall be made in the Generator Panel of the D.G. Set the cost of such provision, connection, testing and commissioning are deemed to be included in the Cost of D.G set and no separate payment shall be made against such works.

3. MATERIAL

3.1 Diesel Engine

The Diesel Engine shall be four strokes, compression ignition, suitable for continuous duty.

Starting shall be through electric starter motor operated on DC supply from lead acid batteries mounted on the skid. The batteries shall be furnished with the set.

The Engine shall be equipped with an alternator type automatic charging system to charge the batteries during running of engine. A static battery charger installed in the control panel shall also be provided to charge the batteries when the engine is not running. Suitable interlocks shall be provided to prevent simultaneous operation of both charging systems.

The batteries shall be adequate to satisfy the following requirements:

- a. Crank the Engine at firing speed for at least 15 seconds.
- b. If the Engine does not start on the first attempt, crank the Engine two more times for the above duration at an interval of 30 seconds between each cranking operation.

3.1.1 Air Intake

Air intake shall be through turbo charger and equipped with dry type filter. Suitable attenuators shall be installed to reduce noise at the air inlet.

3.1.2 Engine Lubrication

A gear type positive pressure lubrication pump shall be provided with efficient filtration arrangement for the lubrication system. A 230V AC mains operated heater with thermostat shall be provided in the crankcase.

Engine shall have a constant oil level regulator, gravity fed from an engine mounted lube oil reservoir. Reservoir shall be equipped with an oil level gauge. Size of the reservoir should be suitable for 30 days continuous operation at full load.

A crankcase pressure release valve shall be provided to operate during excess pressure.

3.1.3 Engine Cooling

Engine shall have a forced air draft, water-cooled radiator supplied with a core guard, cooling system shall have an engine driven centrifugal. An engine shut down circulation. Cooling shall be thermostatically controlled. An engine shut down timer shall be provided to keep the engine running on no-load after any operation of set, so that the engine is sufficiently cooled to start again instantly, if required, without rise in temperature above safe limits.

3.1.4 Exhaust Systems, Noise, Pollution

Exhaust system shall be equipped with a residential type silencer complete with muffler, exhaust manifold, flexible connector, exhaust elbow, exhaust pipe, rain cap, and associated fittings. The exhaust line shall be taken outside the building through the shortest possible and practical route, without any undue bends. This exhaust line shall be adequately covered with thermal insulation material over its entire length i.e from the engine to the termination point. All supports for exhaust system shall be furnished.

In order suppress the noise, acoustic entrance door and acoustic radiator duct along with residential grade silencer will be used for 100 KVA generator placed in the existing generator room.

The exhaust fumes shall be burnt completely and be free of solid matters before escaping to the air.

3.1.5 Speed Governor

The speed governor shall be electronic type. Governor shall regulate engine speed so as to maintain the Generator frequency within plus or minus 2% of the rated frequency. Suitable engine speed shall be attained within 15 second after the engine has been started. Stable engine speed shall be restored with 10 seconds of any sudden change in load, from no load to full load. During this change of load or surge, the speed shall not vary be more than plus or minus 5% of the rated speed.

3.2 FUEL SYSTEM

Engine of the Generator shall operate on commercial high speed diesel oil a fuel oil strainer/filter shall be provided in the fuel line. Fuel system for diesel engine shall be through explosion proof self-priming pump.

The fuel system shall comprise:

- Underground fuel storage tank.
- Fuel transfer pump (s)
- Fuel piping network.
- Fuel day tank.

Underground Fuel Storage Tank, Fuel Transfer Pumps, fuel piping network and day tank of D.G Set are to be provided as per the requirements.

3.3 Generator

Generator shall be synchronous. The Generator shall be capable of carting continuously for 1 hour in every 12 hours, overload equal to 10% rated output with field set for normal rated load excitation.

3.3.1 Excitation

Excitation shall be from brush less rotating diaries mounted on the main shall for 3-phase full wave rectification.

3.3.2 Windings

Alternator windings shall have class-F insulation and shall be impregnated for tropical use. The temperature rise of winding under normal operating conditions and at rated load shall not exceed the limits specified for Class-B insulation. Anti-condensate heaters shall be provided for windings. The heaters shall be thermostatically controlled for switching on after the set has stopped. The thermostat range shall be adjustable and set to prevent overheating of windings. For protection of windings from damage due to overheating, thermostat shall be embedded to stop the set in case the temperature of winding rises above the safe value.

3.3.3 Voltage Regulation

Voltage regulator shall be solid state with provision for manual setting. Regulator shall be so designed to protect the exciter when the set is running at reduced speed during starting or idling of the prime mover.

Voltage regulation shall be plus or minus 2.5% from no-load to full load. Transient voltage drop shall be than 15% at full load and 0.8 power factor. Time required restoring to steady state conditions after transient voltage fluctuation shall not exceed 10 seconds.

3.3.4 Short Circuit Capability

Generator shall be capable of withstanding without injury a 30 seconds three-phase short circuit at its terminal when operating at rated output and power factor with fixed excitation.

3.3.5 Deviation Factor

The deviation factor of the open-circuit line-to-line terminal voltage shall not exceed 0.1.

3.3.6 Electronic Generator Card

Electronic Generator Card must be included.

3.4 CONTROL / INSTRUMENT ATS PANELS

The Control/Instrument Panel for the generator shall be designed for front access, completely assembled, wired and tested. The control panel confirm to the constructional requirements as stated in these specifications section -8132 for LT switch Boards. The panel shall comprise but not limited to the following main components.

3.4.4 Generator Panel

This shall incorporate protection and control equipment, measuring instruments, control and instrument transformers, voltage regulator, governor controls, battery charger, indicating lamps, etc.

3.4.4.1 Circuit Breaker

The circuit breaker shall be triple pole with adjustable release tor-thermal overload, instantaneous over current, under voltage and over voltage protections.

3.4.4.2 Instrumentation

LED/LCD display with adjustable contrast and backlight with quto power off providing following details:

AC Meeting

- i. Volts 3-phase (L-L & L-N)
- ii. Amps (per phase & Average)
- iii. Frequency (Hz)
- iv. KW (total & per phase)
- v. KVA (total & per phase)
- vi. KVAR (total & per phase)
- vii. Power Factor (overall & per phase)
- viii. KW hours
- ix. KVAR hours

An KWh meter (energy meter) shall be provided in compliance to the requirement of Electrical inspector covering the Region (area), in addition to the above mentioned metering.

DC Metering

- i. Battery Volts.
- ii. Engine hours run
- iii. Engine jacket Water Temperature
- iv. Lub Oil pressure
- v. Libe oil Temperature
- vi. Crank attempt counter
- vii. Start Counter
- viii. Engine Speed
- ix. Fuel Oil Level

3.4.2 Safety Devices

Following safety devices shall be provided. The audible alarm shall operate on any fault condition and shall be resettable manually and automatically through a timer after 15 minutes whichever is earlier:

A= Alarm SD = Shutdown TD = Adjustable Time Delay

I	Engine Over Speed	A	SD
II	Low lube oil pressure	A	SD
III	High water temperature	A	SD
IV	Over voltage	A	SD (TD=0-30 sec)
V	Under voltage	A	---
VI	Short circuit and tripping of circuit breaker	A	SD (TD=0-1min)
VII	Low level in fuel day tank	A	SD (TD=0-5 min)
VIII	High level in fuel day tank	A	---
IX	Charger failure	A	---
X	Winding temperature high	A	SD (TD=0-2min)
XI	Over crank	A	SD
XII	Low crankcase oil level	A	---
XIII	High crankcase oil level	A	---
XIV	Charging alternator failure	A	---

After shutdown, the set shall lockout and it shall not be possible to start it unless manually reset after the cause of fault has been removed.

3.4.3 Batteries & Battery Charger

The batteries provided with the D.G. Set shall be of sufficient capacity to perform all required functions.

Battery charger shall be static type and shall provide for both trickle and boost charging of the batteries when the engine is not in operation. The charger shall be of suitable capacity to fully recharge the completely discharged batteries within four hours at boost charge.

3.4.4 Controls

Following controls shall be provided as a minimum:

- i) Auto-Manual-Test-Stop key with LED indicator
- ii) Lamp test key
- iii) Alarm acknowledge
- iv) Status indicators (1 red shutdown, 1 amber warning)
- v) Lock down emergency stop push button.

3.5 AMF Panel (Inbuilt)

The AMF panel shall incorporate automatic changeover system, which shall be designed for the following function:

- I. To start D.G Set immediately when the main supply fails.
- II. To start the set synchronize whenever the main supply voltage drops to 360 volts or rise to 440 volts. The setting voltage shall be adjustable within - 5% and +5% respectively for the lower and upper ranges.
- III. To make two successive attempts, in case the set fails to start in the first attempt.

- IV. Initiate the Automatic Transfer Switch (ATS) closing the Generator Air Circuit Breaker while the supply Air Circuit is already made open. The ATS shall transfer the load to the Generator, after the rated speed/frequency and voltage have been achieved.
- V. The System shall transfer the load from the generator to main supply wherever the voltage returns +5% and persists for at least 3 minutes.
- VI. The system shall be self-resetting after each cycle of operation.
- VII. A four-position selector switch shall be provided for selecting the operation mode i.e. Test-Manual-Automatic-Stop/ Maintenance mode to facilitate the following operation.
 - A. Automatic
As described above
 - B. Manual
Manual starting of the set and load from transformer to generator and vice versa.
 - C. Test
Testing the changeover operation when so desired, and also for starting and running the set without interrupting the normal operation. In case of failure of main supply during testing, the set shall automatically revert to automatic mode of operation.
 - D. Stop / Maintenance
Provision shall be made to isolate the system for troubleshooting and maintenance without interruption of mains power supply. The set shall not be capable of starting in this condition.
- VIII. Two normally open and two normally close potential free contacts rated for 3 Amps at 230 V AC shall be provided, which shall operate when the set is started with the operation mode selector switch in auto or manual position. The contacts shall be wired up to the terminal block in panel.

All necessary control and instruments power factor meters, voltmeters percentage adjustable load shedding etc. shall be provided with the synchronizing, load sharing and AMF Panel.

4. INSTALLTIONS & TESTING

The Diesel generator set and associated equipment with accessories shall be installed at Zonal Office. The contractor shall ensure execution, coordination with the civil works for providing any openings, holes, etc, to avoid any breakage to completed works. The contractor will arrange allied civil works for complete execution of the job at his own cost and to the satisfaction of client. The contractor shall provide foundation bolts and grout them in cement concrete floor using non-shrinkable material with the approval of the client.

All installation material for physically installing the Diesel generator set and associated equipment, such as bolts, nuts, washers, supporting steel, etc., shall be provided and installed by the contractor. The generator shall be installed upright and in level and shall be firmly and rigidly bolted to the steel frame skid with vibration isolators.

The Diesel Generator set shall be completely erected as per manufacturer's instructions and as approved by the Engineer. Loose parts dispatched by the manufacturer shall be installed and connected as per assembly drawing provided by the manufacturer. Any safety locking of meter, relays, etc., provided by the Page. 26

manufacturer for safe transport shall be released only after the generator/control panel is erected in position.

The incoming and outgoing cables shall be connected as recommended by cable manufacturer. The cable armour shall be connected effectively to ground.

The Diesel generator and associated equipment body shall be connected to earth as per instructions given in section "Earthing" of these specifications. The Diesel generator set shall be tested and commissioned in the presence of the Engineer/representative of client. The tests to be carried out are described in article "Testing" of General Specifications for Electrical Works.

The tank shall be installed in accordance with best engineering practice/international codes, the approved shop drawings, applicable code requirements and manufacturer's instructions.

The piping shall be hydrostatically shop tested as required by ASME code, section VIII, DIV-I will be dried immediately after the test.

No separate payment is admissible for testing and commissioning of low voltage D.G Set, associated equipment and piping and is deemed to have been included in the BOQ rates of the Low voltage D.G Set and fuel system.

5. MEASUREMENT AND PAYMENT

5.1 General

The contractor's bid amount against each item of Bill of quantities as given below shall include supply, installation, testing, commissioning and for all works specified herein.

5.2 Diesel Generator Set

5.2.1 Measurement

Measurement shall be made for the Diesel Generator set including Fuel Day Tank, control/instrument panel. Gravity Louvers, Control Wiring to Control/Instrument Panel of other generator, MCO Panel with required.

Interlocking, L.T Switchboard etc. acceptably supplied and installed by the Contractor as a complete job.

5.2.2 Payment

Payment shall be made for the number of jobs measured as provided above at the Contract until price each for supplying installing, testing, commissioning and completion of the Diesel Generator Set, including its reinforced concrete foundation, Fuel Day tank, Gravity Louvers matching with radiator, control/instrument panels and accessories, control wiring between D.G Set and Control/Instrument Panel, ATS Panel with required interlocking, L.T. Switching fixing arrangements, all testing arrangements, etc.

5.3 Fuel System

5.3.1 Measurement

Measurement shall be made for Fuel System comprising underground Fuel Storage Tank of capacity mentioned in BOA/drawings including pumps all accessories and piping acceptably supplied and installed by the Contractor as a complete job.

5.3.2 Payments

Payment shall be made for the number of jobs measured, as provided above at the Contract unit price each and shall constitute full compensation for supplying, installing, testing and commissioning of underground fuel storage tank with excavation, backfilling, sand filling, reinforced concrete foundation/structure (including reinforcement) and fixing/ supporting structure and all other accessories complete with all type of valves, fuel transfer pumps (both electric and manual) float switches control/power wiring, control panel for automatic operation of the pumps, for each generator as per specifications and required for normal operations of D.G. Set.

5.4 Spare Parts

5.4.1 Measurement

Measurement shall be made for the spare parts of Diesel Generator Set as listed in schedule in Tender Documents, acceptably supplied by the contractor as a complete lot.

5.4.2 Payment

Payments will be made for the complete job of spare parts as provided above at contract unit price and shall constitute full compensation for supplying, tagging, packing of spare parts including wooden/steel storage boxes as required.