

"In pursuit of Excellence and Quality in Shipbuilding"



**निविदा आमंत्रण/
TENDER ENQUIRY**

**(एकल निविदा)/
(SINGLE TENDER)**

Garden Reach Shipbuilders & Engineers Limited

DIESEL ENGINE PLANT

(A Govt. of India Undertaking, Ministry of Defence)

An ISO 9001-2015 Plant

Plant Plaza Road, Dhurwa, Ranchi - 834 004

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CIN - U35111WB1934GOI007891

To:

Asian Infra-ventures Private Ltd, Singapore

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2. Name - Arunava Chatterjee, Sales Head – Oil & Gas, Marine
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Department: Purchase

Purchase Executive: Mr. Vasant Samir Minj, Mgr (PPS)

Telephone No: 0651-2401467, 0651-2401580

e-mail: Minj.VasantSamir@grse.co.in

Technical Executive- Mr. Sudarshan Tigga, Mg r(P&S)

e-mail Tigga.Sudarshan@grse.co.in,

PH +91 9264455061.

Tender No: DEP/VSM/IMP/ST/DIESEL ENGINE OBS/ARS/ET-3288

Tender Date: 24.09.2025

Tender Closing Date & Time: 07.10.2025, 12.00 Hrs. (IST).

Tender Opening Date & Time: 08.10.2025, 14:00 Hrs. (IST).

Tender Fee: Not Applicable.

EMD Amount: Not Applicable.

Validity of Offer Up To: 120 days.

Security Deposit: Not Applicable

Performance Bank Guarantee: 10% of ordered value with validity till Guarantee/ Warranty period with one month claim period is to be submitted by the supplier to GRSE along with the dispatch.

Kindly read & refer relevant terms & conditions for further details.

Dear Sir,

Subject: SUPPLY OF DIESEL ENGINE WITH OBS AND SHOCK & VIBRATION MOUNTS FOR ARS PROJECT

Garden Reach Shipbuilders & Engineers Ltd – Diesel Engine Plant invites bids for the following in SINGLE BID SYSTEM

SI No	Item Description	UoM	Quantity	Remarks
1	Supply of Caterpillar 3516C, IMO Tier II Engine rating 1940 bKW @ 1500 RPM with OBS, accessories and attachments suitable to be used as prime-mover of 1850eKW DG sets of ARS Project	Nos	04	Marine Type approved and Unit Certified by IRS & ABS; OBS as per list specified in SOTR
2	Supply of Shock & Vibration Mounts for two-stage mounting system so as to meet the vibration and SBN requirements of 1850eKW DG sets of ARS Project	Sets	04	Selection of mount model by M/s Caterpillar in consultation with OEM
3	Extension of Warranty 02 years	Job	01	Optional
4	Extension of Warranty 03 years	Job	01	Optional

Terms & Conditions as indicated in Part A of this tender and other enclosures / annexures form an integral part of this tender document. We look forward to receive your most competitive and reasonable offer against this Tender.

INSTRUCTIONS TO BIDDER

1. PREAMBLE.

- (a) Garden Reach Shipbuilders & Engineers Ltd is India's leading Shipbuilding Company with ISO 9001:2015 accreditation.
- (b) Garden Reach Shipbuilders & Engineers Ltd - Diesel Engine Plant invites e-offers in single bid system from **M/s Asian Infra-ventures Pvt Ltd, authorised dealer representative of M/s Caterpillar Inc.,** through GRSE e-procurement portal for Diesel Engines with OBS & S&V Mounts suitable to be used as prime-mover of 1850eKW DG sets of ARS Project.

2. **DESCRIPTION OF WORK**. Supply of Diesel Engine with OBS and Shock & Vibration Mounts for ARS project.

3. **SUBMISSION OF OFFER IN SINGLE BID**: Single bid is to be submitted with following enclosed:-

- (a) SOTR Acceptance Matrix, duly filled & signed as per Appendix-A.
- (b) Acceptance of Commercial Terms & Conditions, duly filled & signed as per Appendix -B.
- (c) Acceptance of Instruction to Bidders, duly filled & signed as per Appendix-C.
- (d) Acceptance of STAC, duly filled & signed as per Appendix-D.
- (e) Acceptance of GTAC duly filled & signed as per Appendix-E.
- (f) A blank copy of Price Bid (without mentioning prices) as per Appendix-F.
- (g) Bid Security declaration, duly filled & signed as per Enclosure-4.
- (h) Bank details for payment by RTGS/ NEFT, duly filled & signed as per Enclosure- 7.
- (i) Bidder contact details, duly filled & signed as per Enclosure- 8.
- (j) Document pertaining to Land Border Clause, duly filled & signed as per Enclosure- 9.
- (k) Integrity Pact, duly filled & signed as per Enclosure - 10
- (l) Price Bid in Excel template price bid format by inserting unit price only. No other attachment to the price bid will be reckoned. Excel sheet for price bid is marked as Appendix-G.

Note:- In any case it is mandatory to quote for all line items as per tender, then if it is found after opening of price bids that the price quoted for a particular line item is 'zero' or supplier has not quoted the price and left the price field blank, then supplier has to supply this/these items free of cost to GRSE.

4. **VALIDITY PERIOD OF OFFER**: Bid/ Offer shall have validity period of **180 days** from the tender closing date.

5. **BID SECURITY DECLARATION**: Bidders has to submit bid Security Declaration as per attached format (**Encl-4**) with stamp and sign.

6. **BID REJECTION CRITERIA**:

(a) **Categorical Rejection Criteria**: The following conditions/deviations are non-negotiable and therefore any bid falling under these conditions/deviations shall be summarily rejected. Bidders to note that they shall not be provided any opportunity to rectify these conditions/deviations post bid opening.

- (i) Bids received after tender closing date and time.
- (ii) Bid received other than through e-portal.
- (iii) Bidders who are debarred under PPPMII order 2017, GEM, CPPP Including Tender holiday issued by GRSE.

(b) **Liabe Rejection Criteria**:

- (i) Bidders not submitting Integrity pact (IP).
- (ii) Bidders Submitting Integrity pact with deviation in GRSE-DEP format, subject to approval of deviation.
- (iii) The original of the uploaded copy of Integrity pact if not received within specified period.
- (iv) Bidder's failure to submit sufficient or complete details, in case of deficiencies noticed for evaluation of the bids.
- (v) Incomplete/misleading/ambiguous bids in the considered opinion of Buyer.
- (vi) Bids with technical requirements and/or terms not acceptable to GRSE-DEP/ Customers/External agency nominated as applicable.
- (vii) High seas sales/Sales in transit.
- (viii) Validity period indicated by bidders is shorter than that specified in the tender enquiry.
- (ix) Bidders not agreeing to furnish required Security Deposit / Required Contract Performance Guarantee till completion of the supplies/services as per contract.
- (x) Bidder not agreeing to furnish Performance Bank Guarantee for Equipment supplied or not agreeing for retention of equivalent amount by GRSE-DEP up to the period till completion of contractual & warranty obligations.
- (xi) Bidders not submitting Bid Security Declaration in the prescribed format.
- (xii) Non-submission of Compliance Certificate wrt Land Border Clause as per enclosed format (**Encl-9**).
- (xiii) Bidders not agreeing for Warranty period as specified in the tender.
- (xiv) Any deviation sought, which is not accepted to GRSE-DEP.

(c) **Breach of Obligation Clause with respect to Bid Submitted**: In case of breach of any obligation mentioned under, the bidder shall be disqualified/ debarred from the bidding process for a period of one year from the date of notification:-

- (i) Bidder has withdrawn/modified/amended/impaired / derogated from the tender during the period of bid validity.
- (ii) Bidder fails or refuses to execute the contract upon notification of acceptance of Bid by the purchaser during the period of bid validity.

7. **DELIVERY TERMS & PRICING:**

- (a) Delivery Terms: CIF, Kolkata Port
- (b) Prices of all items of B&D spares listed in the price sheet are to be quoted for delivery as per above Incoterms. Deviation in these Incoterms are not acceptable.
- (c) The prices quoted shall remain firm and fixed during the currency of the order/ contract unless agreed otherwise by GRSE.
- (d) Packing details such as size, weight etc. of the equipment/ items to be mentioned and each item to be endorsed/ stamped by Inspection Agency.

8. **TAXES & DUTIES:**

- (a) Bidder must clearly mention the applicable Taxes & Duties in the rate sheet enclosed in the tender.
- (b) Taxes & duties as applicable to be borne by Buyer & Seller in their own country i.e GRSE will bear the taxes & duties applicable within India and for outside India same will be borne by seller/bidder.

9. **MODE OF DISPATCH:** Air/ Sea

10. **CONSIGNEE:**

- (a) Ordered items are to be delivered at following address:-

Garden Reach Shipbuilders & Engineers Ltd
Diesel Engine Plant
Plant Plaza Road, Dhurwa
Ranchi – 834 004

Note:- In order to avoid inconvenience during the delivery of material, it is advisable for supplier to depute their representative in their own interest to coordinate the activities between the transporter and stores.

- (b) The consignment must be delivered by giving at least 15 days' advance notice to GRSE-DEP clearly indicating weight, dimensions of the consignment etc.
- (c) The following Documents should be sent along with the consignment of B&D Spares as applicable:-
 - (i) Copy of GRSE-DEP Purchase Order & subsequent amendments issued to it, if any.
 - (ii) Copy of Invoice.
 - (iii) Inspection Release Note (IRN) issued by nominated inspection officer.
 - (iv) Delivery Challans clearly indicating GRSE-DEP Purchase Order No, Inspection Note Details and Packing List co-relating the items in the inspection report.
 - (v) Copy of Warranty Certificate, Preservation Certificate etc. as relevant.

11. **DELIVERY PERIOD/ COMPLETION SCHEDULE:**

- (a) Delivery period 08 months w.e.f the date of placement of order.
- (b) **Part Delivery:** Part Supply Part Payment PSPP (03 lots).

12. **ADDITIONAL INSTRUCTIONS:** Bidder shall abide by all Standard Terms and Conditions of Supply (STACS), GT&C and Tender Acceptance formats with offer. The bidder shall also abide statutory requirements, Official Secret Act 1923 and Safety clause hosted on GRSE Website.

13. **INSPECTION:** Engines are to be type approved and unit certified by IRS and ABS.

14. **PAYMENT TERMS:**

- (a) 100% payment of the Purchase Order for material value shall be made by irrevocable Letter of Credit (L/C). L/C will be opened on receipt of your Pro-forma Invoice. Performance Bank Guarantee (PBG) for 10% of ordered value with validity till Guarantee/ Warranty period with one month claim period is to be submitted by the supplier to GRSE along with the dispatch documents on receipt of which a certificate shall be issued by GRSE. Following documents are to be submitted to Bank for negotiation of payment against L/C immediately after shipment in original along with 03 extra copies of each documents:-
 - (i) Signed invoice.
 - (ii) Clean and clear bill of lading.
 - (iii) Certificate of Country of Origin, in triplicate, issued by Chamber of Commerce.
 - (iv) Guarantee/ warrantee Certificate in triplicate.

- (v) Manufacturer's Test Certificate.
- (vi) Bundle wise list of packing.
- (vii) GRSE's certificate as to receipt & acceptance of Performance Bank Guarantee for 10% value of Order.
- (viii) OEM's Certificate of Conformance

Note1: All the documents must clearly indicate the GRSE Purchase Order No., Import License No.

15. BANK CHARGES:

- (a) All normal Bank Charges in India will be borne by GRSE and Bank charges outside India will be borne by the supplier.
- (b) LC shall be negotiable through any correspondent Bank of GRSE Bankers in the supplier's country. LC confirmation charge where required, will be borne by the supplier.
- (c) Bank Charges for extension of LC required due to Supplier's fault shall be borne by the supplier.

16. WARRANTY/ GUARANTEE:

- (a) The items supplied shall be warranted / guaranteed for satisfactory Performance for the period of 36 months from date of receipt and acceptance by GRSE or 12 months from the date of commissioning.
- (b) The Warranty for the spares supplied shall be limited to back-to-back basis and the Warranty obligations flow down to NPOL. This means that if ship is delivered to NPOL by shipyards and at that time the warranty exists, then the balance warranty period of the spares shall be extended to NPOL.
- (c) The Supplier cannot absolve their responsibility for warranty of material even though it is inspected by & approved by the inspection authorities.
- (d) If the defects are not remedied within a reasonable/stipulated time, GRSE-DEP/ IN may proceed to rectify the defects at the supplier's risk & cost, but without prejudice to GRSE-DEP's rights under the contract.
- (e) During the period of warranty / guarantee if any defect noticed in the item supplied, the supplier/ contractor will have to rectify such defects immediately at no extra cost to GRSE-DEP/ IN.

17. PERFORMANCE BANK GUARATNEE:

- (a) The bidder has to submit Performance Bank Guarantee from a Nationalized/Scheduled Banks for 10% of total order value excluding taxes & duties valid up to contractual warranty period plus one-month claim period. Submission of BG from any other Bank will not be accepted.
- (b) In the event of defects due to poor workmanship leading to nonperformance of the Equipment/Item and bidder failure to attend the defects within a reasonable period of time, the Bank Guarantee will be encashed by GRSE-DEP. GRSE-DEP decision in this regard shall be final and binding on the bidder. In the event of postponing of delivery of deliverables or extension of guarantee desired & sought by GRSE-DEP, the Performance Bank guarantee has to be extended till the extended period.

Note:-

- (i) The PBG to be submitted on Rs. 500 Non-Judicial Stamp Paper.
- (ii) All the bank guarantees of this tender should be from Nationalized/Scheduled Banks excluding the Co-Operative banks.
- (iii) Security Deposit will be returned without interest on full execution of the order against firm's request letter.

19. LIQUIDATED DAMAGES (LD): In cases of delay not attributable to Purchaser, beyond the agreed schedule, the Supplier/Contractor shall pay LD, a sum representing 0.5% (Half percent) per week or part thereof, subject to maximum of 5% of the delayed portion of the order/contract. In case the undelivered / unfinished portion of the order results in to non-utilization / ineffective utilization of delivered portion, in such cases LD shall be applicable on the total value of deliverables.

20. LAND BORDER:

- (a) This clause is applicable for bidders from a country which shares a land border with India" for the purpose of this order means: -
 - (i) An entity incorporated, established or registered in such a country; or
 - (ii) A subsidiary of an entity incorporated, established or registered in such a country;
 - (iii) An entity substantially controlled through entities incorporated, established or registered in such a country; or
 - (iv) An entity whose beneficial owner is situated in such a country; or
 - (v) An India (or other) agent of such an entity; or
 - (vi) A natural person who is a citizen of such a country; or
 - (vii) A consortium or joint venture where any member of the consortium or joint venture falls under any of the above.
- (b) Bidders from a country sharing land border with India shall Mandatorily requires registration with registration Committee by the Department for promotion of Industry and Internal Trade (DPIIT). Registration shall not be

applicable for the bidders from those country to which the Government of India has extended Line of credit or in which the government of India is engaged in development project.

(c) Order issue by ministry of Finance department of expenditure Vide OM 6/18/2019PPD dated 23 July 2020 and 24 July 2020 shall be applicable.

21. **INTEGRITY PACT (IP):** The Integrity pact essentially envisages the agreement between prospective vendors / bidders & buyers committing the person/officials of both the parties not to exercise any corrupt influence on any aspects of the contract. Only those vendors/bidders who enter into such an integrity pact with the buyer would be competent to participate in the bid. Therefore, non-acceptance and non-submission of IP by the vendors/bidders shall be liable to rejection. The format of Integrity Pact is enclosed with tender documents (Encl-10). IP shall be submitted on plain paper. The 'Integrity Pact' dully filled as per enclosed format to be submitted along with the offer. Bidders to ensure that every page of IP is ink signed with company seal/stamp. The original of the uploaded copy of IP shall reach GRSE-DEP within 07 days of Tender Opening date.

22. **INDEPENDENT EXTERNAL MONITORS (IEM):** The following Independent External Monitors (IEMs) will have the power to access the entire project document and examine any complaints received by him. In case of any change in IEMs it will be informed accordingly.

(a) Shri Lov Verma, IAS (Retd.),
B-12, Second Floor,
Green Park Extension,
Near Uphar Cinema,
New Delhi – 110016
Email: lov_56@yahoo.com

(b) Shri Debashis Bandyopadhyay,
Ex- Director (HR), BHEL
B1001 Prateek Wisteria,
Sector 77, Noida
Uttar Pradesh – 201301
Email: debashis9999@gmail.com

23. **OPTION CLAUSE:** GRSE-DEP retains the right to place orders for additional quantities up to a maximum of 50% of the originally contracted quantity at the same rate and terms of the contract. Such an option shall be available during the original period of contract. Option quantity during extended delivery period is limited to 50% of balance quantity after original delivery period.

24. **BOOK EXAMINATION CLAUSE:** In case it is found to the satisfaction of the BUYER that the seller has engaged an Agent or paid commission or influenced any person to obtain the contract as described in clauses relating to Agents/Agency commission and penalty for use of undue influence, the seller, on a specific request of the buyer shall provide necessary information/Break-up data/ inspection of the relevant financial documents/information.

25. **E-PORTAL AND E-TENDER GUIDANCE:**

- (a) Instructions to the Bidders to visit <https://eprocuregrse.co.in> and submit the bids online.
- (b) The Digital Signature Certificate (Class III Certificates with signing key usage) issued by SIFY/TCS/n Code / e-Mudra or any Certifying Authority recognized by CCA India one Token/ Smart Card, should be registered.
- (c) Any clarifications may be obtained online through the tender site, or through the contact details.
- (d) Bidder should take into account the corrigendum published before submitting the bids online.
- (e) It will be the bidder's responsibility to check the status of their Bid on-line regularly after the opening of bid till award of work.

26. **CONTACT DETAILS FOR QUERIES:** In case of any clarifications regarding tender condition/TSP/specification, bidders are requested to contact the following person, before the closing date of the tender.

Technical	Mr. Sudarshan Tigga, Mg r(P&S)	Tigga.Sudarshan@grse.co.in
Commercial	Mr. Vasant Samir Minj, Mgr (PPS)	Minj.VasantSamir@grse.co.in

We look forward to receive your most competitive and reasonable offer against this tender.

GENERAL MANAGER (I/C-DEP)
M/s. GARDEN REACH SHIPBUILDERS & ENGINEERS LTD.,
DIESEL ENGINE PLANT, PLANT PLAZA ROAD, DHURWA,

ENCLOSURES:

Enclosure-1	SOTR
Enclosure-2	Standard Terms & Conditions (STACS)
Enclosure-3	General Terms & Conditions (GT&C)
Enclosure-4	Bid Security Format
Enclosure-5	Security Deposit Bank Guarantee format (SDBG)
Enclosure-6	Performance Bank Guarantee (PBG) format
Enclosure-7	RTGS format
Enclosure-8	Contact Details of the Bidder
Enclosure-9	Land Border Clause Format
Enclosure-10	Integrity pact

STATEMENT OF TECHNICAL REQUIREMENT (SOTR)

1. **Scope of Work.** The scope of work involves following:-

SI No	Item Description	UoM	Quantity
(a)	Supply of Caterpillar 3516C, IMO Tier II Engine rating 1940 bKW @ 1500 RPM with OBS, accessories and attachments suitable to be used as prime-mover of 1850eKW DG sets of ARS Project	Nos	04
(b)	Supply of Shock & Vibration Mounts for two-stage mounting system so as to meet the vibration and SBN requirements of 1850eKW DG sets of ARS Project	Sets	04
(c)	Extension of Warranty 02 years (Optional)	Job	01
(d)	Extension of Warranty 03 years (Optional)	Job	01

2. **Basic Technical Requirements.**

(a) The engine is required to meet the technical criteria specified in the Technical Specifications of the 1850eK DG Sets placed at **Appendix-A**.

(b) The engines are to be marine type approved and Unit Certified by IRS and ABS.

(c) Following are to be included in the engine package:-

Quantity	Feature Description
1	PRIME POWER APPLICATION
1	1500 RPM
1	2602 BHP (1940 BKW) W/O FAN
1	RIGHT HAND SERVICE SIDE. Provides right-hand service oil fill for 1500 RPM offering.
1	GREEN PASSPORT DOCUMENTATION - In accordance with the International Maritime Organization (IMO) guidelines on safe and environmentally sound recycling of ships, Supplier Declaration of Conformity (SDoC) documents are available.
1	IMO GL ENGINE CERTIFICATE 2501-3000 HP
1	IRS ENGINE CERTIFICATE 2401-2650 BHP
1	ENG MTD PLATE HEAT EXCHANGER - Cat engine mounted plate-type heat exchanger. Separate circuit. Includes expansion tank, seawater pump, coolant level sensor, and water level switch gauge.
1	WATER LEVEL SWITCH GAUGE - Shipped loose. Provides switch and hoses with connections, not wired.
1	WL GGE & COOL LVL HARN RH HEX- Installed. Provides sensor and switch and hoses with connections, not wired.
1	1000HR OIL PAN-RH-FLAT/REAR DOWN - RH service 1000-hour oil change interval oil pan. Engine mounted flat or rear down.
1	PRIMARY FUEL FILTER - Shipped loose.
1	SUMP PUMP - 1000 HR PAN – Shipped loose.
1	FUEL COOLER HEAT EXCHANGER - Shipped loose. Required if customer supplied small day tank is used. TECHNICAL: Heat exchanger is a titanium plate and frame type. 5 to 10 gpm (19 to 38 lpm) flow rate from customer supplied water source with a maximum water temperature of 110° F (43° C). Pressure drop at 5 gpm (19 lpm) is 3.2 psi (22 kPa) drop at 10 gpm (38 lpm) is 12.1 psi (83.4 kPa). Four (4) x 1 ¼ inch NPT connections for customer connection points. Heat exchanger size is 7.1 in (181 mm) x 18.9 in (480 mm) x 7.7 in (195 mm). For use with sea water, fresh water, or treated water. NOTE: NO BIODIESEL FUELS
1	MARINE ALARM & PROTECTION - Provides engine oil filter inlet pressure, filtered fuel pressure, engine oil block inlet pressure, JW pressure and other sensors required to meet marine alarm and protection requirements.
1	3M MA&P INST PANEL CONN HARNESS - Shipped loose. TECHNICAL: Provides 3-meter harness for instrument panel connection.

1	ALARM KIT-LECP III (BEACON) (RED) -Shipped loose. Provides red beacon for the LECP III alarm and protection panel.
1	3M STAND INST PANEL CONN HARN - Shipped loose. TECHNICAL: Provides 3-meter harness for instrument panel connection.
1	PD BOX JUMP HARN EXTENSION 3M Shipped loose. Technical: Provides 3M (9.8 ft) connection cable from the engine wiring rail to the remote-mounted power distribution box.
1	SHUTOFF CONTACTORS - LH MOUNT - Provides LH mounted shutoff contactors for Marine Alarm and Protection system. TECHNICAL: Oil pressure and water temperature.
1	PREMIUM POWER DISTRIBUTION BOX- Shipped loose. Technical: 30" X 20" X 10"(762mm X 508mm X 254mm) Premium Power Distribution Box. Configurable with Alternator, Prelube, & Elec starter options. Underside gland plate for access. Premium Power Distribution Box contains DC to DC converter. Note: Power Distribution Box is shipped loose and requires off-engine mounting.
1	AIR START MOTOR LH/SR W/MAP - Includes 14-26 volt DC overspeed control module, solenoid valve, Relay valve, air pressure regulator, and Y-strainer. NOTE: Includes air pressure regulator, which is recommended if air supply exceeds 1034 kPa (150 psi). Maximum system pressure for the air pressure regulator is 31 bar (450 PSI) Upstream installation and use of #300 mesh (40 microns) Y-strainer, which is also included, is required to protect the air starter from hard contaminants
1	DAMPER COVER - Provides damper cover for metallic damper guard when no stub shaft is required.
1	CHARGING ALT 24V 60 AMP - Belt driven. Heavy duty with integral regulator, belts, belt guard, mounting, and wiring. TECHNICAL: RH mounted.
1	AIR INLET ADAPTER-ROUND - Shipped loose. TECHNICAL: Metal material. 305 mm (12 in.) round ID inlet.
1	URH ACC DRIVE-ALT/FR SHAFT - Provides upper right hand drive and front shaft to be used with an alternator.
1	ENGINE BARING GP-RH - Manual engine barring device mounted in the RH opening of the flywheel housing. Used to manually turn engine crankshaft.
1	ALTERNATOR JUMPER HARNESS-3M -Shipped loose. Technical: Provides 3M (9.8 ft) starter control cable from the electric starting motor to the remote-mounted power distribution box.
1	LARGE FR TURBO CLEANER MTG-Y - Provides 7" Cat Yellow air cleaners for use with large frame turbos.
1	ELBOW - 305 MM (12") - Shipped loose. Weldable, 90-degree bend.
1	FLEXIBLE EXHAUST FITTINGS - Shipped loose. Includes one set hardware and gasket to bolt to engine. TECHNICAL: 12 in (305mm) x 12 in (305 mm) long with 12 bolt flanges at both ends.
1	EXHAUST FLANGE - 305 MM (12") - Shipped loose.
1	FLANGE/EXH EXPANDER 12" – 14" - Shipped loose. TECHNICAL: 12 to 14 in (305 to 356 mm)
1	VERTICAL EXHAUST - 1600 RPM - Provides vertical exhaust elbow and soft heat shielding.
1	LOAD SHARING MODULE - Shipped loose. NOTE: Cannot be used with Local Speed Throttle Control.
1	CATERPILLAR YELLOW PAINT
1	SPARE PARTS KIT-3516C AUX 1500 - Shipped loose.
1	DOMESTIC PACK -EXP CONTAINER - The engine is shipped in a container. The miscellaneous parts and attachments are boxed and shipped with engine.
1	PRESERVATION-GLYCOL SOULTION - Provides glycol solution in cooling system and vapor corrosion inhibitor in internal engine compartments. Protects engine and accessories from functional deterioration for a minimum of one year under outside storage conditions for ENGINE ONLY or an ENGINE WITH A BASE, RADIATOR OR EXPANSION TANK.
1	MCS GENSET TVA-NOT BV - Provides a custom genset TVA report with stamped approval from the required classification society (LR, ABS, DNV, RINA, etc, except BV). This is a torsional report for a custom generator powered by a Caterpillar engine. The report includes natural frequency calculation, mode shapes, vibratory amplitudes and stressed for both engine and generator. Coupling vibration levels are included for two bearing gensets.

1	STD ENGINE TEST REPORT - The test takes about one hour. Test results reported: Rack setting, full load fuel rate, full load brake horsepower, turbocharger boost (if applicable), lube oil pressure, RPM at rated speed and high idle
1	FUEL CONSUMPTION TEST - Special test for fuel rate and specific fuel consumption. These are determined at 3 points at rated speed. (Full load, three quarters load, and half load.)
1	283 SQFT-2604 SQFT SHRINKWRAP - Plastic shrink wrap provides approximately one-year external protection from moisture, sun and wind under transport and storage conditions. If engine is to be stored outside for an extended period of time, consider also specifying Storage Preservation.

(d) The make, model and quantity of the S&V mounts are to be decided by the bidder in consultation with the OEM of the S&V mounts to meet the vibration and SBN criteria of the DG set specified in the Technical Specifications of the 1850eK DG Sets placed at **Appendix-A**. The mounts are to be delivered along with the engines or before in good condition.

(e) The On-board spares to be supplied with the engines should include following:-

ITEM (OBS/ PARTS KIT)	PART NO	QTY	UNIT	REMARKS
MAIN BEARING	CAT-3558662	1	NOS	MAIN BEARING
PLATE THRUST	CAT- 7C6209	2	NOS	
BOLT	CAT- 7X7925	2	NOS	
VALVE-EXHAUST	CAT-4981593	2	NOS	EXHAUST VALVE
GUIDE VALVE	CAT-4497118	2	NOS	
SPRING VALVE	CAT-4500909	2	NOS	
SPRING VALVE	CAT-4500908	2	NOS	
LOCK-RETAINER (EXHAUST)	CAT-1977055	2	NOS	
SEAL-VALVE STEM (EXHAUST)	CAT-4497116	2	NOS	
SEAT-VALVE (EXHAUST)	CAT-4560411	2	NOS	
ROTO COIL AS (EXHAUST)	CAT-4497113	2	NOS	
VALVE INLET	CAT-4497120	1	NOS	
GUIDE VALVE	CAT-4497117	1	NOS	INTAKE VALVE
SPRING VALVE	CAT-4500909	1	NOS	
SPRING VALVE	CAT-4500908	1	NOS	
LOCK RETAINER	CAT-3750930	1	NOS	
SEAL-VALVE STEM (INTAKE)	CAT-4497115	1	NOS	
ROTO COIL AS (INTAKE)	CAT-4497114	1	NOS	
SEAT-VALVE (INTAKE)	CAT-4807205	1	NOS	
BEARING CONNECTING ROD	CAT-3558509	1	NOS	CONNECTING ROD BEARING
BOLT CONNECTING ROD	CAT- 7N2405	4	NOS	
BEARING SMALL END	CAT-3775237	1	NOS	
RETAINING RING	CAT-2531238	2	NOS	
PIN PISTON	CAT-2638955	1	NOS	
PISTON RING TOP	CAT-4889888	1	NOS	PISTON RING
PISTON RING INTERMEDIATE	CAT-4483651	1	NOS	
RING-PISTON (OIL CONTROL)	CAT-1656668	1	NOS	
TUBE AS-OIL JET	CAT-1989926	1	NOS	PISTON COOLING
BOLT	CAT- 1B2790	1	NOS	
INJECTOR GP FUEL	CAT-4575312	1	NOS	FIP
BOLT	CAT- 7F8698	1	NOS	
GASKET PLATE	CAT-1445692	1	NOS	GASKETS & PACKINGS
SEAL WATER	CAT-4200653	1	NOS	
SEAL WATER	CAT-4200652	1	NOS	
GASKET-CYLINDER HEAD	CAT-3628264	1	NOS	
SW PUMP KIT		1	NOS	ADDL AS DISCUSSED DURING TNC.
AUX PUMP KIT		1	NOS	

(f) Torsional Vibration Calculations (TVC) of the DG set is to be delivered by the bidder as a part of deliverables. The TVC is to be vetted by IRS and ABS.

(g) Following documents are to be delivered by the bidder:-

- (i) Type approval certificate and Unit certificate from IRS and ABS for engines.
- (ii) Green passport documentation.

- (iii) IMO GL engine certificate.
- (iv) FATs report.
- (v) Guarantee/ Warranty Certificate.
- (vi) Test report of the mounts.
- (vii) Country of Origin.

3. **Terms of Delivery.** CIF, Kolkata Port. The seller has to clear the items for export.
4. **Guarantee/ Warranty.** 36 months from the date of acceptance of DG sets by GRSE or 12 months from the date of commissioning of ship, whichever is later.
5. **Terms of Price:**
 - (a) Quoted Price shall be firm and fixed till full execution of the order.
 - (b) No price escalation is allowed at any stage. Quoted price must be inclusive of all charges like, "incidental charge" etc.
6. **Packing Instruction:** All material are to be properly packed to protect against ingress of water & dust and to withstand transit damages/ pilferages during transit. All packing/ cases should be properly identified and tagged. Packing should be of a very high quality and in sea-worthy rigid cases, duly tied with steel band to ensure full safety of the consignment in transit and also must be properly secured in position within the cases using suitable materials.
7. **Identification of Deliverables.** While dispatching each item should be identified with Firm's part number. Each item should be identified with Metallic or Plastic tag indicating both GRSE code number and Firm's part number. Packing list should indicate all deliverable items along with GRSE Purchase Order reference (Ser No of PO)
8. **Delivery Period:** Eight months from the date of placement of order.
9. **Shipping Marks:** The packing cases should be marked as:-
GRSE LTD. DEP RANCHI. PROJECT: B&D spares. CASE NO* DIMENSION.* GROSS WEIGHT*
NET WEIGHT * *TO BE INDICATED. CONSIGNOR'S NAME* PORT OF DISCHARGE - KOLKATA.
10. **Rejection Replacement:** Any equipment/ spares found defective/rejected, Supplier will collect the same from GRSE Stores, all incidental charges to be borne by them, within 30 days from the date of intimation to Supplier of such rejection. GRSE reserves the right to dispose of the rejected items at the end of a total period of 90 days in any manner to the best advantage to GRSE & recover storage charges and any consequence damage from sale proceeds of such disposal.

TECHNICAL SPECIFICATIONS OF 1850eKW DG SET**CHAPTER 1 - GENERAL INFORMATION OF THE VESSEL / EQUIPMENT**

1.0. **INTRODUCTION.** Acoustic Research Ship (ARS) is being designed and built by GRSE for world-wide service as per the requirements of NPOL. The new ship shall be used to carry out acoustic and oceanographic research activities. The design of the ship shall be in compliance to the Indian and international related to safety for the personnel, ship systems, scientific equipment and for the best possible protection of the environment. The vessel shall be propelled with two azimuth thrusters (FPP) which will meet the DP-2 requirements and two bow thrusters.

1.1. **PRINCIPAL PARTICULAR.**

Length over all	96 m
Length between perpendiculars	88 m
Breadth molded	18 m
Depth to main deck	7.70 m
Design Draught	5.50 m
Max speed	12 Knots @85% MCR
Displacement	5556 T
Endurance	30 days transit at 12 knots
Complement	120 personnel
Dynamic positioning -	DPs 2-ABS

1.2. **CLASSIFICATION.**

- The vessel shall be classed with INDIAN REGISTER OF SHIPPING (IRS) as the primary class and AMERICAN BUREAU SHIPPING (ABS) as secondary class with the following notations.
- AMERICAN BUREAU SHIPPING (ABS)
✕A1, Acoustic Research Vessel, SPS (E), ✕AMS, ✕ACCU, ✕DPS-2, UWN (AT), UWN(R), ENVIRO, HAB(WB), VIB-M, NBLES, CR.
- INDIAN REGISTER OF SHIPPING (IRS) ✕ SUL, SPECIAL PURPOSE SHIP, URN(NR), CMF(C3), ACOUSTIC RESEARCH VESSEL, SPECIAL GOVT SERVICE. ✕ IY, IBS, DP(2), CLEAN SEA, CLEAN AIR.

1.3. **ENVIRONMENTAL CONDITION.** The ship is to be designed to meet following environmental conditions:-

- Seawater temperature: 0°C to 32°C.
- Ambient air temperature Summer Primary: 35°C at 70% rel. humidity.
- Ambient air temperature Summer Secondary: 41°C at 50% rel. humidity.
- Maximum air temperature winter: 8°C.

1.4. **ELECTRIC POWER SYSTEM.** Broad specifications of the Electrical Power System shall be as follows:-

- Diesel generators: AC 690V, 3 phase, 50 Hz.
- Main power supply: 415V, 3phase, 50Hz.
- Lighting: AC 230V, 50 Hz.
- Emergency power: AC 690V, 50 Hz.
- Emergency lighting: AC 230V, 50 Hz.
- Clean power/ UPS navigation and communication.: AC 230V, 50 Hz, DC 24V.
- Control circuit: AC 230V, 50 Hz, DC 24V.
- Control and monitoring: AC 230V, 50 Hz, DC 24V.
- Socket outlets: AC 230V, 50 Hz.
- Clean power/UPS scientific (UPS/Converter) : AC 230V, 50 Hz.

CHAPTER 2 - TECHNICAL SPECIFICATIONS OF DG SET

2.0. GENERAL TECHNICAL REQUIREMENT.

- (a) 1850eKW X 04 nos Diesel gensets.
- (b) Diesel Engine coupled with Alternator using suitable flexible coupling and mounted on suitable common base frame with double stage mounting system.

2.1. TECHNICAL REQUIREMENTS.

Parameters of Diesel Engine	
Rating	1940bKW @ 1500 RPM
Model	CAT 3516C
Fuel	Low Sulphur High Flash High Speed Diesel (LSHFHSD)
MARPOL Compliance in respect of NOx emission	MARPOL 73/78 Annex. VI, IMO Tier II
Starting	Direct compressed air
Cooling	2-stage cooling as follows- Fresh water/coolant will cool the engine and Sea water will cool the fresh water/coolant.
Fuel consumption(gm/kW-hr.)	196.9 g/KW-h
Lube oil consumption (gm/kW-hr.)	0.11 g/KW-h
Recommended lubricating oil	15W40 APICH4
TBO (hrs)	18000 hrs
Lub-oil system (wet sump engine) mounted on engine (One engine driven lube oil pump, priming pump, dip stick, low level alarm, other instrumentation as per class, duplex type filter with changeover without stopping engine and set of bellows.	One set for each engine with necessary safeties and alarm. Pre-Lub pump, if required, also to be supplied with bypass facility at the time of emergency starting.
Engine Driven LT pump	1 no per engine (KW rating to be specified by OEM)
Engine Driven HT pump	1 no per engine (KW rating to be specified by OEM)
Governor	Electronic Governor meeting class specifications
Crankcase ventilation	Open crankcase ventilation
Over speed protection	Engine speed not to exceed rated speed by 15%
Type approval	Marine type approved by ABS & IRS
Protection for Engine	As per class rule.
Automation (Protection & Instrumentation)	To comply with relevant class notations.
Maintenance routine	TOH- 9000hrs; MOH- 18000hrs
Dry weight (kg)	7961 kgs
NOx Emissions	IMO MARPOL Tier II compliance duly meeting all applicable class rules
Noise attenuation including silencer	35 dB
The Generator engine RPM and speed shall be from dual sensors.	
Parameters of Main AC Alternator	
Silent pole brushless synchronous Marine Duty AC Alternator (Class Type approved)	
Continuous Rating	1850 KW
Model	Marine type approved model. To be indicated by OEM
Speed	1500 or as suitable (to meet the frequency 50Hz).
System	690 V, 3 phase, 50 Hz
Rated P.F.	0.8
Protection	IP44
Type	Horizontal shaft, foot mounted, Salient pole, Brushless, Synchronous, Horizontal Shaft, Foot Mounted, with AC exciter, PMG, and Air Cooled.
Double Bearing	Two end frames mounted. Self- lubricated. Sleeve bearing, insulated to prevent the flow of shaft current.

Insulation	Class - F insulation with Class - B Temperature rise in accordance with Class rules.
Ancillary fittings	6-stator embedded temperature sensor –PT 100/1000 Type
Bearing Temperature sensor	PT-100/1000 Type
Air circuit temperature sensor	PT-100 Type
Cooling	Air cooled. However, any technical limitation for air cooling, envisaged by OEMs to be brought out during pre-bid for clarification.
Excitation panel	- Generator mounted excitation panel shall be provided for excitation control of generator. - AVR & other accessories to be fitted in excitation panel. - Provision needs to be catered in Excitation Panel/LOP for transmitting signals like AVR Failure, AVR ON, Diode Failure Indication etc. to PMS. - Motorized Voltage trim potentiometer, single/parallel switch, QDC potentiometer to be supplied loose for fitting in switchboard.
Space heaters	Space heaters to be installed in the frame of each generator to prevent the condensation of moisture when the generator is idle and fed from 230V AC source and interlocked with generator circuit breaker.
Paralleling operation	Designed for continuous unattended parallel operation.
Terminal box	Protection IP 44 Brass cable entry glands. Separate terminal box to be provided for power & control cables Terminal plate to be of non-magnetic material to Cable glands included in scope of supply
Type approval	Marine type approved by Class
AVR	Single AVR; Spare AVR in OBS.
Reactance	To be optimized and matched to system.
Dry weight (kg)	To be indicated by OEM
Excessive Temperature Warning	The generators should be fitted with temperature sensors to provide excessive temperature warning for high temperature of stator winding, bearings, cooling air etc. Above sensors shall have the facility to interface with local control panel followed by remote positions.
Output Data:	Alternator maker's should furnish the following details: - Rated Efficiency - stator resistance - stator reactance - Synchronous Reactance (Direct Axis) - Transient Reactance (Direct Axis) - Sub-transient Reactance (Direct Axis) - Negative Sequence Current* - Transient open-circuit time constant (Direct Axis) - Sub-transient open-circuit time constant (Direct Axis) - Transients short-circuit time constant (Direct Axis) - Sub-transient short-circuit time constant (Direct Axis) - DC Time constant of synchronous machine - Armature short circuit time constant
BROAD SPECIFICATION FOR LOCAL CONTROL PANEL (LCP):	
LCP description:	One Local control cum audio/video panel for each main DG set should be in the scope of OEM. PLC based local control panels with LCD screens should be supplied. The parameters will be displayed in digital on the LCD screen. The OEM should provide the dimensions of local control panel.
Quantity	One per DG set
Model	Marine Type Approved
Mounting	Bulkhead mounted on suitable mounts
Operating Voltage	24V +/- 2V DC
Display	HMI

Features of LCP	HT fresh water temperature Digital HT Fresh water temperature gauge on LCD panel
	Lub oil pressure Digital Lube oil Pressure gauge on LCD panel
	LT fresh water pressure Digital LT Fresh water pressure gauge on LCD panel
	Starting air pressure Digital Starting air pressure gauge on LCD panel
	Fuel pressure Digital Fuel oil pressure gauge on LCD panel
	Lub oil temperature Digital Lube oil temperature gauge on LCD panel
	Engine speed Digital tachometer for engine speed on LCD panel
	Sea water pressure
	Hour meter
	Starting switch (24V DC)
	Voltage
	Start/ Stop push button
	Remote/ Local selector switch
	Exhaust temperature gauge for each bank
	Low Lub oil pressure (Alarm & Trip)
	High HT freshwater temperature (Alarm & Trip)
	Over speed (Trip & Reset)
	Emergency stop (push button with protection)
	Low level in expansion tank (Alarm)
	Remote/ Local start indication
	Power ON/ OFF Indication
	High Lub oil temperature (Alarm)
	Priming pump on / off switch cum indication.
	Audible Hooter to be provided for all the alarms.
	Fuel filter differential pressure
	Shut-down override. As per Class Rules
	Lub Oil filter differential pressure
	Temperature of stator windings
	DE and NDE bearing temperature
	Low fresh water pressure (Alarm)
	Low starting air pressure (Alarm)
	Exhaust temperature for each bank (Alarm)
	Low Voltage (Alarm)
	High temperature of stator windings (Alarm)
	High bearing temperature (Alarm)
	Pre-lub pump ON/ OFF switch cum indication
Potential free contacts	Outputs parameters of the above to be provided (where necessary) for control & monitoring using Remote Control System (RCS)
Interface with RCS	Output for RCS to be provided with suitable signal isolators for satisfactory interface
Auto start from blackout	Software/hardware signal to be configured to permit Auto start from blackout.
Software & hardware signals	Provision for adequate no. of software & hardware signals to be arranged in local control panel for interfacing with power management system & CCAMS. Number & type of hardware & software signals required will be communicated to the DG manufacturer during drawing approval of DG set.
Type approval	Marine type approved by CLASS

Another requirement	(i) The duplex lube oil filter arrangement to be such that it could be changed over from the used to the standby one without stopping the engine. (ii) Gauges of critical parameters to be analogue type as required by class. (iii) Potential free contacts/necessary outputs for all the above to be provided for providing control/ monitoring from Remote control system. (iv) Laminated wiring diagram for alarm I control panel to be provided. (v) All pressure transmitters, pressure switches, sensors in the scope of supply of main D.G. set should give the signals as follows. - Oil and water temperature: PT 100, 3 wires. - Oil Pressure: 4 to 20 mA. - For levels: digital contacts suitable for 24 V DC /10 mA (vi) Any deviation on above to be clearly indicated with values/specification. (vii) Facility for Display/alarm for temperature of stator windings, bearings, air circuit temperature, cooler leakage etc. to be provided in the local control panel.
Other Accessories (any deviation or alternate arrangement to be indicated by OEM)	
Common base frame	Suitable for installation of engine and alternator
Exhaust Gas Bellow	As required and recommended by OEM
Bellows	For SW, FW, LO & FO piping connections
Flexible hoses	For compressed air connections/
Exhaust Gas Silencer with spark arrester with resilient mounting. (Damping Capacity = 35 dBA).	1 set per engine
All engine external connections are to be provided with flexible pipes with matching mating flange/ adaptor complete with fasteners. Fuel line to be provided with fire retarded hose	One set per each DG
Fresh water-cooling system on each engine including gauge and low-level alarm (mounted on engine)	1 set per engine (KW ratings for pump to be specified by OEM).
Fuel oil System shall be fed from daily service tanks, through Duplex strainer, engine mounted duplex filters, Booster pump; Fuel oil leakage from nozzles shall be led to fuel oil drain tank with high level alarm, electronically controlled system.	1 set per engine with necessary safeties and alarm. (Requirement of Fuel oil priming pump to be in accordance with class requirement).
Flywheel cover	1 set for each engine.
TVC	To be done by OEM (Approval by class to be arranged by OEM)
Protection for Engine & Alternator	As per class
Automation (Protection & Instrumentation) Refer, clause 2.1.15)	To comply with SYJ/ ACCU notations.
Corrosion Inhibitor/ coolant	Per DG set
Lifting Beam	01 no / shipset
Hand turning Gear / rod	Per each DG
Flexible expansion bellows in exhaust pipe inside funnel	As required & recommended by OEM
Exhaust end connection compensators	As required & recommended by OEM
Flexible pipe connection, spare set	01 spare set of flexible hoses including one for each type of pipe connections on engine(s)
Signals from pressure transmitters, pressure switches, sensors in the scope of supply of main DG	(a) Oil and water temperature: PT 100, 3 wires. (b) Oil Pressure: 4 to 20 mA. (c) For levels: digital contacts suitable for 24 V DC /10.
EMI/ EMC	Electronics components to comply IEC 60533 concerning EMC
Electro Static Discharge (ESD)	System design for ESD control and protection at PCB/ module/ assembly and unit level

2.3 ENGINE SYSTEM DETAILS (FOR EACH DG SET). [INDICATIVE LIST]

2.3.1 Air Intake System Items Required:

- a) Intake Air Filter – Engine Mounted
- b) Air Intake Manifold –Engine Mounted
- c) After cooler –Engine Mounted
- d) Vacuum Indicator –Mounted on Intake Piping

2.3.2 Exhaust System Items Required:

- a) Exhaust Manifold – Dry Type –Engine Mounted
- b) Exhaust gas turbocharger
- c) Exhaust Bellow from each Bank of engine with counter flange & fasteners
- d) Stainless Steel bellows with companion flanges & fasteners for common exhaust outlet –as required.
- e) Exhaust Y-Pc./ connection Pc. with counter flanges and fasteners if applicable as per manufacturer design to be provided (Detail to be finalized by OEM after discussion with GRSE).
- f) Exhaust silencer with spark arrestor (35 dbA) with Steel Counter Flange & Fasteners.
- g) Exhaust temp. sensor at each Bank for remote indication (Refer Instrumentations).
- h) Exhaust sensor for temp. alarm for each bank (Refer Instrumentations).
- i) Flexible expansion bellows in exhaust pipe inside funnel.

2.3.3 Fuel System Items required:

- a) Duplex fuel filter with differential pressure indicator with alarm contact – base rail mounted.
- b) Fuel Pump with electronic governor – engine mounted.
- c) Fuel injectors.
- d) Check (Non-Return) valve in fuel supply & drain lines.
- e) Wire braided hoses between filter and pump (meeting class requirement).

2.3.4 Cooling system Items required:

- a) Engine driven fresh water pumps (HT & LT).
- b) Engine mounted Heat Exchanger with counter flanges, gaskets, bolts and nuts.
- c) Pre-heating unit.
- d) Thermostatic temperature control valve.
- e) Engine mounted SW pump.
- f) Corrosion inhibitor coolant.
- g) Suitable T-pc connection with necessary check valve shall be provisioned on pump outlet to connect emergency S.W. Supply connection from fire main.

2.3.5 Lubricating oil system Items required:

Each diesel generator set is to be of wet sump and to have an independent lubricating oil system.

- a) Lube Oil Sump – Engine Mounted
- b) Engine driven lube oil pump with built-in safety valve
- c) Lube Oil Cooler – Fresh Water Cooled Integral with Engine Coolant Circuit – Engine Mounted.
- d) Oil filler tube with cap and lube oil dipstick oil level check – Engine Mounted
- e) Lube oil filter (Duplex type)
- f) By-pass Filter engine Mounted
- g) Lube oil Hand Draining Pump Base Rail Mounted.
- h) Lubricating oil system for the engines to be in accordance with the manufacturer's recommendation.
- i) Breathing pipes from engines crank cases to be led to top of funnel. Provision for connection of vent pipe must be in the engine.
- j) The flushing of LO service line of Main engine shall be done by the system oil up to cleanliness class as recommended by maker.
- k) The grades of lubricant, etc. shall be as prescribed by the generator engine manufacturers and shall be approved by the OWNER.

2.4 **LOAD SHARING:** The load sharing shall be included in diesel engine delivery based on isochronous load sharing and drop regulation as back-up.

❖ Diesel generator – 4x1850 KW

SL.NO	CONNECTED	LOAD %	TOTAL POWER (kw)
1	NAV. ON SCIENTIFIC EQUIP. & DP		
	3	57.61 %	921.83
2	NAVIGATION LOW SPEED (4Kn)		
	1	43.29 %	692.58
3	MANOEURING		

	2	64.96 %	1039.29
4	WORST CASE SINGLE FAILURE		
	2	56.36 %	901.79
5	NAVIGATION 100% (12Kn)		
	3	68.99 %	1103.86
6	DP STATION KEEPING		
	2	69.02 %	1104.29
7	NAVIGATION HALF SPEED (6Kn)		
	2	71.99 %	1151.79

2.5 CONTROL AND MONITORING SYSTEMS POWER UNITS

- Power supply unit for supplying isolated dual 24VDC with necessary battery back-up to the engine LCP.
- Cabinet for Bulkhead Mounting
- Protection: IP-44
- Main Components:
 - 230VAC/24VDC power supply converter.
 - 24VDC/24VDC power supply converter.
 - Miniature Circuit Breakers (MCBs) and terminals Each converter is dimensioned for 100% load. Failure of one supply will cause automatic takeover by the second supply.
- Power Supply available from ship side
 - Main: 230VAC / abt. 150W
 - Backup: 24VDC/ abt. 150W.

2.6 SPECIAL REQUIREMENTS

- a) The OEM shall supply an Electronic Fuel Controller (EFC) along with a remote speed sensing switch. EFC should be of fast response type suitable for necessary commands from synchronizing unit controlled remotely and from power management system.
- b) The speed-sensing switch will be mounted on MSB for enabling synchronizing/ paralleling as required for power management system.
- c) Since the operation of Main DG Sets are to be interfaced with CCAMS, necessary sensors for instrumentations and controls are to be supplied by DG manufacturer duly wired up to JB on engine/LOP.
- d) Generator protection (under frequency, over frequency, under voltage, over voltage, reverse Power and over current) to be provided.
- e) Engine / Alternator should be suitable for continuous parallel operation with each other.
- f) The main DG sets should be suitable for paralleling and load sharing from the main switchboard & PMS. The OEM should fully interact with the suppliers of the main switchboard and automation equipment. The OEM should ensure that all necessary pockets and other provisions are made on the engine / alternator or on the built-in piping of the engine wherever necessary to fit necessary sensors for remote control and monitoring and for power management. The OEM must provide all required signals for achieving a fault free interface with centralized alarm monitoring system of vessel.
- g) Main Diesel generator engines should be capable of starting locally and remotely. Necessary interlocking to be provided for the same. All necessary instrumentation, even not specified in this specification but required for satisfactory operations as per classification rule requirements, is also to be supplied by the OEM.
- h) All safety/ sensors/ switches mounted on the engine will be of good quality and reputed make. The output signals will be finalized after selection of main DG sets and prior to finalization of alarm monitoring system. OEM shall finalize the details and numbers of sensors / safety / switches in detailed engineering as required for remote control and monitoring power management system and classification societies requirements and supply of all these.
- i) All safety/ sensors/ switches mounted on the engine to be such that their functionality could be checked without removing them (for example, jacket cooling water high temperature alarm – set point of PT100 sensor could be changed in integrated CCAMS so that its alarm set point is changed to check its functionality.)
- j) The diesel engine should be fitted with a separate over speed device so adjusted that the speed cannot exceed the maximum rated speed as per class requirement.
- k) Load trials of Generator engines with all safety checks (cold & hot) is to be done at harbour prior going to sea trial. OEM is requested to provide the list of all the parameter with alarm and trip value (Ex-Lub oil, fuel oil, overspeed) with the technical offer.
- l) Each alternating current generator, unless of the self-regulating type, is to be provided with automatic means of voltage regulation; voltage build-up is not to require an external source of power.
- m) The voltage regulation of any alternating current generator with its regulating equipment is to be such that at all loads, from zero to full load at rated power factor, the rated voltage is maintained within ± 2.5 per

cent under steady conditions. There is to be provision at the voltage regulator to adjust the generator no load voltage.

- n) The transient voltage rise at the terminals of a generator is not to exceed 20 per cent of rated voltage when rated KVA at a power factor not greater than 0.8 is thrown off.
- o) Generators are to be capable of maintaining under steady state short circuit conditions a current of at least three times the full load rated current for a duration of at least two seconds or where precise data is available for the duration of any longer time delay which may be provided by a tripping device for discrimination purposes.
- p) Generators required to run in parallel are to be stable from no load [kW] up to the total combined full load [kW] of the group, and load sharing is to be such that the load on any generator does not normally differ from its proportionate share of the total load by more than 15 per cent of the rated output [kW] of the largest machine or 25 per cent of the rated output [kW] of the individual machine, whichever is less.
- q) When generators are operated in parallel, the kVA loads of the individual generating sets are not to differ from the proportionate share of the total kVA load by more than 5 per cent of the rated kVA output of the largest machines.
- r) Generators running in parallel may have a common neutral connection to earth provided they are suitably designed to avoid excessive circulating currents. This is particularly important if the generators are of different size and make. Generators in which the third harmonic content of the waveform does not exceed 5 per cent may be considered adequate.
- s) The above requirement of transient loading capability & voltage regulation should meet the latest class requirement of ABS & IRS.
- t) Speed control system of the generator sets to be supplied by engine supplier.
- u) All machinery to be designed and installed for normal operation with unmanned engine room in accordance with the rules and regulations as stated in this specification.

- 2.7 **INTEGRATION WITH PMS/ CCAMS (COMPUTERIZED CENTRAL ALARM MONITORING SYSTEM)**
Power Management system will be installed on board (another OEM's scope). The system shall be designed to control and monitor the main generators (4 Nos.), Harbour generator (1 No), and an Emergency generator (1 No.) on board through power management system modules integrated with CCAMS. The system manages the plant in split or non-split bus bars operations preventing black outs and optimizing generator load by disconnecting / connecting essential consumers (preferential tripping) and starting/stopping generator the system shall automatically reconfigure generator/consumer configuration after a blackout. The system shall be capable of carrying out the following required functions and any other which would be mandatory to meet class rules.
- a) Load depending on start and stop
 - b) Safety start and stop
 - c) Shutdown
 - d) Schematically Load Sharing
 - e) Selection of generator priority
 - f) Splitting of non-essential load groups
 - g) Load-dependent starting and stopping of generators (Load dependent stop shall be possible to disable)
 - h) Automatic standby start after black-out and automatic sequential restarting of essential equipment
 - i) Sequential starting selection/automatic change-over of generators
 - j) Monitoring of DG parameters
 - k) Load and frequency control
 - l) Heavy consumer control/preferential trip.
 - m) Automatic synchronization and load distribution and sharing to the busbars
 - n) Selection of standby sequence
 - o) Re-establish power after blackout
 - p) Controlling generator voltage and reactive load distribution
 - q) Load distribution of active power (kW) for symmetric, asymmetric or (fast) load
 - r) Handling of heavy consumers
 - s) Limitation of generated effect in order to meet restrictions regarding short circuit power (automatic load shedding)
 - t) Start blocking by fault detection (short-circuit)

For monitoring & control of DG parameters from PMS, local control of DG set shall have the provision for necessary integration with PMS. The above requirement of monitoring & control of DG parameters from ships automation system is indicative one & type & no. of DG parameters for integration with ships automation system will be decided during detailed engineering stage. Firm to provide necessary interfacing units, sensors, potential free contacts, terminals & other accessories in local control panel complete in all respect for interfacing of DG parameters with ships integrated automation system.

In addition to above, the power management system should be operable from Computerized control and monitoring system (CCAMS) Workstations in case of unmanned machinery space. The PMS shall be suitably interfaced with the Switchboards and CCAMS. Necessary command transfer and acknowledgement facilities will be provided as per classification requirements.

CCAMS will have control of various DGs.

- CCAMS will have the facility to START/STOP of DGs through the CCAMS mimic in SEMI-AUTO /Slave mode of PMS.
- CCAMS will also display various alarm and monitoring status related to DGs.
- Necessary authorization for control of DGs will be provided from PMS to CCAMS.

View above two sets of serial links & 02 (Two) sets of hardwired signal connections to be provided from the LCP for interfacing with ship's system MSB/PMS & CCAMS. Type and qty. of hardwired & serial link signals will be finalized during detailed design.

2.8 **STARTING SYSTEM:**

- a) The engine is to be arranged for air starting.
- b) Engine should be arranged for local and remote starting. The solenoid valve mounted on engine at starting air inlet, for local starting of engine, should be operable for remote starting and for power management system.
- c) The air starting system comprises starter motor, 24 V.DC start solenoid with manual override, relay valve, fog lubricator, moisture trap, push button, Pressure Reducing Valve etc.
- d) The OEM should comment on the reliability of the starting air system, especially on the air piston of the air starting system so that the generator should not start inadvertently.
- e) The air starter motor should be rigidly mounted on engine housing.

2.9 **GOVERNOR:**

- a) Diesel engines should be fitted with a suitable Electronic governor for unattended paralleling to provide speed regulation in accordance with classification societies rule requirement. The governor shall be of fast response type suitable for receiving commands from synchronizing unit controlled remotely and from power management system.
- b) The electronic governor to be electrically operated and controlled from the DG control panel / Main Switch Board / CCAMS
- c) Spring return selector actuator for adjustment of speed to be provided loose for mounting in Switchboard.

Note: Electronic speed governors & its actuators with AVR of DG sets are to be type tested/Type approved meeting class requirement.

2.10 **AVR:** Alternator will be provided with single AVR. Spare AVR to be provided in OBS.

2.11 **INSTRUMENTS, GAUGES, ALARMS AND SAFETY EQUIPMENT.**

As per detail of LCP (Refer page -11 of 48)

2.12 **OUTPUT FOR REMOTE CONTROL**

- a) Output for remote Monitoring & Control to be provided with suitable signal isolators for satisfactory interface with CCAMS. Two separate sets of output /signals as required for interface with CCAMS to be provided.
 - i) Generators engine start & stop indication
 - ii) Generator lube oil low pressure alarm and trip for each generator
 - iii) Generator lube oil high temp. alarm for each generator
 - iv) Generator engine jacket water high temp alarm and high temp trip for each generator
 - v) Generator RPM indication and over speed trip for each generator.
 - vi) Engine exhaust gas temperature indication
 - vii) Winding temperature high alarm
 - viii) Fuel consumption indication
 - ix) FW expansion tank low level alarm for all generators
- b) Any other parameters as required by genset OEM for remote monitoring.
- c) Along with the Local Control panel, remote panel in ECR/ Wheelhouse are to be included. Instrumentation to monitor all parameters while operating the set as per requirement of Class is to be provided.
- d) Alarms (audio-visual) are to be provided as per Class rule. The sets are to meet requirement under unattended machinery space to obtain SYJ/ ACCU class notation. Extent of instrumentation with provision of auto start/stop/auto change over should be provisioned.
- e) Each DG set should be suitable for auto start from blackout.
- f) Suitable for attended & intendent parallel operation for each DG set.

2.13 TERMINAL BOX AND CABLE GLANDS:

Suitable watertight terminal box of protection IP 44 and of ample size fitted with brass cable entry glands should be provided. Separate terminal box to be provided for power & control cables. Details will be furnished during detail engineering should be used as power output feeders.

Terminal plate through which these cables are passing should be of non-magnetic material to reduce eddy currents. The box should contain all main terminals for power supply and aux. terminals for AVR, Exciter and Heater etc. A lamination diagram plate should be provided for the local control panel. Necessary terminals will be provided on the junction box. Cable glands to be included in scope of supply.

2.14 DP2 SYSTEM:

- Power system includes all components and systems necessary to supply the DP-system with continuous power such as Generators, Switchboards and Power Management systems.
- Redundancy for notation DP (2), a loss of position and/or heading, is not to occur in the event of a single fault in any active component or system. The Active components includes Generators and Switchboards including short circuits.
- When the electrical power requirements are supplied by generator sets, on loss of power there is to be provision for automatic starting and connection to the switchboard of a standby set and automatic restarting of essential auxiliary services to be complied.
- The Indication of absorbed electrical power and available on-line generating capacity is to be provided at the main dynamic positioning control station. An alarm is to be initiated at the dynamic positioning control station(s) when the total electrical load of all operating thruster units exceeds a preset percentage of the running generator(s) capacity. This alarm is to be adjustable between 50 and 100 per cent of the full load capacity having regard to the number of electrical generators in service.
- For class notations DP (2), in operating conditions where all the generator sets are not being utilized, provision is to be made for automatic starting, synchronization and load sharing of a non-running generator before the load reaches the alarm level required above.
- Means are to be provided to prevent starting of thruster motors until sufficient generating capacity is available.
- Vendor is to comply with all the requirements of DP2 annotations of both classification societies i.e., IRS and ABS.

2.16 The extent of monitoring required for Electrical Power generating plant to be as per the Table below –

Monitoring of Electric Power Generating Plant – Main DG				
System		Required Monitoring		Comment s
		(stated by an X)		
		Alarm	Automatic Shutdown of prime mover with alarm	
Generators driven by trunk IC Engines	Lubricating oil pressure, low	X	X	
	Lubricating oil temperature, high	X		
	Fuel oil leakage from high pressure pipes	X		
	Pressure or flow of cooling water, low	X		
	Temperature of cooling water or cooling air, high	x		
	Level in cooling water expansion tank, low	X		
	Starting air pressure, low	X		
	Over speed activated		X	
	Exhaust gas temperature for each Bank, high	x		
	Voltage, low	X		
	Frequency, low	X		
	Disconnection of non-essential consumers	X		
1. Alarm and automatic shut off is to be provided for Engines of 2250 [KW] and above or having cylinders of more than 300 [mm] bore. For each engine, one oil mist detector (or engine bearing temperature monitoring system or equivalent device) having two independent outputs for initiating the alarm and shut-down would satisfy the requirement for independence between alarm and shut-down systems.				

Note: The above monitoring requirement is indicating type & to be in line with DG manufacturer standard & class requirement.

CHAPTER 3 - MISCELLANEOUS REQUIREMENT OF EQUIPMENT

All information contained in the SOTR is to be treated as CONFIDENTIAL and not to be divulged to a third party without written approval of GRSE/NPOL.

The equipment is to comply class rules (as applicable) for unit/type test certifications and Quality Control Parameters. The details to be furnished in technical offer.

3.1 INTERFACE SPECIFICATIONS:

All the interfaces with engine and alternator are to be provided with suitable counters flange, adapters, cables glands (undrilled) etc.

The vendor is responsible for integration with associate sensors/ equipment.

Interfacing with other ship's equipment/ systems will be finalized by the OEM in consultation with respective system vendors during detail design stage. Necessary hardware required for interfacing with other ship systems shall be provided by the OEM.

3.2 NOISE AND VIBRATION:

- a) In general, low frequency rotation of machinery and/or system is preferred and systems should be selected for their smoothness of operation. Balancing of all the rotating machinery, decoupling it from the hull with appropriate mountings is required.
- b) Vibration calculations and measurements of the diesel generator sets and other machinery chosen shall to be carried out by the equipment supplier.
- c) Propulsion motors, generating sets and all other significant rotating machinery to be mounted according to recommendations from Noise Consultant and Supplier in order to meet specified noise and vibration levels according to class requirements and as per attached Annexure -I. Electrical components such as chokes, transformers, rectifiers etc. to be resilient mounted.
- d) Particular attention to be given to selecting equipment with well-balanced components and inherently low levels of noise and vibration.
- e) Appropriate silencing and vibration isolating arrangements are to be provided for the main sources of noise and vibration including main and auxiliary engines.
- f) The selection Engines, Alternators and mounting system to be such as to eliminate transmission of structure bourn noise and vibration in the vessel.
- g) Max. noise level requirements in engine room and propulsion-room to be in accordance with specified class notation for the ship. The vibration and noise levels shall be recorded both during yard tests and during the sea trails under realistic operational conditions.
- h) Where necessary structure-borne vibration from all reciprocating, or rotating machines should be controlled by the following means:
 - I. Selection of inherently well-balanced machines
 - II. Use of anti-vibration mounts, or isolators, selected base plates and support: such measures to be applied as required to machines, pipe work, exhausts, etc.
- i) It is anticipated that noise and vibration critical reciprocating and rotating machines, including associated pipe work and services will need to incorporate single-stage isolation. A detailed and thorough analysis of the isolation system specified for the propulsion prime mover (s) is required in order to show compatibility with the noise specification and to ensure compliance with the requirements for limitation of vibration internal to the vessel. The analysis for the isolation system must show that any flexural responses of the diesel engine bedplate will be such that no resonance might arise near any excitation frequencies.
- j) The frequencies of scientific equipment and frequencies produced by generator should not cause resonance in specific operational regime like "navigation on Scientific equipment and DP". The Frequencies of all scientific equipment are tabulated below.

QTY	FREQUENCY	LOCATION	DEPTH	MEASUREMENT	SENSOR INTERFACE
1		Exposed Deck	0-6000 m	CONDUCTIVITY, TEMPERATURE, DEPTH, TURBIDITY, Ph and CHLOROPHYLL	GPS
		PO Lab			
		PO Lab			
		Exposed Deck			
		PO lab			
1		Exposed Deck	1000 m	CONDUCTIVITY, TEMPERATURE, PRESSURE and SALINITY	
		Physical Oceanography Lab			
		Physical Oceanography Lab			
		Exposed Deck			
		Exposed Deck			
		Physical Oceanography Lab			
1		Physical Oceanography Lab		CONDUCTIVITY, TEMPERATURE	
		Physical Oceanography Lab			
		Physical Oceanography Lab			
		Sea Chest			
1	75 KHz	Physical Oceanography Lab	Upto 500 m	WATER PROFILING DEPTH	Provision to give compass input or GPS navigation data & NMEA tilt information
		Gondola			
		Physical Oceanography Lab			
1	12-18 KHz(DEEP)		1 to 11000m(DEEP)		Interface to DGPS, Interface to Heave info from Motion Reference Unit
		Geo Physical Lab			
		Geo Physical Lab			
		Gondola			
1	Dual freq mode (30 KHz to 40 KHz) & (200-210KHZ) for deep sea bathymetry	Geo Physical Lab	1m to 3000m.		Interface to DGPS, Interface to Heave info from Motion Reference Unit
		Gondola			
		Geo Physical Lab			
1	20-50 KHz OR BETTER	Gondola	3000m or More		GYRO & MRU to be procured as part of DP2 System. DGPS to be procured as part of Navigational system.
		Gondola			
		Geo Physical Lab			
		Geo Physical Lab			
		Geo Physical Lab			
		geo physical lab			
		Gondola			
1	DUAL/TRIPLE (100 KHz & 400 KHz)		1000m or More		HRP & Heading((Feed from DP2 MRU). DGPS From Navigation
		Exposed Deck			
		Geo Physical Lab			
		Geo Physical Lab			
		Geo Physical Lab			
1			1500m or More		HRP ((Feed from DP2 MRU). DGPS From Navigation

		Gondola			
		Geo Physical Lab			
		Geo Physical Lab			

3.3 SCOPE OF SUPPLY:

- General: The scope includes the supply of equipment as complete in compliance with the requirements as mentioned in this specification
 - The proposed set (i.e. Engine & Alternator) must have an outstanding track record of performance in the Marine field. The bidder must furnish a "Reference List" in support of track record.
- Note: Any other item not mentioned above/ in this but required for successful completion of the system is also required to be quoted.

3.4 ON BOARD SPARES (OBS)

All necessary accessories, spares and consumables required for installation and uninterrupted operation till warranty period or 02 years whichever is maximum to be supplied as part of the scope. Running hour of each DG set annually will be maximum of 3000 hours. OBS is to be supplied by OEM as per maker list meeting class requirement for 2 years.

- The vendor required to include class recommended OBS including AVR for unrestricted service.
- Each spare is preserved, inspected and packed with suitable tag.
- Commissioning spares are to be included.
- 1 set of bellows are to be included in scope as spare.
- Any sub-system that is required for the operation or a function requested in this specification must automatically be included in the scope of supply and must not be added as additional after the order and delivery of the system.

3.5 OEM RECOMMENDED TOOLS AND TEST EQUIPMENT

OEM shall supply one set of recommended tools (with toolbox) and test equipment, if any, for on-board maintenance and same shall be furnished along with the offer. Hand tools are to be delivered according to the Maker's standard delivery, including special tools for removal of pistons, frequency generator, crankshaft deflection indicator and torque setting wrenches for all engine torques.

3.6 LANGUAGE:

For all equipment, the display panels, functional menus, software inputs / outputs, functions and all manuals shall be in English.

3.7 DOCUMENTATION:

- Documentations shall be supplied as detailed below: -

SI No	Item description	QTY
1	Manuals (included with As Made drawings, CPL/PIL) Consists of Installation manual Operator manual Maintenance manual Software Documentation	4 Sets of paper Print per ship 4 Sets on CD/latest digital media per ship
2	As Made drawings (approved by Inspection Authority)	
3	3D model of all equipment/sensor to be provided in .stp format	
4	HAT/SAT Schedules (Approved)	
5	Type Test Certificate, Shop Test Report & Inspection Certificate (IRS & ABS).	
6	Calibration Data/ Certificate	
7	On-board spares list	

- All documentations must be in English.
- All documents must be legible and user friendly.
- All drawings and documents shall contain dimensions and other parameters in metric units (SI Units).
- The manuals also should cover all aspects of the system like calibration, post-processing, servicing and troubleshooting, etc.
- Electronic manual-** OEM is to give all the data/document (operation & instruction manual, installation manual, CPIL/PIL, Maintenance manual, system drawing, FAT report, and spare part list) of Generator along with and auxiliary/accessories including control system in XML/ SGML (in CD/DVD drive) and firm will prepare interactive electronic technical manual IETM level 4 documentation of Main DG and to be supplied to GRSE. Same Database to be used, ie. SQL Server 2024. Detail of all such documents to be submitted by OEM as a part of equipment IETM and the same is to be indicated in the respective technical offer as per above table.

3.8 **SERVICE OF ENGINEER:**

The OEM shall provide the necessary service of engineers to carry out the following activities:

- a) Installation inspection.
- b) Connectorisation.
- c) Setting to Work.
- d) Harbour and Sea Acceptance Trials

Service Engineers shall bring their own test equipment/ calibration kit, tools and adequate spares for installation, setting to work and commissioning at their own cost. OB spares shall not be used for this purpose.

The OEM shall indicate total cost (In Price Bid) for executing all technical activities in the offer. OEM need to give activity wise cost break-up along with Mandays in the price bid. No extra man-days/ payment on this account shall be admissible or considered on completion of total technical assistance.

The OEM shall undertake Installation inspection/ Connectorisation/ STW/ HAT/ SAT as per time schedule finalized in discussion with Berth officer.

In case of any irregularities in the operation/ performance of the system or non- conformance to specified parameters observed on integration with ship's system, the OEM is bound to rectify the defect. The OEM shall ensure complete responsibility of satisfactory operation of the system on board.

3.9 **TRAINING:**

The OEM shall provide an operational and maintenance training course to the crew at GRSEs/ OEM's premises (at owner's cost) / on-board (as applicable). A detailed training package for on board exploitation, maintenance and repair activities along with tools and test kits that would be required for such maintenance shall be offered in connection with STW activities. Training aids comprising of audio - visual / CBT packages (on operation, maintenance and repair activities) are to be provided. The training material will be provided in hard/ soft copies to the participants.

The Firm will arrange for onboard acquaintance and job training for the crew (20 Personnel) of the ship as per their respective area of specialization which includes training for 10 persons at shipyard prior to delivery and the rest onboard. The cost of their local travel, lodging and boarding / victualing shall be on Firm's account and deemed to be included in the quoted rates.

The duration and number of personnel recommended for training needs to be indicated and shall be decided during pre-bid.

3.10 **BINDING DRAWINGS AND DOCUMENTS:**

OEM shall furnish following documentation:

At the time of bidding:

OEM shall furnish Installation drawing, Holding down arrangement & schematic drawings (P &ID) for all systems along with BOM.

Post placement of order:

Footprint & interface details including installation drawing with maintenance envelope, GA, CG location and holding down arrangement /mounting details and 3D model (in .stp format) are to be submitted within 30 days. Protocol for AMS, HAT and SAT is to be furnished.

During delivery of store:

- a) Comprehensive manual (system description, alignment procedure, operating manual, troubleshooting repair manual, maintenance manual etc.)- 04 soft copy & 04 sets hard copy.
- b) Comprehensive part list/PIL 02 soft copy & 03 sets hard copy
- c) As made drawings – 04 soft copy & 04 sets hard copy (Class approved/Type approved)
- d) Shop trial report in triplicate.
- e) Weight certificate
- f) Footprint & interface details including binding installation drawing with CG location are to be submitted. stp format within agreed time frame.
- g) Brass instruction plate for starting and stopping duly mounted to be provided with each engine/set.
- h) Certificates from Class in triplicate.

(Electronic version of all documents are also to be submitted)

GRSE shall prepare ship's related production drawings based on OEM's drawings duly approved by NPOL. OEM shall provide binding drawings in 2D (Auto CAD) / 3D(STP) format.

Any changes in approved drawings (if recommended subsequently by GRSE/QA/NPOL/Inspecting agency) should be brought to the notice of GRSE immediately and concurrence/ approval of revised drawings are to be obtained by the OEM from the approving authority as indicated in the SOR/P.O.

OEM shall ensure that equipment is manufactured and delivered to the shipyard without any deviation from approved drawing of the equipment.

3.11 QAP:

OEM is required to submit QAP covering all stage inspection, alignment check at shop/on board, calibration of sensors/ gauges prior to kick start, HAT (load trial: No load, 25% Load, 50% load, 75% load, 100% Load and 10% overload, paralleling operation). QAP is to be prepared by OEM complying the class & SOTR requirement and same is to be submit to class (by the OEM) for final approval. QAP is also to be submitted to Owner and shipyard. Final approved QAP is to be handed over to GRSE(QA).

3.12 QUALITY ASSURANCE:

The quality of the equipment/stores delivered according to this SOTR shall correspond to the technical conditions and standards valid for the deliveries of the same equipment in OEM's country or specifications and shall also include therein minor modification to the equipment suggested by the BUYER without any commercial implication. Such modifications will be mutually agreed to. The OEM confirms that the equipment/stores to be supplied under this contract shall be new i.e. not manufactured before (Year of Contract) and shall incorporate all the latest improvements and modifications thereto and spares of improved and modified equipment are backward integrated and interchangeable with same equipment supplied by the seller in the past if any. The seller shall supply an interchangeability certificate along with the changed part numbers wherein it should be mentioned that item would provide as much life as the original item.

The item should be of the latest manufacture, conforming to the current production standard and having 100% defined life at the time of commissioning of the ship.

3.13 FACTORY ACCEPTANCE TRIALS (FATs):

FAT for the all system will be carried out at OEM premises by a team of NPOL and GRSE and dual classification society. The FAT team will also scrutinize the Environmental test reports & EMI /EMC Results. Systems which does not requires FATs will be accepted against OEM certifications and duly filled up ATR. Vendor/OEM need to submit FAT document/protocol to NPOL & Classification society within 02 (two) months of placement of order for approval. FAT protocol also to be forwarded to GRSE for reference and record. FAT will be conducted at OEM premises as per approved FAT protocol. A copy of Final FAT Report shall be submitted by OEM to GRSE (CDO) within one month after FAT. SBN & ABN trial of each DG is to be conducted by OEM as per Annexure-1 (noise consultant report) meeting class rule during FAT and report along with acceptable limiting value is to be provided to GRSE/NPOL by OEM.

Vendor need to submit FAT document to NPOL within 02 (two) months of placement of order. A copy of Final FAT Report shall be submitted by the firm to GRSE (CDO) within one month after FAT.

3.14 HATs/ SATs:

HATs/ SATs Schedule along with Procedure i.e., GRAQ shall be prepared by vendor and the same need to be forwarded to GRSE/NPOL (N) for approval within 06 (six) months of Purchase Order issued to vendor. Only approved HATs/ SATs schedules along with Procedure need to be forwarded to GRSE.

3.15 TEST AND TRIALS

All functions of the equipment including accessories and control system shall be tested. A detailed testing procedure, worked out by OEM, shall be submitted to Owner/Class for recommendations prior to start of the test program. All trials/tests shall be done in realistic conditions, in deep and shallow waters as applicable.

3.15.1 HARBOUR ACCEPTANCE TEST (HAT): All the equipment and systems shall be commissioned and tried out at Harbour in floating condition. A HAT according to schedule recommended by OEM shall be conducted and the system shall be commissioned by the shipyard.

3.15.2 SEA ACCEPTANCE TEST (SAT):

Detailed Sea Acceptance test (SAT) shall be conducted to qualify the system for its functionality and application and to comply with the specification in total. Equipment that requires SAT in deeper waters and specific site conditions to prove the equipment compliance to specification, shall have to be arranged in such areas suitable to the yard. Suitability of location should be confirmed by the shipyard in consultation with NPOL and intimated to the OEM. All services, spares, consumables will be OEM scope.

3.16 INPUTS REQUIRED FROM SHIP SYSTEMS

3.16.1 Power Supply Requirement:

The Governors on diesel engines driving main electric generators are to be capable of automatically maintaining the speeds and frequency within following limits:

- Transient frequency variations within 10% of the rated frequency with a recovery time to steady state conditions not exceeding 5 seconds, when the maximum electrical step load is switched on or off.
- Momentary variations of 10% of the maximum rated speed when the rated load of the generator is suddenly thrown off, provided this does not cause the intervention of the over-speed device.
- Momentary variations of 10% of the maximum rated speed when 50 per cent of the rated load is suddenly thrown on followed by the remaining 50 per cent load after an interval sufficient to restore the speed to steady state. Steady state conditions should be achieved in **not more than 5 seconds**.
- At all loads between no load and rated load the permanent speed variation is not to be more than 5% of the maximum rated speed.
- For generating sets operating in parallel, the governing characteristics of the engine are to be such that within the limits of 20% and 100% of total load, the load on any generating set does not normally differ from its proportionate share of the total load by more than 15 % of the rated output of the largest machine or 25% of the rated output of the individual machine in question, whichever is less.

*Further details are listed below.

3.16.2 Power Supply Characteristics of Ships Main AC Supply: The following outputs will be available in the ship system. The details of is appended below –

690V, 3 Ph, 50 Hz.

415V, 3 Ph, 50 Hz.

230V, 1/ 3 Ph, 50 Hz.

24VDC

Voltage	Normal Voltage	690V 415V 230V
	Load range tolerance Average Line to Line value of 3 phase system Line to Line voltage of 1 phase of 3Ph system	±8% ±9%
	Maximum Unbalance	±2%
	Maximum Modulation	±2%
	Transients (Excluding Spikes (average line to line value for 3 phase system)	
	Frequent Transients	
	High Limit	±9%
	Low Limit	-13%
	Recovery time	0.5 Sec
Wave Form	Maximum Individual Harmonic	3.5%
	Maximum Total Harmonic	5%
Frequency	Nominal Frequency	50 Hz
	Load range Tolerance	±2.5%
	Constant Load Tolerance	±0.5%
	Modulation	±0.25%

3.17 TECHNICAL REQUIREMENT:

3.17.1 Design: The Equipment and other associated components shall be designed, manufactured and tested for continuous operation with standing ship's motion, vibration, and ambient conditions. The size and weight shall be kept to minimum consistent electrical and mechanical requirements. High Quality of work man ship shall be employed in manufacturing equipment.

3.17.2 Enclosure: The enclosures of electrical and electronic devices and control panels shall be fabricated from 14 SWG mild steel sheets conforming to IS-2062. The equipment shall be designed so that all components may be removed from the front of the cubicles with the front cover only removed. There shall be no hidden connection. All the components of the equipment should have easy access for removal/ refit.

3.17.3 Vibration: All the equipment will be marine type, robust in construction and will meet the ship vibration, The equipment shall be designed with the requirements of the specified Classification Society.

3.17.4 Internal Wiring: Internal wiring of the equipment shall be carried out with LFH (Limited Fire Hazard) cables suitable for marine application.

3.17.5 System Cables Supply & Connectorisation:

- a) **Internal Wiring:** Internal wiring of the equipment shall be carried out with LFH (Limited Fire Hazard) cables suitable for marine application.
- b) All interconnection cables including network & interface cables for interfacing to other equipment/ systems shall be supplied by OEM along with the system. Connection of all equipment, sub-units, sensors etc. and termination of all cables including network cables & interfacing cables at vendor's equipment end are included in the scope of the Firm. Manpower required for connectorisation work on board ships shall be arranged by the Firm. All materials & tools required for connection will be in the scope of OEM. Connectors suitable for Yard supply cable shall be supplied by the OEM wherever necessary. The OEM is also required to carry out measurement of insulation resistance of the cables and same is to be offered for inspection to inspecting agency. OEM to specifically indicate if any of the system cable is required to run in separate route away from power supply cables. However, laying of cables and termination of cables to the shipyard supplied equipment/ items are not in the scope of the Firm.
- c) The distance between DG & LCP to be considered tentatively 10m and the same will be finalized in detailed design.
- d) All the instrumentation & special cables are to be supplied by OEM.

3.17.6 Installation Material

One set of installation material that includes special tools if any, plugs, adapters, mating flanges, sockets (with accessories), pins and cable lugs, shock/vibration mounts etc. as required for satisfactory completion of system installation on board ship should be supplied. All materials required for connectorisation shall be in the scope of the vendor.

3.17.7 Components

All components shall be of approved Marine type. Standard specification and grade of material of each component used shall be indicated in the binding drawings. Make and type of components are to be listed in the binding drawings. Necessary Approved Certificates /Documents/ Reports need to be submitted along with equipment binding data.

3.17.8 EMI/ EMC

All equipment / systems being fitted onboard are to be EMI/ EMC compliant and requirements in IEC 60533 concerning EMC, "Electromagnetic Compatibility of Electrical and Electronic Installations in Ships", to be fulfilled as a minimum. COTS equipment are to comply with IEC 60533 or equivalent standards. All equipment shall have the provision of grounding, bonding and shielding as per NECP 500. The system should not induce any EM interference in other systems. The OEM should also indicate if any additional precaution/measure is necessary for the Yard to take during installation/ cable laying. The Vendor is required to implement recommendations as provided by EMI / EMC consultants as per Annexure-II.

3.17.9 ESD Protection

The system design will take into account adequate measures for Electro Static Discharge (ESD) control and protection at PCB/module/assembly and unit level. Each Electro Static Discharge sensitive part/assembly will be duly marked with a symbol/warning. The OEM will use ESD protective materials for handling, packaging storage and transport.

3.17.10 Cable Entry Glands

Cable entry glands shall be suitable for marine use conforming to specification BS6121 / EN 62444-2013 for incoming and outgoing cables. Cable glands are to be fitted with the equipment on detachable gland plate. Cable entry shall preferably be from bottom of the panel.

3.17.11 Tally and Diagram Plates

Engraved circuit diagram tally, component tally, name tally in English shall be provided of anodized aluminum/ Naval brass/ flame retardant type material. Circuit diagram tally plate indicating details of connection and terminal marking as on the equipment shall be fitted on the backside of the front cover of the panel. OEM's Tally giving OEM's Name, Description of the item including serial number, power output, rating, weight, year of manufacturing etc. are to be provided.

3.17.12 Lifting Arrangement

Equipment weighing more than 40 Kg shall be provided with collar eyebolts or suitable lifting lugs/ arrangements. If the eyebolts cannot remain in situ after the equipment has been installed in the ship, provision is to be made for their securing arrangement on the equipment.

3.17.13 Painting

Painting shall be suitable for Marine use. The equipment / chassis shall be degreased and cleaned prior to applying etching primer. The equipment shall be painted with rust proof paint and finishing paint as per approved painting specifications/procedures/ OEM requirements. In addition, suitable peel of coating to be provided for all panels prior to dispatch.

3.17.14 Calibration

All Instrumentations/ sensors including sensors integrated with main systems shall be calibrated prior to delivery and Calibration certificates need to be submitted with a validity of one (01) year from delivery of vessel. OEM needs to recalibrate all Instrumentations / Sensors in GRSE premises during commissioning stage in case of expiry of Calibration certificates.

3.18 INTERFACE WITH SHIP'S OTHER SYSTEMS

The OEM shall provide all information required for integration of the equipment onboard the ship. Total equipment integration with all other sub-units (Including other Firms Equipment) will be OEM responsibility. The equipment shall be designed and constructed so that it can be fully integrated with the system to which it interfaces. All components shall be compatible in order that the functional performance of the equipment is not degraded as a result of it's integration within the system as a whole.

3.19 WARRANTY:

The equipment with associated controls / instrumentation is to be guaranteed for stipulated performance for a time period as per GRSE STAC/ commercial clause from the date of acceptance/ delivery of vessel.

Extension of warranty: OEM shall mandatorily indicate in the offer, the annual rate for extended warranty period, in the event of expiry of warranty period along with the commercial terms and conditions, if any.

3.20 PRODUCT SUPPORT:

Product support is to be provided to repair / maintenance / service /supply of spares etc. for minimum period of 35 years from the date of delivery of the vessel. Also, bidder will provide OEMs' quotations valid for at least six months period for spare parts for 5 years' service support as per the recommendations of the OEMs.

3.21 MAINTENANCE SCHEDULE:

Established maintenance schedules, calibration schedules for each sensors / equipment (wherever applicable) as per OEM are to be provided.

3.22 INSPECTION:

Protocol for manufacturing stage inspection, onboard inspection & type test is indicated in the table below.

SI No	Description of Activity	Approval Authority
1	Binding data (Design calculation, Drawing, manual etc.)	Dual Class (IRS+ABS)
2	QAP	Dual Class (IRS+ABS)
3	FAT protocol	Dual Class (IRS+ABS)
4	Manufacturing Inspection Authority	Dual Class (IRS+ABS)
5	FAT (Factory Acceptance Trial) witness.	Dual Class (IRS+ABS)
6	Dispatch clearance	Dual Class (IRS+ABS)
7	Receipt Inspection	GRSE(QA)
8	On Board inspection (II/HAT/SAT)	Dual Class (IRS+ABS)
9	Type test	As per class rule

3.23 RESPONSIBILITY

OEM shall confirm that all the deliverables listed in the offer/supplied is complete and sufficient for satisfactory performance of the equipment/ system. The OEM shall ensure complete responsibility of satisfactory performance of the equipment/ system on board. Additional items if required for proving the system/equipment on board shall be supplied by the OEM without any commercial implication.

3.24 OTHER TERMS AND CONDITIONS:

3.24.1 Transportation

All equipment shall be adequately packed and protected with supports to ensure adequate protection during all modes of transportation. Each unit within a package/container shall be clearly marked for identification. The container shall clearly indicate the item description with caution marks, quantity, weight, size, etc.

3.24.2 Preservation

Initial preservation/Packing shall be made suitable for tropical conditions and protect against high humidity.

A separate document giving complete details and instructions for storage, preservation, handling and transportation after delivery is to be supplied. The OEM shall indicate the delivery schedule, transport, packing, preservation, insurance, etc.

Vendor to ensure Preservation for equipment in such way that there will be no deterioration of electronics during prolonged storage time. Details of the preservatives used and the preservation and de-preservation procedure while in store & also onboard preservation procedure will be submitted by OEM. Requisite

preservatives (with proven valid shelf life) will be supplied for carrying out re-preservation work by GRSE, when necessary, as per procedure provided by OEM. Battery units for the system, if any, shall be supplied during STW/ commissioning stage.

The equipment to be supplied in preserved condition valid for minimum two-year duration, post receipt equipment at GRSE.

Extension of Preservation: OEM shall mandatorily indicate in the offer, the annual rate for extended preservation of equipment, in the event of expiry of preservation period along with the commercial terms and conditions, if any.

3.24.3 Price

Quoted price is to include itemized price list of major components of the equipment, spares and other activities included in the scope such as services of engineers as required for installations, testing, commissioning and training etc.

3.24.4 Packing List

The OEM will provide a complete list of deliverables/complete packing list indicating all units, sub units, cables, installation materials, OB spares, documentation etc. at least one month prior to delivery for codification purpose and to incorporate the same in order copy or amendment of the Purchase Order as applicable.

3.24.5 Essential Clause

(a) The equipment/ item is to be weighed in the presence of Inspecting Authority and a Weight Certificate is to be submitted at the time of delivery of the equipment duly signed by Inspecting Authority. The specified Weight of Equipment / Item is to be strictly maintained. However, if the actual weight of the equipment varies by more than 1%, then the same should be intimated to GRSE.

(b) All the OEMs are to furnish the binding dimensions of the equipment within the tolerance limit of 2%, which should be strictly maintained during delivery of the equipment. However, no change in footprint dimensions will be accepted.

3.25 SCOPE OF OFFER:

The following information applicable for equipment/ system shall be supplied with the initial offer:

- a) System overview and proposed system configuration
- b) System description with Block diagram, System components, System operation including interfaces with other on-board systems.
- c) Outline drawings of the equipment indicating overall dimensions, weight, CG and maintenance envelope.
- d) Inter unit cable diagram with cable specification including interfaces.
- e) Power supply scheme for the system indicating power consumption of individual units.
- f) Heat dissipation of the main equipment, devices and sub-units
- g) Details of other ship services required.
- h) Tools required for installation and maintenance.
- i) Complete Installation recommendation
- j) OEM's list of spares for installation
- k) Delivery time from receipt of order
- l) Trial and commissioning time for complete system on board
- m) Part identification list at subunits level
- n) List of main equipment included in the standard scope of supply.
- o) List of accessories included/ not included in the standard scope of supply.
- p) List of installation materials and system cables included/ not included in the standard scope of supply.
- q) List of optional units and accessories not included in the standard scope of supply.
- r) List of equipment required for installation and operation of the equipment and not supplied by the OEM.
- s) Un-priced bid.

3.26 SECURITY:

The information about the ship and the requirements mentioned in the SOTR are not to be communicated to any third party without prior approval of GRSE/ NPOL.

3.27 DRAWING APPROVAL:

- a) 3(Three) copies of binding installation drawing and system drawings/documents are to be forwarded to the yard within 30 days of placement of LOI for GRSE comments on Installation Angle, in consultation with owner.
- b) OEM is to submit the revised Drawings/ documents post incorporation of GRSE /owner comments to Classification society copy to GRSE for final approval. Modification suggested by Classification society shall be incorporated by OEM. The final approval from classification society of the equipment along with accessories/part and control system is the responsibility of OEM. The Drawings/ documents requiring approval by Inspecting Authority, same shall be obtained by OEM from Inspecting Authority.
- c) Approval of drawings by the Class and Flag Authority to be obtained by the OEM as applicable.
- d) "Flag Authority" Where the term "Flag Authority" appears, it refers to: The Maritime Authority of India.

e) Digital files of the drawings also need to be submitted to the owner in native format “(.dwg/.docx/.iges/.xlsx/etc.)” format.

3.28 INSPECTION & TEST:

- a) Equipment are to be supplied duly inspected, tested and certified by Classification Authority (IRS & ABS) as applicable.
- b) QAP for the equipment/ items is to be prepared by OEM to meet the Class requirement and to be submitted to Inspection Authorities for approval. Final approved copy of QAP is to be submitted to GRSE(QA) for reference/ records.
- c) Trial / HAT documents (GRAQ), based on which trials will be carried out, are to be submitted by the OEM.
- d) Certificates Required: Following certificates, but not limited to, shall be provided:
 - i. All certificated required by Classification Society
 - ii. Shop test/ factory acceptance test certificate.
 - iii. Statutory certificates
- e) Machines intended for essential services shall undergo tests specified in Table 1. Tests, if any relevant required by the national standards are also to be carried out. Type tests are to be carried out on a prototype machine or on the first of a batch of machines and routine tests carried out on subsequent machines.

Table 1 : Tests to be carried out on Electrical Rotating machines					
Sr. No.	Tests	A.C. Generators		Motors	
		Type Test	Routine test	Type Test	Routine test
1	Examination of the technical documentation, as appropriate and visual inspection	X	X	X	X
2	Insulation resistance measurement	X	X	X	X
3	Winding resistance measurement	X	X	X	X
4	Verification of the voltage regulation system	X	X6		
5	Rated load test and temperature rise measurement	X		X	
6	Overload test	X	X4	X	X4
7	Verification of steady short-circuit conditions (3)	X			
8	Over-speed test	X	X	X5	X5
9	Dielectric strength test	X	X	X	X
10	No load test	X	X	X	X
11	Verification of degree of protection	X		X	
12	Verification of bearings	X	X	X	X
1. For machines of less than 100 kW, type tests on prototype machine is acceptable. For 100 kW or more, tests on at least the first of each batch of machines are to be carried out. 2. The report of machines routine tested is to contain the manufacturer's serial number of the machine which has been type tested and the test results. 3. Verification of steady short-circuit condition applies to synchronous machines only. 4. Only applicable for machines of essential services rated above 100 kW. For routine tests, overcurrent test may be carried out in lieu of overload test. 5. Not applicable for squirrel cage motors. 6. Only functional test of voltage regulator system.					

f) The high voltage test is to be carried out at 1000 plus twice the rated voltage with a minimum of 2000 V on new machines, preferably at the conclusion of the temperature rise test. The test is to be applied between the windings and the frame with the core connected to the frame and to any windings or sections of windings not under test. Where both ends of each phase are brought out to accessible separate terminals, each phase is to be tested separately. The test is to be made with alternating voltage at any convenient frequency between 25 and 100 Hz of approximately sine wave form. The test is to be commenced at a voltage of not more than one half of the full-test voltage and is to be increased progressively to full value, the time allowed for the increase of the voltage from half to full value being not less than 10 seconds. The full test voltage is then to be maintained for one minute and then reduced to one half full value before switching off.

g) During additional high voltage tests on a machine which has already passed its tests or on machines after repair, the voltage of such further tests is to be 75 per cent of the value given in the Table 2.

h) After the high voltage tests the insulation resistances are to be measured using a direct current insulation tester between:

- ❖ All current carrying parts connected together and earth
- ❖ All current carrying parts of different polarity or phase, where both ends of each polarity or phase are individually accessible. The minimum values of test voltages and corresponding insulation resistances are given in Table 2. The insulation resistance is to be measured close to the operating temperature, or an appropriate method of calculation is to be used.

Table 2 : Minimum values of test voltages and corresponding insulation resistances		
Related Voltage VR (V)	Minimum Test Voltage (V)	Minimum Test Insulation Resistance (MΩ)
VR ≤ 250	2 x VR	1
250 < VR ≤ 1000	500	1
1000 < VR ≤ 7200	1000	(VR / 1000) + 1
7200 < VR ≤ 15000	5000	(VR / 1000) + 1

3.29 **SUPPORT SERVICES:**

Product support is to be provided for repair / maintenance / service /supply of spares etc. for entire vessel service life from the date of delivery of the vessel.

3.30 **QUOTATION:**

The OEM should submit the quotation based on this SOTR. The following are also to be included along with the technical offer.

GA Diagrams/Schematic diagrams

Technical specification /Write up on system operation.

Bill of material.

3.31 **PRE-BID:**

A pre-bid meeting shall be held within 07 days of publication of tender prior submission of bid to discuss scope of supply and drawing submission and approval procedure.

CHAPTER 4 – POWER MANAGEMENT SYSTEM REQUIREMENTS

The Power Management System controls and monitors the generation plant and maintains set power requirements and guarantee stable operation. The devices are connected and communicated as a closed circuit to eradicate single point failures: in cases of unit fall-out, the master functionality automatically moves to another host, always keeping the system safe and reliable.

Power management systems will be carried out by dedicated Protection & Power Management modules, inside the Main Switchboard, or integrated in the IACMS. In case it's arranged by independent devices, PMS will be connected to the IAS.

4.1 MANUAL MODE:

The maneuvers are executed by the operator. The stop and start of each generator must be done from the local control panel of each generator set.

The circuit breakers corresponding to the generators and the consumers must be manually operated from each panel. The corresponding breaker and generator protections will be active.

Some functionalities will not be active, for example in manual mode, the System will not send start commands to other generators when it exceeds the preset power limit. The operator shall be responsible for ensuring the availability of energy to the consumers by connecting the number of generators necessary to cover the load demand and the distribution of the load.

For the synchronization and load sharing between generators, the adjustment of speed is performed by the operator, with the aid of local MSB visual synchronizer device.

The breaker command is executed from the front cubicle on MSB690 and it could be protected by a synchronization interlock device. It is also possible to connect the circuit breaker from its front pushbutton.

In this mode, the operator is fully responsible of the operation.

4.2 SEMI- AUTOMATIC OR MANUAL-AIDED MODE:

The actions are performed manually by the operator on the PMS stations. These actions are simple actions such as open/close, start/stop, synchronize order... The PMS supervises actions and does not permit wrong actions nor actions that will become in an undesired situation such as black out, overload of generators.

Some functionalities will not be active, for example in semi mode, the System will not send start commands to other generators when it exceeds the preset power limit.

The operator shall be responsible for ensuring the availability of energy to the consumers by connecting the number of generators necessary to cover the load demand and the distribution of the load.

For the synchronization and load sharing between generators, the adjustment of speed is performed by PMS, but an operator action is needed to start the pre-programmed sequence to close or open the breaker.

The breakers command is executed from the front cubicle on MSB690 or PMS and synchronization is controlled, supervised and allowed by PMS system.

4.3 AUTOMATIC MODE:

The actions are performed by the PMS. The actions can be automatic type, as add or remove generator according to needed load or it can be manual type. Manual actions are grouped and are considered as a sequence. As example, the operator can order add a generator and the PMS will automatically generate all the sequence: start order, synchronizing, close breaker order and load sharing.

PMS Functions. The PMS functions are the following:

- Manual Start/Stop.
- Automatic Start/Stop or equivalent action for steam control, if any, when the turbine start/stop is not advisable.
- Load dependent Start/Stop or equivalent action for steam control, if any, when the turbine start/stop is not advisable.
- Load transfer.
- Black out recovery.
- Sequential restarting of essential services after black out recovery.
- Sequential starting selection / automatic changeover generators. Gen set priority.
- Automatic synchronizing and load sharing.
- Operator-initiated synchronization and de-loading.

- Load and frequency control.
- Heavy consumers control / preferential trip.
- Automatic operation modes.

4.4 PMS/ IACMS

The PMS could be standalone system or integrated inside IACMS, depending on the choice of makers finally done.

The IACMS monitors the PMS and main switchboard configuration of supply circuit breakers and enables the operator to set the desired network configuration, through the established IACMS operator interface. The important power, voltage, current and frequency values of the switchboards are also monitored and shown in the IACMS operator interface. IACMS operation interfaces will be available in ECR and Bridge.

PMS will send to IACMS those indication signals to be shown on the system layout in the screen, as well as all required alarms. PMS will receive from IACMS all those control signals activated in the IACMS screen. The IACMS will not only send orders like open/close breakers, start/stop generators and other habitual commands on PMS system, but also it will can change setup parameters for alarms or events in the PMS.

4.5 GENERATOR SETS:

The diesel generator sets shall be started and stopped from PMS or from the engine side.

The diesel generator set shall automatically shut down in accordance with the manufacturer's design criteria. A shut-down condition shall be identified by an alarm connected to the IACMS, with a pre-alarm to the PMS. The diesel generator set shall be fitted with its own electronic governor, with the speed setting remotely carried out either manually by the governor control switch on the ECR MSB or automatically from the PMS.

The emergency diesel generator set are not controlled by the PMS. Interface, if any, only for alarm and indication purposes.

4.6 NETWORK PROTECTION:

Generator protection breakers will be Air Circuit Breakers withdrawable type. The generator panels in switchboard are equipped with the overload and reverse power relays.

Definition of engine concept shall include:-

- Constant speed or variable speed drive to be defined. In case of variable speed, the SBN limit curve is valid for all combinations of engine speed and power.
- The vendor shall ensure that the equipment is free of resonance at any relevant engine speed, including idle speed. A calculation report shall be provided for natural frequencies of the resiliently mounted equipment.
- Concept for mounting to be defined (single elastic or double elastic). The SBN limit curve is valid above the mounting stage with connection to the ship foundation.

Measurements shall be conducted by a competent party. The vendor shall provide measurement reports including results for all noise measurements. Any deviations from proposed procedures to be discussed before FAT.

REQUIREMENTS FOR NOISE AND VIBRATION:

Structure-borne noise shall not exceed the limit curve as shown in Figure 1. The equipment shall be free of excessive vibration as defined in ISO 20286, DNV Vibration Class or comparable guidelines. The overall A-weighted free field sound pressure source level shall be no higher than 106 dB(A).

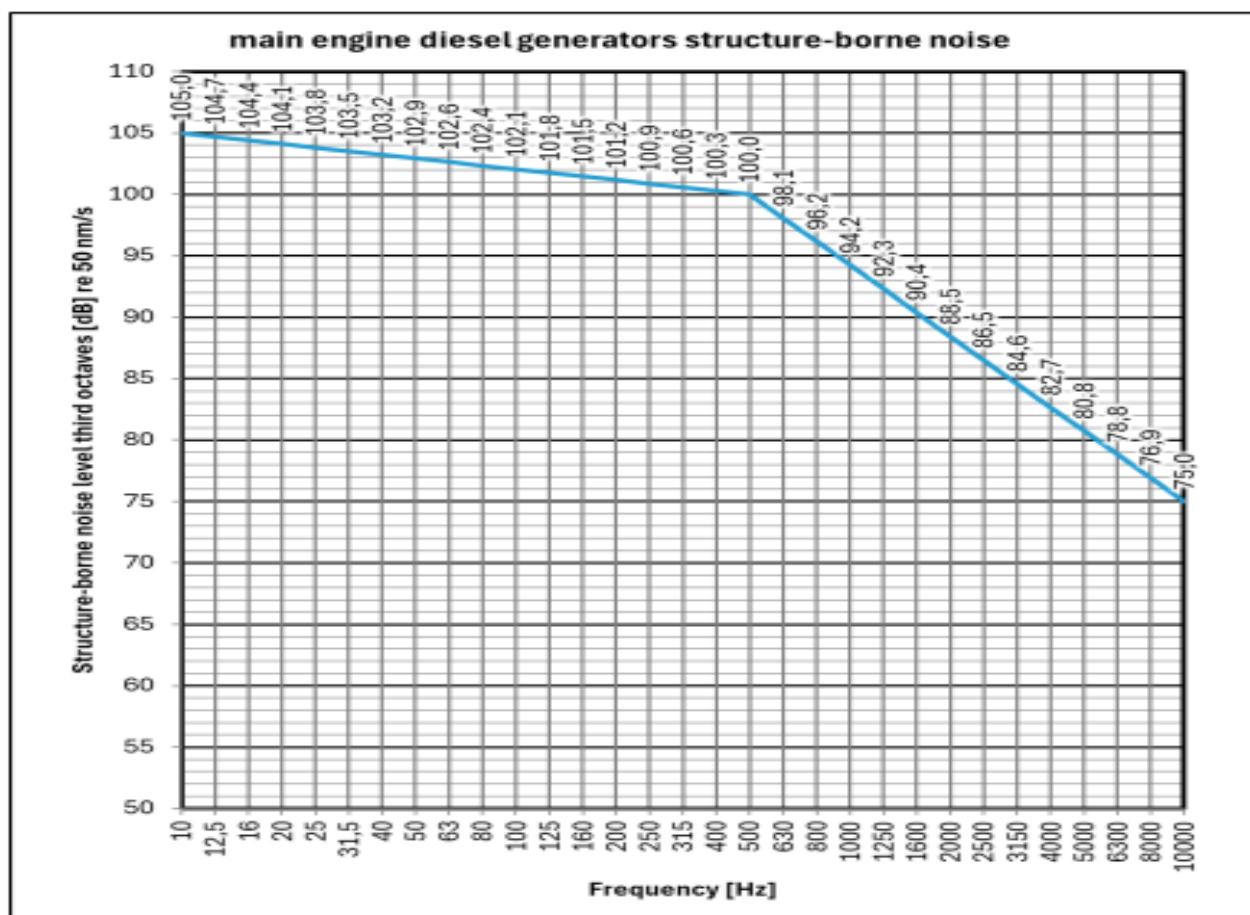


Figure 1: SBN limit curve for diesel generators, energetic mean above resilient mounts, valid for each direction separately

INTEGRATION:

The diesel generators shall be mounted on elastic mounts made of natural rubber with a hardness of no more than 60 Shore(A). The calculated vertical rigid body natural frequency including consideration of dynamic stiffness of the mounts shall not be higher than 5 Hz. The horizontal stiffness of the mounts shall not be higher than the vertical stiffness. The shipyard will ensure that the manufacturer presents a dynamic stiffness measurement up to at least 500 Hz according to ISO 10846 or else guarantee dynamic stiffness of less than factor 2 at 20 Hz.

SBN flanking path transmission shall be reduced by flexible joints to all attachments to shipboard connection, like bellows for water piping, flexible hoses for compressed air and a steel bellows exhaust gas connections. All connections must allow sufficient motion of the diesel generator relative to its connection due to e.g. ship motion.

Cables of the generator shall be arranged in individual bundles of typical four single cables with a bend of at least 45° between generator and the first ship side fixation.

The exhaust gas ducting including all integrated parts like filters, silencers etc. are to be resiliently mounted, resilient mounts to be designed with vertical static deflection of minimum 2 mm. A calculation report shall be presented to demonstrate static deflections of resilient mounts due to gravity loading. Steel rope type mounts shall not be used. All parts of exhaust ducting shall provide sufficient attenuation against transmission of exhaust noise from inside to outside so that 85 dB(A) in 1 m distance of the surface are not exceeded. This is especially relevant for rectangular structures such as filters or catalysts.

TEST CONDITIONS

At least one diesel generator has to be mounted on its original resilient foundation in FAT. The test bed foundation shall be such that the SBN level difference across the mounts is at least 20dB at all frequencies to ensure that the source level is not affected by the foundation.

ABN shall be measured according to relevant standards such as ISO 6798 or ISO3746:2010 for free field average sound pressure level and sound power level.

SBN shall be measured additionally on the foundation below the elastic mounts for at least two selected mounts to check that the requirement of minimum 20 dB difference between above and below the mount is fulfilled.

The energetic average of SBN levels above mounts for each direction has to meet the requirement.

ABN measurement conditions must allow determination of the free field level. Besides overall dB(A) levels also measurements in one-third octave bands shall be performed.

Exhaust gas noise shall be measured in one-third octave bands.

The energetic average is defined as

$$L_v = 10 \cdot \log \left(\frac{\sum_i^n \frac{V_i^2}{V_0^2}}{n} \right)$$

With L_v the energetic average of SBN,

V_i the velocity at measuring position,

V_0 the reference velocity and

n the number of measuring locations.

ABN measurement conditions must allow determination of the free field level. Besides overall dB(A) levels also measurements in one-third octave bands shall be performed.

Measurement shall be made at 100, 70, 50, 30% of maximum power and in idle.

If the vendor performance FAT according to another acknowledge standard this will be reviewed.

The other generator sets can be measured the same way as the diesel engines have to undergo routine procedures for factory testing anyway.

SBN and ABN background noise with engine switched off shall be measured immediately before the start of the test procedure. Results of background noise measurements shall be documented in the test report.

During FAT, Diesel generators will be tested for their effect on onboard noise. An indication for radiated noise can be the measured level at the foundation. Moreover, indicative radiated noise can be measured in harbor at small distance under favorable conditions taking into consideration the propagation conditions.

The test report shall contain at least the following information

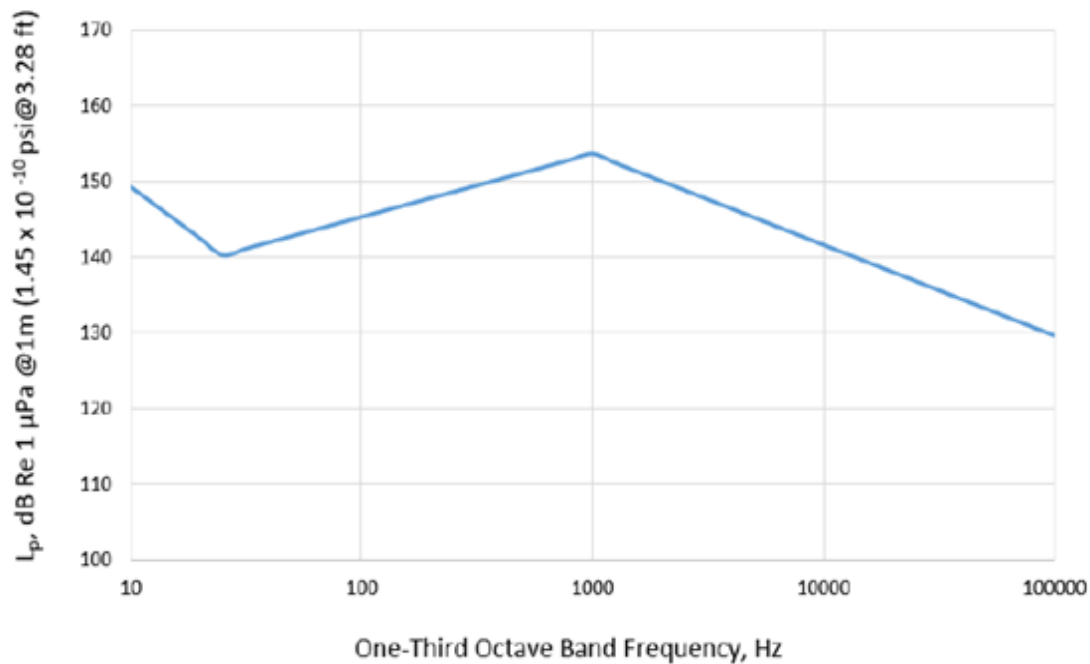
- Date and place of test, person in charge
- Details of installation (type of mounts, picture of assembly)
- Specification of measurement equipment and measurement procedure
- Operating conditions of engine
- Sketch or phot of measurement locations
- Results ABN for each operating condition
 - ◆ Overall sound pressure levels in dB(A) of engine surface noise
 - ◆ Overall sound power levels in dB(A) of engine surface noise
 - ◆ Overall sound power levels in dB(A) of exhaust noise
 - ◆ Display of results in 1/3 octave bandwidth
- Results SBN for each operating condition: Energetic average of SBN above mounts, displayed separately for axial, lateral and vertical direction
 - 1/3 octave SBN (velocity) level

Comparison of SBN velocity level in 1/3 octave bandwidth, above and below the mounts, 100% power, displayed separately per mount and direction.

The ABS notation equivalent to DNV for the project.

+A1, (E), SPS, +AMS, +ACCU, +DPS-2, UWN(AT), UWN(R), Enviro, HAB(WB), VIB-M, NLBES, CR with Vessel Description "Acoustic Research Vessel"

Allowable UWN Limits for Research Vessels (1 May 2025)



UWN Limits for Research Vessels (1 May 2025)

Frequency Range	Criteria, L_p , in dB re 1 μ Pa @ 1 m (1.45×10^{-10} psi @ 3.28 ft)
10 - 25 Hz	$178.38 - 32.7 \log f + 10 \log(\Delta f)$, f in Hz
25 - 1k Hz	$135 - 1.66 \log f + 10 \log(\Delta f)$, f in Hz
1 k - 100 k Hz	$130 - 22 \log f + 10 \log(\Delta f)$, f in kHz

where Δf is the bandwidth of the measured data, approximately $0.23f$, (f in Hz).

STANDARD TERMS & CONDITIONS

101		The word ' Purchaser ' refers to Garden Reach Shipbuilders & Engineers Ltd- Diesel Engine Plant (GRSE-DEP), a Company registered under the Indian Companies Act, 1913 and it includes its successors or assignees.
102		The word ' Bidder/Supplier/Contractor ' means the person / firm / Company who undertakes to manufacture and/or supply and/or undertake work of any nature assigned by the Purchaser from time to time and includes its successors or assignees.
103		The word ' Owner ' means the person or authority with whom GRSE-DEP (Purchaser) has contracted to carry out work in relation to which orders are placed by the Purchaser on the Bidder/Supplier/Contractor under this contract for supply or manufacture of certain items and would include Department of Defence Production, Ministry of Defence, Government of India, the Indian Navy, the Coast Guard and any other specified authority.
120		GENERAL
	121	<i>Unless otherwise indicated specifically by the bidder / contractor in his bid, it shall be construed as his acceptance of all the conditions mentioned in this stacs.</i>
200		COMMUNICATION & LANGUAGE FOR DOCUMENTATION
	201	Any letter, facsimile message, e-mail intimation or notice sent to the Bidder/Supplier/ Contractor at the last known address mentioned in the offer / order shall be deemed to be valid communication for the purpose of the order/contract. Unless stated otherwise by the purchaser, Language for communication & all documentation shall be same, which the Purchaser has used, in the tender enquiry.
210		PURCHASER'S PROPERTY.
	211	All property (such as materials, drawings, documents etc) issued by the Purchaser or any other individual or firm on behalf of the Purchaser in connection with the contract shall remain confidential, being the property of the Purchaser and the Bidder/Supplier/Contractor shall undertake to return all such property so issued and will be responsible for any or all loss thereof and damage thereto resulting from whatever causes and shall reimburse the Purchaser the full amount of loss and damage.
	212	On completion of work in any compartment / location of the purchaser's premises, the Bidder/Supplier/Contractor must ensure that the place is left in a reasonably clean state and all scrap is transferred to nearby scrap-bins.
220		RISK PURCHASE
	221	If the equipment / article / service or any portion thereof be not delivered / performed by the scheduled delivery date / period, any stoppage or discontinuation of ordered supply / awarded contract without written consent by Purchaser or not meeting the required quality standards the Purchaser shall be at liberty, without prejudice to the right of the Purchaser to recover Liquidated Damages / penalty as provided for in these conditions or to any other remedy for breach of contract, to terminate the contract either wholly or to the extent of such default. Amounts advanced or part thereof corresponding to the undelivered supply shall be recoverable from the Contractor / Bidder at the prevailing bank rate of interest.
	222	The Purchaser shall also be at liberty to purchase, manufacture or supply from stock as it deems fit, other articles of the same or similar description to make good such default and/or in the event of the contract being terminated, the balance of the articles of the remaining to be delivered there under. Any excess over the purchase price, cost of manufacture or value of any articles supplied from the stock, as the case may be, over the contract price shall be recoverable from the Bidder / Supplier / Contractor.
230		RECOVERY-ADJUSTMENT PROVISIONS
	231	Payment made under one order shall not be assigned or adjusted to any other order except to the extent agreed upon in writing by the Purchaser. During the currency of the contract, if any sum of money is payable by the Bidder / Supplier / Contractor the same shall be deducted from any sum then due or thereafter may become due to the Bidder / Supplier / Contractor under the contract or any other contract with the Purchaser.

240		ADDITIONAL BANK GUARANTEE
	241	In case after opening of price bid of technically cleared firms, it is noted that L1 firm has quoted very low rates and indicates to withdraw from the tender then EMD shall be forfeited and firm may be given tender holiday including intimation to other PSUs. If the rates quoted are less than CRSE-DEP estimates by 40% or so and if the difference in rate between L1 and L2 is 30% or more then quote will be treated as freak low quote. In case of freak low quote, meeting may be held with L-1 bidder to ascertain whether the quoted prices are "workable".
250		INDEMNIFICATION
	251	The Bidder / Supplier / Contractor, his employees, licensees, agents or Sub-Supplier / Sub-contractor, while on site of the Purchaser for the purpose of this contract, indemnifies the Purchaser against direct damage and/or injury to the property and/or the person of the Purchaser or that of Purchaser's employees, agents, Sub-Contractors / Suppliers occurring and to the extent caused by the negligence of the Bidder / Supplier / Contractor, his employees, licensees, agents or Sub-contractor by making good such damages to the property, or compensating personal injury and the total liability for such damages or injury shall be as mutually discussed and agreed to.
260		TRANSFER OF SUPPLIERS / CONTRACTOR'S RIGHTS
	261	The Bidder / Supplier / Contractor shall not either wholly or partly sell, transfer, assign or otherwise dispose of the rights, liabilities and obligations under the contract between him and the Purchaser without prior consent of the Purchaser in writing.
270		SUBCONTRACT & RIGHT OF PURCHASER
	271	The Bidder / Supplier / Contractor under no circumstances undertake or subcontract any work / contract from or to any other Sub-contractor without prior written approval of the Competent Authority of Purchaser. In the event it is found that such practice has been indulged in, the contract is liable to be terminated without notice and the Bidder / Supplier / Contractor is debarred all from future tender enquiries / work orders. However, in no circumstances a contractor is permitted to subcontract any part of the contract to the bidders who had quoted for the concerned tender.
280		PATENT RIGHTS
	281	The Bidder / Supplier / Contractor shall hold harmless and keep the Purchaser indemnified against all claims arising as a result of infringement of any patent / copy rights on account of manufacture, sale or use of articles covered by the order.
290		AGENTS/AGENCY COMMISSION
	291	The seller confirms and declares to the buyer that the seller is the original manufacturer or authorized distributor/stockiest of original manufacturer of the stores referred to in this contract and has not engaged any individual or firm, whether Indian or foreign whatsoever, to intercede, facilitate or in any way to recommended to the Buyer or any of its functionaries, whether officially or unofficially , to the award of the Contract / Purchase order to the Seller; nor has any amount been paid, promised or intended to be paid to any such individual or firm in respect of any such intercession, facilitation or recommendation. The Seller agrees that if it is established at any time to the satisfaction of the Buyer that the present declaration is in any way incorrect or if at a later stage it is discovered by the Buyer that the Seller has engaged any such individual/firm, and paid or intended to pay any amount, gift, reward , fees, commission or consideration to such person, party, firm or institution , whether before or after the signing of this Contract / Purchase order, the Seller will be liable to refund that amount to the Buyer. The seller will also be debarred from participation in any RFQ/Tender for new projects/program with Buyer for a minimum period of five years. The buyer will also have a right to consider cancellation of the Contract either wholly or in part, without any entitlement or compensation to the Seller who shall in such event be liable to refund all payments made by the buyer in terms of the Contract along with interest at the rate of 2% per annum or 6% whichever is higher above LIBOR (London Inter Bank Offer Rate) (for foreign vendors) and base rate of SBI plus 2% (for Indian Vendors). The Buyer will also have the right to recover any such amount from any contracts concluded earlier with Buyer.

300		USE OF UNDUE INFLUENCE / CORRUPT PRACTICES
	301	The Bidder / Supplier / Contractor undertakes that he has not given, offered or promised to give, directly or indirectly any gift, consideration, reward, commission, fees, brokerage or inducement to any person in service of the Purchaser or otherwise in procuring the contract or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of the Contract with the Purchaser for showing or forbearing to show favour or disfavour to any person in relation to the Contract or any other Contract with the Purchaser. Any breach of the aforesaid undertaking by the Bidder / Supplier / Contractor or any one employed by him or acting on his behalf (whether with or without the knowledge of the Bidder / Supplier / Contractor) or the commission of any offence by the Bidder / Supplier / Contractor or any one employed by him or acting on his behalf, as defined in Chapter IX of the Indian Penal Code, 1980 or the Prevention of Corruption Act, 1947 or any other Act enacted for the prevention of corruption shall entitle the Purchaser to cancel the contract and all or any other contracts with the Bidder / Contractor / Supplier and recover from the Bidder / Supplier / Contractor the amount of any loss arising from such cancellation. Decision of the Purchaser or his nominee to the effect that a breach of the undertaking has been committed shall be final and binding on the Bidder / Supplier / Contractor.
	302	The Bidder / Supplier / Contractor shall not offer or agree to give any person in the employment of Purchaser any gift or consideration of any kind as "Inducement" or "reward" for doing or forbearing to do or for having done or forborne to do any act in relation to the obtaining or execution of the contract/s. Any breach of the aforesaid condition by the Bidder / Supplier / Contractor or any one employed by them or acting on their behalf (whether with or without the knowledge of the Bidder / Supplier / Contractor) or the commission of any offence by the Bidder / Supplier / Contractor or by any one employed by them or acting on their behalf which shall be punishable under the Indian Penal Code 1980 and/or the Prevention of Corruption by Public Servants, shall entitle Purchaser to cancel the contract/s and all or any other contracts and then to recover from the Bidder / Supplier / Contractor the amounts of any loss arising from such contracts' cancellation, including but not limited to imposition of penal damages, forfeiture of Security Deposit, encashment of the Bank Guarantee and refund of the amounts paid by the Purchaser.
	303	In case, it is found to the satisfaction of the Purchaser that the Bidder / Supplier / Contractor has engaged an Agent or paid commission or influenced any person to obtain the contract as described in clauses relating to Agents / Agency Commission and use of undue Influence, the Bidder / Supplier / Contractor, on a specific request of the Purchaser shall provide necessary information / inspection of the relevant financial document / information.
310		IMMUNITY OF GOVERNMENT OF INDIA CLAUSE
	311	It is expressly understood and agreed by and between M/s. (Bidder / Supplier / Contractor) and GRSE-DEP is entering into this Agreement solely on its own behalf and not on the behalf of any person or entity. In particular, it is expressly understood and agreed that the Government of India is not a party to this Agreement and has no liabilities, obligations or rights hereunder. It is expressly understood and agreed that GRSE is an independent legal entity with power and authority to enter into contracts solely in its own behalf under the applicable of Laws of India and general principles of Contract Law. The (Bidder / Supplier / Contractor) expressly agrees, acknowledges and understands that GRSE is not an agent, representative or delegate of the Government of India. It is further understood and agreed that the Government of India is not and shall not be liable for any acts, omissions and commissions, breaches or other wrongs arising out of the contract. Accordingly, (Bidder/ Supplier / Contractor) hereby expressly waives, releases and foregoes any and all actions or claims, including cross claims, impleader claims or counter claims against the Government of India arising out of this contract and covenants not to sue Government of India in any manner, claim, cause of action or thing whatsoever arising of or under this Agreement
320		EXPORT LICENCE
	321	The export licenses that may be required for delivery of the various items/equipment to GRSE shall be arranged by the Bidder / Supplier / Contractor from the concerned authorities in their country without any time & cost implications on the Purchaser
330		BANNED OR DE-LISTED CONTRACTORS / SUPPLIERS
	331	The Bidder / Supplier / Contractor declares that they being Proprietors / Directors / Partners have not been any time individually or collectively blacklisted or banned or de-listed by any Government or quasi-Government agencies or PSUs. If a bidder's entities as stated above have been blacklisted or banned or de-listed by any Government or quasi-Government agencies or PSUs, this fact must be clearly stated and it may not necessarily be a cause for disqualifying him.

340		DUTY OF PERSONNEL OF SUPPLIER/SUPPLIER
	341	GRSE-DEP being a Defence Public Sector Undertaking, Bidder / Supplier / Contractor undertakes that their personnel deployed in connection with the entrusted work will not indulge in any activities other than the duties assigned to them.
350		DISPUTE RESOLUTION MECHANISM AND ARBITRATION
	351	DISPUTE RESOLUTION MECHANISM (DRM)
		(a) Any dispute/differences between the parties arising out of and in connection with the contract shall be settled amicably by mutual negotiations.
		(c) In case of non-settlement by (i) above, if at any time, before, during or after the contract period any unsettled claim, dispute or difference arose between the parties, upon or in relation to or in connection with or in any way touching or concerning this tender/agreement/order/contract, the same shall be referred to the concerned Functional Director. The Functional Director shall then nominate an Executive of the rank of General Manager whom he thinks fit and competent or a Committee of Executives who/which shall then scrutinize the claims/disputes that have been referred to the concerned functional Director and make efforts for amicable settlements by mutual discussions/negotiations.
		(d) In case no amicable settlement is arrived by (b) above within a period of three months, then the contractor shall approach Public Grievance Cell and address the disputes as per the provisions made under the relevant clause of the contract.
		(e) In case the issues/disputes do not get settled within a period of six months from the date of submission of the dispute to the Grievance Cell, then the contractor may invoke Arbitration Clause of the contract.
	352	ARBITRATION
		(a) If at any time, before during or after the contract period, any unsettled claim, question, dispute or difference arises between the parties, upon or in relation to or in connection with or in any way touching or concerning this order, the same shall be settled / adjudicated through Arbitration to be conducted by a Sole Arbitrator under the laws of India. (b) The international Centre for Alternate Disputes Resolution (ICADR) on an application by either of the parties, shall appoint a Sole Arbitrator under its applicable Rules. The procedure of the arbitration shall be governed by the Rules of ICADR. (c) Both the parties agree and accept ICADR for all arbitral references and have satisfied themselves about the neutrality and eligibility of the ICADR. (d) The Award of the Sole Arbitrator shall be final, conclusive and binding upon the parties. (e) In the event of the death, incapacity' resignation or inability for any reason whatsoever of the Sole Arbitrator' the appointing institution i.e., ICADR, shall, on an application from any of the parties, appoint another fit and competent person as Sole Arbitrator to adjudicate on the issues originally referred to in accordance with law' (f) The arbitrator shall be competent to grant interim orders and direct measures for interim protection to the parties. (g) If the arbitration award is set aside by a competent Court and unless the disputed issues are decided or otherwise ordered by the said Court' the appointing institution i.e, ICADR shall, on an application from any of the parties, appoint a new person as Sole Arbitrator to adjudicate such disputes and differences in accordance with laws in force in India. (h) The cost of the arbitration, fees of the appointing institution (ICADR) and the arbitrator, remuneration of the stenographer and clerk, stamp paper etc." as decided by the Sole Arbitrator, shall be shared equally by the parties. (i) The seat / venue of the Arbitration unless otherwise decided by the Sole Arbitrator shall be at Kolkata' India'. (j) The language of the proceeding shall be in English".
360		JURISDICTION OF COURTS
		All contracts shall be deemed to have been wholly made in Kolkata and all claims there under are payable in Kolkata City and it is the distinct condition of the order that no suit or action for the purpose of enforcing any claim in respect of the order shall be instituted in any Court other than that situated in Kolkata City, West Bengal State, India

GENERAL TERMS & CONDITIONS

A20		SECURITY DEPOSIT
	A21	The successful bidder shall submit a Security Deposit @ 3 % of the contract / order value (excluding taxes, duties, freight, service component) of the Order in the form of Demand Draft / Bank Guarantee in the prescribed format in favour of Purchaser within 25 days from date of Contract. The Security Deposit will be returned only after the successful execution of the order / contract. Refund of Security Deposit whenever considered admissible by the Purchaser, shall be without interest only
A30		FORFEITURE OF EMD / BID BOND
	A31	In cases of withdrawal of bid during validity period or during any extension granted thereof, non-acceptance of agreed conditions of Technical and or Commercial and or Price Negotiations, non-submission of the security deposit and / or non-acceptance of the order the EMD or bid security will be forfeited or encashed as the case may be.
A40		FORFEITURE OF SECURITY DEPOSIT
	A41	Non-performance of agreed terms and or default/breach by Bidder/Supplier/Contractor will result in forfeiture of security deposit with application of risk purchase provisions as felt appropriate by the Purchaser.
A50		FORFEITURE OF PERFORMANCE GUARANTEE
	A51	In the event of Bidder/Supplier/Contractor failure to attend the Guarantee defects within a reasonable period of time, the Performance Bank Guarantee will be encashed by the Purchaser. The Purchaser's decision shall be final and binding on Bidder/Supplier/Contractor in this regard.
A60		SUPPLIES
	A61	The equipment / products / items / Services to be supplied shall be strictly in accordance with the Drawings / Specifications / Requirements indicated in the Tender Enquiry / Order with deviations, if any, as mutually accepted
A70		PROGRESS REPORTING & MONITORING
	A71	Where so stipulated in the order, the Bidder / Supplier / Contractor shall render such reports from time to time as regards the progress of the contract and in such a form as may be called for by the Purchaser.
A80		CANCELLATION OF ORDER
	A81	The Purchaser reserves the right to cancel an order forthwith without any financial implications on either side, if on completion of 50% of the scheduled delivery/Completion period the progress of manufacture/Supply is not to the satisfaction of Purchaser and failure on the part of the Bidder/Supplier/Contractor to comply with the delivery schedule is inevitable. In such an event the Bidder/Supplier/Contractor shall repay all the advances together with interest at prevailing bank rates from the date of receipt of such advances till date of repayment. The title of any property delivered to Purchaser will be reverted to the Bidder/Supplier/Contractor at his cost.
	A82	In case of breach / non-compliance of any of the agreed terms & conditions of order / contract. GRSE-DEP reserves the right to recover consequential damages from the Supplier / contractor on account of such premature termination of contract.
	A83	In case of delay beyond agreed period for liquidated damages or 10weeks from contractual delivery period whichever is earlier, GRSE-DEP reserves the right to cancel the order and procure the order items / services from any available source at GRSE-DEP's option & discretion and entirely at your risk and cost. Extra expenditure incurred by GRSE-DEP in doing will be recoverable from Bidder/Supplier/Contractor.
A90		PRESERVATION AND MAINTENANCE
	A91	Should any material require any preservation till its final installation/fitment, the detailed procedure (Long term & short term) for the same as also the time of interval after which the state of preservation needs to be reviewed is to be stated by the Bidder/Supplier/Contractor.
	A92	Further the de-preservation prior to the material/equipment being commissioned and the maintenance procedure together with its periodicity is also to be indicated by the Bidder / Supplier / Contractor.
	A93	The Bidder / Supplier / Contractor in their offer must confirm that indigenous oil; lubricants and preservatives, etc. can be used in the equipment. The bidder must also give assurance that the equipment performance will not be downgraded by use of indigenous equivalents.

A100		FREIGHT AND INSURANCE
	A101	For Indigenous Bidders. In cases where the offers are for 'Door Delivery to Purchaser,' transit freight & Insurance charges shall be borne by the Bidder / Supplier / Contractor. In other agreed cases of Ex-works / Ex-Transporter's warehouse or Railway godown offers, the Bidder / Supplier / Contractor on dispatch, shall give details of materials with dispatch particulars and their value in time to Purchaser's Insurance Company on the contact details as provided in the order. In such agreed cases, the freight & insurance charges will be paid by the purchaser directly to the parties concerned.
	A102	For Foreign Bidders. For overseas supplies, terms of delivery is CIF, Kolkata Port. The seller has to clear the items for export.
A110		TAXES & DUTIES / STATUTORY LEVIES (Not Applicable for this Tender)
A120		DEMURRAGE
	A121	Storage and Demurrage charges will be payable by the Bidder / Supplier / Contractor for all shipments that reach purchaser without proper dispatch documentations, Lorry Receipts not accompanied by packing lists, invoices etc. The Supplier shall be responsible for fines due to errors or omissions in description, weight or measurements and for increased handling charges due to improper packing.
A130		INSPECTION, TESTING.
	A131	The ordered items will be inspected either by IRS & ABS.
	A132	The decision of the Inspecting Authority or their representatives, as the case may be, on any question of the intent, meaning and the scope of Specifications / Standards shall be final, conclusive and binding on the Bidder/ Supplier / Contractor.
	A133	The Bidder / Supplier / Contractor shall accord all facilities to Purchaser's Inspectors Nominated Agency to carry out Inspection / Testing during course of manufacture / final testing.
A140		RECEIPT INSPECTION BY GRSE-DEP
	A141	GRSE-DEP shall carry out necessary inspection of the items on receipt, on the basis of an appropriate quality assurance system and inspection system requirements along with representative of the Owner. Any objection raised by GRSE-DEP Quality Control Team against quality of materials or workmanship shall be satisfactorily corrected by the Contractor at his expense including replacement as may be required within shortest possible time within 30 days. Items damaged during transit shall also be rectified/replaced by the Contractor within shortest possible time, payment for which shall be made at mutually agreed rates
A150		REJECTION OF MATERIALS
	A151	Should the articles, or any portion thereof of the equipment be found defective / rejected, the Bidder / Supplier / Contractor shall collect the same from the Purchaser's Stores, all incidental charges being borne by him (inclusive of Custom duty, if payable), within 30 days from the date of intimation to the Bidder / Supplier / Contractor of such rejection. The Purchaser reserves the right to dispose off the rejected items at the end of a total period of 90 days in any manner to the best advantage to the Purchaser and recover storage charges and any consequential damages, from sale proceeds of such disposal.
A160		TECHNOLOGICAL DEVELOPMENTS / MODIFICATIONS
	A161	The Bidder / Supplier / Contractor shall unconditionally and free of cost to the Purchaser transfer information on technological developments / innovations / modifications which the Bidder / Supplier / Contractor would evolve in future (within 3 years) in relation to the supplied equipment. To enable this, the Purchaser's address shall be added to the Bidder / Supplier / Contractor's mailing list or database or any other document maintained for dissemination of product information and the Purchaser shall be informed of the action taken in this regard. If such improvements / modifications are brought in by the Bidder / Supplier / Contractor's Design Department in the course of manufacture of equipment ordered by the Purchaser, the Bidder / Supplier / Contractor shall incorporate such improved versions in the equipment without any extra cost to the Purchaser under Purchaser's prior consent.
	A162	If the Purchaser be desirous of getting incorporated all post supply modifications / improvements arising out of technological developments to the original equipment supplied by the Bidder / Supplier / Contractor, the Bidder / Supplier / Contractor, shall quote for and carry out all such modifications to the equipment.
	A163	Where the whole or a portion of the equipment has been specifically developed by the Bidder / Supplier / Contractor for the Owner and the latter would through the Purchaser be bearing the entire or part of the development cost incurred by the Bidder / Supplier / Contractor, the design rights for the whole or portion thereof, of the equipment as appropriate, shall vest in the Owners.
	A164	Prior approval of the Owner should be obtained before similar articles are sold / supplied to any other party other than the Owner. If such approval is given and sale is effected, the

		Bidder / Supplier / Contractor shall pay to the Owner royalty at the rate mutually agreed to.
	A165	The Sub-contractor / Supplier / Supplier shall continue to support the equipment for a minimum period of 20 years from the date of supply by making available spare parts and assemblies of the equipment supplied. Should the Sub-contractor / Supplier / Supplier decides to discontinue the product, for any reason whatsoever, adequate notice shall be given to the Purchaser / Owner to enable procurement of the requisite lifetime spares.
A170		PURCHASER'S RIGHT TO ACCEPT ANY BID, PART OF BID AND TO REJECT ANY OR ALL BIDS.
	171	The Purchaser reserves the right to accept and or reject any or all tenders and or to withdraw the tender in to and or award the contract / order in full or part to more than one Supplier / contractor without assigning any reason whatsoever and without thereby incurring any liability to the affected Bidder or Bidders or any obligations to inform the affected Bidder or Bidders of the grounds for GRSE-DEP action.
A180		BANK GUARANTEE / INSURANCE COVER FOR FREE ISSUE MATERIAL
	A181	The Bidder / Supplier / Contractor shall furnish Bank Guarantee / Insurance Cover equivalent to the value of materials supplied by GRSE-DEP free of cost valid up to the execution of the contract / delivery of material, inspected / accepted and receipt at GRSE DEP together with the material reconciliation statement whichever is later.
A190		BIDDER'S RESPONSE IN CASE OF NO PARTICIPATION
	A191	The Sub-contractor / Supplier / Supplier shall inform the Purchaser in advance in case he is unable to participate in the tender for whatsoever reason. Failure to comply with this will be viewed seriously and consecutive three failures on the part of Sub-contractor / Supplier / Supplier to do so is liable for disqualification / debarring of the Subcontractor / Supplier / Supplier from all future tender enquiries and or delisting from the list of 'Approved Registered Suppliers
A200		FACILITY PROVISION (Applicable only for Services)
	A201	The Purchaser would consider providing facilities like - compressed air at one point, crane facility for handling heavy loads for lowering onto the ship and water intended for use by the Contractor / Bidder for execution of contract for working within the Purchaser's premises at no extra cost to the Contractor / Bidder. Industrial gases, electrical power, office space / RU store facility may be provided at one point only if possible and available and on chargeable basis if so desired by the Contractor / Bidder. The contractor / Bidder shall make his own arrangements for fixing necessary fittings, wires, welding machines, transformer, etc for power, connecting lines, storage etc for water and necessary fittings, pipes, breaker, hoses etc for compressed air.

Bid Security Declaration Format
(On Bidders Letterhead)

Tender No: 00000000000000000000000000000000

Date:

To
Garden Reach Shipbuilders & Engineers Limited
Diesel Engine Plant
Plant Plaza Road
Dhurwa
Ranchi 834 004

I/We the undersigned declare that:-

1. I/We understand that, according to your conditions, bids must be supported by a Bid Securing Declaration.
2. I/We accept that I/We may be disqualified/debarred from bidding against Garden Reach Shipbuilders & Engineers Limited tenders for a period of one year from the date of notification if I/We are in a breach of any obligation under the bid conditions, because I/We:-
 - (a) Have withdrawn/modified/amended, impairs or derogates from the tender, my/our bid during the period of bid validity specified in the form of Bid; or
 - (b) Having been notified of the acceptance of our Bid by the purchaser during the period of bid validity (i) fail or refuse to execute the contract, if required, or (ii) fail or refuse to furnish the Performance Security within the timeline, in accordance with the instructions to Bidders & as per tender terms & conditions.
3. I/We understand this Bid Securing Declaration shall cease to be valid on the Thirty First day from following:-
 - (a) if I am/We are not the successful Bidder, the receipt of your notification of the name of the successful Bidder; or
 - (b) the expiration of the validity of my/our Bid or any extension thereof.

Signed _____ (Signature of person whose name and capacity are shown)

In the capacity of _____ (insert legal capacity of person signing the Bid Security Declaration)

Name: _____ (Insert complete name of name of person signing the declaration)

Duly authorized to sign the bid for an on behalf of _____ (Insert the complete name of Bidder)

Dated on _____ day of _____ 2021 (Insert date of signing) Corporate seal (where appropriate)

(Note: in case of a Joint Venture, the Bid Securing Declaration must be in the name of all Partners to the Joint Ventures that submits the bid)

FORM NO. QS/03/0020

GARDEN REACH SHIPBUILDERS & ENGINEERS LIMITED
43/46, GARDEN REACH ROAD
KOLKATA – 700 024.

FORMAT OF BANK GUARANTEE TOWARDS SECURITY DEPOSIT.

Ref : 1. BPE Notification No. BPE/G:032/78/1(4)/Adv(F)/69 dated 24.10.78.
 2. F.No.0(7)/B.O.III/75 dated 2.11.77.

GUARANTEE BOND

(to be used by all scheduled banks)

1. In consideration of M/s. Garden Reach Shipbuilders & Engineers Limited, 43/46, Garden Reach Road, Kolkata – 700 024(hereinafter called “The Buyer”) having agreed to exempt M/s..... (hereinafter called “The Party”) from the demand, under the terms and conditions contained in the Tender/ Purchase order no.....dated (hereinafter called “the said Tender/ Order”) of security deposit for the due fulfillment by the said Party's of the terms and conditions contained in the said Tender, on production of a Bank Guarantee for Rs..... (Rupees.....only), we Bank Limited (hereinafter referred to as “the Bank”) do hereby undertake to pay to the Buyer an amount not exceeding Rs..... against any loss or damage caused to or suffered by the Buyer by reason of breach by the said Party of any of the terms or conditions contained in the said Tender.
2. We.....Bank do hereby undertake to pay the amounts due and payable under this Guarantee without any demur, merely on a demand from the Buyer stating that the amount claimed is due by way of loss or damage caused, to or would be caused to or suffered by the Buyer by reason of any breach by the said Party of any of the terms or conditions contained in the said Tender or by reason of the Party's failure to perform the said Tender. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the bank under this guarantee.
3. We.....Bank Limited further agree to the Guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Tender. Order and that it shall continue to be enforceable till all the dues of the Buyer under or by virtue of the said Tender/Order have been fully paid and its claims satisfied or discharged or till the Chairman & Managing Director, Garden Reach Shipbuilders & Engineers Limited, certifies that the terms & conditions of the said Tender have been fully and properly carried out by the said Party and accordingly discharges the Guarantee. Unless a demand or claim under this Guarantee is made on us in writing on or before the..... we shall be discharged from all liability under this Guarantee thereafter.
4. We.....Bank Limited further agree with the Buyer that the Buyer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms & conditions of the said Tender/Order or to extended time of performance by the said party from time to time or to postpone for any time or from time to time any of the powers exercisable by the Buyer against the said Party and to forbear or enforce any of terms and conditions relating to the said Tender/Order and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Party or for any forbearance, act or omission on the part of the Buyer or any indulgence by the Buyer to the said Party or by any such matter of thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.
5. We.....Bank Limited lastly undertake not to revoke this Guarantee during its currency except with the previous consent of the Buyer in writing.
6. Notwithstanding anything contained here in above, the liability of the Guarantor under this Guarantee is restricted to Rs..... (Rupees.....only) and that this Guarantee shall remain in force until its expiry on the(date), unless a suit or action to enforce a claim under this Guarantee is made against the Guarantor within six months from the date of expiry, all the rights of the beneficiary under the said Guarantee shall b released and discharged from all liabilities thereof.

ForBank Limited.

(seal)

Dated theday of2025

FORMAT NO. QS/03/0019

PROFORMA OF BANK GUARANTEE TOWARDS SATISFACTORY PERFORMANCE

THIS DEED OF GUARANTEE made thisday of

BETWEEN.....

(hereinafter called "THE BANK") which expression shall unless excluded by or repugnant to the context, be deemed to include its successors in office and assigns of the ONE Part and GARDEN REACH SHIIPBUILDERS AND ENGINEERS LIMITED, having their Head Office at 43/46, Garden Reach Road, Calcutta – 700024 (hereinafter called "THE BUYERS") which expression shall unless excluded by or repugnant to the context be deemed to include their successors in Office and assigns of the part.

WHEREAS Messershaving its registered office at(hereinafter called "THE SELLER") have accepted an Order No. dated..... for supply of from the Buyer to manufacture and deliver the same to Buyer in good condition.

AND WHEREAS it is one of the terms of the said order that the seller shall furnish to the Buyer a Bank Guarantee comprising% of the value of the order amounting to Rs. (Rupees) only for the satisfactory performance of the equipment supplied against the said order at least for a period of from the date of supply i.e. from

AND WHEREAS the Buyer has agreed to accept such Bank Guarantee.

NOW THIS INDENTURE WITNESSETH THAT in consideration of the premise the Bank hereby unequivocally undertakes and agrees with the Buyer to pay to the Buyer upon demand in writing whenever required so by them to do and within a fortnight from date of such demand sum or sums not exceeding in the whole of Rs. (Rupees.....) only as may become payable to the Buyer by the Seller by virtue of or arising out of the Terms and Conditions of the said Order.

Provided it is hereby expressly stipulated and agreed that if any question as to whether any sum has become payable by the seller to the buyer by virtue of or arising out of the said order, the decision of the Buyer will be final and conclusive and the Guarantee herein contained shall not be revocable by notice or by reason of dissolution or winding up of the business of the seller or any change in the constitution or composition of the seller's business and the liability of the bank under this presents shall not be impaired in any way by any extension of time or alteration made given conceded in the conditions of the said order or any other indulgence given by the buyer or by reasons of any failure on the part of the Buyer to enforce any of their remedies against the sellers and / or by reasons of failure on the part of the Buyer to observe or perform any of the stipulation contained in the said order and to be observed or performed by the sellers or by any other dealings between the Buyer and Seller whether any of the above takes place with or without the knowledge of the Bank and that the Guarantee herein contained shall remain in full force and virtue only. All claims and demands of the Buyer arising out of or in connection with the said order have been fully paid and satisfied PROVIDED ALWAYS AND IT IS HEREBY AGREED BETWEEN THE PARTIES THAT a Bank's liability under this Indenture shall remain in full force from the date of issue of the Guarantee till.....and is limited to a sum of Rs. (Rupees.....) only.

NOTWITHSTANDING anything stated above our liability under the Guarantee is restricted to Rs. (Rupees.....) only. Our Guarantee shall remain in force up to..... and unless a claim or demand in writing is made on the bank within 6 months from the date of expiry of the Bank Guarantee the bank shall be released and discharged from all liabilities thereunder.

Date :.....2025

Signature of Bank's Authorised
Signatories with Code No., Name,
Designation and Bank Stamp

[illegible][illegible]

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[illegible]

4. Supplier's / Vendor's Complete Postal Address:

Door No.								Street:											
Location:								District:											
City:								State:						PIN					

[illegible][illegible][illegible][illegible][illegible]

10. Nature of the Account: (Tick whichever is applicable & put 'x' mark for the balance two accounts)

Savings Bank Account:		Cash Credit Account:		Current Account:	
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[illegible]

Bank's Stamp Authorized Signature of the Officer of the Bank.

CONTACT DETAILS OF BIDDER

Name of Bidder:	
Address:	
Contact Number:	
email id:	

Details of Authorized Representatives; (Three Levels)

1.

Name:	
Designation	
Direct Landline Number:	
Mobile Number:	
Email id:	

2.

Name:	
Designation	
Direct Landline Number:	
Mobile Number:	
Email id:	

3.

Name:	
Designation	
Direct Landline Number:	
Mobile Number:	
Email id:	

Land Border Clause**Declaration of Compliance of Order (Public Procurement No.1, 2 & 3) dtd 23 Jul 2020 & 24 Jul 2020 on Restrictions under Rule 144 (xi) of the General Financial Rules (GFRs), 2017**

This declaration must form part of all tenders & it contains general information and serves as a declaration form for all bidders. (Before completing this declaration, bidders must study the General Conditions, Definitions, Govt Directives applicable in respect of Public Procurement No.1, 2 & 3) dated 23 Jul 2020 & 24 Jul 2020 on Restrictions under Rule 144 (xi) of the General Financial Rules (GFRs), 2017 & prescribed tender conditions).

DECLARATION BY AUTHORISED SIGNATORY OF THE FIRM

I, the undersigned, (full names), do hereby declare, in my capacity as of M/s (name of bidder entity), that:

The facts contained herein are within my own personal knowledge.

I have read the Order (Public Procurement No.1, 2 & 3) dated 23 Jul 2020 & 24 Jul 2020 on the subject of Restrictions under Rule 144 (xi) of the General Financial Rules (GFRs), 2017 regarding restrictions on procurement from a bidder of a country which shares a land border with India and comply to all the provisions of the Order

3) I certify that M/s (name of bidder entity) **is not from such a country or, is from such a country** (strike out whichever is not applicable). I hereby certify that this SUPPLIER fulfills all requirements in this regard and is eligible to be considered. [Where applicable, evidence of valid registration by the Competent Authority is attached]

4) I understand that the submission of incorrect data and / or if certificate / declaration given by M/s (name of bidder entity) is found to be false, this would be a ground for immediate termination and further legal action in accordance with law as per Clause 12 of the Public Order on Restrictions under Rule 144 (xi) of the General Financial Rules (GFRs), 2017

AUTHORISED SIGNATURE: _____

DATE: _____

Seal / Stamp of Bidder

REF TENDER NO.

Dt:

INTEGRITY PACT TO BE EXECUTED FOR HIGH VALUE ORDERS

- 1. IN FORMAT ENCLOSED.**
- 2. IN NON – JUDICIAL STAMP PAPER OF VALUE RS. 110/-.**
- 3. TO BE EXECUTED BY PERSON WITH APPROPRIATE AUTHORITY.**

INTEGRITY PACT

This Integrity Pact is made on day of (month & year) between M/s. Garden Reach Shipbuilders & Engineers Limited (GRSE) having its Registered & Corporate office at GRSE Bhavan, 61, Garden Reach Road, Kolkata, West Bengal – 700024, India, hereinafter referred to as “The Principal”

and

M/s, a company/ firm/ individual (status of the company), PSU/Partnership/Joint Venture and having its registered office at, hereinafter referred to as “ the Bidder / Contractor”

The Principal intends to award, under laid down organizational procedures, contract for..... The Principal values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/ transparency in its relations with its Capital Bidder(s)/ or Contractors(s).

In order to achieve these goals, the Principal has appointed Independent External Monitors (IEMs) in consultation with Central Vigilance Commission, who will monitor the tender process and the execution of the contract for compliance with the principals mentioned above.

Section 1 – Commitments of the Principal

(1) The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

- (a) No employee of the Principal/Buyer, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
- (b) The Principal/Buyer will during the tender process treat all Bidder(s) with equity and reason. The Principal/Buyer will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
- (c) The principal will exclude from the process all known prejudiced persons.
- (d) The Principal/Buyer undertakes to scrupulously follow the tender containing Standard Terms & Conditions (STAC) and General Terms & Conditions (GT&C) in respect of procurement contracts for goods, services and civil works.

(2) If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the IPC/PC Act, or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and in addition can initiate disciplinary actions.

Section 2 – Commitments of the Bidder(s)/ Contractor(s)

(1) The Bidder(s) /Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

- (a) The Bidder(s) / Contractor(s) will not, directly or through any other person or firm, offer, promise or give to any of the Principal's employees involved in the tender process or the execution

of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

(b) The Bidder(s)/Contractor(s) will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

(c) The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act. Further, the Bidder(s)/Contractor(s) will not use improperly, for purpose of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

(d) The Bidder(s)/Contractor(s) of foreign origin shall disclose the name and address of the Agents/representatives in India, if any. Similarly, the Bidder(s) /Contractor(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any. Further, details as mentioned in the "Guidelines on Indian Agents of Foreign Suppliers" shall be disclosed by the Bidder(s) /Contractor(s). Further, as mentioned in the Guidelines all the payments made to the Indian agent/representative have to be in Indian Rupees only, copy of the "Guidelines on Indian agent of foreign Supplier" is annexed and marked as annex.

(e) The Bidder(s)/Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

(f) The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

(g) In case the Bidder(s) / Contractor(s) is a Joint Venture, then all the Partners of the Joint Venture should sign this Integrity Pact. The Bidder(s) / Contractor(s) shall ensure the compliance of the provisions of this Integrity Pact by all its Joint Venture Partners. Further, the Bidder(s) / Contractor(s) shall be held responsible for any violation/breach of the provisions of IP by any one or more of its Partners.

(h) The Bidder(s)/ Contractor(s) shall ensure compliance of the provisions of this Integrity Pact by sub-contractor(s), if any. In this regard, Bidder(s)/ Contractor(s) shall ensure for entering into a similar Integrity pact arrangement with their respective sub-contractor(s) before entering into any specific sub contractual arrangement, in connection with execution of main contract with Principal. The Integrity Pact shall be generally executed in all such cases where the value of sub contract works is Rs. 2 Crore and above, the content of IP can be decided by Bidder(s)/ Contractor(s), which shall be in similar lines of this main Integrity Pact. The signed Integrity Pact needs to be retained by the Bidder(s)/Seller(s) and shall be submitted to Principal, upon seeking such information. Further, the Bidder(s)/Seller(s) shall be held responsible for any violation/breach of the provisions by its sub-contractor(s).

(i) The Bidder(s)/ Contractor(s) signing Integrity Pact shall not approach the any Court of Law while representing the matters to IEMs and until IEMs delivers their decision in the matter.

Section 3 – Fall Clause:

The bidder undertakes that it has not supplied/is not supplying similar product/systems or subsystems at a price lower than that offered in the present bid in respect of any other Ministry/Department of the Government of India or PSU and if it is found at any stage that similar product/systems or sub systems was supplied by the Bidder to any other Ministry/Department of the Government of India or a PSU at a lower price, then that very price, with due allowance for elapsed time, will be applicable to the present case and the difference in the cost would be refunded by the Bidder to the Buyer, if the contract has already been concluded.

Section 4 - Previous Transgression

(1) The Bidder(s)/ Contractor(s) declares that no previous transgressions have occurred in the last 3 years from the date of signing of this Integrity Pact with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

(2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or action can be taken as per the Company's procedure.

Section 5 – Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/Contractor(s) before award or during execution has committed a transgression through a violation of Section 2, 3 or 4 above or in any other form such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s) /Contractor(s) from the tender process or take action as per the extant procedure of the company.

Section 6 – Compensation for Damages

(1) If the *Principal* has disqualified the Bidder(s) from the tender process prior to the award according to Section 5, the Principal is entitled to demand and recover the damages equivalent to earnest Money Deposit /Bid Security.

(2) If the principal has terminated the contract according to Section 5, or if the Principal is entitled to terminate the contract according to Section 5, the Principal shall be entitled to demand and recover from the Contractor liquidated damages of the Contract value or the amount equivalent to Performance Bank Guarantee.

Section 7 - Equal treatment of all Bidders/ Contractors/ Sub-contractors

(1) The Bidder(s) /Contractor(s) undertake(s) to demand from all sub-contractors a commitment in conformity with this Integrity Pact, and to submit it to the Principal before contract signing.

(2) The Principal will enter into agreements with identical conditions as this one with all Bidders, Contractors and Sub-contractors.

(3) The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

Section 8 – Criminal charges against violating Bidder(s) / Contractor(s) / Sub-contractor(s)

If the Principal obtains knowledge of conduct of a Bidder(s) / Contractor(s) or Sub-contractor(s), or of an employee or a representative or an associate of a Bidder(s) / Contractor(s) or Sub-contractor(s) which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the same to the Chief Vigilance Officer.

Section 9 – Independent External Monitors (IEMs)

(1) The Principal has appointed competent and credible Independent External Monitors (IEMs) for this Integrity Pact in consultation with the Central Vigilance Commission. The task of the IEMs is to review independently and objectively, whether and to what extent the parties comply with the obligations under this Integrity Pact.

(2) The IEMs are not subject to instructions by the representative of the parties and perform their functions neutrally and independently. IEMs reports to the Chairman and Managing Director (CMD) of the GRSE.

(3) The Bidder(s) /Contractor(s) accepts that the IEMs have the right to access without restriction to all Project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the IEMs, upon their request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Sub-contractors. The IEMs are under contractual obligation to treat the information and documents of the Bidder(s) /Contractor(s) /Subcontractor(s) with confidentiality.

(4) The Principal will provide to the IEMs sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the IEMs the option to participate in such meetings.

(5) As soon as the IEMs notices, or believes to notice, a violation of this Integrity Pact, they will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or to take other relevant action. The IEMs can in this submit recommendations, these recommendations would be in the nature of advice would not be legally binding. Beyond this, the IEMs has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

(6) The IEMs will submit a written report to the Chairman and Managing Director of the GRSE within 8 to 10 weeks from the date of reference or intimation to them by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.

(7) IEMs shall be entitled to compensation on the same terms as being extended to / provided to Independent Directors on the Board of the GRSE.

(8) If the IEMs have reported to the Chairman and Managing Director of the GRSE a substantiated suspicion of an offence under relevant IPC/PC Act, and the Chairman and Managing Director of the GRSE has not, within the reasonable time taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer, the IEMs may also transmit this information directly to the Central Vigilance Commissioner.

Section 10 – Integrity Pact Duration

The validity of this Integrity Pact shall be from the date of its signing and extend up to the complete execution of the contract to the satisfaction of both the Buyer and the Bidder/Seller, including warranty period, whichever is later. In case of Bidder is unsuccessful, this Integrity Pact shall expiry after six months from the date of the signing of the contract.

Section 11 – Law and Place of Jurisdiction

This Integrity Pact is subject to Indian Laws. Place of performance and jurisdiction is the Registered and Corporate Office of the Principal i.e. Kolkata, India

Section 12 – Other Legal Actions

The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of the extant law in force relating to any civil or criminal proceedings.

Section 13 – Other provisions

(1) Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

(2) If the Contractor is a partnership or a consortium or a joint venture, this pact must be signed by all partners or consortium/joint venture.

(3) Should one or several provisions of this Pact turn out to be invalid, the remainder of this Integrity Pact remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

The Parties hereby sign this Integrity Pact, is deemed as part of the Contract, at on and parties concerned are bound by it provisions.

(For & On behalf of the Principal)
(Office Seal)

Date:
Place:

Witness - 1:
Name & Address

Witness - 2:
Name & Address

(For & On behalf of Bidder/ Contractor)
(Office Seal)

Date:
Place:

Witness - 1:
Name & Address

Witness - 2:
Name & Address

