



PEOPLE'S UNIVERSITY OF MEDICAL & HEALTH SCIENCES FOR WOMEN
SHAHEED BENAZIRABAD

**TENDER DOCUMENTS FOR:
“200 KVA D.G SET MANUAL/ AUTO WITH
CANOPY”**



FINANCIAL PROPOSALS

LAST DATE OF RECEIVING BACK THE
TECHNICAL PROPOSALS ALONG WITH
FINANCIAL PROPOSALS



MONDAY

25-04-2017

UPTO 12.10 P.M

**PUMHSW, SHAHEED BENAZIRABAD
LV POWER DISTRIBUTION**

**TECHNICAL SPECIFICATIONS
DIESEL GENERATOR**



1.1 SCOPE OF WORK

The work under this Section consists of the following.

Supply, installation, testing and commissioning and transportation of 200 KVA D.G Set manual/ auto with canopy

- a. , relevant material and all the allied accessories as specified herein or as given and in the Bill of Quantities.
- b. The generators are Prime rating, shall be placed as located in drawing on a 6" raised RCC pad or as required by generator supplier.
- c. The contractor shall discuss the electrical layout with the Consultant and coordinate at site with other services for the exact route, location and position of control/power cable and equipment.

The supplier shall prepare the complete shop Drawings based upon the installation manual of manufacturer and Bill of Quantities for showing the installation layout along with material / accessories to be used for the following.

- a) Installation, mounting and fixing details of the generators on the foundation pad
- b) Fabrication and Installation of Diesel Tank (Buried in ground)
- c) Layout drawings for relevant pipes of Diesel supply system.
- d) Fabrication and Installation of Cable Trays (where ever required)
- e) Fabrication details of supply fans, ventilation Fans and filters.
- f) Installation of ventilation Fans and Allied ducts.
- g) The Contractors shall perform test of leakage.
- h) The Installation contractor shall provide all coordination & supports to the Supplier to the commissioning of the Generators. (In case, of third party contractor)
- i) Fabrication and installation details / layout for lube oil Tanks.
- j) Fabrication and Installation details / layout for Diesel Day Tank.
- k) Layout drawings for relevant pipes of Flue Gas system.

1.2 TECHNICAL SPECIFICATIONS

1.2.1 General Performance Requirements

1.2.1.1 The generating sets shall be of standard design of reputed manufacturer as described in approved manufacturer list and other control to be of the generator manufacturer's, who shall have similar units in operations under similar applications & field conditions. The generator set shall comply with IEC 60034-1.

1.2.1.2 The generator set shall be specially designed for low ambient noise level, suitable for indoor use with a maximum noise level (dB) as mentioned in the summarized specifications attached here with. The bidder shall state with his bid the value of noise during operation.

1.2.1.3 Each generating set shall after reducing the power absorbed by the auxiliaries deliver continuous specified power output at 400 volts and 0.8 power factor, 3-phase, 50 Hz under full load condition, should have capability of voltage variation from 380-440V.

All auxiliaries, accessories and connection systems along-with all necessary cables, fittings, hardware etc. for complete vibration proof installation of prime-mover, generator, control panel including starting, inlet, exhaust, cooling system, etc. are to be included in the scope of supply.

1.2.1.4 The engine shall be directly coupled to the generator with a maximum r.p.m speed as shown in summarized specifications attached here with.

1.2.1.5 The engine-generator package shall be mounted on vibration proof spring / rubber pads. Heavy duty lifting eyes and jacking screws shall be provided on the skids. Supplier shall provide foundation design and shall supply foundation bolts and any other material / hardware for complete installation of the package. Any excessive torsional vibration shall be avoided for both engine and alternator.

1.2.2 Specifications for Diesel Fuel Engine Prime Mover

1.2.2.1 Engine shall be four strokes, compression ignition engine (preferably manual ignition).

1.2.2.2 Starting shall be done by the electric starter motor operated from 24V D.C lead acid batteries mounted on the skid. Batteries shall be provided by the supplier. The engine shall be equipped with an alternator type automatic charging system to charge the batteries during normal engine operation. The charger and batteries shall be adequate to satisfy the following requirements.

- a. Crank the engine at firing speed for at least 15 second.
- b. Crank the engine three times for the above duration.
- c. Fully charged the discharged batteries within eight hours.

1.2.2.3 Overload Capabilities

Engine shall be of continuous rating with overload capability of at least 10% above the normal rating for up-to 1 hour continuously in any 12 hour period. The rating of gen-set shall be in accordance to ISO 8528 and overload capability shall be in accordance to the ISO 3046.

1.2.2.4 Air Intake

Air intake shall be naturally aspirated, equipped with suitable filter.

1.2.2.5 Engine Cooling

Engine shall be fan cooled, water radiator type supplied with guard. Cooling system shall have an engine centrifugal pump for cooling water circulation.

1.2.2.6 Exhaust System

Exhaust system shall be equipped with double residential type silencer complete with muffler exhaust manifold, flexible connector, exhaust elbow, rain cap, and associated fittings. The exhaust line shall be taken outside the building in the shortest possible way and not to include too many bends. The exhaust line should be insulated along its way from the engine to the termination point at the wall.

At the termination, protection shall be provided form rain, etc. All the piping should be insulated with the glass wool wrap and then steel jacket.

1.2.2.7 Speed Governor

Electronic governor (to be mentioned clearly along with the bids) shall regulate engine speed so as to maintain the generator frequency within + 2 % of the specified output frequency. Stable engine speed shall be restored within 10 second after the engine has been started shall be restored within 8 second of any sudden load change from no load to full load. During the change of load surging period, the speed shall not vary by more than rated speed.

1.2.2.8 Instruments

Skid mounted panel shall have calibrated gauge / meters to measure the following

Engine speed.

Lube oil pressure.

Engine oil temperature.

Engine water temperature.

Engine running hours.

Diesel level meter / indicator (For Diesel Generator)

Pressure Gauge meter

Battery charging current.

1.2.3 Fuel System

For Diesel Engine:

Engine shall be operated on commercial high speed diesel oil. A fuel oil strainer / filter shall be provided in the fuel line. Fuel system for diesel shall not require any priming.

Contractor shall also include complete fuel storage and transfer system. The tank shall have level gauge and pump to facilitate the pumping of diesel from drums / reservoir.

Contractor shall submit with the bid, details of fuel system and estimated fuel consumption at half, three quarter and full load operation. It shall have a vernier throttle control for speed adjustments.

1.2.4 Specification for Generator

1.2.4.1 Type generator shall be synchronous.

1.2.4.2 Excitation.

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

1.2.4.3 Windings

Alternator winding shall have class-H insulation with anti condensate heater for winding and shall be impregnated for tropical use.

1.2.4.4 Voltage Regulation

Voltage Regulator shall be solid state with provision for manual setting. Regulator shall be so designed as to protect the exciter when the generator is running at reduced speed during starting or idling of the Prime-mover. Voltage regulation shall be $\pm 1\%$ from no-load to full load.

1.2.4.5 Over Load Capability

The generator shall be capable of carrying 1 hour overload of 10% of nominal rated current with field set for normal rated load excitation for any 12 hour period. The rating of gen-set shall be in accordance to ISO 8528 and overload capability shall be in accordance to the ISO 3046.

1.2.4.6 Short Circuit Protection

Generator shall be capable of withstanding a minimum time as specified in IEC 60034-1, without injury for a three phase short circuit at its terminal when operating at rated kVA and power factor.

1.2.4.7 Over Speed

Synchronous generator shall be so constructed that in case of emergency they will withstand an over speed of 25% without mechanical injury.

1.2.4.8 Deviation Factor

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

1.2.4.9 Specifications for Control Panel

Control panel shall be skid mounted front access part of the engine-generator package. Removable bolt-on glands shall be provision to suit bottom entry. Panel shall be complete with all control wiring, pressure clamped terminal and lugs. Control panel shall be wired by flexible PVC insulated cable. All cables shall be suitable color coded and numbered for circuit identifications. Contractor shall submit with the bill all electrical and mechanical details and installation drawings. Panel shall be provided with connection for remote shut off operation.

1.2.5 Unit Control Section

This shall incorporate measuring instruments, instrument transformers, circuit breakers, voltage regulator, governor, voltage adjusting rheostat, battery charger, enunciators, indicating lamps etc.

1.2.5.1 Instruments

Following measuring instruments shall be provided.

- a. Ammeter with selector switch.
- b. Voltmeter with selector switch.
- c. Frequency meter (dial type).
- d. Kilowatt hour meter.
- e. Ammeter (charging current).

1.2.5.2 Safety Devices

Following alarm/shutdown enunciators and safety device shall be provided.

- a. Alarm and shutdown for.
 - High crank case low oil level.
- b. Alarm and lockout.
 - Over crank.
- c. Alarm and shutdown
 - Engine Over speed.
- d. Alarm for battery charging
- e. Winding temperature light alarm and shut down.

After shut down this set shall lock out and it shall not be possible to restart unless the fault has been removed and manually reset.

1.2.5.3 Circuit Breaker

All circuit breaker shall be triple-pole electromagnetic type with over-current under voltage, and short circuit protections.

1.2.5.4 Battery Charger

Battery charger shall be static type and shall supply a float charge to the batteries when the engine is not in operation. Work also includes the wiring from DB (HESCO) to charger.

1.3 TOOLS

A complete set of tools for routine operating and maintenance of engine and generator shall be furnished without additional cost. A detailed and comprehensive list of tools is to be provided by supplier along with the technical and commercial bid.

1.4 TECHNICAL DATA

Details to be provided with this quotation.

1.5 ENERGY METER / HOUR METER

An energy meter of suitable rating and to meet the requirement of electrical inspector to record the total operating hours of the generator an HOUR-OPERATION-METER shall also be provided.

1.6 VIBRATION ISOLATORS:

The generators should be securely fixed & mounted on rubber pad foundation to avoid transfer of vibrations to earth, foundation of building, walls etc.

1.7 FACTORY ASSESSMENT TEST:

Pre-delivery factory assessment test shall be performed in the presence of Consultant's representative. Refer annexure B for complete list of tests to be performed.

1.8 SPECIAL INSTRUCTIONS FOR THE BIDDERS

The supplier shall prepare the complete shop Drawings based upon the installation manual of manufacturer and Bill of Quantities for showing the installation layout along with material / accessories to be used for the following.

2.0 SUMMARIZED TECHNICAL REQUIREMENT:

DIESEL GENERATOR:

Power Rating	200 kVA (<i>Prime</i>)
Output Voltage	400 / 240V
Frequency	50 Hz
Power Factor	0.8 (Lagging)
No. of phases	3
R.P.M	1500
Voltage regulation	± 1%
Excitation	Self Excited
Insulation Class	Class H
Ingress Protection	IP 23 (with canopy)
Sound Level (without canopy)	<105 dBA @ 1 meter
Governor	Electronic
AMF	With Controller

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DIESEL GENERATOR

**PART - BILL OF QUANTITIES
ELECTRICAL & ALLIED SYSTEMS**

S.NO.	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
	DIESEL GENERATOR				
1	<p>Supply, installation, testing and commissioning of following Diesel Generator Set operating on 3-phase, 400V, 50Hz, 1500 rpm Prime Rated, Water Cooled Diesel generating set, suitable for operation at 50°C inside power house with control panel, AMF (with ATS) and 90% relative humidity assembled in accordance with their provided drawings / manuals and consisting of painted welded steel bed plate frame work to accommodate engine alternator complete with manual governor to give regulation to BS:5514 class A1, balanced flywheel, water jacket heaters energized by the incoming main supply, heavy duty starting batteries, battery charger, hour runs meter, KWH meter, emergency stop push button, radiator, with water level switch, fuel tank, piping works, consisting of black steel pipe schedule 40, fuel pump, exhaust system residential type silencer, 400/230 V, 50 Cycles/second, at 1500 RPM, for 3 phase 4 wire system.</p> <p>The work also includes but not limited to</p> <ul style="list-style-type: none"> - Transportation up to site, inside PUMHSW room. - 1/2 thick neuprene Sheet and - placement on foundation pads - Vibration Isolators, leveling and grouting <p>The work also includes all allied mechanical and electrical works including material, labor, tools, accessories etc. Genset shall be with built-in radiator and including all other accessories essential for transportation and installation of gen set.</p>				
A	200 kVA D.G Set , electronic governor with canopy, output prime rating 200 kVA, 160 kW, output standby rating 220 kVA, 180 kW (Unlimited Hours).	1	Job		
2	Providing and installation of remote AUTO/OFF/MAN selector switch . Complete with wiring in PVC conduit, Panel with all required facilities.	1	Job.		
3	On load testing of DG sets with material required for 4 hours operation inclusive of fuel, engine oil etc. Load should be provided by the client at site.	1	Job.		
4	Obtaining of NOC and Fitness Certificate for above Generators and Diesel Storage Tank form Concerned Authorities.	1	Job.		
	<p>Note:</p> <ol style="list-style-type: none"> 1, Contractor have to provide all the accessories/device required for completion of system. 2, Mention all owner supplied material/work along with the bid which are not included in the scope of work but required for completion of work. 3. Price of Old DG Set must be adjusted in total amount. 				
Total Amount (Rs.)					
Total Amount (Rs.) in words					

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**LIST OF APPROVED MANUFACTURERS
FOR DIESEL GENERATOR**

S.No.	Manufacturers/Vendors
1	Diesel Generator
	Cummins
	Caterpillar
	F.G Wilson