TENDER SPECIFICATION OF MARINE AC DIESEL GENERATORSETS (165-170KW) WITH ACCESSORIES

1. **Name of the Equipment**. Marine AC Diesel Generator sets (165-170KW) with accessories.

2. **Purpose**. The Generator sets will be used to generate main electric power of the ship. The Generator sets will replace defective generator sets fitted onboard naval ships. The Generator sets shall be able to operate independently and in continuous parallel operation with two existing generators onboard. The new generators are to be operated, controlled and monitored in similar or better manner than the existing system.

   a. Independently.

   b. Continuous parallel within offered and existing Baudouin Gensets.

   c. Parallel load shifting automatically within offered and existing Baudouin Gensets.

3. **Quantity**. 05 (Five) complete sets.

4. **Original Equipment Manufacturer (OEM)**. Name and Full address with telephone number and e-mail of OEM to be mentioned.

5. **Principal/ Supplier/ Bidder**. Name and full Address with telephone number and e-mail of Principal/ Supplier/ Bidder is to be mentioned.

6. **Local Agent**. Name and full Address with telephone number and e-mail of Local Agent is to be mentioned.

7. **Year of Manufacturing**. 2025 or later.

8. **Pre-bid Site Survey**. Prospective bidder must visit the installation site to estimate installation materials and works involved in installation including **MCR Monitoring Panel, Remote Control Panel, Auto Synchronizing Panel, Manual Synchronizing Panel, Exhaust System and Cables** before submission of tender (including requirement of any supporting structure to install the offered Marine Diesel Generator etc) involved in installation works to avoid any difficulties/ confusion after placing order. Site survey report has to be submitted by the bidder with offer in this regard. Bidder shall send application to BN through DGDP for security clearance 04 (Four) weeks prior to the said site survey.

9. **Qualification of Bidder**. Manufacturers of Marine AC Diesel Generator sets (165-170 KW) with accessories or their authorized distributor/ agent can submit quotations through their authorized local agent enlisted in DGDP. In case of offer from foreign trading company/ distributor/ agent, certificate of dealership/ agency ship from Original Equipment Manufacturer (OEM) is to be submitted with the offer. In this regard the following certificates are to be submitted with the offer (if not OEM):

   a. Authorization Certificate from OEM.

   b. Supply Assurance Certificate from OEM.

10. **Manufacturer Requirement**. The newly installed items shall be brand new, unused and of recent model, proven reliability in the field of operation. The supplier shall ensure the continuity of the operation and availability of necessary spares for at least 15 years each in case of obsolete model over time. In case of obsolesce of spare parts, the OEM is to propose appropriate/ alternate solutions to ensure trouble free operation of the equipment for the said period.

11. **Condition for Acceptance of Quotation**. The quotation shall have supporting documents (Coloured booklets, catalogues, brochures etc) with details about the offered equipment/ item. If detailed information regarding specifications, manufacturer's manuals and catalogue for the quoted equipment/ items are not provided, the quotation may not be accepted.

12. **Acceptance/ Rejection of Bid**. DGDP/ BN reserves the right to accept or reject any bid or to terminate the bidding process and reject all bids at any time prior to the contract award (without thereby incurring any liability to the PURCHASER.

13. **Classification Standard**. The Marine AC Diesel Generator sets (Prime Mover and Alternator) and associated accessories and items supplied under the scope of the supply are to be designed, constructed/ manufactured and tested up to the requirement of IEEE/ IEC/ ISO/ IMO/ marine internationally recognized classification society. The applicable classification standard(s) of offered items are to be mentioned and all the relevant certificates are to be submitted with the offer in English.

14. **Scope of Supply**. The Marine AC Diesel Generator sets are to be supplied as per the specifications enumerated in the subsequent paragraphs. The Generator sets and associated

a. 05 x Complete Gensets with essential and standard accessories are as follows (As per para-16):

(1) Prime Mover (Engine).

(2) Alternator.

(3) Local Control Panel.

(4) Remote Control Panel.

(5) MCR Monitoring Panel.

(6) Synchronizing Panel.

(7) Fuel Oil System.

(8) Lubricating Oil System.

(9) Cooling Water System.

(10) Exhaust System.

(11) Shutdown System.

(12) Safety Devices.

b. Necessary Cables (Power cable and Control cable) for connecting as necessary among Gensets, Engine Local Control and Monitoring Panel, Remote Control & Monitoring Panel, MCR Monitoring Panel, Synchronizing Panel and Switchboard (As per para-22).

c. Software and firmware (As per para-23).

d. Certificates and Reports (As per para-24).

e. Drawing and Manuals/ Documents (As per para-25).

f. Optional Spares (As per para-26).

g. Local Training (As per para-27).

h. Factory Acceptance Test (FAT) (As per para-28).

j. Installation, supervision and Setting to Work (STW) (As per para-29).

k. Test/ Trial and Acceptance(As per para-30).

15. **Operating Environment of Generator Sets**.

a. **Ambient Condition**. The Generator sets and associated accessories and items are to be designed to operate in the following ambient condition:

Air temperature	5^0C to 55^0 C.
Sea Water (SW) temperature	5^0C to 32^0 C.
Relative humidity	Up to 95 % Non-condensing.
Salinity	Up to 34 gm/ltr.
Quality of Sea Water (SW)	High Mud (Suspended solids in SW 2000 ppm) content SW in Coastal Areas.

b. **Maximum Allowable Inclinations**. The Generator set and associated accessories and items shall be able to run when the ship (on which they will be installed) is subjected to following rolling/ pitching:

(1) Roll : $\pm 30^0$
(2) Pitch : $\pm 10^0$

c. **Standard**. The Generator shall be also meet the following standards:

a. For Mechanical shock: MIL-STD-901D.
b. For Electromagnetic compatibility (EMC) : MIL-STD-461.
c. For Environment ruggedness: MIL-STD-810.

16. **Additional Feature Offered by Bidder**. The bidders may suggest and offer additional features for the Generator sets. In this case, Bidders have to explain the detailed advantage of that/ those features of the Generator sets.

17. **Technical Specifications**.

a. **Complete Genset**.

Ser	Description	Remarks
1.	Country of Origin and Manufacture (Assembler)	**Genset, Control & Monitoring with Other accessories**. Canada/ Japan/ Turkiye/ Norway/ Switzerland/ USA/ UK/ Finland/ Sweden/ France/ Germany/ EU country (Country to be mentioned)
2.	**Type**	Marine Type (To be mentioned)
3.	**Brand**	To be mentioned
4.	**Model**	To be mentioned
5.	**Operating Environment**.	
	i. **Ambient Condition**. The Generator sets and associated accessories and items are to be designed to operate in the following ambient condition:	
	(ii) Ambiant air	$+5^0$ C to + 50^0 C
	(iii) Sea Water (SW) temperature	$+5^0$C to $+32^0$ C
	(iv) Relative humidity	Up to 95% (non-condensing)
	(v) Salinity	Up to 34 gm/ltr
	(vi) Quality of Sea Water (SW)	High Mud (Suspended solids in SW 2000 ppm) content SW in Coastal Areas
	ii. **Maximum Allowable Inclinations**. The Generator sets and associated accessories & items shall be able to run when the ship (on which they shall be installed) is subjected to following rolling/ pitching:	
	(i) Roll	$\pm 30^0$
	(ii) Pitch	$\pm 10^0$
6.	Power factor	0.8 Lagging or better
7.	Output	440V, 60Hz, 3 Phase, 165 - 170 KW, 1800 RPM
8.	Dimension	Dimension of the offered Gensets (Prime Mover and Alternator combined) shall not be more than the existing Generator sets dimension (Dimension is to be mentioned) **Note**: Overall dimension of the existing Generator sets of the ship (Prime Mover and Alternator combined) are approximately **Length** 2870 mm, **Breadth** 1470mm and **Height** 1750 mm.
9.	Type of Coupling (Prime Mover and Alternator)	Details to be mentioned
10.	Combined Base Frame	The Prime Mover and the Alternator are to be elastically mounted on a combined base frame to be rigidly fixed to the Generator seating. Lifting eyes are to be provided for lifting the complete Generator sets as a whole, and also the Prime Mover and the Alternator separately. The supplier is to supply standard shock and anti-vibration mountings along with holding-down bolts.
11.	General Features	i. Generator shall be suitable to operate at low load condition (25% loads) without any problem.
		ii. **Maintenance/ Overhauling Schedule**. (a) Time between top overhauls: 5000 or more (To be mentioned) (b) Time between major overhauls: 10000 or more (To be mentioned)
		iii. **Loading Condition**. 1. The Generator and AVR system must be highly responsive. However the generator shall meet the marine standard transient condition as follows (Certificate is to be provided with the offer in this regards): a. **Voltage**. (1) Voltage transient tolerance: +16% to –16% or better (To be mentioned)

Ser	Description	Remarks
		(2) Voltage transient recovery time: Max 3 sec or better (To be mentioned) (3) Voltage Regulation: Within ±5% or better (To be mentioned) b. **Frequency**. (1) Frequency transient tolerance: +5.5% to -5.5% or better (To be mentioned) (2) Frequency transient recovery time: Max 3 sec or better (To be mentioned) 2. The above transient Conditions must be maintained under following load change: a. Load changes from 0 to 50% b. Load changes from 50% to 100% c. Load changes from 100 to 0% d. Sudden addition of largest 3-phase induction motor available onboard ship while generator running at 50% load. The largest motor of the ship is of 45 KW (AC compressor motor).
		Note: Graphs showing various characteristics and responses of transient voltage and frequency variation are to be submitted with the FAT Report
12.	Power Supply for Control System.	The required power supply for control system is to be mentioned. The existing control system power supply is 24V DC.
13.	Coupling	The Alternator is to be directly driven with flector (steel plate) to Prime Mover (Engine) as per SAE standard
14.	Labeling	Circuit breakers, control switches, instruments, cables, indicating light and terminal blocks, etc are to be clearly labeled.

(2) **Prime Mover (Engine)**.

Ser	Description	Remarks
1.	Manufacturer (OEM)	Manufacturer of Prime Mover shall be as following: Wartsilla/ Scania Marine Engine/ Caterpillar/ SEMT Pielstic/ MAN Diesel/ MTU/ Moteurs Baudouin (To be mentioned)
2.	Type	Marine type
3.	Brand	Wartsilla/ Scania Marine Engine/ Caterpillar/ SEMT Pielstic/ MAN Diesel/ MTU/ Moteurs Baudouin (To be mentioned)
4.	Model	To be mentioned
5.	Country of Origin and Manufacture	Finland/ France/ Germany/ Sweden/ USA/ UK (To be mentioned)
6.	Year of Manufacture	2025 or later
7.	Overload Rating	110% of max rating (1 hour within 12 hours) or better
8.	Number of Cylinders and arrangement	To be mentioned
9.	Specific Fuel and Lube oil Consumption per hour in various load condition (at 50%, 75%, 100%)	Lub oil: 0.8 kg/kwh or better Fuel: At 50% Load- 30 Ltr/Hr; or better At 75% Load- 43 Ltr/Hr; or better At 100% Load- 57 Ltr/Hr; or better
10.	Fuel and Lub Oil to be used	Fuel: HSDO Lube Oil: To be mentioned
11.	Governor	Electronic
12.	Turbo Charger	Make and Model are to be specified

Ser	Description	Remarks
13.	Engine Block	Country of manufacturer is to be mentioned.
14.	Shut down system	Details to be mentioned (Including emergency shutdown)
15.	Starting System	The prime movers shall be started by battery. The engines shall be fitted with self-starter and dynamo for charging the batteries (Details to be mentioned). Necessary batteries are to be provided by the supplier with following specification: i. Brand: To be mentioned ii. Model: To be mentioned iii. Type: Maintenance Free marine type Battery iv. Country of manufacturer: To be mentioned v. Qty: To be mentioned vi. Output Voltage: To be mentioned vii. Capacity: To be mentioned viii. Dimension and weight: To be mentioned (Site survey to be conducted to ensure that the offered items are compatible with the existing facilities) ix. Any others (If any): Details to be mentioned
16.	Safety Devices	Following safety protections are to be incorporated: i. Engine over speed ii. High Engine temperature iii. Low Engine oil pressure iv. Others to be mentioned (if any)

(3) **Alternator**.

Ser	Description	Remarks
1.	Manufacturer (OEM)	Manufacturer of Alternator shall be as follows: Leroy Somer/ Stamford (To be mentioned)
2.	Type	Self-excited (To be mentioned)
3.	Brand	Leroy Somer/ Stamford (To be mentioned)
4.	Model	To be mentioned
5.	Country of Origin and Manufacturer	France/ UK (To be mentioned)
6.	Parallel Operation and Low Load operation	a. The offered generator shall have the arrangement to run in continuous parallel condition with automatic load sharing with other three existing generators onboard.
		b. The generator shall be capable of continuous operation at minimum 80% load.
		c. The generator shall also be capable of continuous operation at loads as low as 25% of full load.
7.	Year of Manufacturer	2025 or later
8.	AVR:	
	i. Type	Electronic type
	ii. Brand	To be Mentioned
	iii. Model	To be Mentioned
	iv. Any other	To be Mentioned
9.	Insulation Class	H or Better
10.	Number of bearing	Single
11.	Number of poles	4 Poles
12.	Max continuous ratings	80% of full capacity or better
13.	Rotor	Dynamically balanced
14.	Stator	Durable winding in star configuration

15.	Connection	3 wire, star connection, neutral ungrounded
16.	Safety Devices	Following safety protections are to be incorporated: i. Over load protection ii. Short circuit protection iii. Under frequency indicator iv. Excitation loss indicator v. Reverse power protection vi. Any others to be mentioned

(4) **Local Control Panel**.

(a) The DG local control panel shall be of marine standard and flexibly mounted on the generator sets. Necessary arrangement shall be arranged so that the generator can be started from this panel. The panel will also be equipped with following digital/ analogue meters and gauges:

i. **Meters.**

(1) RPM tachometer.

(2) Hour counter.

ii. **Gauges.**

(1) Lube oil pressure gauge (in & out).

(2) Seawater pressure gauge.

(3) Lube oil temperature gauge.

(4) Fresh water temperature gauge.

(5) Exhaust temperature gauges (Combined).

(6) Lube oil filter differential pressure gauge.

(7) Fuel filter differential pressure gauge.

iii. Emergency Shutdown push button (Push button to be protected with open/ close flexible cover).

(b) **Safety Devices**. Following safety devices are to be provided for each Generator in the digital LCP:

i. Low lube oil pressure alarm- audio and visual.

ii. High cooling water temperature alarm- audio and visual.

iii. High lube oil temperature alarm- audio and visual.

iv Low lube oil pressure shutdown device with audio and visual alarm.

v. Prime Mover over speed alarm and auto shut down device/ over speed trip gear (with manual resets).

vi. Reverse power protection system.

vii. Over current protection system.

viii. Over voltage/ under voltage protection system.

ix. Over speed protection system.

x. All safety warning and fault warning are to be shown in the Generator control panel.

(5) **Remote Control Panel**. Remote Control Panel of the generator sets shall be of marine standard and is to be fitted in the existing switchboard. The generator shall be started and stopped from this panel during normal operation, and an **EMERGENCY STOP** provision shall be included. Necessary modification in this regard is to be done by the bidder/ supplier. Required modification of the existing switchboard is to be estimated by the bidder before submission of the tender specification. The following components with Digital/ Analog meters and lamp indication to be included in the panel with **each genset**

(a) 01 x DG Remote Monitoring unit (Digital display)

(b) 01 x Kilowatt meter

(c) 01 x Voltmeter with phase selector switch.

(d) 01 x Frequency Meter.

(e) 01 x Amps meter with phase selector switch.

(f) 01 x Ohm/ insulator meter.

(g) 01 x Emergency Stop push button. (Push button to be protected with open/ close flexible cover).

(h) 01 x RPM decrease/ increase button.

(j) **01 x Air Circuit Breaker/ Motorized Circuit Breaker**. Air Circuit Breaker/ Motorized circuit breaker is to be provided and installed by the bidder mentioning appropriate ratings on completion of site survey.

(k) Lamp for bus-bar alive indication, Generator circuit breaker non-close, Generator ACB/MCCB abnormal trip, Generator running indication green lamp.

(l) Earth Testing Facility (Lamp with push switch).

(m) Alternator droop kit.

(n) Any other device/ meter necessary for control/ monitor the generators.

(6) **MCR Monitoring Panel**. Remote Monitoring Panel of the generator sets shall be of marine standard and is to be fitted in MCR. For installation of MCR monitoring panel required site survey shall be done before installation by the bidder/ supplier (to understand about cable requirement, cable layout, fixing position at MCR and other arrangements as required. The following components including lamp indications and alarm shall be incorporated with each MCR Monitoring Panel:

i. **MCR Components**.

1. 01 x DG Remote Monitoring unit (Digital display)

2. 01 x Emergency Stop push button. (Push button to be protected with open/ close flexible cover)

3. Generator running status (ON/OFF) indication light.

ii. **Visual and audio alarm**.

1. Lube oil pressure alarm (High and Low).

2. Lube oil temperature alarm (High and Low).

3. Cooling water temperature alarm (High and Low).

4. Prime Mover over speed alarm.

5. DG auto shut down alarm.

(7) **Parallel Operation**. The offered generator shall be fully capable of operating in parallel with all existing shipboard generators (Moteurs Baudouin, Model: 6M16S, AVR: Digital AVR-D550, Leroy Somer (Nidec). It must support both **automatic** and **manual** paralleiling functions. The synchronizing system, including required panels and devices, shall conform to **marine-grade standards** and shall be integrated into the **existing generator control panel** within the switchboard (details to be clearly specified in the technical offer).The bidder shall conduct a **mandatory site survey** to determine cable requirements, cable routing, and the appropriate mounting arrangement within the switchboard. The following items are to be provided for the said parallel operation:

(a) **Auto Synchronization Panel**. This synchronization mode shall facilitate automatic parallel operation to allow uninterrupted load transfer and continuous automatic load sharing among all shipboard generator sets. The bidder shall provide all equipment, modules, wiring, and devices necessary to achieve full automatic synchronization for each generator. The auto-synchronizing arrangement and other associated equipment **shall be of marine standard**. Complete technical details of the proposed automatic synchronization arrangement, including module/model number, quantity, location, functionality, and integration method must be submitted with the offer.

(b) **Manual Synchronization Panel**. Manual synchronizing mode shall be required as an alternative parallel mechanism other than the Auto Synchronization mode for uninterrupted load sharing between all shipboard generator sets. The manual synchronizing panel is to be separately fitted in the offered generator control panel in the existing switchboard. If a manual synchronization system is not manufactured by the GENSET OEM, the bidder shall provide a suitable marine-grade system from a reputable and appropriate source. Each synchronizing panel shall consist of the following:

i. 01 x Synchroscope.

ii. 03 X Frequency Regulator/ Adjust knob.

iii. 03 X Voltage Regulator/ Adjust knob.

iv. 01 X Generator selector switch (The selector switch has a provision to select between two gensets).

v. Any additional device/equipment/ item necessary for complete manual synchronization (to be listed in the offer).

(c) **Additional accessories**. The bidder shall provide all required **wiring, connectors, terminal interfaces, and cable accessories** for the parallel operation mentioned above between the shipboard generators. The bidder must ensure that the synchronizing panel enables **smooth, stable, and reliable load transfer and continuous parallel operation** among all shipboard generators under all operational and load conditions. **All additional components, accessories, and devices** required for successful parallel operation, whether mentioned or not, in this specification are to be provided by the supplier and to be mentioned during the submission of the technical specification.

(8) **Fuel Oil System**. Fuel oil system should consist of the followings but not limited to:

(a) Prime Mover driven fuel oil feed pump to supply fuel to the engine fuel circuit. The Ship's a Ready Use (RU) tank mounted on or beside the prime mover in the Generator room to be used.

(b) A fuel pre-filter/ water separator to be equipped to ensures the filtrations of fuel coming from the Day Tank. The fuel circuit to have 02 X disposable filters (Cartridges) which can be replaced and vented in operation using the lever fitted to the filter head.

(c) Pressure regulating valve (Sensors are connected to digital display at LCP).

(d) Flame proof hose lines for fuel pipe work to and from Prime Mover.

(9) **Lubricating Oil System**. The lube oil system should consist of the followings:

(a) Prime Mover driven lub oil pump (gear type) with relief valve on pump discharge (LO Pump included).

(b) Lub oil pump for extracting oil from wet sump (LO extracted Pump included).

(c) The engine to be equipped with 02 X Duplex type lub oil filters/ cartridges. Filter cartridges are to be changeable during running.

(d) Flexible connections/ hoses.

(10) **Cooling Water System**. Prime Mover internal cooling is to be done by fresh water. Fresh water-cooling is to be done by seawater. Seawater is muddy in the harbor, where the ships will usually be berthed and operated. The Prime Mover cooling water system should include the following:

(a) Engine driven self-priming seawater and fresh water circulating pumps with discharge pressure gauges. (**Water pumps with rubber impellers will not be acceptable**).

(b) Any type of fresh water cooler, external to the Prime Mover.

(c) Fresh water and seawater pressure gauges.

(d) Galvanized steel fresh water pipe external to the Prime Mover with flexible pipe connection.

(11) **Exhaust System**. The existing exhaust system (Stbd: length- 20070mm, inner diameter- 130mm, outer diameter- 140mm. Port: length- 560mm, inner diameter- 76mm, outer diameter- 92mm) will be used for the new Generator sets. The exhaust system of the offered Generator sets shall match with the existing exhaust system of the ship from Generator outlet to ships outlet through funnel. **In this regard, the supplier must visit the ships in Mongla Naval Berth**. If cannot be matched, necessary adjustment of connecting the outlet of new DGs and the existing exhaust pipes is to be made by the supplier. Details of various cable specification and unit price (per meter) is to be quoted separately. In addition, followings may be included in the exhaust system:

(a) Combined exhaust temperature gauge for both bank.

(b) Stainless steel expansion bellows with flange between the Turbo charger/ Engine exhaust manifold outlet and the main exhaust pipe.

(c) Exhaust silencers.

18. **Safety Devices**. Following safety devices are to be provided for the Generator:

Ser	Description	Remarks
1.	Low lube oil pressure alarm - audio and visual.	To be mentioned.
2.	High cooling water temperature shutdown device with audio and visual alarm.	To be mentioned.
3.	High lube oil temperature alarm - audio and visual.	To be mentioned.
4.	Low lube oil pressure shutdown device with audio visual alarm.	To be mentioned.
5.	Prime Mover over speed alarm and auto shut down device/ over speed trip gear (with manual resets).	To be mentioned.
6.	Manual emergency shut off device.	To be mentioned.
7.	Reverse power protection system.	To be mentioned.
8.	Over current protection system.	To be mentioned.
9.	Over voltage/under voltage protection system.	To be mentioned.
10.	Over speed protection system.	To be mentioned.

19. **Shutdown System**. Gensets shutdown system should include the following:

(a) Normal shutdown is to be provided from Local control panel and Switch board.

(b) Emergency shutdown (push button to be protected with open able cover).

20. **Essential Spares**. The following essential spares are to be provided at the time of delivery and unit price is to be quoted separately with the offer:

Ser	Name of Item	Qty	Unit Price
1.	Oil Filter	10	To be mentioned
2.	Fuel Filter	10	
3.	Air Filter	05	
4.	Sea Water Pump Mechanical Seal	10	
5.	Fresh Water Pump Mechanical Seal	10	

21. **Standard Accessories**. Standard accessories must include every item and accessories, which are essential to make the offered system operational with full functionality. Whether those are mentioned in the specification or not they are to be supplied by the bidder within the scope of the supply. Any such accessories, kit and items associated to operate the said equipment in full functionality are to be mentioned clearly with purpose and submit with offer mentioning item wise price.

22. **Cables**. The supplier is to provide necessary high quality Power and Control cables for Generator sets (as per IEC 60092-353 and IEC 60092-350 standard) for all power & control/monitoring connections. **Actual requirement of cable are to be assessed by the supplier on site visit and to be submitted with the offer (if existing power supply cable from generator to switchboard are useable then separate power supply cable not be quoted but to be mentioned clearly in the offer)**. Details of various cable specification and unit price (per meter) is to be quoted separately.

23. **Software and Firmware**. All necessary software and firmware of Generator sets controller, Engine speed controller, AVR and other control circuit are to be provided in soft copy (USB/CD). Method and items required for loading the software and firmware are also to be provided.

24. **Certificate and Reports**.

a. Following certificates and reports are to be provided in English for each item including associated equipment/ accessories **with the offer**:

(1) 'Type approval certificates' of classification society (As per para13).

(2) Supply Assurance Certificate.

(3) Guarantee and warranty certificates.

(4) After sales service support certificate.

b. Following certificates and reports are to be provided in English for each item including associated equipment/ accessories **during delivery**:

(1) 'Type approval certificates' of classification society (As per para13).

(2) 'Quality assurance certificates' for each item and their associated equipment and instruments from OEM is to be provided.

(3) 'FAT Certificates'.

(4) Certificate of genuine product and brand-new item.

(5) Guarantee and warranty certificates.

(6) After sales service support certificate.

25. **Drawing and Manuals/ Documents**.

a. **Installation Drawings**. Following drawings are to be submitted for buyer's approval prior 04 (Four) months of commencing of installation work onboard ship:

(1) Layout drawing of the system.

(2) Cable diagram including cable type and cable grouping.

b. **Manuals/ Documents**. 02 (Two) set of following documents and manuals in English are to be provided for each genset at free of cost at the time of delivery:

(1) Operating Manual of the Prime Mover and Alternator.

(2) Technical Manual with Circuit Diagram.

(1) Operating Manual of the Prime Mover and Alternator.

(2) Technical Manual with Circuit Diagram.

(3) Maintenance Manual of the prime mover and alternator.

(4) Parts Catalogue of the Prime Mover and alternator.

(5) Circuit diagram of the AVR.

(6) Electrical wiring diagrams and faultfinding flow charts of the alternator.

26. **Optional Spare**. A list of the following optional spares is to be quoted separately with item wise unit price. The buyer may select the any of the spares as required from the list:

Ser	Name of Item	Quantity	Unit Price
1.	AVR	01	To be mentioned
2.	ACB/ Motorized Circuit Breaker with appropriate ratings	01	
3.	Oil Filter	01	
4.	Fuel Filter	01	
5.	Air Filter	01	
6.	Belt (As applicable)	01	
7.	Engine Oil Pressure Sensor (High & Low)	01	
8.	High Cooling Water Temperature Sensor	01	
9.	High Lub Oil Temperature Sensor	01	
10.	Reverse Power Relay	01	
11.	Over Voltage Relay	01	
12.	Over Current Relay	01	
13.	Under Voltage Relay	01	
14.	Over Speed relay	01	
15.	Local Control Display	01	
16.	Remote Control Display	01	

27. **Local Training**. The supplier is to send one qualified representative who will provide onboard operation and maintenance training in Bangladesh to BN personnel for a duration of 05 (Five) working days **after test, trial and commissioning of all the Generator sets**. During training, emphasis is to be given on operation, maintenance and fault finding of Prime Mover, Governor, Alternator, AVR, Engine and Generator sets Controller including software/ firmware installation procedure and Control Circuit etc. Cost of transportation, accommodation and food of the supplier representative is to be borne by the supplier. Cost of onboard training is to be quoted separately. A set of detail training content is to be provided by bidder to BN 04 (Four) weeks prior to the said training. The training shall include (but not limited to) the following:

a. System composition, configuration, principle of operation, parallel operation (Manual, Semi-auto, Auto) and troubleshooting.

b. Software installation, operation and configuration for smooth conducting of all the tests.

c. Theoretical concept and procedure of tests (practical).

d. Frist hand repair and maintenance.

28. **Factory Acceptance Test (FAT)**. Following FAT(s) criteria to be carryout in OEM or manufacturer of prime mover/ alternator/ assembler premises for the offered System:

a. FAT shall be carried out by a team of 02 (Two) BN members for duration of 06 (Six) working days in OEM premises at the buyer's expense. Both way air fare, accommodation and food for the FAT team shall be borne by BN. All types of movement/ transportation (air/sea/road) of the team within the manufacturer's country, reception and arrangement for entry into the country/ concerned area for the FAT are to be arranged by the supplier. The supplier shall inform the buyer about the date of FAT (schedule) and FAT criteria at least 08 (eight) weeks prior to the date of FAT. FAT procedure shall be forwarded to the buyer 6 (six) weeks prior to the date of commencement of the FAT to the concerned directorate for approval of BN. Serial No of Prime Mover and Alternator are to be provided eight weeks before FAT. The cost of FAT in this respect is to be quoted in the offer.

stores to the supplier concerned. The supplier will not make shipment of any item of the contract without clearance from DGDP.

c. The FAT shall be carried out at manufacture's factory premises following approved FAT protocols.

d. During FAT, tests shall be carried out to fulfill the required condition mentioned in technical specification of the offered system. Various tests for checking performance are to be carried out and recorded. After FAT, a joint test report shall be prepared and signed by both the bidder and purchaser's representative.

e. The FAT criteria in details is to be submitted, which shall include the following:

(1) **Generator Load Tests**. Generators load test shall be carried out to fulfill the required condition mentioned at Para 17a(11)iii. Recording of voltage, frequency, transient voltage and frequency variation and recovery time shall be made to ascertain the specified condition.

(2) **Prime-Mover Test**. Factory Test Reports of prime mover are to be provided.

(3) **Tests of Alarm and Safety Device**. Various test for checking temperature, pressure, fuel oil consumption etc. with recording of alarm and shutdown steps are to be carried out.

(4) **Test Report**. Test reports are to be prepared in English which will include all test results and other relevant information. Test report is to be submitted to BN before shipment.

f. **Location of FAT**. Location of FAT with full address is to be mentioned.

29. **Installation, Supervision & Setting to Work (STW)**. Installation, Supervision, and Setting to Work (STW) shall be done as following:

a. **Installation Site**. Onboard BNS KARATOA, TURAG and SANGU.

b. **Installation Material and Accessories**. All installation materials, test equipment/ instrument, tools, cables, cable gland and other necessary accessories required for the installation, STW and supervision are to be provided by the supplier.

c. **Bidder/ Supplier Responsibility**.

(1) Installation of gensets with standard accessories and software installation (if required/necessary) are to be done by supplier. As such, any accessories required for the operation and maintenance shall be provided by the supplier.
(2) The offered gensets and other accessories are to be installed by replacing the existing genset of the ship's and to be commissioned by the qualified OEM Engineers.
(3) The Supplier shall make arrangements/modification/ alteration (as required) to install the offered gensets as per scope of supply at no additional cost.
(4) The Supplier shall make arrangements/modification/ alteration (as required) to ensure trouble free and continuous single operation, parallel operation among the supplied generators and also parallel operation with all shipboard generators.
(5) Any damage during reinstallation/ installation of offered gensets, existing onboard equipment, machineries and items/ systems shall be compensated by supplier. Damaged equipment, machineries and items/ systems are to be made operational with its full functionality by the supplier.
(6) Qualified OEM Engineers are to be employed for the installation and STW, HAT and SAT and commissioning. All types of expenses related with both-way airfare (to and from Bangladesh (installation site)), food, accommodation and internal travel of the OEM engineer during installation are to be borne by the supplier.

d. **Purchaser Responsibility**. Purchaser shall provide available assistance (if required) for installation under the direct supervision of OEM Engineer. BN Dockyard shall provide available work/ facility (if required) for installation. The Bidder shall coordinate with the ship for requesting support from the BN Dockyard. Support equipment may be provided (if available) from the user side upon request prior installation.

30. **Test/ Trial and Acceptance**. Test, Trial and Acceptance requirements are as follows:

a. **General**. The OEM Engineer shall ensure satisfactory tests, trial and functioning/ commissioning of the equipment at purchaser's premises after all necessary installation. Necessary software installation shall be done before test/trial. All instruments and consumables for HAT, SAT and Acceptance are to be provided by the supplier.

b. **HAT and SAT Protocol**. The HAT and SAT protocol/ procedures including schedule are to be submitted to BN 04 (four) weeks prior HAT and SAT.

c. **HAT**. Harbour Acceptance Test (HAT) shall be carried out at harbour on completion of Setting to Work (STW).

d. **SAT**. Sea Acceptance Test (SAT) shall be carried out at sea on completion of satisfactory HAT.

e. **Acceptance**. On completion of satisfactory Test/ Trial (HAT and SAT), Final acceptance certificate shall be signed by purchaser and supplier.

31. **Delivery**.

a. **Delivery and Installation Time**. Item delivery and installation shall be completed within 12 (Twelve) months and breakdown of said time line is appended bellow:

(1) **Delivery Time**. The items shall be delivered to the 'Place of Delivery within **09 (Nine)** months after signing the contract.

(2) **Installation Time**. The Gensets shall be installed onboard ships within **03 (Three)** months after delivery of the items.

b. **Place of Delivery**. NSD, Khulna.

c. In case of CFR, the supplier shall carry the items from any sea port/ air port (as applicable) to NSD Khulna at the cost and responsibility of supplier.

32. **Shipment**.

a. **Source of Raw Material**. To be mentioned.

b. **Source of Supply**. The source of supply of the offered items/ systems are to be mentioned. It shall be from the country of manufacturer or country of origin.

c. **Port of Shipment**. To be mentioned. The port of shipment is to be from the country of manufacturer or country of origin.

d. **Consignee**. The supplied item shall be the following consignee:

The Commanding Officer
Naval Stores Depot
New Mooring, Chattogram,
Bangladesh
BIN-002349278-0503

or

Officer In Charge
Naval Stores Sub Depot Dhaka
Naval Unit Khilkhet
Namapara, Dhaka-1229, Bangladesh

e. All items are to be brand new and to be delivered in seaworthy packing to ensure safe transit by sea. Certificates in this regard are to be provided during delivery.

f. All packages are to have packing notes showing their contents in detail and all packages shall be marked with the name and address of the consignee and gross weight.

33. **Warranty, Guarantee and After Sales Service**.

a. **Warranty**.

(1) 12 (Twelve) months manufacturer's warranty for trouble free operation is to be provided for the item from the date of acceptance by the purchaser. If any component of the supplied items becomes defective during the warranty period, the overall warranty shall be extended automatically for the period of subject component remains defective.

(2) For warranty repair/ replacement, the supplier shall collect the defective item from NSD, Chittagong/ NSD Khulna/ NSSD, Dhaka (as applicable) and re-supply the same to collecting place after warranty repair or for replacement within 90 (ninety) days from the date of defect at no cost to the purchaser.

b. **Bank Guarantee (BG) for Warranty**. The BIDDER shall issue a Bank Guarantee (BG) during submission of last 20% payment for a value of **@ 05% (Five percent) of the total CFR/CPT value** from any scheduled bank in Bangladesh in favour of The Senior Finance Controller (Navy), Sailors Colony, Lalasarai, Mirpur–14, Dhaka-1206, representing Bangladesh

Navy, Peoples Republic of Bangladesh, information to The Directorate General Defense Purchase, Ministry of Defense, Peoples Republic of Bangladesh. This BG shall remain valid until the warranty period of the supplied Gensets and other items (not withstanding minor deficiencies which would be mutually settled and agreed between PURCHASER and BIDDER) in Bangladesh, and it shall expire on receipt of **Warranty Completion Certificate**. If the contractual obligation warrants the extension of the validity of the BG, the BIDDER shall remain liable to do so at its own cost. In case of material failure of the BIDDER to fulfill its contractual obligation as per the terms and conditions of the contract, the BG in full or part thereof must be forfeited at the discretion of the PURCHASER.

c. **Guarantee**. The supplier is to give guarantee of continued supply of spares for at least 10 (Ten) years at a reasonable price (not exceeding 3% per year). Certificate is to be submitted with the offer.

d. **After Sales Service**. After sale service shall be available with the local agent of supplier and is to be provided as and when required for indefinite period or at least 15 years after the installation. If any system, equipment etc becomes obsolete or out of production during or after the installation period (at least upto 15 years), the supplier is to submit alternative of same/ improved version for selecting the suitable replacement.

34. **Validity**. The offer is to remain valid till 30 June 2026.

35. **Terms of Payment**. Payment shall be made through an Irrevocable Letter of Credit (LC). LC shall be opened at the expense of the PURCHASER and **100% LC** value shall be made operative in favour of Supplier. CFR value being the value of the supplied goods, payment shall be made as under:

a. **1st Installment**. 80% of CFR value shall be paid **after shipment of the Gensets with essential and standard accessories** and on submission of the following documents to the bank:

(1) Original Airway Bill (AWL)/ Bill of Landing (BL) must be issued by air lines/ shipping lines or authorized agent of shipping lines/ air lines against DGDP contract reference (after signing the contract). LC number, and Bangladesh bank registration number are to be mentioned in AWL/ BL. Freight amount must be shown separately otherwise only FCA value shall be paid. All documents to be submitted (01) original with at least (05) five copies other than bill of lading shall be (03) three original with (03) three copies. In addition to this, following shall also be considered:

(a) Name of the carrier must be indicated in AWL/ BL.

(b) Must be signed by carrier or a named agent for/ on behalf of the carrier.

(2) 'Supplier's Signed Commercial Invoice' for (freight/ services amount to be shown separately (if applicable)) representing 80% of CFR value as stated in the contract.

(3) 'Packing List' signed by the authorized representative of the shipping company or exporter.

(4) 'Certificate of Origin' signed by the Manufacturer's Authorized Person/Authorized Official of the exported country.

(5) 'Manufacturer's Certificate' Signed by the MANUFACTURER/ SUPPLIER. Certifying that product has been produced as per technical data/ analytical data and specification as per contract.

(6) 'Manufacturer's Warranty Certificate' Signed by the MANUFACTURER/ SUPPLIER.

(7) 'Factory Acceptance Test (FAT) Completion Certificate' signed by the SUPPLIER.

(8) 'Quality Assurance Certificate' (QAC) signed by the SUPPLIER.

(9) 'Shipment Clearance Letter' Signed by DGDP (Directorate General Defense Purchase, Dhaka, Bangladesh) as PURCHASER.

b. **2nd Installment**. 20% of CFR value shall be paid **after successfully commissioning** and on submission of the following documents to the bank:

(1) 'Supplier's Signed Commercial Invoice' for representing 20% of CFR value as stated in the contract.

(2) 'Final Acceptance Certificate' issued by the PURCHASER after successful completion of installation, HAT, SAT and commissioning of system.

(3) The bidder shall submit the relevant document of 5% BG of CFR value, which shall be released on submission of warranty completion certificate.

7c. **Installment of Factory Acceptance Test (FAT), Training and Services**.

(1) **Factory Acceptance Test (FAT)**. 100% cost of FAT shall be paid **after successful completion of FAT** and on submission of the following documents to the bank:

(a) 'FAT report' signed by the PURCHASER for the successful completion of the 'FAT' in OEM premises.

(b) 'Supplier's Signed Commercial Invoice' for 100% of FAT value as stated in the contract.

(2) **Local Training**. 100% cost of Local Training shall be paid **after successful completion of local training** and on submission of the following documents to the bank:

(a) Certificate Signed by the PURCHASER for the successful completion of Local Training' in Bangladesh.

(b) 'Supplier's Signed Commercial Invoice' for 100% of Local Training value as stated in the contract.

(3) **Installation and Final Acceptance**. 100% cost of 'Installation shall be paid after successful completion of Installation and Final Acceptance on submission of the following documents to the bank:

(a) Certificate Signed by the PURCHASER for the successful completion of the 'Installation and Final Acceptance' in Bangladesh.

(b) 'Supplier's Signed Commercial Invoice' for 100% of Installation and Final Acceptance value as stated in the contract.

36. **Price**. Price of the each item of the total offer is to be shown separately (e.g. price of the main equipment, additional accessories, Installation, local training, warranty/ guarantee etc) and then grand total of the foreign currency to be shown on the original offer submitted by the bidder. Moreover, if the item is imported against this tender, price to be quoted without import duties.

37. **Compliance Statement**. A compliance statement fulfilling all the requirement of the tender is to be submitted for evaluation of the quotations. Stating mere 'Yes or No' shall not suffice and detailed evidence with description/ information, brochures/ booklet, drawing and diagram as required is to be given. An incomplete compliance statement may attribute to cancellation of the offer. If any clause of this specification does not commensurate with offered item. the deviation is to be spelt out clearly

Directorate General of Defence ... Date ... Ministry of Defence

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