SYAMA PRASAD MOOKERJEE PORT, KOLKATA
HALDIA DOCK COMPLEX
An ISO – 9001 : 2015 Organization
Office of Sr. Dy. Manager (P&E)
Operational Building, 1st Floor,
Chiranjibpur, Haldia, Dist.: Purba Medinipur
West Bengal, India, PIN – 721 604.
Mob: +91 9434031346
himam.hdc@kolkataporttrust.gov.in

ISO 9001:2015 Certified by IRQS

MGMT. SYS. RvA C 071

No. DM (P&E)/100 Power House DG / ENQ/ 42 **Dated: July 19, 2021**

Request for submission of Budgetary Offer

Sub: Enquiry for obtaining Budgetary Quotation for supply, delivery, installation, testing & commissioning of Outdoor type Silent and Green Diesel Generator sets of 11 KV, 1010 kVA rating with AMF Panel including Comprehensive Maintenance Contract (CMC) for a period of 5 (five) years , after expiry of 2 Year's Guarantee Period, for Power House and GC Berth Sub-station of Haldia Dock Complex,Syama Prasad Mookerjee Port, Kolkata .

Haldia Dock Complex, SMP, Kolkata intends to procure 2 nos. 11 KV, 1010 KVA DG sets to provide power supply for Dock Operational zone and other important locations.

A technical estimate, containing Scope of Work, Bill of Quantities and Technical Specification, is enclosed herewith for ready reference along with following terns & conditions:

Payment Terms:

a) Against Supply & Delivery:

i) Payment for 70% amount of each item will be made against supply of respective item at site and submission of bills along with Custodian Certificate and other relevant documents like Inspection Reports, Challans etc.

ii) Payment for 20% amount of each item will be made against installation of the respective item and submission of bills along with Installation Certificate.

iii) Payment fro 10 % amount will be made against Testing, successfully commissioning, taking over the commissioned job by HDC, SMPK and submission of bills along with Job Completion Certificate.

b) Against Installation and Commissioning :

i) Payment for 90% amount of each item will be made against installation of the respective item and submission of bills along with Installation Certificate.

ii) Payment for 10% amount will be made against Testing, successful commissioning, taking over the commissioned job by HDC, SMPK and submission of bills along with Job Completion Certificate.

c) Against Maintenance :

Payment shall be made on quarterly basis during Comprehensive Maintenance Contract (CMC) Period of 05 (five) years.

Completion Period :

Supply, Installation, Testing & Commissioning to be completed, in all respect, within 9 months , from the date of placement of Order .

Inspection:

Inspection of items will be carried out by Third Party Inspection agency or representative of the Engineer of the Contract as per discretion of the Engineer of the contract. Cost for Third Party Inspection agency will be borne by Haldia Dock Complex.

Guarantee: The supply, installation, testing & commissioning job will have to guaranteed for a period of 24 months after handing over of the job.

Gate Pass:

Necessary Gate Pass for entering into the Dock Area would be issued for the personnel, equipment, machineries, materials etc. of the contractor in connection with the aforesaid supply, on chargeable basis, as per rules then prevailing, on the basis of written request from the contractor.

Liquidated Damage:

If the Contractor fails to complete the job within the stipulated date or such extension(s) thereof, as may be allowed by Engineer, HDC in writing, the Contractor shall be required to pay as compensation (Liquidated Damage) to HDC,KoPT and not as penalty, @ ½ % of the cost of unfinished portion of the work, for every week's delay(part of the week would be treated as full week), provided always the entire amount of compensation to be paid under the provision of this clause shall not exceed 10 % of the total contract value. HDC,KoPT may, without prejudice to any other method of recovery, deduct the amount of such damages from any money which is due or which may become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from their obligation to complete the work or from any other of their obligations or liabilities under the contract. Taxes as applicable rate on LD amount if any will be levied.

Validity:

The offered price should valid for 90 (Ninety) days, from the date of Offer.

Budgetary offers (as per the enclosed Annexure), along with comments / suggestions (if felt necessary), are invited from experienced / reputed firms, for the subject work, **within 09.08.2021**.

Thanking you.

Yours faithfully,

(S.S.K.Hassan Imam),
Dy. Manager(P&E),
Haldia Dock Complex,
SMP, Kolkata.

SCOPE OF WORK & TECHNICAL SPECIFICATION

Scope of work

Supply factory assembled, factory tested 2 nos. Green, Silent, Engine-Alternator set with CPCB approved acoustic enclosure capable of delivering 11 kv, 1010 kVA at 0.8 pf at site conditions including all accessories like base frame, silencer, exhaust flexible piping, fuel tank, fuel piping (B class) with valves and other fittings for supply and return lines, fuel transfer pump with hose pipes and clips, suitable capacity of battery for starting on MS frame, battery charging dynamo/alternator necessary Anti vibration mounting arrangements, with manual control panel, Engine instrument panel, armoured copper conductor control cable with suitable glands from Genset to AMF panel including foundation etc., complete conforming to the attached specifications as required.

i) Supply, Installation, Testing and Commissioning of 2 Nos. 1010 KVA capacity, 3.3 KV, 1500 rpm outdoor Diesel Generator Set with Acoustic enclosure type, separately excited from 24V Battery.

ii) Supply of all materials and making suitable RCC foundation, base frames and anti-vibration pads.

iii) Design, Supply, Installation, Testing and Commissioning of 2 Nos. Microprocessor based Auto-Mains Failure (AMF) panel complete with separate AMF cum Distribution panel switchboard and its allied equipment.

iv) Supply, laying & termination of HT Power Cable 1C x 1000 sq mm, XLPE Insulated, 11 KV (E) grade Aluminium armoured type cable from DG Set – AMF panel- Load distribution panel, Main panel – AMF panel. Supply, laying & termination of Control cable (XLPE, 1.1KV grade, PVC insulated copper armoured cable).

v) Earthing through NGR to be carried out as per latest IS standards for the Generator Set.

vi) Supply, Installation, Testing and Commissioning of 02 sets NGR and NIS Panel for earthing the DG Sets.

vii) After successful commissioning of DG Sets, the contractor shall carry out Comprehensive Maintenance for five years after expiry of Guarantee Period for two years.

viii) Supply, installation, testing & commissioning of 02 nos. DG Set with complete accessories as per relevant standard.

The successful bidder should carry out the above complete work as per latest IER and other relevant standard. The scope of work is not restricted, If, any material is shortage, the contractor shall fulfill the complete system as per latest IER and relevant standard on the offered rate.

ix) Any additional work, if required, for the purpose of the project has to be carried out by the contractor.

A. List of Approved Manufacturers /makes :

Sl. No.	Items	Name of the Manufactures
i)	Engine	Cummins / Cater Pillar/MTU/ Perkins – STERLING / Wartsila
ii)	Alternator	Stamford / AVK or AVKC /LEROYSOMER / KEC/ Crompton/ Toyo Denki
iii)	Microprocessor for AMF panel	Deep Sea/ Woodward
iv)	VCB & MCCB	Siemens / ABB
v)	Panel Meters	AE / IMP / Universal / Reshabh / Kaycee / Meco / Enercon / Schneider (Conzerv) / L&T / Secure.
vi)	Lead Acid Battery	Exide / Furukawa / Amco / Amara Raja/ Crompton Greaves / Cummins Pulse .
vii)	Power Cables	Polycab/ Finolex / Torrent / Havells
viii)	Fire Extinguishers	ISI MARKED

B. Detailed technical description :

DIESEL ENGINE :

Diesel Engine shall be Radiator cooled confirming to BS 5514/ISO: 3046. BHP shall be as per manufacturer's standard to deliver specified prime rated output at 0.8 lagging power factor at NTP condition.

The exhaust pipe line shall be of suitable dia for fixing the hospital grade silencer with suitable supports at suitable intervals with all its accessories such as bends, flanges, couplings etc.(including rain cap at the end to prevent the water entering inside) providing sleeves at the wall crossing complete as required.

The exhaust pipe line shall be with thermal insulation with glass wool, covered with wire mesh and gladded with 24 gauge aluminum sheet.

No of cylinders shall be as per manufacturer's standard. Engine shall be of reciprocating compression ignition (Diesel) type, water cooled, electric start, turbocharged & after cooled model, Multi cylinder with electronic fuel governor suitable for the above generating set. The engine should have the capacity of 10% over loading for one hour in twelve hours duration.

Engine should have a well-designed air handling system with Dry type replaceable paper element air cleaner with restriction indicator and Optimised turbocharger for increased altitude capabilities.

Engine should also contain Spin on lube oil filter, Plate type lube oil cooler, Electrical starter motor with soft start engagement feature, Battery charging of 12 V 180 AH DC with 6 hrs. back up for charging alternator.

a) ENGINE INSTRUMENT PANEL AND SAFETY CONTROLS

i) INSTRUMENT PANEL

It shall comprise of the following:

a) Starting switch with key

b) Lube oil pressure gauge

c) Battery charging ammeter

d) Stop push button or lever.

e) Water temperature indicator

f) Radiator water level indicator.

ii) Safety control auto cut off for low lube oil pressure, High water temperature and over speed with audio and visual lamp indication on control panel.

iii) Hour meter cum RPM indicator.

iv) Engine and alternator are mounted on a common MS fabricated base frame with AVM pads.

v) Base frame with integral fuel tank is to be provided with drain plug, air vent, inlet and outlet connection, level indicator and provision for cleaning

vi) Standard integral set-mounted radiator system, designed and tested for 50°C ambient temperature

INSTRUMENT PANEL

i) Hospital grade silencer

ii) Fuel tank

iii) Hand operated fuel transfer pump with 5 mtr. length suitable hose pipe.

b) SPEED & GOVERNING

The Engine shall be fitted with electronic governing system as per relevant BS specification amended up to date.

c) ENGINE START

Engine shall be cold and self starting type. The starter battery shall conform to IS 7372 amended up to date and of sufficient capacity to meet the Engine starting and control gear requirements

d) QUIETNESS OF OPERATION

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

e) SILENCER

Efficient heavy duty hospital type silencer suitably optimised to meet stringent noise emission standards laid down by MoEF/CPCB for the exhaust shall be supplied. For silencer there shall be Insertion loss of 25dBA at 1 m from exhaust pipe under free field condition. A test certificate to this effect shall be furnished.

ALTERNATOR

Alternator of any of the approved makes as mentioned above, capable of generating 1010 KVA at 0.8 pf (lag), 11 KV, 3 Ph, 50 Hz, AC 3 wire system while operating at 1500 RPM and suitable for direct coupling with the above diesel engine. The alternator should have the capacity of 10% over loading for one hour in twelve hours duration.

a) The alternator shall be copper wound of totally enclosed type screen protected type with class 'F' insulation, with temperature rise limited to Class F at 50 Deg C ambient temperature designed and constructed to withstand tropical conditions, self regulating type conforming to BS 2613/IS 4722 amended up to date as applicable. Alternator shall be brushless type, screen protected, revolving field and self regulated through an DVR (Digital Voltage Regulator). It shall have ±0.5% voltage regulation in static conditions. It shall have class 'F' insulation with IP 23 protection enclosure.

b) It should contain 3 Phase reconnectable winding with 12 terminals brought out for connection or OEM standard.

c) It should have Better motor starting capability and best in class efficiency.

d) It should have compact design with sealed bearings for longer life and lesser maintenance.

e) It should contain impregnation on all wound components for better mechanical strength.

CONTROL PANEL

Control panel should be manufactured out of not less than 1.6 mm thick CRCA sheet and is powder coated for weather-proof and long lasting finish. The control panel should consist of the following parts:

a) Power Command Controller or any DG Set controller as recommended by manufacturer

b) Copper bus bars with suitable capacity with incoming/ outgoing terminals.

c) Indicating lamps for 'Load ON' and 'Set Running'

d) Instrument fuses duly wired and ferruled

e) If MCCB is provided in the panel then microprocessor based protection to be provided.

POWER COMMAND

The Diesel Generator should have Power Command control system or any DG Set controller as recommended by manufacturer, which is a microprocessor based generator set monitoring, metering and control system with LCD display designed to meet the demands of today's engine driven generator sets with following functionalities:

a) Intuitive operator interface which includes LED backlit LCD display with tactile feel soft-switches & generator set status LED lamps

b) Digital AVR for shunt or PMG excitation with torque matching.

c) Sensor Failure Indication, Programmable Idle Speed Control, Digital Synchronizing Function, Sync Check, Synchronoscope, Auto Load Sharing, Compatibility to Remote Monitoring and Smart Starting.

d) Digital electronic governing with temperature compensation and smart starting.

e) SAE J1939 interface to Full Authority Electronic (FAE) engines.

f) Remote start-stop

g) Engine metering: Oil pressure, Coolant temperature, Battery voltage, Engine speed

h) AC Alternator metering: L-L Voltage and L-N Voltage, Current (1 and 3 phase), Volt-Amperes (phase and total) and Frequency.

i) Engine protection: Low lube oil pressure, High/Low coolant temperature, Over speed, Battery Over/Under/Weak Volts, Fail to crank/start, Sensor failure.

j) AC Alternator protection: Over/Under voltage, Over/Under frequency, Over current, Short circuit and Loss of AC sensing.

k) Data logging: Engine hours, Control hours, Engine starts and up to 10 recent fault codes

l) Configurable glow plug control

m) Configurable cycle cranking

n) 12 and 24 Volt DC operation

o) Sleep mode

p) Programmable I/Os (4 inputs and 2 outputs), expandable with AUX101/102 modules

q) Modbus interface (RS485 RTU)

r) In Power compatible (PC based service tool)

ACOUSTIC ENCLOSURE

The enclosure shall be fabricated out of not less than 2 mm thick CRCA sheet duly powder coated.

a) It shall specially designed to meet stringent MoEF/ CPCB norms of 25 dBA insertion loss @ 1mtr at 75% load under free field conditions.

b) The acoustic enclosure should be made of CRCA sheets. The paint shade of the Acoustic Enclosure shall be as per manufacturer’s standard.

c) Enclosure is power coated (inside as well outside) with a special pure polyester based powder. All Nuts and bolt/external hardware are made from stainless steel

d) The doors are gasketed with high quality EPDM gaskets to avoid leakage of sound.

e) The door handles are lockable type

f) The rock wool is further covered with fibre glass cloth and perforated poweder coated MS sheet.

g) Specially designed attenuators are provided to control sound at air entry to the container and exit from the container.

h) Adequate ventilation is provided to meet air requirement for combustion and heat removal.

i) There is provision for emergency shut down from outside the enclosure.

j) It should have base lifting for easy handling at customer site

k) It should be designed to have optimum serviceability

l) It should have air inlet louvers specially designed to operate at rated load

m) It should be made on special purpose CNC machines for consistency in quality and workmanship

n) It should contain 14 tank pre-treatment process and UV resistant powder coating of all parts to withstand extreme environment

o) It should use special hardware for longer life

p) It should have flush styling - no projections

q) It should have fluid drains for lube oil and fuel

r) It should have fuel filling arrangement inside the enclosure

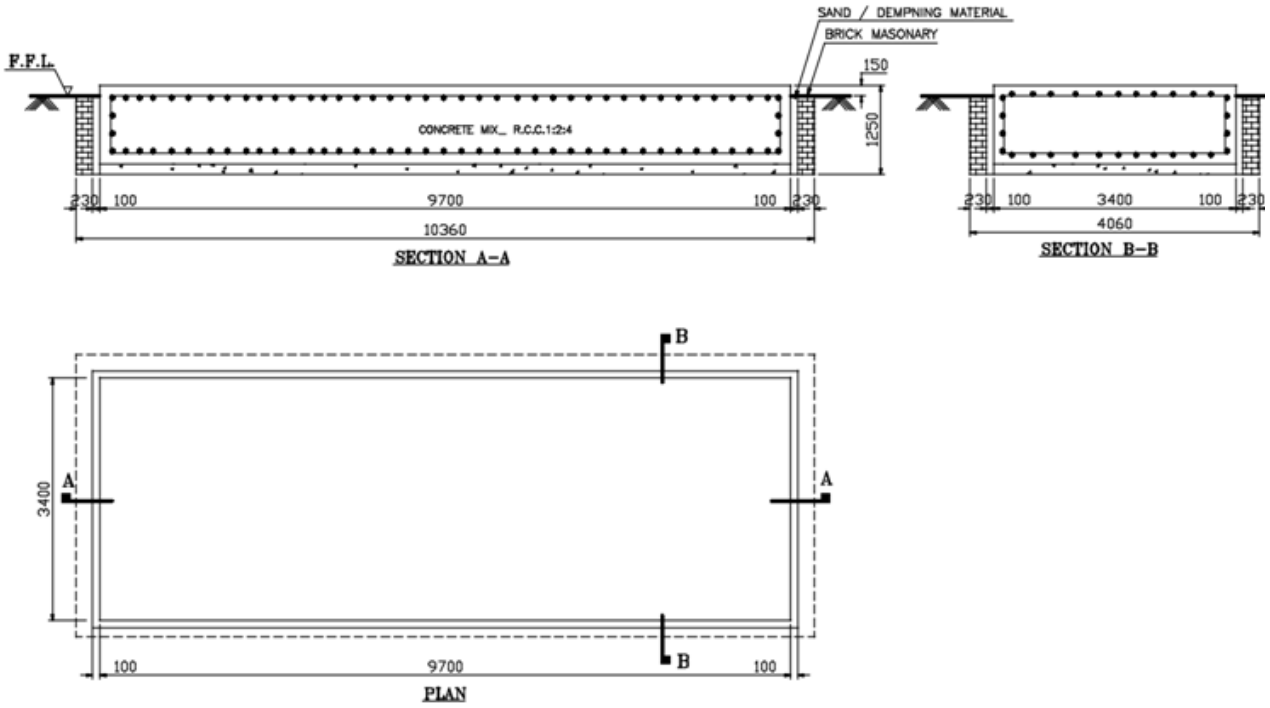
The firm should clearly give details of specification with a copy of certificate issued by the designated agencies as per Environment Act along with the tender. In the absence of these enclosures, the tenders shall be liable for rejection.

Exhaust System :

As per CPCB rules, Exhaust Pipe height will be 30M and its proper support is also to be considered. In case there is no provision is possible to provide support to the Exhaust Pipes , then Self supported GI structure for providing support to this 30 M Exhaust Pipe is to be considered. Civil Foundation area of the Self supported Steel Structure is also to be considered by successful bidder with an approx area of 3M x 3M nearer to the DG Set Foundation. All types of Piping & Civil work will be under the scope of successful bidder.

RCC FOUNDATION FOR 1010 kVA DG SET

The RCC foundation shall be carried out by the contractor as per latest standard norms. The tentative foundation drawing shown for the reference. However, to carry out work as per the site condition. Soil bearing capacity 5T/m2 to be considered for design of RCC foundation.



AUTO MAINS FAILURE PANEL

The AMF panel shall be fabricated out of CRCA steel sheet of minimum 16 SWG, totally enclosed dust, dump and vermin proof, cubicle type with easy accessibility to all control wiring. The AMF panel shall be supplied from the panel manufacture who are having the test Certificate of CPRI/ERDA. The AMF panel shall provide HT/LT switch gear bus and all other protective devices based on the transformer rating and load. Accordingly, the contractor shall submit the drawing and take necessary approval before fabrication of AMF Panel. The AMF panel should have a provision for cable entry and exit of 1 C x 1000 sq mm for both incoming and outgoing connected panel and transformer. All the protective devices shall be designed based on the transformer capacity. Tripping device should be activated based on the connected load. During

approval of the drawing, the contractor shall submit type test certificate of AMF Panel for similar ratting from manufacturer for reference purpose.

THYRISTOR CONTROLLED STATIC BATTERY CHARGER

Battery charger of suitable rating shall be of semiconductor type with automatic boost cum trickle selection with auto cut off facility and with suitable ammeter and voltmeter for charging from AC mains. It shall be provided in addition to dynamo along with the engine. The tenderer shall include AC and DC wirings of battery charger in recess/surface armoured U/G cable of copper conductor.

MICROPORCESSOR BASED AMF CONTROLLER

The AMF panel power command control is microprocessor based generator set monitoring and control system mounted in the genet control panel. The control provides simple operator interface to the indication and an LCD hour counter. The integration of all function in to single control system provides enhanced reliability and performance compared to conventional generator set control systems.

CONTROL SYSTEM

The standard control system includes all the functions necessary to locally or remotely start and stop and protect the generator set.

KEY SWITCH – OFF AND MANUAL/AUTO

In the OFF mode, the generator set is immediately shut down (if running) and cannot be started. It also resets any faults, in this mode, all power is removed from the control and its outputs in MANUAL/AUTO model, the control is powered. The manual start push button and remote start input become enabled.

MANUAL START BUTTON

This button will initiate a Genset start sequence when the control is in manual/auto mode. This button is locked out when the engine is running.

ENGINE FAULT INDICATION (LED)

The common Engine fault indicator panel should have following indications:

i) Fail to start

ii) Over speed, under speed

iii) Low oil pressure

iv) High engine temperature

v) Battery charging alternator fail

LCD ENGINE HOUR COUNTER

The control includes an LCD engine hour counter. The counter will increment whenever the engine is running.

FUNCTIONS : CONTROL/PROTECTION

Remote Start – When in Manual/Auto mode the control accepts a ground signal from remote devices to automatically start the generator set.

Over speed shutdown

Engine Starting – The control system supports automatic engine starting, which included solid state outputs for starter control, and fuel solenoid control. The start disconnect is achieved by monitoring main alternator output frequency – Low lube oil Pressure Shutdown and High Engine water temperature shutdown.

Starting Sequence – in the Manual/Auto mode, the crank cycle is repeated upto 3 times, if starting is still unsuccessful a Fail to Srt fault is generated. If the engine starts, the crank cycle is terminated at crank disconnect frequency of 20 Hz. – Under speed Shutdown, Fail to Start, Shutdown after 3 attempts, Battery charging alternator fail warning.

Microprocessor based AMF module incorporating: Functions:

- Supply failure timer
- Restoration timer
- 3 impulse automatic engine start / stop logic
- Mains / generator voltage & frequency sensing

controller with the following features:

- Water temperature / Lube oil pressure / engine speed
- Voltage / ampere / frequency / kVA
- Running – hour counter
- No. of starts
- Fault indication (LED type)
- Over / under speed
- Fails to start
- Low oil pressure
- High engine temperature
- Under / over voltage
- Over current
- Combined meter for kW / Power Factor / kVA
- Electronic KWH meter (counter display)
- Current transformers

Relay

- Earth Fault Relay (Electronic type)
- Over current Relay (Electronic type)

Indications (LED)
- DG ON, Load on DG
- Mains ON, Load on Mains, Battery Charger ON

Push Buttons (AMF module by pass mode)
- Generator contactor close / trip
- Mains contactor close / trip (If provided)
- Fault accept /reset.

GENERAL REQUIREMENTS

The engine and alternator shall be assembled on a common base frame. Alternator shall be directly coupled to the engine by means of flexible couplings. The 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.

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 the 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, without any necessity of replacement and cleaning. Temperature and pressure gauges shall be fitted to the lubricating system.

FUEL SYSTEMS /FUEL TANK

The fuel tank shall have capacity of 990 litre running of DG sets continuously for 12 Hrs. The tank shall have level indicator marked in liters, filling inlet with removable filter.

It should contain Combined Unit Injection type fuel system with Electronic Step Timing Control (ESTC) injectors which smoothly stabilise engine speed under load with A1 class Electronic governing. It should also contain filter system which is a pre filter including water separator and and main filter.

OPERATING CONDITIONS

The Engine Alternator shall be capable of delivering the specified output under the site conditions.

OTHER GENERAL REQUIREMENTS

i) THE PERIOD OF OPERTATION

The Engine Alternator set offered shall be prime duty type conforming to BS 5514 and BS : 2613. The set may be idle for a period except for routine test periodically.

ii) OVER LOAD

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

iii) OUTPUT VOLTAGE FREQUENCY AND WAVE FORM

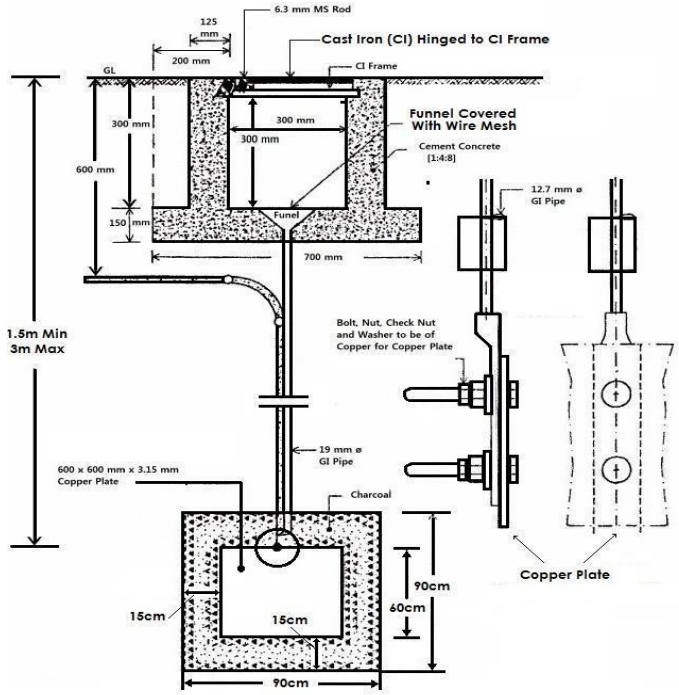
Normal output voltage shall be 3.3 KV with ± 2.5% manual adjustment at all conditions of load with coarse and fine controls. Frequency shall be 50 cycles per second ± 4 %. Output wave form shall be sinusoidal at all load conditions. Alternator shall be of brushless type provided with DVR suitable for voltage regulation of ± 2.5% or better at all load conditions and with prime mover speed drop up to 4% of nominal speed. Alternator shall be provided with radio frequency suppressor and in built frequency rollover protection.

iv) SAFETY PROVISION

All Exposed moving parts like fan blades etc. shall be provided with suitable Guards / covering to avoid the chances of accidents.

v) EARTHING

Provision shall be made for earthing of all non current carrying metal parts of the equipment earth lugs of suitable size shall be provided wherever earth connection to the apparatus are necessary earthing work shall be carried out as per IE rules / IS specifications amended upto date. The tentative foundation drawing shown for the reference. However, to carry out work as per the site condition.



vi) FINISH

All exposed metal parts shall be suitably finished to prohibit corrosion under climatic conditions prevailing at site.

CONSTRUCT UNIFORM PLATFORM (MASONRY WORK)

The RCC foundation should be constructed based on the soil bearing capacity i.e. 5 Ton per Sq.M. The size of the foundation shall be at least more than 1 M bigger than the size of the DG set at the height of 1 M from the ground level including steps. The platform shall be constructed as per latest standard norms of M20. The measurements are tentative and vary as per the site condition.

SUPPLY AND LAYING OF HT POWER CABLE & CONTROL CABLE

The cable measurements are tentative and may vary as per site condition. Supply & laying of 1C x 1000 Sq mm , XLPE Insulated, 11 KV (UE) grade Aluminium armoured type cable from DG Set – AMF panel- Load distribution panel to VCB panel and making end terminations with suitable cable terminations, conforming to relevant IS with latest amendments with ISI mark of approved make.

Supply and laying of control cable of 16 C x 2.5 Sq mm (XLPE, 1.1KV grade, PVC insulated copper armoured cable) with 10% spares with terminations for the

said cable conforming to relevant IS with latest amendments with ISI mark of approved make.

Note: i) Test certificates from the manufacturers for the cable shall be submitted along with the supply of cable.

LT cable shall be laid along with suitable GI pipe and connected to Mains panel, AMF panel, DG set and Load distribution panel. The cable quantity shown in the price schedule is tentative. The Contractor shall measure the quantity and supply the same. However, the payment will be made by actual length.

The end termination for 1100V grade underground cables shall be of crimping type lugs shall be supplied by the contractor. The crimping type lugs shall be installed by highly skilled personnel.

Scope of work shall also include Control cable for DG Set. The cable shall be laid underground / on wall / in pipe/existing trench as per site requirement.

After installation of Distribution Panel testing and commissioning shall be done as directed by Engineer in charge.

Tests would be carried out as per IS , by the Contractor , before dispatch of the assembled DG set, at manufacturer's works, in presence of the representative(s) of the Engineer.

INSTALLATION, TESTING AND COMMISSIONING

Installation, testing and commissioning of the above Genset complete with its acoustic enclosure, AMF panel and all equipments, accessories/ associated items on the existing cement concrete floor / foundation including supplying consumables like lube oil, fuel and providing artificial resistive load, cabling, switching arrangements, etc., for trial run (i.e. 2 hours full load, 1 hour 10% overload & 1 hour at no load) and final Acceptance Testing of Genset (i.e. full load for 6 hours & 10% over load for 1 hour) including topping up of lube oil upto full mark and filling of fuel suitable for working etc., as per specifications as required. Load trail to be done as per site condition. The tentative drawing shown for the reference. However, the work has to be carried out as per the site condition.

ACCEPTANCE TEST

The test shall be with artificial resistive load only and nonlinear load will not be arranged for testing purpose. Load trail to be done as per site condition.

INSULATION TEST

Immediately after the over-load test, the insulation resistance between the stationary coil and the frame is tested with 1.1KV/2.5KV Meggar.

REGULATION TEST

The Automatic and manual regulation of the alternator at no load, half load and full load are noted for the nominal voltage of 230 Volts between phase and neutral at power factor 0.8. All the arrangements for all the test shall be the responsibility of the successful bidder.

FUNCTIONAL TEST

Performance of incoming switch / circuit breaker starting arrangement for the engine safety features, instruments and control panel etc., shall be verified.

C. MAINTENANCE WORK DURING DEFECT LIABILITY PERIOD AND CMC PERIOD

After successful installation by the Contractor and accepted by HDC, Maintenance shall be carried out by the contractor during guarantee period of 2 years and CMC period of 5 years, after expiry of 2 years' Guarantee period

The Maintenance work is comprehensive in nature, therefore, all the repairing and maintenance cost including spares to be borne by the Contractor.

The contractor shall submit the maintenance schedule to HDC for approval based on OEM recommendation to carry out the maintenance work during Defect Liability Period, as well as during CMC period of 5 years

The contractor shall maintain records in Log book for the entire Maintenance work duly signed by authorised representatives of HDC, KoPT & the Contractor and the same need to be submitted along with bill for payment.

During the maintenance, the contractor shall clean properly the D.G. set , AMF panels, etc. and check all the parameters as per maintenance schedule and standards and also with the satisfaction of the HDC representatives.

The Contractor shall arrange training for the technical staff of HDC for maintenance of D.G. set. The training should included AMF panel operation on both the mode i.e. Auto/manual start of DG set immediately during failure of power supply & malfunctioning of AMF panel including important check list.

The Contractor shall complete the preventive maintenance activity as per schedule and shall record in register with sign of appropriate authority of HDC and the Contractor.

Payment shall be made on quarterly basis during Defect Liability Period, as well as during CMC period. However, the Contractor shall submit the records showing availability and maintenance report, along with the bills.

The Contractor shall ensure 99% availability of the D.G. set on each quarter during Defect Liability Period, as well as during CMC period, failing which 1% of the quarterly bill value would be deducted from the quarterly running bills.

OEM shall visit at site at least once in a year on yearly basis for checking DG Set and allied equipment and submit the report. Accordingly, the contractor shall rectify the problems as mentioned in the report within a short period.

D. OPERATION INSTRUCTIONS AND DRAWINGS

The Contractor shall provide 2 sets of operation and maintenance manual, complete layout drawings of Genset, AMF panel with wiring, earthing system and battery charger for DC source compiled in the spiral binding hard copy and soft copy hand over to HDC representative.

E. INSPECTION AND TESTING OF GENERATOR SETS

The engine alternator sets shall be tested at factory, before dispatch to site and at site as per detailed specification of NIT in the presence of department representatives.

All the following tests to check the performance of the set to meet the requirements of specifications shall be carried out at site after installation. The engine shall be run for at least half an hour on no load and then the engine shall be run continuously for six hours at its full rated load. 'The set will be tested with an overload of 10% for one hour. The over load test may be taken at any stage during the full load period and need not be at the end of six hours of full load test. During the full rated load test half hourly readings of the stationary coil temperature are to be taken and the rise in temperature should not be more than the value stipulated as per relevant clauses of insulation given in IS - 4722 - 1958. The fuel consumption should be within 5% of the manufacturers stipulated ratings.

PRICE SCHEDULE 11 KV, 1010 KVA Green, Silent DG set

Sl. No.	Description of the work		Unit	Qty	Unit Rate (in Rs.)	Amount (in Rs.)
1	Supply & Installation of outdoor type 11 kV, 1500 r.p.m., 3 Phase, 50Hz , 1010 kVA acoustic enclosure Green, Silent, Diesel Generator Set complete with all accessories including power pack (battery + charger) as detailed in 'Technical Specification'.					
	a)	Supply	Set	2		
	b)	Installation, Testing & Commissioning	Set	2		
2	Supply & Installation of Microprocessor / PLC based Auto-Mains failure (AMF) panel with distribution cubicle switchboard (Load Distribution Panel) , including all accessories, as detailed in 'Technical Specification'.					
	a)	Supply	Set	2		
	b)	Installation, Testing & Commissioning	Set	2		
3	Supply & Laying of HT 11 KV (UE) grade 1C X 1000 mm2, XLPE insulated XLPE, Aluminium armoured type Power Cable [from DG Set to AMF panel and AMF panel to Load distribution panel (VCB)] , as detailed in 'Technical Specification'. VCB Specification: 11 KV, 630 A VCB, 25 KA for 3 Sec.					
	a)	Supply	m	600		
	b)	Laying, Testing & Commissioning	m	600		
4	End Termination of HT 11 KV (UE) grade 1C X 95 mm2, PVC insulated XLPE, Aluminium armoured type Power Cable [as detailed in 'Technical Specification' including supply of Cable Jointing kits.					
	a)	Supply	Set	12		
	b)	End termination, Testing & Commissioning	Set	12		
5	Supply & Installation of Control cable (XLPE, 1.1 kV grade, PVC insulated copper armoured cable) with terminations for the said cable.					
	a)	Supply				
		16 C X 2.5 mm^2	m	500		
	b)	Laying, Testing & Commissioning				
		16C X 2.5 mm^2	m	500		
6	Making of suitable civil (RCC) foundation with base frame for installation of acoustic enclosure (with 1010 kVA D.G. set) , including construction of uniform platform of suitable size, as detailed in 'Technical Specification'.		LS	2		

7	Providing earthing system for the DG set, using size 600 mm X 600 mm X 3.15 mm Copper flat plate buried in ground in a depth of 2 m. from ground level with alternate layer of charcoal & salt, including supply & fixing of 40 mm dia perforated GI pipe funneling for watering purpose and construction of masonry pit with metal cover, as per IS: 3043 as detailed in 'Technical Specification'.					
	a)	Supply	Set	4		
	b)	Installation, Testing & Commissioning	Set	4		
8	Supply and Installation of Hot Dip Galvanized (100 micron) flats of size 50 mm X 6 mm for earthing connections, as per Technical specification.					
	a)	Supply	m	200		
	b)	Installation, Testing & Commissioning	m	200		
9	Exhaust System including all pipeing & civil work as per scope of work for self supporting exhaust structure					
	a)	Supply	Set	2		
	b)	Installation, Testing & Commissioning	Set	2		
10	NGR along with NIS Panel for earthing the DG Set as per relevant standard system requirement.					
	a)	Supply	Set	2		
	b)	Installation, Testing & Commissioning	Set	2		
11	Part – B: Comprehensive Maintenance Contract (CMC): Comprehensive Maintenance Contract (CMC) of 11 KV DG set with full responsibility of carrying out schedule maintenance as per the recommendation of OEM and attending fault, as and when required and supply of required original spare parts / spares excluding fuel to keep the DG set in fully operational condition for a period of 5 (five) years, after expiry of 2 year's Guarantee Period.					
a)	1st year CMC		2	LS		
b)	2nd year CMC		2	LS		
c)	3rd year CMC		2	LS		
d)	4th year CMC		2	LS		
e)	5th year CMC		2	LS		