

**TENDER SPECIFICATION OF MAIN ENGINE - 5PC**

1. **Name of the Equipment.** Main Engine 5PC Ships (BNS APARAJEYA, ADOMYA, ATONDRO, PADMA & SURMA).

2. **Purpose.** The Main Engines will propel 'The Padma Class Patrol Vessel of the Bangladesh Navy. These engines are intended to replace the Ships' existing engines (Model: TBD620V8 manufactured by Henan Diesel Engine Industry Co, Ltd, China, under the license of DEUTZ). No changes/modifications of the ship's hull and structure will be considered, and the ship's existing gearbox and shaft line must be kept intact. The proposed engines should be configured with the existing engine and machinery control system of the vessel. The new engines and accessories shall be accommodated in the existing ship's engine room and compartment(s)/ space(s). The engines and propulsion system must be independent and operated safely.

3. **Quantity.** 5(five) complete sets (Counter-Clockwise rotation).

4. **Manufacturer, Principal SUPPLIER & Local SUPPLIER.** Name and full address to be mentioned.

a.	Manufacturer	To be mentioned
b.	Principle SUPPLIER	To be mentioned
c.	Local SUPPLIER	To be mentioned

5. **Year of Manufacturing.** 2024 or later.

6. **Country of Origin.** To be mentioned.

7. **Manufacturing Country.** To be mentioned.

8. **Operating Environment of Engine.** The environment under which the engines will be operated, and their performances will be measured is as under:

Ser	Parameters	Remarks
a.	Air Temperature	5 <sup>o</sup> - 45 <sup>o</sup> C
b.	Sea Water (SW) Temperature	5 <sup>o</sup> - 35 <sup>o</sup> C
c.	Relative Humidity	Up to 95%
d.	Suspended Solids in SW	Up to 20,000 ppm
e.	Salinity	Up to 34 gm/ltr

9. **Maximum Allowable Inclinations.** The main engines and accessories should be able to run when the ship is subjected to the following rolling/pitching:

a. **Transient Condition.**

(1)	Front/ rear end down (pitch)	± 10°
(2)	Left/ right side down (roll)	± 30°

  
**SAEED AHMAD SADY**  
 Lt Commander BN  
 Assistant Director Purchase (Navy)  
 Directorate General Defence Purchase



b. **Continuous Condition.**

(1)	Front/ rear end down	± 10°
(2)	Left/ right side down (heel)	± 15°

10. **Qualification of BIDDERS.** Only the authorised SUPPLIERS of the OEM can bid on the tender. In such a case, the manufacturer's certificate of authorisation must be submitted with the offer.

11. **Certificate/Document of Authentication.** The local SUPPLIER must provide the following original certificate(s)/ document(s) with the offer/quotation of items as regard to the genuineness of source and item(s) to establish a chain of links from the original source to supply items:

- One certificate/ document by the manufacturer (of the engines) favouring the BIDDER.
- Two certificates/ documents, one from the manufacturer to their authorised agent and the other from the authorised agent to BIDDER.
- Three certificates/ documents, one by the manufacturer to an authorised agent, second by an authorised agent to a sub-agent, and third by a sub-agent to BIDDER.

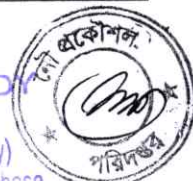
12. **Standard.** All Engines are to be tested and certified (class-approved) by a classification society that is a member of IACS. A necessary class approval certificate is to be provided for all individual engines before shipping. The detailed contact information of the local office in Bangladesh (if any) and the headquarters of the approving class society is to be submitted with the offer. The BIDDER must clearly state that the proposed propulsion machinery, i.e., main engines and their associated equipment, are compatible and that the arrangements suit the ship's stability, structural strength, vibration, and noise signature point of view.

13. **Pre-Bid Meeting.** It will be arranged if enough potential BIDDER(s) who would purchase tender documents from DGDP request a bid meeting. The date will be preferably 2 (two) weeks before the submission of the offer. The date and time of the pre-bid meeting (if requested and arranged) will be notified in advance.

14. **Supply Assurance Certificate.** The BIDDER should submit the necessary 'free for sale' governmental license for the concerned components/items, with an obligation to supply spare parts, technical advice, etc., in the future.

15. **Scope of Supply.** The scope of supply is to include the following:

Ser	Description
a.	5 x Lot of Supply and installation of marine propulsion diesel engines, new shock and vibration mountings and new torsional vibration damper as per paragraphs 21 and 22.
b.	Supply of auxiliaries and accessories and as per paragraph 23.
c.	Optional Items as per paragraph 24.
d.	Spare parts as per paragraph 25.



Ser	Description
e.	Supply of tools and special tools as per paragraphs 26 and 27.
f.	Pre-shipment Inspection (PSI) and Factory Acceptance Test (FAT) for the above items as per paragraph 28.
g.	Installation Supervision of engines, Onboard Training, Drawing, Manual, Brochure and Test/Trial Acceptance of the above items as per paragraphs 31 to 35.
h.	Warranty as per paragraph 36.
j.	Any other relevant issue (if any).

16. **Sales and Record.** A record of sales by the BIDDER/ agent of engines mentioning the year and buyer (s) is to be included with the quotation.

17. **Max Allowable Overall Dimensions of the New Engine.** The allowable dimension of the new engines must not exceed (Similar to existing engines):

a. Length 2500 mm x Breadth 1500 mm x Height (including sump) 2200 mm and Height (from existing foundation) 2300 mm.

18. **Expected General Particulars/ Characteristics of the Ship after Installation of Engines.**

a. No change in the hull/structure will be considered.

b. The new engines and other supplied accessories must be accommodated in the existing engine spaces of the ships.

c. The existing shaft line and gearbox will remain intact.

d. Very minor changes in displacement and draught might be considered, but only if they are essential.

e. The proposed engines should be configured with the ship's existing engine and machinery control system.

19. **Existing Principal Particulars of the Ship.** The existing principal dimensions of the ship are as follows:

Ser	Description	Remarks
a.	LOA/LBP, m	50.40 m
b.	Breadth (max), m	7.50 m
c.	Depth (moulded), m	4.1 m
d.	Draught (d or T), m	
	Fwd	1.7 m
	Aft	1.9 m
e.	Height of mast above the keel, m	13.7 m
f.	Displacement, tonne	241.80 tons (light) / 281.30 tons (full)

20. **Technical Specification.**

- a. **Engine.** The new engines should include but not be limited to the following:

Ser	Description	Remarks	
(1)	Brand	HND/ DUETZ/ Any other brand if licensed/ permitted by DUETZ (necessary documents are to be attached)	
(2)	Type of engine	High-speed engine (1800 rpm)	
(3)	Model	TBD 620 V8	
(4)	Manufacturer (full name and address)	To be mentioned	
(5)	Nature of Duty	Marine propulsion	
(6)	Cycle of Engine	4-Stroke Diesel	
(7)	Aspiration	Turbocharged (with inter-stage cooler)	
(8)	Number of Cylinders and Arrangement	To be mentioned	
(9)	Cylinder and Arrangement	To be mentioned	
(10)	Bore and Stroke, mm	To be mentioned	
(11)	Fuel Injection	Direct fuel injection	
(12)	Brake Horsepower	To be mentioned	
(13)	Brake Mean Effective Pressure (BMEP)	To be mentioned	
(14)	Idling rpm	To be mentioned	
(15)	Max Continuous Rating (rpm)	To be mentioned	
(16)	Power and Speed, kWb (BHP) @ rpm (a) Idling (b) Economic (c) Cruising (d) Max Continuous (e) Max	To be mentioned separately for the following conditions: (a) ISO conditions; and (b) At 52°C air and 38°C SW.	
(17)	Cooling	Freshwater (FW) cooling: FW is to be cooled by SW through the heat exchanger. (The suspended solid in muddy seawater 20,000 ppm is to be considered for coolers to avoid clogging)	
(18)	Preferred Periods (for major maintenance)	Top Overhaul	After 12,000 hours.
		Major Overhaul	After 24,000 hours
(19)	Fuel oil to be used	NATO F-76 or equivalent	
(20)	Lube oil to be used	Grade SAE 30/ equivalent, and the oil/ equivalent must be commercially marketed and available in	



Ser	Description	Remarks
		Bangladesh's local market.
(21)	Lube oil cooling system	The suspended solid in muddy seawater at 20,000 ppm should be considered for coolers to avoid clogging. To be mentioned
(22)	Specific fuel consumption (SFC, kg/kW-hr)	All ratings are to be mentioned in tabular form
(23)	Specific oil consumption (soc, kg/kW-hr)	
(24)	Type and Number of Turbocharger/engines	To be mentioned
(25)	Turbocharger Manufacturer's full particulars	To be mentioned
(26)	Dimension of Turbocharger (LxBxH, mm)	To be mentioned
(27)	Dry Weight of Turbocharger, kg	To be mentioned
(28)	Overall Dimension of the Engine (L x B x H, mm)	To be specified (as per Art 17)
(29)	Dry weight of engine (all inclusive), kg	To be specified. Preferably not more than 3,600 kg
(30)	Noise Level, dB	The noise level of the overall engine sets should be as minimal as possible so that the noise level in the machinery space does not exceed 115 dB(A)
(31)	Engine Safety features	To be mentioned
(32)	Engine Starting system	To be mentioned (Existing: Electric (044-2SA)

21. **New Shock and Vibration Mountings.** Shock and vibration mountings, according to international standards and duly vetted by the International Classification Society, are to be provided to withstand shock. Followings should be supplied with each set as per the class standard described:

- a. The number of marine-type shock and vibration mountings is required.
- b. Vibration insulators as required.
- c. Combined bedplate to match with engine seating.

22. **New Torsional Vibration Damper.** The engines should be fitted with torsional vibration dampers approved by the internationally recognised classification society.

23. **Auxiliaries and Accessories.**

- a. The standard accessories and auxiliaries must include every item essential to installing and operating the engine and control system, whether mentioned in the



specification or not. A list of such essential accessories and auxiliaries, along with their itemised price, must be included in the quotation.

- b. Optional auxiliaries/ accessories, if any, are to be separately quoted with an itemised price for each item.
- c. Lubricating oil for the main engine for the first fill and flushing are to be supplied in separate containers.
- d. Cooling water inhibitor is to be supplied in sufficient quantities to run till the warranty period of the engine.

24. **Optional Items.** The quotation should include a list of optional items (if any) and an itemised price for each engine. Technical details of these items should be included in the offer (the price should not be included in the total price; this price will not be included in the financial evaluation for determining the BIDDER's position).

25. **Spare Parts.** A recommended list of spare parts required for 05 years of satisfactory operation of main engines is to be provided indicating itemised price. Only the prices of items selected by the PURCHASER will be added to the total price while the comparative prices of the SUPPLIERS are evaluated.

26. **Tools.** 1 (one) set of standard tools for maintenance of main engines are to be provided indicating itemised price. The quantity and size of these tools are to be mentioned in the quotation. That price will be added to the total price while evaluating the comparative price of the SUPPLIERS.

27. **Special Tools.** A recommended list of special tools required for carrying out maintenance of the main engine and gearbox, including major overhaul, is to be submitted with the quotation indicating the itemised price. The PURCHASER will have the option to place an order for such special tools. However, one set of special tools is to be provided free of cost with the item. Besides, the following tools must be quoted:

a.	1 x Set Torque Spanner (to be suitable for fixing the cylinder head and main bearing cover).
b.	1 x Set special Bearing Extractor (if any)
c.	1 x Test Equipment for calibrating the engine control system will be provided.
d.	1 x Software program for the engine control and fault finding with complete accessories (like connectors, dongles, etc) is to be supplied.
e.	01 x Digital Tachometer (portable) to measure the turbocharger rpm is to be supplied.
f.	01 x Digital Thermometer (handheld, non-contact/remote sensing) for measuring temperature.

28. **Factory Acceptance Test (FAT) and Pre-shipment Inspection (PSI).**

- a. Factory Acceptance Test (FAT) and Pre-shipment Inspection (PSI) of all four engines will be carried out by 3 (Three) officers of BN for a duration of 5 (five) working days

(exact date is to be confirmed by the SUPPLIER depending on FAT facilities available) excluding journey period at the manufacturer factory premises. If the offered main engines are not from the same manufacturer/country, then BN FAT/PSI has to be conducted in different locations to complete FAT/PSI for all five engines. The SUPPLIER will have to inform the PURCHASER about the date and schedule of PSI and FAT along with complete documentation for suggested FAT Criteria at least 8 (eight) weeks prior to the commencement of PSI and FAT.

b. FAT procedure shall include all the tests to check the engine's proper functioning/ performance criteria according to the engine manufacturer's standard procedure. The FAT procedure shall be duly vetted by the classification society (member of IACS) and approved by BN. However, the following tests should be included in the FAT procedure:

(1) **New Engine Load Testing.** Engine load tests and trials for several hours on the water brake/dynamometer (series factory acceptance testing) are to be carried out on factory premises in the presence of the buyer's representative. Engine load test records and reports are to be supplied. Acceptance trials should include the following:

- (a) Starting trials.
- (b) Maximum continuous load operation.
- (c) Maximum load operation.
- (d) 75% of maximum load operation.
- (e) 50% of maximum load operation.
- (f) No load trial.
- (g) The following parameters are to be recorded during the trial:
  - (i) Power Ratings (kW).
  - (ii) Speed (rpm).
  - (iii) Fuel consumption.
  - (iv) Lub oil consumption.
  - (v) Fuel rack position.
  - (vi) Oil pressure and temperature.
  - (vii) Cooling water temperature.
  - viii. Exhaust gas temperature per cylinder
  - ix. Combined exhaust gas temperature.
  - x. Governor function.
  - xi. Turbocharger's rpm.
  - xii. Charge air pressure.
  - xiii. Noise level.

c. The SUPPLIER and PURCHASER's representatives will prepare and sign Joint inspection reports for PSI and FAT.

d. On return from the country of FAT and PSI, BN officers will submit reports to the Directorate of Naval Engineering (DNE) of Naval Headquarters (NHQ). DNE will, in turn, forward the final decision along with the PSI and FAT report within 2 (two) weeks, based on which Directorate General Defence Purchase (DGDP) will render clearance to the



SUPPLIER concerned for shipment of stores. The SUPPLIER will not arrange the shipment of any item mentioned in the contract without clearance from DGDP.

e. The PURCHASER will bear All costs related to PSI and FAT, including airfare, accommodation and food for BN Officers. The SUPPLIER will arrange local transportation (air/sea/road/rail) for BN officers within the manufacturer /SUPPLIER's country, reception and arrangement for entry into the country/ concerned area for PSI and FAT. However, if FAT/PSI must be conducted at different countries/times (refer to article 28 (a)), then the PURCHASER will bear the above cost only for the first team/FAT. All costs for the subsequent FAT are to be borne by the SUPPLIER.

29. **Engine Preservation.** Engine internal preservation is to be carried out on completion of acceptance testing. In conjunction with suitable packing, the internal preservation should suffice for transportation and/ or storage for a period of up to one year.

30. **Painting.** The manufacturer will apply a suitable paint coat for the main engines as per standard practice (light white alkyd resin paint is preferred).

31. **Installation and Installation Supervision.** The PURCHASER will install the main engines and other associated fittings onboard the ship at the PURCHASER's cost. However, the SUPPLIER will have to provide technical support from a qualified engineer(s) for installing the engines (if necessary, online/offsite support can be provided).

32. **Production and Supply of Drawing and Technical Information.** The BIDDER will prepare and supply the installation drawings and instructions to BN. These will include a general arrangement drawing of the main engines, gearbox, and couplings, final seating plans of the main engines, and working drawings. The BIDDER is also to prepare and supply the installation drawings for the exhaust and propulsion control system. The drawings are to be submitted to BN for approval before installation.

33. **Brochures and Drawings to be Submitted with the Offer.** The following brochures/ drawings are to be submitted with the offer for evaluation and assessment (free of cost):

- a. One set of brochures/ booklets with details of the main engines offered.
- b. One set of installation plans (Phase wise).

34. **Manuals, Drawings and Documents.** The following manuals and drawings in English (hard and soft copy), 7(seven) sets (one set each for the ships and two sets for the dockyard) are to be supplied at the time of delivery without any cost:

- a. Operation and maintenance manuals.
- b. Maintenance schedules (if not provided with the operation manual).
- c. Workshop level repair manual.



- d. Parts Identification List (parts catalogue) with internationally recognised pattern no.
- e. Factory test and pre-delivery inspection certificate.

35. **Test/ Trial and Acceptance.**

- a. Test/ trial will be carried out for all five engines by BN in the harbour (if any installation schedule is available within 3 months of delivery), or running test will be carried out at BN Dockyard (ICE Shop) in the presence of the manufacturer's representative.
- b. The engine manufacturer will provide the services of at least one engineer to supervise the test, trial, and acceptance for the duration of the running test at the dockyard/harbour/sea trial. The manufacturer's engineer(s) will be responsible for demonstrating and ensuring that the tests, trials and acceptance of main engines and accessories are satisfactory as per the contract requirements. The duration of his/their stay for the test and trial is to be specified.
- c. The BIDDER will bear the cost of airfare, accommodation and food of the manufacturer's engineer (s).
- d. After a satisfactory test and trial, an acceptance certificate will be signed by the buyer and the BIDDER.
- e. If the PURCHASER cannot arrange installation and/or test trial of any individual engine within 4(four) months from the date of supply of all items (required for operation), the engine(s) will be considered accepted.

36. **Warranty.**

- a. Warranty for trouble-free operation is to be given by the SUPPLIER for the supplied engines for a period of 12 (twelve) months from the date of acceptance by the PURCHASER.
- b. During the warranty period, if any engine remains non-operational for any action pending by the SUPPLIER, the warranty period will be extended for the same period.
- c. The warranty should cover all parts, accessories and labour (including the service engineer's cost, if any) throughout the warranty period.
- d. For warranty repair/replacement, the SUPPLIER will collect the defective item from NSD Chattogram /NSSD Dhaka (as applicable) and re-supply the same after warranty repair or replacement.

37. **Shipment.**

- a. The SUPPLIER will arrange transportation of all items by sea to Chittagong sea port, Bangladesh.



- b. All items are to be delivered in seaworthy packing/container to ensure safe transportation by sea.
- c. All packages are to have packing notes showing their contents in detail, and all packages shall be marked with the consignee's name and address and gross weight.
- d. The SUPPLIER will arrange transportation of all supplied items from Chattogram seaport to the installation site.
- e. **Port of Shipment.** Any port of the manufacturing country. If the port of shipment is other than the manufacturing country due to some unavoidable reason, then a certificate from OEM is to be provided to prove the genuinity of the engines.

38. **Delivery.**

- a. The items are to be delivered within **9 (Nine) months** from the date of signing the contract to the following consignee:

The Commanding Officer  
Naval Stores Depot Chattogram  
New Mooring, Chattogram, Bangladesh

- b. **Place of delivery.** NSD Chattogram.

- c. In the case of CFR, the SUPPLIER will carry the items from Chittagong sea port to NSD Chattogram at the cost and risk of the SUPPLIER.

39. **Validity of Offer.** The offer should remain valid until 30 June 2025.

40. **Terms of Payment.** L/C for the full purchase amount will be opened in favour of the principal SUPPLIER under the following payment terms:

- a. 80% of the total CFR value will be paid on delivery of the items described under the scope of supply and on production of necessary shipping documents.
- b. The remaining 20% of the CFR value will be paid for producing an 'Acceptance Certificate' after a satisfactory test and trial jointly carried out by the buyer's and SUPPLIER's representatives.

41. **Condition for Acceptance of Quotation.** The quotation must have supporting documents (booklets, leaflets, catalogues, brochures, drawings, etc.) with detailed particulars of the offered engines, without which the quotation might not be accepted.

42. **Compliance Statement.** A compliance statement fulfilling all the tender requirements is to be submitted for evaluation of the offer. Merely stating 'Yes' or 'No' will not suffice, and detailed description/information as required is to be given. An incomplete compliance statement

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may contribute to the cancellation of the offer. If any clause of this specification is not commensurate with offered items, the deviation must be spelt out clearly.

**Enclosures:**

- |    |  |                   |
|----|--|-------------------|
| 1. | Ship General Description               | - 1 (one) page.   |
| 2. | Existing Propulsion System Particulars | - 4 (four) pages. |
| 3. | General Arrangement Drawing            | - 1 (one) sheet.  |
| 4. | Stability Information of Ship          | - 1 (one) page.   |



SAEED AHMAD SADY  
Lt Commander BN  
Assistant Director Purchase (Navy)  
Directorate General Defence Purchase