

QUALITATIVE REQUIREMENTS/TECHNICAL SPECIFICATION OF FAST ATTACK CRAFTS

N.	Specification	Parameters
1	<u>Role and function</u>	The vessel shall be designed and constructed as Fast Attack Craft for use in saline & muddy water of creek area of Gujarat, Sunderban area of West Bengal and also in Indian territorial waters. The craft shall be capable to operate in shallow water during day/night operation for patrolling, surveillance and chasing /intercept suspected watercrafts. The craft shall be provided with Bow ramp facility for quick disembarking of troops for any operations. The water craft must have carrying capacity of 16 pers including crew.
2	<u>Speed</u>	i) Maximum - Not less than 40 Knots with full load displacement at 85% MCR ii) Cruising speed : Not less than 25 Knots.
3	<u>Endurance</u>	360 NM at 25 Knots of cruising speed with full load.
4.	<u>General Features</u>	i) Length- Approx 16 Mtr+0.5 Mtr ii) Beam- According to ships stability criterion and design. iii) Draught- Less than 1 Mtr at full load. iv) Fresh water capacity- Approx 1000 Ltr. v) Fuel capacity- sufficient to meet the range criteria of 360 NM plus 25% reserve.
		<u>Propulsion</u> Twin water-jets propulsion of Rolls Royce/Hamilton/castoldi or any reputed make having indigenous product support facilities duly type approved by IRS or any member of IACS.
		<u>Main Engines</u> 2 x In-board diesel engine turbo-charged and after cooled inboard marine diesel engines developing enough power to meet speed criteria mentioned in clause 2 of MTU/CATERPILLER/VOLVO PENTA/CUMMINS/YANMAR make or any reputed brand having indigenous product support facilities duly type approved by IRS or any member of IACS and having not less than 2000 hours operating profile per year. Power of engine shall meet speed criteria.
		<u>Steering system</u> The steering system shall be single station power assisted hydraulic system integrated with water jet hydraulic system.

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Co-opted Member- 1

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S.N	Specification	Parameters
		<p>Power generation</p> <p>01 No of Marine DG of sufficient capacity of Lourenco/Marine/ Fischer Panda/Mase DG Set/ Kohler/NANI Diesel or any reputed brand having indigenous product support facilities duly type approved by IRS or any member of IACs shall be provided, that shall meet the total power requirement including lighting and air conditioning with at least 20% reserve capacity. Type, quantity & capacity of generator shall meet IRS class requirements.</p> <p>The power generated by DG shall be adequate for all auxiliary systems, heating, ventilation, air conditioning, lighting and kitchen loads.</p>
5.	Hull Materials- General Hull works	<p>The hull & superstructure shall be of Marine grade GRP/FRP (Fiber Reinforced Plastic) and gel coated finish. The material used in the craft shall be of marine grade class approved type vinyl ester resin.</p> <p>It shall be of sufficient strength to withstand the adverse service conditions.</p>
6.	Structure to main deck Watertight transverse bulkheads.	<ul style="list-style-type: none"> ➤ Watertight transverse bulkheads to be built in accordance with plan of watertight sections. ➤ All penetrations to be made watertight ➤ Watertight bulkheads are to be extended upto main deck.
7.	Doors in superstructure	<ul style="list-style-type: none"> ➤ Marine watertight windows, hatches approved by the classification society made to national/international standards shall be used. ➤ All fitting shall be of anti corrosive material. All fittings exposed to sea water shall be resistant against corrosion. ➤ The superstructure to be equipped with exits and emergency exits according to General Arrangement Doors and hatches providing access from the outer decks into the super structure to be weather tight and single wheel lever operated. ➤ Weather tight doors to have a minimum clear width and a lintel height above the deck coaming height to be according to Classification requirements. ➤ Doors and hatches providing access from the outer decks into the super structure to be weather tight doors and hatches are to be fitted with arrangements for securing them in an open position and are to be provided with pad locks to a master key arrangement. ➤ Easy access to/from the wheelhouse and lower crew accommodation.

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N.	Specification	Parameters
8.	Marks on Hull, Superstructure etc	The crafts name, ID No., crafts's emblem & National flag is to be affixed to both sides of the hull at super structure level. The craft's name, ID No. BSF emblem to be affixed on transom. Size and location to be as per approved drawing.
9.	Fenders	Rubber fender provided all around (except aft transom). The material shall be of low weight with high shock absorbing and good buoyancy. 06 Nos pneumatic fender size 2.5 feet x 1 feet to be provided with the boat for additional safety.
10.	Anchor, windlass, pockets, House pipe	As per the class requirement shall be provided. The complete system shall have galvanic protection inside cable locker.
11.	Railing	Stainless steel 316 hand/grab rails shall be fitted throughout accommodation and service areas for safety of personnel on board. Stainless steel 316 guard rails all round the main deck for safety of crew and personnel shall be provided.
12.	Anode Protection- External	Suitable anodes to be fitted on the hull sea chest & other appropriate places for 18 months of continuous service.
13.	Bow Thrusters	Bow thrusters system be provided and adequate powerful separate battery be provided to operate bow thrusters system or coupled with any engine by operating system from wheel house.
14.	Inverter /UPS	Battery system of adequate capacity with independent charging facility shall be provided for starting of main engines/Generator sets and meeting emergency load such as Navigational aids, communications and emergency lighting etc. backup upto 8 hours.
15.	Bilge pump	Electric power operated automatic bilge pump be provided with one more additional stand by manual Bilge pump. Hand bilge pump - as per class requirements. Bilge alarm system - fitted to all bilge wells to indicate high water level in the bilge. Alarm panel shall be fitted on helm console in the wheelhouse. Bilge pump - As per class requirement. Engine driven type pump with a 24 V DC.
16	Associated equipment	i) Basic maintenance kit related to repair of FRP. ii) On board spares. The craft to be supplied with basic maintenance onboard spares of main engine, propulsion system & DG set for 2000 hrs operation.

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S.N.	Specification	Parameters
17	<p><u>EQUIPMENTS</u> <u>NAVIGATION AND COMMUNICATION</u> <u>Navigation and Radio Equipment</u></p>	<p><u>NAVIGATIONAL EQUIPMENTS</u> Radar - 01 (High resolution) High resolution 48 NM radar able to track 10 targets simultaneously of reputed make consisting of colour 7"radar monitor located in the wheel house and an enclosed random scanner mounted on the mast. GPS/Echo - 01 Sounder/Chart plotter One composite GPS/Echo sounder (dual frequency capable of measuring upto 1000 m depth)/chart plotter of any reputed make with chart Cardin wheelhouse shall be provided to suit speed requirement. In addition, one set of navigation chart instruments shall be also provided and shall be integrated with the radar and shall have multifunctional display. Magnetic compass and binnacle - 01 Reputed make magnetic compass capable of being operational at high speeds. The compass shall be of 100mm diameter fitted in the wheel house at suitable location to facilitate navigation of an approved electromagnetic compass which is luminous and deviation card. Search Light Search light for 360° coverage with remote operation from wheel house of minimum 200 Watt with Xenon lamp (minimum 200 Mtr range). To be positioned on wheel house roof. Loud Hailer :- 01 With speaker forward and aft. Electric Horn/Whistle :- 01 One electric whistle/horn shall be fitted. NAVTEX:- for weather and navigational warning shall be provided. Police Siren - 01 AIS Type A - 01 Binoculars :- One Marine binocular of Magnification 7 x 50, with protection case of reputed make. One night vision binocular of 7X magnification be provided. One Barometer, Anemometer, Inclinator and wet & dry bulb thermometer in the wheelhouse shall be supplied.</p>

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N.	Specification	Parameters
		<p>Navigation lights :- Navigational lights as per COLREG 1972 as amended rules as applicable shall be provided.</p> <p>Additional Items Following additional items shall be provided:-</p> <ol style="list-style-type: none"> 1. Ship's clock - 01 2. Navigational chart instruments with chart table with parallel ruler - 03 Nos and divider - 02 Nos and locker - 01 set 3. First Aid box. <p>COMMUNICATION EQUIPMENTS</p> <p>VHF Radio (Marine) with DSC capabilities :- 01 25 W VHF TX/RX multi-channel marine radio telephone shall be provided positioned in the wheelhouse.</p> <p>Police Radio - To be provided by BSF.</p>
18.	Associated safety equipment	<p>Lifesaving appliances as per the statutory requirements for the craft shall be provided. Stowage space shall be provided for life jacket and mounting brackets for life buoys. Life saving equipments shall be class approved type as per SOLAS/MMD requirements.</p> <ol style="list-style-type: none"> a) Life raft - 02 (12 men capacity fitted one on each side with HRU). b) Life jackets - 24 (Adult SOLAS approved). c) Lifebuoy - 06 (30" diameter SOLAS approved. Two with life line and two with light and smoke signal). d) Flares pack - 01 (SOLAS set) - Comprising 6 red rocket parachute flares, 12 red hand flares and 2 orange buoyant smoke signals/markers. e) Signalling Mirror - 01 (daylight signalling). f) Torch - 01 (Water proof electric torch suitable for morse signalling) . g) Whistle - 01 (Whistle or equivalent sound signal). h) One buoyant safety knife shall be provided. One bucket shall be provided. j) Hand held spotlight with wander leads x 2, Low level deck lighting as per design. k) Shore power connection facilities (230 Volt, Single phase) with 100 Mtr cable of required capacity. l) Hull lifting points alongwith lifting arrangements and slings x 4 m) Fire fighting system and damage control system as per class requirements. n) Jet inspection hatches, fully compliant engine room with forced air ventilation system and full compliant ships wiring and fuse system.

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S.N.	Specification	Parameters
		<p>o) Adequate deck rails and hand holds to the deck areas of the craft and suitable foldable mast to host navigational and communication equipment.</p> <p>p) One blue flashy police light on wheel house roof, one police siren on wheel house roof.</p> <p>q) Boat poles x 2 & mooring line x 4</p> <p>r) Towing line with stern mounted towing posts and towing line storage locker. Towing post should be strengthened with additional stiffeners.</p> <p>s) Mooring bollards, cleats and fairleads of SS 316 to be provided and strengthened by providing additional stiffeners linked with bulkheads to withstand the watercraft load in the tidal current/bad weather to ensure proper mooring of watercraft.</p> <p>t) The Machinery space shall be fitted with fixed fire fighting system and fire-alarm & smoke detection system meeting class/SOLAS requirements.</p> <p>u) A fire alarm system operated by smoke detectors shall be provided for engine room, generator room (detectors installed above the engines), accommodation cabin and wheelhouse. An audible alarm shall be fitted at the helm console.</p>
19.	Weapon mounting & Armoured protection	<p>(a) The Fast Attack Craft is to be fitted with Armour protection of suitable material of International standards to wheelhouse, cabin, accommodation and GPMG pedestals against light ammunition. Armour protection NIJ-level -III should be fixed inbuilt and not removable.</p> <p>(b) Remote operated weapon system (ROWS) of MMG at the bridge top with operating facily at captain cabin be provided and with provision to operate manually.</p> <p>(c) Two iron post with armoured protection, one each at rear & front deck to mount LMG/INSAS.</p>
20	Cabin	<p>Specious enough to accommodate seating arrangements of 12 persons. It should be air conditioned & should have suitable height adjustable seats for 12 persons. Provision of 6 men foldable sleeping berth with proper cushioning & upholstery.</p> <p>One toilet with sewage treatment plant shall be provided. It should have following fittings:-</p> <p>(a) Water closet - 01 No. (b) SS Wash basin with fittings - 01 No.</p>
21.	Air condition Plant	<p>➤ The craft shall be provided with marine type reputed make air conditioning system. The system shall be compact, environment friendly and have low-power consumption. The capacity of the AC shall be as per requirement. The AC shall be capable of maintaining 24^o C room temperature in an ambient temp of 45^o with humidity above 80 percent.</p> <p>➤ The air conditioning system chosen shall provide adequate cooling capacity in wheel house and crew accommodation to maintain cool conditions even at high temperatures.</p>

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S.N.	Specification	Parameters
		<ul style="list-style-type: none"> ➤ Air conditioning system suitable for operating in 220V electrical system of the boat shall be provided. AC system should have the service facility in India. ➤ Suitable ventilation as required shall be installed for engine room.
22.	Galley	<p>One galley shall be provided, consisting of:-</p> <ul style="list-style-type: none"> • One 230 V electric cooking range/min tow hot plates with rails for retaining cooking utensils. • Working services (Stainless steel) • Utensil for cooking food for 16 men onboard & stowage. • Ventilation & air extraction. • Waste disposal unit. • One microwave oven. • Gieser - 01 • 24V & 220 V power supply. • One small capacity refrigerator. • One tea kettle. • Sink, single bowl set into bench top. • Pressurized water with tap. • Cupboards and shelving. • Small RO plant to meet the requirement of onboard personnel.
23.	Aft Deck	All surfaces shall be of minimum maintenance and easy to clean. The areas shall have adequate handholds.
24.	Wheel house/Bridge	<p>It should be air conditioned & shall have 4 numbers of suitable height adjusting/rotating seat with suspension control, arm rest & lap belt for operating crew in the wheel house/bridge.</p> <p>The wheel house must be provided the following equipments facilities:-</p> <ul style="list-style-type: none"> • Almost 360 degree vision. • Overhead vision. • Steering system. • Engine/propulsion controls and instrumentation. • Chart table with parallel ruler - 03 Nos and divider - 02 Nos • Ventilation and air conditioning including fixed side windows and roof hatches. • Lighting including dedicated lighting to dedicated seating positions.

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S.N.	Specification	Parameters
		<ul style="list-style-type: none"> • Adequate stowage areas for all navigation equipment like radar, DGPS/Magnetic compass etc. • Master control panel for system. • Wall mounted fan for cabin. • Wind screen wiper (heavy duty).
25.	Sea Worthiness & Manoeuvrability	<p>(i) The watercraft shall be capable of maintaining cruising speed upto sea state-3.</p> <p>(ii) The watercraft shall remain operational with reduced performance in conditions upto sea State - 4 and sustainable upto sea state-5.</p> <p>(iii) The bottom structure of the watercraft shall be designed in such a way to minimize slamming effect when the watercraft is operating at high speed in significant wave height of 1.5 Meters and above.</p> <p>The vessel shall have good manoeuvrability for the following operational requirements :-</p> <p>(a) Going alongside and leaving a jetty under adverse wind and tide conditions without external assistance.</p> <p>(b) Going alongside and leaving a vessel while under way for boarding purposes.</p> <p>(c) Turning at or near rest under the action of the main engines and the steering system in adverse weather and sea conditions.</p> <p>(d) Manoeuvring safely under all conditions of loading and speeds in adverse weather and sea conditions.</p> <p>(e) Crash stop from full speed ahead in minimum 1.5 times of boat length.</p> <p>(f) Manoeuvring from one engine in case of failure of the other.</p>
26.	Noise	Noise and vibrations in various sections of the vessel are to be limited as per class rules.
27.	Paint	Tin free anti fouling paint system as per latest IMO regulations shall be applied to hull bottom (below waterline).The pattern of the anti fouling paint on the outer part of the hull will be disruptive with combination of OG & cream/smoke gray colour. Inside of hull paint colour should be pale cream.
28.	Regulations	<p>The vessel shall be built with following IRS class notation or equivalent.</p> <p>SWASTIK, SUL, HSLC, RS1, Patrol, "Special Government Service" for operations within 30 NM from the coast. "IY".</p>
29.	Annual exploitation	Annual exploitation of 2000 hours per year.
30.	Certificates	Following documents to be provided by builder with each vessel on delivery-three sets in hard copy & one set in soft copy:-

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S.N.	Specification	Parameters
		a) All IRS/class society approved drawings, booklets, manuals & trial data. b) As built final building specification, as fitted drawings and consolidated schedule of piping, painting, insulation, panelling. c) Manual with regards to installation, operation and maintenance of various equipment/fittings, systems and part identification list. d) Service manual, part catalogue/identification list of major machinery such as main engine, gear box, generators, pumps etc. and accessories. e) Docking plan, LSA plan, fire fighting plan alongwith instruction of operating safety equipment. f) Certificate of IRS or any member of IACS class. g) Builder's certificate. h) Compass adjustment. i) Anchor & chain cable, mooring ropes certificate. Major machinery (Main engines, Gear box, water jets & generators etc) type approval certificate.

Presiding Officer:- [Signature]
 (Kunal Mazumdar),
 DIG(WW), FHQ, BSF New Delhi

M-1 :- [Signature]
 (A.K. Sharma), SSO(T),
 (B. BPR&D)

M-2 :- Not attended
 (_____), _____, NSG

M-3 :- [Signature]
 (Sanjeev Singh), DC, CRPF

M-4 :- [Signature]
 (K S Arora), DC, Assam Rifle

M-5 :- [Signature]
 (Rakesh Kumar), Insp/Exe, CISF

M-6 :- [Signature]
 (Ritesh Kumar Dwivedi), AC, NDRF

M-7 :- [Signature]
 (Ved Prakash), AC, SSB

M-8 :- [Signature]
 (Amit Gupta), DC, ITBP

M-9 :- [Signature]
 (Jose Abraham), AC (WW)
 Water Wing, BSF Bhuj

Co-opted Member 1 :- [Signature]
 (Cdr K K Dhawan), Principal Surveyor, IRS, New Delhi

M - 2 :- [Signature]
 (Ravi Yadav) Surveyor, IRS, New Delhi

APPROVED / NOT APPROVED

[Signature]
 DIRECTOR GENERAL,
 BORDER SECURITY FORCE

QUALITATIVE REQUIREMENTS/TECHNICAL SPECIFICATION AND TRIAL DIRECTIVES OF FAST ATTACK CRAFTS

Specification	Parameters	Trial Directives
Role and function	<p>The vessel shall be designed and constructed as Fast Attack Craft for use in saline & muddy water of creek area of Gujarat, Sunderban area of West Bengal and also in Indian territorial waters.</p> <p>The craft shall be capable to operate in shallow water during day/night operation for patrolling, surveillance and chasing /intercept suspected watercrafts. The craft shall be provided with Bow ramp facility for quick disembarking of troops for any operations. The water craft must have carrying capacity of 16 pers including crew.</p>	<p>The watercraft will be tested physically on river border in shallow water and deep water conditions.</p>
Speed	<p>i) Maximum - 40 Knots with full load displacement at 85% MCR</p> <p>ii) Cruising speed : Not less than 25 Knots.</p>	<p>i) Watercraft will be driven with Maximum speed Not less than 40 Knots under full load condition (fuel, fresh water, all boat equipment, 08 pers on board etc).</p> <p>ii) Engine make & model of both engine (port & star board) will be recorded.</p> <p>iii) The watercraft is to attain</p> <p>a) Full speed of not less than 40 knots at 85% MCR</p> <p>b) Cruising speed of 25 knots at full load in sea state 3 conditions.</p> <p>iv) Data be recorded during the course of full load trial as per following details</p> <p>A. DEPARTURE CONDITIONS (To be physically measured)</p> <p>Draught forward = mtrs</p> <p>Draught Aft = mtrs</p> <p>Displacement = mtrs</p>

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			<p>B. ARRIVAL CONDITIONS (To be physically measured)</p> <p>Draught forward = mtrs</p> <p>Draught Aft = mtrs</p> <p>Displacement = mtrs</p> <p>v) fuel consumption at average speed not less than 20 to 25 knots be recorded as per following details:-</p> <p>a. Total fuel in tanks before speed trial commencement = tons</p> <p>b. Total distance travel and time taken in speed trail =</p> <p>c. Remaining fuel in tanks after speed trail = tons</p> <p>d. Fuel consumed during speed trail = tons</p> <p>e. Average fuel consumption and speed =</p> <p>vi) Speed trial at full load at 10 % MCR (ideal condition) will be recorded at following format (Double run)</p> <table border="1" data-bbox="1282 836 2134 990"> <thead> <tr> <th rowspan="2">TIME</th> <th colspan="2">RPM</th> <th colspan="2">SPEED</th> <th colspan="2">WIND</th> <th rowspan="2">DEPTH</th> </tr> <tr> <th>Port</th> <th>Stbd</th> <th>EM</th> <th>GPS</th> <th>Speed</th> <th>Dir</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>vii) Speed trial at full load at sea state 3 conditions will be recorded as per following format (Double run)</p> <table border="1" data-bbox="1282 1112 2134 1266"> <thead> <tr> <th rowspan="2">TIME</th> <th colspan="2">RPM</th> <th colspan="2">SPEED</th> <th colspan="2">WIND</th> <th rowspan="2">DEPTH</th> </tr> <tr> <th>Port</th> <th>Stbd</th> <th>EM</th> <th>GPS</th> <th>Speed</th> <th>Dir</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	TIME	RPM		SPEED		WIND		DEPTH	Port	Stbd	EM	GPS	Speed	Dir									TIME	RPM		SPEED		WIND		DEPTH	Port	Stbd	EM	GPS	Speed	Dir								
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N.	Specification	Parameters	Trial Directives
		load.	load will be assessed based on fuel consumption after running 60 NM at cruising speed.
1	General Features	i) Length- Approx 16 Mtr+0.5 Mtr	Physical measurement to be carried out.
		ii) Beam- According to ships stability criterion and design.	Physical measurement to be carried out.
		iii) Draught- Less than 1 Mtr at full load.	To be physically measured.
		iv) Fresh water capacity- Approx 1000 Ltr.	To be measured
		v) Fuel capacity- sufficient to meet the range criteria of 360 NM plus 25% reserve.	Total Nos. of tanks and capacity of each tank. To be calculated as per Average fuel consumption during 4 hours continuous endurance trial at cruising speed.
		<p>Distance Total Fuel Fuel consumed Fuel Left Travelled Capacity</p>	
		<p>Propulsion Twin water-jets propulsion of Rolls Royce/Hamilton/castoldi or any reputed make having indigenous product support facilities duly type approved by IRS or any member of IACS.</p> <p>Main Engines 2 x In-board diesel engine turbo-charged and after cooled inboard marine diesel engines developing enough power to meet speed criteria mentioned in clause 2 of MTU/CATERPILLER/VOLVO PENTA/CUMMINS/YANMAR make or any reputed brand having indigenous product support facilities duly type approved by IRS or any member of IACS and having not less than 2000 hours operating profile per year. Power of engine shall meet speed criteria.</p>	<p>i) Twin Marine diesel engines to propel the craft using water jets. Reliability, efficiency and low maintenance requirement should form the basis for selection of engines.</p> <p>1. PURPOSE: To ascertain possible no. of starts with the given batteries.</p> <p>2. CRITERIA : Should be able to do 06 starts.</p> <p>3. PROCEDURE: 3.1 Prepare main engine for operation.</p> <p>Start port main engine. Stop as soon as L.O & F.O pressure are achieved. Repeat start- stop 06 times. Carry out same for stbd. Main Engine also.</p> <p>NO. OF STARTS GIVEN: Port 06 Starts Stbd- 06 starts</p>

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S.N.	Specification	Parameters	Trial Directives							
		<p>Steering system The steering system shall be single station power assisted hydraulic system integrated with water jet hydraulic system.</p> <p>Power generation 01 No of Marine DG of sufficient capacity of Lourenco/Marine/ Fischer Panda/Mase DG Set/ Kohler/NANI Diesel or any reputed brand having indigenous product support facilities duly type approved by IRS or any member of IACs shall be provided, that shall meet the total power requirement including lighting and air conditioning with at least 20% reserve capacity. Type, quantity & capacity of generator shall meet IRS class requirements. The power generated by DG shall be adequate for all auxiliary systems, heating, ventilation, air conditioning, lighting and kitchen loads.</p>	<p style="text-align: center;">MAIN ENGINE START TEST</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th rowspan="2" style="width: 15%;">ATTEMPTS</th> <th colspan="3" style="text-align: center;">TIME IN (SEC)</th> </tr> <tr> <th style="width: 15%;">ME(P)</th> <th style="width: 15%;">ME(S)</th> <th style="width: 15%;">DG SET</th> </tr> </table> <p>NOTE- SPECIFIC GRAVITY OF BATTERIES TO BE CHECKED BEFORE AND AFTER ENDURANCE TRIAL</p> <p>CONTROL SYSTEM INSTALLATION</p> <ol style="list-style-type: none"> 1. Check that items are installed according to the assembly: 2. Make visual inspection- good finish, no finish, no damage made : 3. The power to the system must be taken from nets with high priorities so that the supply is not jeopardized any condition. See information in installation description. 4. Check yard cabling between the units. 5. Check so the cables screens are not connected inside the boxes. 6. Check earth fault between earth and supply cables. 7. Please note that the illumination system earth (and Joystick system earth whenever applicable) will be connected to main system earth, internally in the Ultra jet system without any galvanic isolation between. <p>CONTROL SYSTEM FUNCTION TEST</p> <p>All control systems functions to be checked physically during trial.</p> <p>Test with engine running and backup system on</p>	ATTEMPTS	TIME IN (SEC)			ME(P)	ME(S)	DG SET
ATTEMPTS	TIME IN (SEC)									
	ME(P)	ME(S)	DG SET							

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			<p>a) Press backup push-button on in the backup panel.</p> <p>b) <u>Do the same movement on the jet as above by manipulator stick.</u></p> <p>c) <u>Press RPM+and -</u></p> <p>Test all control system, hydraulic alarm, back up alarm, booster alarm, failure alarm of all system, synchronisation system, hydraulic pressure, LO system etc. checked.</p> <p><u>SEA ACCEPTANCE TRIAL GENERAL</u></p> <p>During the sea trial it should be verified that the operating performance is acceptable. Any discrepancy to specification and/ or normal experience values should be noted.</p> <p><u>WATER JET UNIT WITH SHAFT LINE</u></p> <p>Shaft Seal : Check the leakage and the temperature after running at full speed for some time.</p> <p>Shaft coupline bearing etc. Check the temperature of the support bearing after running at full speed for some time. Acceptable temp. Normally max. 65°C if higher the actual suppliers recommendations should be followed.</p> <p><u>TEMPERATURE</u></p> <p>Measure the highest oil temperature in the oil tank after running at the full speed for so long time so the temperature has become stable. Max departure should not exceed suppliers value.</p>

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S.N.	Specification	Parameters	Trial Directives
			<p><u>PERFORMANCE</u></p> <p>Boat speed; The average boat speed for a double run is noted. Shaft speed versus ship speed is noted in the "operating limits" diagram from the manual.</p> <p>Crash Stop; Note down the initial speed, stopping time and the stopping distance if measured. Manoeuvring; Any remarks concerning the manoeuvrability should be noted.</p> <p>Sea Trial Condition: Note down the official figures for sea trial condition.</p> <p><u>SEAL READING TAKEN AS PER DGG. NO. HARBOUR ACCEPTANCE TRIAL GENERAL</u></p> <p>Before sea trial, the installation of the WJ- equipment should be checked in accordance with the drgs. And information given. If any discrepancy is observed it should be noted and rectified.</p> <p>Check that the units are placed in accordance to the General Assembly drg.</p> <p><u>INLET DUCT</u></p> <p>Shape of inlet duct: A visual inspection should be made with special attention to smoothness of the inner surface shape of the intersection to the hull bottom. Should be checked before the watercraft is launched. Inspection ports, reinforcements etc. is checked on the outside of the duct.</p> <p>Shape of inlet grid : Whether an inlet grid is installed or</p>

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N.	Specification	Parameters	Trial Directives
			<p>not should be noted. If installed, check that the design is accordance with manufactures recommendation.</p> <p>Corrosion protection : Check that sufficient corrosion protection is provided.</p> <p><u>WATER- JET UNIT</u></p> <p>Blade tip clearance: Before launching, the tip clearance must be measured and values should be noted in the separates protocol. This can be made by the yards QA personnel. The tip clearances should also be checked at the blade on the top position after launching. Acceptable clearances have to be determined by the yard with alignment calculation, shaft sagging, bearing load distribution, hull deflections etc.</p> <p>Trim tabs etc. Check that the steering and reversing gear can move full strokes without hitting any hull parts. Any trim tabs or foils must not be installed in such a way that the reversed jet can not pass unaffected.</p> <p><u>HYDRAULIC SYSTEM</u></p> <p>Pressure: Measure the max. Pressure obtained when doing full steering manoeuvres and crash stop at/ from the max. speed.</p> <p>The lub oil pressure is measured close to the return line connection on the WJ- Unit. The pressure is noted at the highest working oil temperature.</p> <p>Installation : The placing of the components should be</p>

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S.N.	Specification	Parameters	Trial Directives
			<p>accordance with the approved plan. Special attention is to be given to access space for service.</p> <p>Piping System: Check that the inner diameter of the pipes are according to the plan.</p> <p>Flushing of piping System: Check that the piping system is flushing in accordance with the flushing instruction and that the system was filled with oil prior to launching.</p> <p>Oil quality : Check that the system has been filled up with oil according to instructions. Oil sample must be taken and tested in according to the maker's instruction.</p> <p>Valve settings : After finishing flushing procedure it should be checked that relief valves are adjusted to the maker's recommended values.</p> <p>CONTROL SYSTEM INSTALLATION:</p> <p>The control system installation should be tested in accordance with maker's recommendation.</p> <p>CONTROL SYSTEM FUNCTION TESTS:</p> <p>The control system should be tested in accordance with maker's recommendation.</p>
5.	Hull Materials- General Hull works	The hull & superstructure shall be of Marine grade GRP/FRP (Fiber Reinforced Plastic) and gel coated finish. The material used in the craft shall be of marine grade class approved type vinyl ester resin.	<p>Hull material to be type approved.</p> <p>Laminate testing report to be submitted duly certified by the class surveyor.</p>

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N.	Specification	Parameters	Trial Directives
5.	Structure to main deck Watertight transverse bulkheads.	<p>It shall be of sufficient strength to withstand the adverse service conditions.</p> <ul style="list-style-type: none"> ➤ Watertight transverse bulkheads to be built in accordance with plan of watertight sections. ➤ All penetrations to be made watertight ➤ Watertight bulkheads are to be extended upto main deck. 	Structure to be as per class approve plan and to be physically verified.
7.	Doors in superstructure	<ul style="list-style-type: none"> ➤ Marine watertight windows, hatches approved by the classification society made to national/international standards shall be used. ➤ All fitting shall be of anti corrosive material. All fittings exposed to sea water shall be resistant against corrosion. ➤ The superstructure to be equipped with exits and emergency exits according to General Arrangement. Doors and hatches providing access from the outer decks into the super structure to be weather tight and single wheel lever operated. ➤ Weather tight doors to have a minimum clear width and a lintel height above the deck coaming height to be according to Classification requirements. ➤ Doors and hatches providing access from the outer decks into the super structure to be weather tight doors and hatches are to be fitted with arrangements for securing them in an open position and are to be provided with pad locks to a master key arrangement. ➤ Easy access to/from the wheelhouse and 	Structure to be as per class approve plan and to be physically verified.

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S.N.	Specification	Parameters	Trial Directives
		lower crew accommodation.	
8.	Marks on Hull, Superstructure etc	The crafts name, ID No., crafts's emblem & National flag is to be affixed to both sides of the hull at super structure level. The craft's name, ID No. BSF emblem to be affixed on transom. Size and location to be as per approved drawing.	Physical inspection to be carried out.
9.	Fenders	Rubber fender provided all around (except aft transom). The material shall be of low weight with high shock absorbing and good buoyancy. 06 Nos pneumatic fender size 2.5 feet x 1 feet to be provided with the boat for additional safety.	Structure is to be physically examined.
10.	Anchor, windlass, pockets, House pipe	As per the class requirement shall be provided. The complete system shall have galvanic protection inside cable locker.	To be as per the approved plan. Physical examination to be carried out . The anchor will be lowered on the water with the help of motor upto maximum depth as per following procedure :- a. Lower Anchor upto water level b. "LET GO" Anchor c. Blackslip till chain tight d. Hoist anchor clear of water into house pipe

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.N.	Specification	Parameters	Trial Directives
			Load testing certificate of the Anchor rope, Anchor winch, etc. to be provided. e. Effectiveness of anchor will be tested by noting down the latitude & longitude of the boat location after every 10 minutes for 30 minutes. Sea condition, Weather & water depth will be recorded.
11.	Railing	Stainless steel 316 hand/grab rails shall be fitted throughout accommodation and service areas for safety of personnel on board. Stainless steel 316 guard rails all round the main deck for safety of crew and personnel shall be provided.	To be physically examined. Should be built of Marine grade material. Class certificate to be provided.
12.	Anode Protection-External	Suitable anodes to be fitted on the hull sea chest & other appropriate places for 18 months of continuous service.	To be physically examined. Should be built of Marine grade material and certificate to be provided by the boat builder.
13.	Bow Thrusters	Bow thrusters system be provided and adequate powerful separate battery be provided to operate bow thrusters system or coupled with any engine by operating system from wheel house.	To be physically examined. Should be built of Marine grade material. Class certificate to be provided.
14.	Inverter /UPS	Battery system of adequate capacity with independent charging facility shall be provided for starting of main engines/Generator sets and meeting emergency load such as Navigational aids, communications and emergency lighting etc. backup upto 8 hours.	To be physically examined and check the function and load of Inverter/UPS system.
15.	Bilge pump	Electric power operated automatic bilge pump be provided with one more additional stand by manual Bilge pump. Hand bilge pump - as per class requirements. Bilge alarm system - fitted to all bilge wells to	To be physically examined and check the function.

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S.N.	Specification	Parameters	Trial Directives
		<p>indicate high water level in the bilge. Alarm panel shall be fitted on helm console in the wheelhouse.</p> <p>Bilge pump – As per class requirement. Engine driven type pump with a 24 V DC.</p>	
16.	Associated equipment	<p>i) Basic maintenance kit related to repair of FRP.</p> <p>ii) On board spares.</p> <p>The craft to be supplied with basic maintenance onboard spares of main engine, propulsion system & DG set for 2000 hrs operation.</p>	<p>To be physically examined.</p> <p>To be physically examined.</p> <p>List of such spares/ items to be provided by the builder.</p>
17	<p><u>EQUIPMENTS</u></p> <p><u>NAVIGATION AND COMMUNICATION</u></p> <p><u>Navigation and Radio Equipment</u></p>	<p><u>NAVIGATIONAL EQUIPMENTS</u></p> <p>Radar – 01 (High resolution)</p> <p>High resolution 48 NM radar able to track 10 targets simultaneously of reputed make consisting of colour 7” radar monitor located in the wheel house and an enclosed random scanner mounted on the mast.</p> <p>GPS/Echo – 01</p> <p>Sounder/Chart plotter</p> <p>One composite GPS/Echo sounder (dual frequency capable of measuring upto 1000 m depth)/chart plotter of any reputed make with chart Cardin wheelhouse shall be provided to suit speed requirement. In addition, one set of navigation chart instruments shall be also provided and shall be integrated with the radar and shall have multifunctional display.</p> <p>Magnetic compass and binnacle – 01</p> <p>Reputed make magnetic compass capable of being operational at high speeds.</p> <p>The compass shall be of 100mm diameter fitted in the wheel house at suitable location to</p>	<p>Radar</p> <p>Note: Type approval certificate to be provided.</p> <p>MAKE : _____ MODAL : _____</p> <p>HARBOUR ACCEPTANCE TRIAL:-</p> <ol style="list-style-type: none"> Check the mounting of all units and interconnection wiring as per installation wiring. Check grounding of all individual units. Check AC supply for display and correct polarity as per the scanner fitted. Switch ‘ON’ the radar. Check key light up, the display shows the start up information. Check warming up, Standby in 180 seconds and software version appearing on the display. After 180 seconds STANDBY appears on the display. Now radar is ready for transmission. Press the ‘POWER STANDBY TX’ key. Scanner rotates and radar is in transmitting mode. Check for gain, sea, range and other related functions by selecting the menu and multi switches.

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N.	Specification	Parameters	Trial Directives
		<p>facilitate navigation of an approved electromagnetic compass which is luminous and deviation card.</p> <p>Search Light Search light for 360° coverage with remote operation from wheel house of minimum 200 Watt with Xenon lamp (minimum 200 Mtr range). To be positioned on wheel house roof.</p> <p>Loud Hailer :- 01 With speaker forward and aft.</p> <p>Electric Horn/Whistle :- 01 One electric whistle/horn shall be fitted.</p> <p>NAVTEX:- for weather and navigational warning shall be provided.</p> <p>Police Siren - 01</p> <p>AIS Type A - 01</p> <p>Binoculars :- One Marine binocular of Magnification 7 x 50, with protection case of reputed make. One night vision binocular of 7X magnification be provided. One Barometer, Anemometer, Inclinator and wet & dry bulb thermometer in the wheelhouse shall be supplied.</p> <p>Navigational lights :- Navigational lights as per COLREG 1972 as amended rules as applicable shall be provided.</p> <p>Additional Items Following additional items shall be provided:- 1. Ship's clock - 01 2. Navigational chart instruments with chart</p>	<p>I. To switch to stand by mode press the "POWER" key and the display returns to STANDBY screen, while transmission and scanner rotation stop.</p> <p>J. Check scanner off mode operation. Ensure that radar is in standby mode, warning up, press Clear Key. Radar data not available appears. Scanner supply is off and the timer is cleared.</p> <p>K. Press the STANDBY TX key for radar operation, countdown start and radar goes in standby mode. Press STANDBY TX again to switch to transmit.</p> <p>L. STANDBY TX scanner and display, Press and hold the Powr key for three seconds.</p> <p>SEA ACCEPTANCE</p> <p>A. Switch 'ON' the radar and check the picture of different ranges.</p> <p>B. Check the gain, sea, multitarget, soft key for their correct functioning (control is set to manual adjustment)</p> <p>C. Check the tuning of receiver in AUTO/ MAN mode.</p> <p>D. Check range and bearing using VRM/EML. The respective VRM and EML appearing on the display.</p> <p>E. Check for Guard zones and Alarms.</p> <p>F. Check the Zoom function.</p> <p>G. Offsetting the centre, set the longest range scale. Thereby the centre can be offset by 66% of the radius anywhere on the screen.</p> <p>H. Check for hidden Ships Heading Marker.</p> <p>I. Check for mode of operation and screen window</p>

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S.N.	Specification	Parameters	Trial Directives
		table with parallel ruler - 03 Nos and divider - 02 Nos and locker - 01 set 3. First Aid box. COMMUNICATION EQUIPMENTS VHF Radio (Marine) with DSC capabilities :- 01 25 W VHF TX/RX multi-channel marine radio telephone shall be provided positioned in the wheelhouse. Police Radio - To be provided by BSF.	to display radar, chart and data log-NA. J. Check for MARPA (Automatic Radar Plotting Aid). K. Check for heading mode operation viz. Head up, North up, Course up. L. Check for lat/long reading if GPS is interfaced. M. Check for compass NMEA o/p displayed if the same fitted. N. Press POWER key for stand by and switch off. GPS a) <u>GPS. As per IMO standards.</u> MAKE: _____ MODEL: SL NO. _____ <u>PURPOSE</u> : Installation and commissioning of DGPS. <u>PROCEDURE</u> : Check for ship's supply within the rated range. Check for connection between antenna an display. Check for cable routing and connection. Check the installation of the equipment as per the inward wiring diagrams of ship and installation drawings in the service manual. Check the mounting of the antenna for firmness and clearance in terms of visibility of horizon. The antenna must have a clear field of view and must be kept a minimum of 3m from any other transmitting antenna This antenna must not be mounted on the top of a mas or tower.

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.N.	Specification	Parameters	Trial Directives
			<p>Check that all inter- connecting cables to and from the main unit are well routed and secured.</p> <p>Check the grounding of the equipment using suitable test equipment. The shield of the power cable must be connected to the watercraft's sea water ground.</p> <p>If the system works on DC Power alone, it must be verified that this supply is in the range of 12V to 24V DC. Switch on the DC power to the equipment and then switch on the GPS receiver using the appropriate key on the panel.</p> <p>Check the software version displayed at start up and make a note for future reference.</p> <p>Using the key marked GPS check if the GPS correction have been enabled.</p> <p>Now leave the system in the ON state. It will take some time to download the satellite almanac and ephemeris data the first time, or if the region of operation has been changed.</p> <p>The LED as the system successfully tracks the required number of satellites necessary for a position fix the Green LED will attain a steady state glow. The position can now be viewed using the POS key on the front panel.</p> <p><u>Sounder/Chart plotter</u> MAKE: _____ MODEL: _____ SL NO.: _____</p> <p>1. <u>DESCRIPTION:</u></p> <p>The echo sounder is of the above make navigation recording type echo sounder. The range is up to 1000 mtrs. The presentation is a continuous display on colour screen.</p>

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S.N.	Specification	Parameters	Trial Directives
			<p>2. <u>PURPOSE OF TEST:</u></p> <p>2.1 To demonstrate the effectiveness of the equipment in shallow and deep water.</p> <p>2.2 To calibrate the equipment w.r.t. navigational chart.</p> <p>3. <u>CRITERIA OF TEST</u></p> <p>The equipment must be functional.</p> <p>4. <u>USE OF ECHO SOUNDER:</u></p> <p>The service Engineer shall demonstrate the operation of the equipment.</p> <p><u>HARBOUR ACCEPTANCE TRIAL</u></p> <p>Inspect the mounting of display unit. Ensure that the transducer is properly mounted. Check that the cables are properly secured.. Check the DC input supply (11-40V DC) Check the earthing of the equipment.</p> <p><u>SEA ACCEPTANCE TRIAL</u></p> <p>Switch on the equipment Set the image brightness to an appropriate level. Check zoom image, dual frequency image, also measure depth by VRM. Select an appropriate range using RANGE to show echoes between water surface and sea bottom. Adjust the gain as required.</p> <p>Magnetic compass and binnacle MAKE: _____ MODEL : _____ <u>HARBOUR ACCEPTANCE TRIAL (MAGNETIC COMPASS)</u> A. Check the mounting of the equipment.</p>

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N.	Specification	Parameters	Trial Directives
			<p>B. Make sure that magnetic compass installed on horizontal surface.</p> <p>C. Check the magnetic sound connection and check the repeater following as per magnetic compass.</p> <p>D. Check the dial lamp for lighting.</p> <p>E. Slew the magnetic and check for 360⁰ rotation.</p> <p><u>SEA ACCEPTANCE TRIAL</u> To check the bearing of magnetic compass with respect to the ship's rotation for 360⁰.</p> <p><u>Navigational light</u> Note: To be physically examined and performance test to be conducted. MAKE: MODEL: <u>TEST CRITERIA</u> Search light is no be functional Remote operation to be functional 100 Meter focused visibility to be ascertained.</p> <p><u>Communication equipment</u> Note: To be physically examined and performance test to be conducted. MAKE: MODEL:</p> <p>Physical examination of the function of other equipment be carried out.</p>
18	<u>Associated safety equipment</u>	<p>Lifesaving appliances as per the statutory requirements for the craft shall be provided. Stowage space shall be provided for life jacket and mounting brackets for life buoys. Life saving equipments shall be class approved type as per SOLAS/MMD requirements.</p> <p>a) Life raft - 02 (12 men capacity fitted one</p>	<p>Physical examination to be carried out</p> <p>Load test certificate be provided by the builders as applicable.</p> <p>Life rafts and hydrostatic release unit are to be SOLAS/LSA code approved type. Certificates be checked.</p>

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		<p>on each side with HRU.</p> <p>b) Life jackets - 24 (Adult SOLAS approved).</p> <p>c) Lifebuoy - 06 (30" diameter SOLAS approved. Two with life line and two with light and smoke signal).</p> <p>d) Flares pack - 01 (SOLAS set) - Comprising 6 red rocket parachute flares, 12 red hand flares and 2 orange buoyant smoke signals/markers.</p> <p>e) Signalling Mirror - 01 (daylight signalling).</p> <p>f) Torch - 01 (Water proof electric torch suitable for morse signalling) .</p> <p>g) Whistle - 01 (Whistle or equivalent sound signal).</p> <p>h) One buoyant safety knife shall be provided. One bucket shall be provided.</p> <p>j) Hand held spotlight with wander leads x 2, Low level deck lighting as per design.</p> <p>k) Shore power connection facilities (230 Volt, Single phase) with 100 Mtr cable of required capacity.</p> <p>l) Hull lifting points alongwith lifting arrangements and slings x 4</p> <p>m) Fire fighting system and damage control system as per class requirements.</p> <p>n) Jet inspection hatches, fully compliant engine room with forced air ventilation system and full compliant ships wiring and fuse system.</p> <p>o) Adequate deck rails and hand holds to</p>	<p>Boat builder to provide strength certificate of the mooring lines.</p> <p>Boat builder to provide strength certificate of the Towing lines and towing post.</p> <p>Boat builder to provide strength certificate of the mooring bollards and fairleads.</p>

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S.N.	Specification	Parameters	Trial Directives
		<p>the deck areas of the craft and suitable foldable mast to host navigational and communication equipment.</p> <p>p) One blue flashy police light on wheel house roof, one police siren on wheel house roof.</p> <p>q) Boat poles x 2 & mooring line x 4</p> <p>r) Towing line with stern mounted towing posts and towing line storage locker. Towing post should be strengthened with additional stiffeners.</p> <p>s) Mooring bollards, cleats and fairleads of SS 316 to be provided and strengthened by providing additional stiffeners linked with bulkheads to withstand the watercraft load in the tidal current/bad weather to ensure proper mooring of watercraft.</p> <p>t) The Machinery space shall be fitted with fixed fire fighting system and fire-alarm & smoke detection system meeting class/SOLAS requirements.</p> <p>u) A fire alarm system operated by smoke detectors shall be provided for engine room, generator room (detectors installed above the engines), accommodation cabin and wheelhouse. An audible alarm shall be fitted at the helm console.</p>	
19.	<u>Weapon mounting & Armoured protection</u>	(a) The Fast Attack Craft is to be fitted with Armour protection of suitable material of International standards to wheelhouse, cabin, accommodation and GPMG	Physical examination to be carried. The function of the ROWS to be checked.

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S.N.	Specification	Parameters	Trial Directives
		<p>pedestals against light ammunition. Armour protection NIJ-level -III should be fixed inbuilt and not removable.</p> <p>(b) Remote operated weapon system (ROWS) of MMG at the bridge top with operating facility at captain cabin be provided and with provision to operate manually.</p> <p>(c) Two iron post with armoured protection, one each at rear & front deck to mount LMG/INSAS.</p>	
20	Cabin	<p>Spacious enough to accommodate seating arrangements of 12 persons. It should be air conditioned & should have suitable height adjustable seats for 12 persons. Provision of 6 men foldable sleeping berth with proper cushioning & upholstery.</p> <p>One toilet with sewage treatment plant shall be provided. It should have following fittings:-</p> <p>(a) Water closet - 01 No. (b) SS Wash basin with fittings - 01 No.</p>	To be check physically.
21.	Air condition Plant	<p>➤ The craft shall be provided with marine type reputed make air conditioning system. The system shall be compact, environment friendly and have low-power consumption . The capacity of the AC shall be as per requirement. The AC shall be capable of maintaining 24° C room temperature in an ambient temp of 45° with humidity above 80 percent.</p> <p>➤ The air conditioning system chosen shall provide adequate cooling capacity in wheel house and crew accommodation to maintain</p>	Functional test to be carried out.

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S.N.	Specification	Parameters	Trial Directives
		cool conditions even at high temperatures. ➤ Air conditioning system suitable for operating in 220V electrical system of the boat shall be provided. AC system should have the service facility in India. ➤ Suitable ventilation as required shall be installed for engine room.	
22.	Galley	One galley shall be provided, consisting of:- <ul style="list-style-type: none"> • One 230 V electric cooking range/min tow hot plates with rails for retaining cooking utensils. • Working services (Stainless steel) • Utensil for cooking food for 16 men onboard & stowage. • Ventilation & air extraction. • Waste disposal unit. • One microwave oven. • Gieser - 01 • 24V & 220 V power supply. • One small capacity refrigerator. • One tea kettle. • Sink, single bowl set into bench top. • Pressurized water with tap. • Cupboards and shelving. • Small RO plant to meet the requirement of onboard personnel. 	Physical examination and functional test to be carried out.
23.	Aft Deck	All surfaces shall be of minimum maintenance and easy to clean. The areas shall have adequate handholds.	Physical examination to be carried out.
24.	Wheel house/Bridge	It should be air conditioned & shall have 4 numbers of suitable height adjusting/rotating	Physical examination of operation to be carried out.

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S.N.	Specification	Parameters	Trial Directives
		<p>seat with suspension control, arm rest & lap belt for operating crew in the wheel house/bridge.</p> <p>The wheel house must be provided the following equipments facilities:-</p> <ul style="list-style-type: none"> • Almost 360 degree vision. • Overhead vision. • Steering system. • Engine/propulsion controls and instrumentation. • Chart table with parallel ruler – 03 Nos and divider – 02 Nos • Ventilation and air conditioning including fixed side windows and roof hatches. • Lighting including dedicated lighting to dedicated seating positions. • Adequate stowage areas for all navigation equipment like radar, DGPS/Magnetic compass etc. • Master control panel for system. • Wall mounted fan for cabin. • Wind screen wiper (heavy duty). 	
25.	Sea Worthiness & Manoeuvrability	<p>(i) The watercraft shall be capable of maintaining cruising speed upto sea state-3.</p> <p>(ii) The watercraft shall remain operational with reduced performance in conditions upto sea State – 4 and sustainable upto sea state-5.</p> <p>(iii) The bottom structure of the watercraft</p>	To be checked/ tested during speed/ endurance trial.

PO [Signature] M-1 [Signature] M-2 Not attended M-3 [Signature] M-4 [Signature] M-5 [Signature]
 M-6 [Signature] M-7 [Signature] M-8 [Signature] M-9 [Signature] Co-opted Member-1 [Signature] M-2 [Signature]

N.	Specification	Parameters	Trial Directives
		<p>shall be designed in such a way to minimize slamming effect when the watercraft is operating at high speed in significant wave height of 1.5 Meters and above.</p> <p>The vessel shall have good manoeuvrability for the following operational requirements :-</p> <ul style="list-style-type: none"> (a) Going alongside and leaving a jetty under adverse wind and tide conditions without external assistance. (b) Going alongside and leaving a vessel while under way for boarding purposes. (c) Turning at or near rest under the action of the main engines and the steering system in adverse weather and sea conditions. (d) Manoeuvring safely under all conditions of loading and speeds in adverse weather and sea conditions. (e) Crash stop from full speed ahead in minimum 1.5 times of boat length. (f) Manoeuvring from one engine in case of failure of the other. 	
26.	Noise	Noise and vibrations in various sections of the vessel are to be limited as per class rules.	<p>TEST CONDITIONS :</p> <p>Ship shall be running is normal operating conditions. All other machinery is to run under normal operating conditions.</p> <p>Type approved certificate to be produced by the builder.</p>

PO [Signature] M-1 [Signature] M-2 Not attended M-3 [Signature] M-4 [Signature] M-5 [Signature]
 M-6 [Signature] M-7 [Signature] M-8 [Signature] M-9 [Signature] Co-opted Member-1 [Signature] M-2 [Signature]

S.N	Specification	Parameters	Trial Directives
27	Paint	Tin free anti fouling paint system as per latest IMO regulations shall be applied to hull bottom (below waterline).The pattern of the anti fouling paint on the outer part of the hull will be disruptive with combination of OG & cream/smoke gray colour. Inside of hull paint colour should be pale cream.	To be physically checked.
28	Regulations	The vessel shall be built with following IRS class notation or equivalent. SWASTIK, SUL, HSLC, RS1, Patrol, "Special Government Service" for operations within 30 NM from the coast. "IY".	Boat builder to provide IACS class certificate.
29	Annual exploitation	Annual exploitation of 1500 hours per year.	Boat builder to provide IACS class certificate.
30	Certificates	Following documents to be provided by builder with each vessel on delivery-three sets in hard copy & one set in soft copy:- a) All IRS/class society approved drawings, booklets, manuals & trial data. b) As built final building specification, as fitted drawings and consolidated schedule of piping, painting, insulation, panelling. c) All marine grade material (316 & more of SS equipments/accessories). d) Manual with regards to installation, operation and maintenance of various equipment/fittings, systems and part identification list. e) Service manual, part catalogue/identification list of major machinery such as main engine, gear box,	Boat builder to provide certification. Certificates to be physically verified.

PO

M-1

M-2 Not attended

M-3

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M-7

M-8

M-9

Co-opted Member-1

M-2

S.N.	Specification	Parameters	Trial Directives
		generators, pumps etc. and accessories. f) Docking plan, LSA plan, fire fighting plan alongwith instruction of operating safety equipment. g) Certificate of IRS or any member of IACS class. h) Builder's certificate. i) Compass adjustment. j) Anchor & chain cable, mooring ropes certificate. Major machinery (Main engines, Gear box, water jets & generators etc) type approval certificate.	

Presiding Officer:- [Signature]
 (Kunal Mazumdar),
 DIG(WW), FHQ, BSF New Delhi

M-1 :- [Signature]
 (A.K. Sharma), SSO(T),
 (B. BPR&D)

M-2 :- Not attended
 (), , NSG

M-3 :- [Signature]
 (Sanjeev Singh), DC, CRPF

M-4 :- [Signature]
 (K.S. Aiy), 2K Assam Rifle

M-5 :- [Signature]
 (Rakesh Kumar), Inspr/Exe, CISF

M-6 :- [Signature]
 (Ritesh Kumar Dwivedi), AC, NDRF

M-7 :- [Signature]
 (Ved Prakash), AC, SSB

M-8 :- [Signature]
 (Amit Gupta), DC, ITBP

M-9 :- [Signature]
 (Jose Abraham), AC (WW)
 Water Wing, BSF Bhuj

Co-opted Member 1 :- [Signature]
 (Cdr K K Dhawan), Principal Surveyor, IRS, New Delhi

M - 2 : [Signature]
 (Ravi Yadav) Surveyor, IRS, New Delhi

APPROVED / NOT APPROVED

[Signature]
 DIRECTOR GENERAL,
 BORDER SECURITY FORCE