



Ministry of Environment and Energy  
Male', Republic of Maldives



## TERMS OF REFERENCE

*for*

# SPECIFICATIONS FOR THE DESIGN, MANUFACTURE AND SUPPLY OF TWO (02) LANDING CRAFTS

*Funded by*

*the Public Sector Investment Program*

*of the Government of the Republic of Maldives*

April 2016

**Issued By:**

Waste Management and Pollution Control Department  
Ministry of Environment and Energy  
K.Male', Republic of Maldives

## SPECIFICATIONS FOR THE DESIGN, MANUFACTURE AND SUPPLY OF TWO (02) LANDING CRAFTS

### Functional Requirements of Landing Craft

The vessel will travel daily from its harbor at the Regional Waste Management Facility (RWMF) and will travel to 4-5 islands on a round trip basis to collect waste and also support logistical requirements necessary such as carrying deck load cargo and diesel oil. The minimum endurance required for this vessel will be about 400nm. The maximum daily steaming time will be maximum 15 hours per day. The load carrying capacity of the vessel shall be between 200 tons and 250 tons with facilities required for necessary lashing.

The vessel shall have dedicated tanks that can accommodate about 50 to 70 tons of Diesel oil as cargo and Ballast tanks to maintain the necessary trim. The maximum height of the load above the deck will not exceed 3.5m. The vessel shall be able to carry lorries with full cargo of waste, excavators and other types of heavy vehicles.

The load carrying area of the vessel shall be approximately 120 to 150m<sup>2</sup> on the deck. The deck loading shall not be less than 3.5T/m<sup>2</sup>. The load carrying area will be contained within a bulwark of at least 1 m height or other similar enclosure.

Island harbours and channels are dredged to approximately 3 - 3.5m (MSL), however, access may be reduced over time. The vessel shall have sufficient full load draft to access island harbours and channels of less than 3m depth (MSL). Depending on coastal conditions maintenance dredging may be occur every 2-3 years. The average vessel service speed shall be approximately 10 Knots.

The vessel shall be twin screw with Marine Diesel Engines of about 294kW/400MHP to 368kW/500MHP each (Yanmar or Cummins). The Engine room shall have enough space to accommodate 2 Engines, its gear box (Gear Ratio 4:1), and steering arrangement. The Main Engine power rating shall be decided based on the full load displacement of the vessel and the required speed of 10 Knots. The generator (Yanmar or Cummins) capacity shall also be decided based on the operational requirement of the vessel.

The vessel shall be fitted with cargo pumps of Positive Displacement gear type for suction and discharging of diesel to and from the vessel. The pressure of the pump shall not be less than 4kg with 2" diameter for suction and discharging pipe.



The vessel shall be able to carry about 20000 liters of fuel oil and about 10000 liters of fresh water for consumption during operation or an appropriate volume that is required to cover the endurance of 400 nautical miles.

The vessel shall be able to compliment at least 6 crew members including Captain and Chief Engineer and if possible, the accommodation shall have separate cabins for both Captain and the Chief Engineer.

The vessel shall be provided with facilities for dinning, washing and cleaning for crew onboard.

The vessel shall be provided with 2 anchors of about suitable weight each with two windlasses. The sling of windlass shall be at least 50m and the thickness of the anchor chain shall be of suitable thickness. The vessel shall be provided with at least 2 mooring ropes of at least 150m each.

A forward ramp door of width at least 4m and length at least 5m withstanding the loading of heavy cargo shall be fitted to the vessel. The vessel shall also be fitted with ship side doors of width at least 1.829m (6ft) on both sides (port and starboard) of the vessel. The ship side doors shall have means of closure during steaming.

The vessel shall also be fitted with a small jib crane to load and discharge cargo to and from the vessel. The minimum Safe Working Load (S.W.L) shall not be less than 2 tons with minimum outreach of 2m from the ship side.

Preliminary particulars of intact stability for calculation of stability in different loading conditions shall be in accordance with the International Code on Intact Stability (2008 IS Code).

The safety equipment and the requirement of the vessel shall be in accordance with the national regulation enforced by the Maritime Administration of Maldives.

<i>Description</i>	<i>Requirement</i>	<i>Comment</i>
Hull Construction material	Steel	IACS Class A Grade steel or equivalent



Specifications for the Design, Manufacture and Supply of Two (02) Landing Crafts

Minimum Service speed		10 knots	Steaming at full load
Load required		Approximately 250T	
Length		30m or more (LOA)	Maintain this range
Beam		8.5m	at amid ships
Depth		Between 2.2m to 2.5m	As appropriate
Crew Accommodation		6 Nos	Minimum (Including Captain and Chief Engineer)
Load carrying area (Deck space)		120 to 150m <sup>2</sup>	Minimum
Main Engine (2 Units)	Rated Output	294kW/400MHP to 368kW/500MHP	Yanmar or Cummins
	Cylinders	6 in-line	Appropriate power for service speed of 10knots  Spare parts should be readily available at the Purchaser's country i.e. the Republic of Maldives
	Displacements	13.140 to 13.733	
	Combustion System	Direct Injection	
	Aspiration	Turbocharger + intercooler	
	Starting System	Electric starting motor (24V 6.0kW)	
	Cooling System	Heat exchanger	
Auxiliary (2 Units)		2 Units	
Gear Box		2 Units of Ratio 1:4	
Oily water separator		1 Unit with flow rate capacity of minimum 0.25 M <sup>3</sup>	



Cargo gear	1 unit of small jib crane	Minimum Safe Working Load of 2 tons
Air conditioning unit	Either central or split type	For crew accommodation
Endurance	400nm	Minimum
Fuel Storage	20000ltr (for vessel)	Minimum
Fresh water	10000ltr (for vessel)	Minimum
Main electrical system	24VDC	Step down to 12VDC to Wheelhouse as necessary
Heavy Load electrical system	230VAC	Provided from Gen-set
Electrical components	50Hz	-
Cargo pumps	At least 1 unit (Positive Displacement gear type, minimum pressure of 4kg)	Suction and discharge pipe of 2" diameter
Freshwater main and distribution system (incl. PVC piping, pump, filling, fittings)	Service to shower, basin etc.	May include toilet flushing as proposed by Bidder
Seawater main and distribution system (incl. pump, HD piping, vented loop, thru hull fittings, hose and nozzles as required).	Service to deck wash/firefighting	May include toilet flushing as proposed by bidder.
Ballast pumping system (incl. piping, tankage and pump)		May be proposed by bidder for safe and efficient operation of vessel for safe and efficient operation of the vessel for different loading conditions.
Drainage/ sewerage discharge system (incl. pumps, sumps, piping thru-hull fittings, vented loop, and venting)	Service from toilet shower room, compartment bilge pumps etc.	May include sewage/greywater tankage as proposed by bidder
Diesel Tankage (incl. filling and venting arrangements)	Capacity approximately 20000 liters	Actual capacity to be determined based on endurance, safe and efficient operation of vessel and crane



Specifications for the Design, Manufacture and Supply of Two (02) Landing Crafts

Fresh water Tankage	Capacity approximately 10000 liters	Actual capacity to be determined based on the endurance, safe and efficient operation of vessel
Minimum	10000ltr (for vessel)	Fuel storage
Minimum	10000ltr (for vessel)	Fresh water
Wheelehouse as necessary Step down to 12VDC to	24VDC	Main electrical system
Provided from Gen-set	130VAC	Heavy load electrical system
2" diameter Suction and discharge pipe of	50Hz	Electrical components
May include toilet flushing as proposed by bidder	At least 1 unit (Positive Displacement gear type, minimum pressure of 4kg)	Cargo pumps
May include toilet flushing as proposed by bidder	Service to shower, basin etc.	Freshwater main and distribution system (incl. PVC piping, pump, fitting, fittings)
May be proposed by bidder for safe and efficient operation of the vessel for different loading conditions.	Service to deck wastewater	Sewerage main and distribution system (incl. pump, HD piping, vented loop, thru hull fittings, hose and nozzles as required).
May include sewage/greywater tankage as proposed by bidder	Service from toilet showers room, compartment pipe pumps etc.	Ballast pumping system (incl. piping, tankage and pump)
Actual capacity to be determined based on endurance, safe and efficient operation of vessel and crew	Capacity approximately 30000 liters	Drainage/ sewerage discharge system (incl. pump, pump, piping thru-hull fitting, vented loop, and venting)
		Diesel Tankage (incl. filling and venting arrangements)



## Technical Specifications of Landing Craft

The hull shall be constructed with IACS Classification Society A Grade steel. All the steel plates shall be shot blasted with SA2.5 and primer painting of 30 to 50 microns shall be applied before fabrication. The scantlings of the bottom, ship sides, main deck, double bottom (if any) and superstructure decided were based on the details of the functional requirement and specification which are given in the Table.

The engines shall be heavy duty 294kW/400MHP to 368kW/500MHP Marine Diesel Engines (Yanmar or Cummins) with (1800 to 1950 RPM) continuous rating revolution diesel engine with complete stern arrangement package, and electric start. The engines shall be provided with a smart charging alternator with regulator, heavy duty, lead acid, maintenance free marine start batteries). Engine controls shall be cable driven. The vessel gear reduction ratio shall be calculated to ensure maximum operational efficiency. The exhaust system shall be an above water type, and fixed pitch standard propeller package. The clutch shall be wet hydraulic multi dist. type, the lubrication system shall be a forced lubrication system, the propeller shaft shall be Stainless Steel, and the steering shall be a hydraulic steering system with wheel, cylinder, pump pipes, and rudder cylindrical cutlass bearing stock with arm. The propeller shall be bronze. The propeller and rudder blade dimensions shall be calculated to maximize operating efficiency. Engines and generator shall be provided with manufactures all standard meter, indicators and switches etc.

The mechanical equipment will be kept to a minimum. A ballast tank, ballast transfer pump and pipework shall be required to trim the vessel during full load and lightship condition.

The electrical load requirements shall be available onboard the vessel during operation as well as in idle condition. Shore power is generally unavailable in Maldivian islands, and as such the vessels power supply equipment will need to be sufficient to operate equipment for loading and unloading as well as steaming operations. The vessels main power supply will be a 24VDC electrical circuit. A 24V-12V step down transformer **may** be required to supply 12VDC equipment if necessary. The vessel will require continuous power to wheelhouse instrumentation and intermittent power to all other 24VDC light load service equipment and appliances. The engine alternator will recharge the service battery bank(s) when the engine is running. A generator will power high voltage (230v) equipment through a high voltage circuit (such as battery recharge / ballast pump / diesel cargo pump / deck wash / fire pump, and exterior weather proof GPO etc. as **may** be required). The generator shall be supplied with a thru hull exhaust system (either through the engine exhaust or separate as required). A battery charger (230 -24VDC) shall be provided to recharge the service battery bank(s) from the generator. A battery switch to isolate/ transfer power supplies to and from the service battery bank (as required for emergency engine starting etc.). The generator shall be provided with 12V start battery. The alternator, generator output, and service battery bank capacity (Ah) shall be calculated from the power balance for the equipment load to be serviced.

A small jib crane to load and discharge cargo to and from the vessel shall be fitted on the deck. The minimum Safe Working Load (S.W.L) shall not be less than 2 tons with minimum outreach of 2m from the ship side. Jib crane lift and move loads associated with general marine work and within their rated capacity. The operator's cab, engine, hoist, and swing machinery are all part of the machinery house. A power system provides all power aboard the crane. The capacity of the crane shall be the lifting of 2 tonne from a distance of 2 metres from ship side with adjustable boom length and pillar height. The rotation capacity of the boom shall be 360 degrees.



The various pieces of vessel and crane equipment to be designed, selected, and installed to provide well-coordinated pieces of operating machinery to comply with specified requirements. Safety devices and guards to be built into or about the equipment to protect both the crane and crane operating personnel.

The machinery house and operator's cab shall be fully enclosed and contain the crane machinery, power units, control panels, auxiliary pumps, and operator's controls.

The vessel shall be provided with navigation lights (Red/ Green Stbd and Port side, anchor light, stern light, steaming light), waterproof sealed beam searchlight, air horn and navigation equipment (G.P.S. Navman 5500, DC 10-16V, screen 5"+ equivalent), compass, VHF communication and antenna. The wheelhouse will be equipped with oscillating wall mount fans, ceiling lights, and power outlet sockets. The wheelhouse will be provided with wiper(s) to the windscreen. The engine/generator bulkhead compartment will be provided with lights and power outlet sockets. The engine/generator bulkhead compartment shall have adequate ventilation. Inlet/outlet air blower(s) **may** be required to ventilate the engine/generator bulkhead compartment. Emergency power arrangements must be made available to all essential electrical lighting, and operating units (including engine starting). Hardwired smoke detection alarms shall be provided to engine/generator bulkhead compartment, wheelhouse with bunk accommodation **as required**.

All wiring shall be flame proof, and colour coded etc. as required. All necessary distribution boards, electrical control panels, fuse panels and circuit breakers shall be provided as required for the safe operation of the vessel.

The wheelhouse will be located on the main deck but will be proportioned and positioned to maximize the load carrying capacity of the vessel. The wheelhouse will be fully enclosed with a rear weatherproof door (with acrylic viewing panel, heavy duty, marine grade stainless steel levers, locks and hinges). The windscreen shall be watertight with tempered, flat panel glass and steel/ anodized aluminum frames. Watertight windows shall be provided to Port and Stbd of wheelhouse as required. The wheelhouse shall be equipped with all necessary equipment required for steering, engine control, navigation etc., appropriate to requirement of the vessel. The vessel wheelhouse shall be provided with helmsmen chair (molded shell with seat and lumber cushion type) internal storage and console for mounting of navigation, switches etc. **as required**. The vessel shall have crash bulkhead with an integral chain locker. Grab rails shall be fitted to the exterior of the wheelhouse on Port and Stbd side to enable safe access around to the chain locker at the fore of the vessel.

Toilet/ shower shall be provided in the accommodation of the vessel. The toilet/shower room shall be provided with basin with marine toilet (freshwater flush with macerator and overboard discharge pump), freshwater shower and basin mixer, towel hanger, mirror, and Muslim shower. The bunk accommodation shall be provided with bunks constructed of timber frames and slats with plywood bases or similar within the wheelhouse. The toilet/shower room shall be provided with wooden panel doors and frames with brass butt hinges, and latches as required.

A galley and a mess room which can accommodate at least 6 crews shall be provided onboard the vessel. The galley shall have cooking and washing up facilities. Means of keeping chilled and frozen



items used as daily consumption of food and cooking shall be provided either in the galley or in mess room.

The vessel deck shall be provided with heavy duty schedule 80 steel fairleads, and deck cleats, and deck bollards, and aft rings **as required**. Anchor, anchor rope and chain shall also be provided for as necessary. The steel used for the construction of hull, main deck, double bottom (if any) and superstructure shall be shot blasted with SA 2.5 prior applying the necessary paint. The underwater hull shall be provided with antifouling (2 coats) and antifouling primer (two coats). Durable, marine grade paint/ shall be applied to all exterior surfaces as necessary. Zinc anodes of appropriate size and numbers shall be fixed to the underwater area of the hull. A durable, nonslip, marine grade finish shall be applied to exterior decks, stairs and interior service areas. The saltwater firefighting/deck wash hose connection (hydrant) and the hose reel holder.

An integral staircase will provide access from the wheelhouse to below decks. The engine/generator bulkhead compartment will be accessible thru-decks from the stair case and engine/generator bulkhead door. An emergency escape hatch will be provided from the engine/generator bulkhead compartment to the aft of the main deck.

The vessel will be supplied with adequate fuel, and freshwater tankage. Freshwater tankage for crew requirements (drinking and hygiene) will be approximately 10000 litres. Fuel tankage should be calculated for 15 hours per day steaming, with total fuel tankage capacity calculated the intended endurance which is approximately 400nm. (approximately 20000L total fuel tankage capacity). The total fuel and freshwater tankage (and a separate seawater ballast tank **if required**) capacity shall be calculated according to the overall ballast requirements of the vessel to maximize steaming efficiency. All tankage shall be provided with connection, fill and breather arrangements **as required**. A sewage/greywater holding tank **may** be required.

The pump requirements for the vessel shall be kept to a minimum. PVC fresh and HD seawater main, distribution PIPING and fittings shall be provided as necessary. Self-priming seawater deck wash/ fire pump(s), hose(s), and nozzle(s) shall be provided as necessary. Vented loop, thru hull marine fittings (bronze/brass/teflon) shall be provided for the seawater intake and distribution (and ballast tank arrangements if required) as necessary. A sewage/greywater sump and overboard discharge pump, piping and fittings shall be provided as necessary. A freshwater service pump(s) shall be provided as necessary. Bilge pumps shall be provided to hull and bulkheads **as required**. Bilge pump capacity shall be calculated for the area to be serviced. Deck lockers (chain) shall be drained to the bilge pumps sumps. Deck wash/fire pump, (and ballast pump, and sewage overboard discharge pump **if required**), and freshwater service pump capacity shall be calculated according to service requirements. All thru-hull fittings for intake/ discharge shall be bronze/brass/Teflon as require.

The vessel shall be provided with all necessary safety/ emergency equipment including hand manual pump rotary bilge pump (2lit./stroke), flag set, first aid kit, life jackets, life rings, fire extinguishers (powder and Co<sub>2</sub>) and fenders **as required**.

The vessel shall be provided with at least one set of spare parts (mandatory spare parts) required to be carried on the vessel during operations. Mandatory spare parts are those spare parts required under the National Rules and Guidelines for safe operations of the vessel by



the regulatory authority of Maldives. The spare parts of all the machinery included in the design of the vessel shall be readily available in the Republic of Maldives, upon requirement in the future.

**Table 1: Indicative List of Goods and Specifications:**

Item	Description	Requirement	Quantity	Remark
<b>1. Hull, superstructure, decks, compartments and lockers</b>				
1.1	Hull	Bottom hull of 12mm, shell 10mm, structural supports, framing, etc.		IACS Class A Grade steel or equivalent
1.2	Keel ballast			As proposed by Bidder in accordance to relevant Rules
1.3	Portholes	Minimum 300mm, aluminum anodized frames :		In accordance to relevant Rule.  Additional porthole if shower and toilet are separate compartments
1.4	Decks	Flat load carrying deck of 12mm		Load carrying deck to be reinforced as required and in accordance to relevant Rules
1.5	D-fender	6" wall thickness	1 No. per vessel	
1.6	Bulwark	Bulwark with integral scuppers around load carrying deck.		.
1.7	Below decks bulkheads	Crash bulkhead of 10mm thickness		



		Engine/generator compartment bulkhead of 10mm thickness		
1.8	Below deck compartments	Engine/generator compartment		
1.9	Double bottom plate	Shell plate 6mm thickness		
1.10	Super structure	Shell plate 6mm thickness		
1.11	Ramp	Minimum length of 5m and minimum width of 4m	1 Nos	
1.12	Ship side gates	Minimum width of 1.829m (6ft)	2 Nos	Shall be locked during operating at sea
1.13	Deck compartment	Wheelhouse and annex on foredeck. Bunk accommodations Shower/ toilet room Mess room and kitchen		Shower and toilet may be separate compartments Mess room and kitchen maybe separate compartments
1.14	Chain locker	Integral to crash bulkhead	1 No. per vessel	Hatch cover in accordance to relevant National Rules.  Drained to bilge sump
1.15	Below deck escape hatch	Engine room to rear of main deck	1 No. per vessel	Hatch cover in accordance to relevant National Rules
1.16	Ladder	From wheel house to below decks	1 No. per vessel	No slip finish to treads and platform



1.17	Deckwash/ fire fighting connection and hose reel/holder	S/W hydrant/hose connection for firefighting/deck wash	1 No. per vessel	In accordance with relevant rules
1.18	Cargo gear	1 unit of small jib crane	Minimum Safe Working Load of 2 tons	Minimum out reach of 2m from the ship side
<b>2. Engine and Machinery Department</b>				
2.1	Engine	1800 to 1950 RPM, Continuous rating revolution, diesel, electric starting  400 to 500 hpYanmar or Cummins	2 No. per vessel	HP to be determined by functional design requirement for efficient steaming  Spare parts should be readily available at the Purchaser's country i.e. the Republic of Maldives
2.2	Lubrication system	Forces lubrication	2 No. per vessel	Or as otherwise recommended for safe and efficient operation of vessel
2.3	Clutch	Wet hydraulic multi dist. type	2 No. per vessel	Or as otherwise recommended for safe and efficient operation of vessel
2.4	Shafting	316 Stainless Steel	2 No. per vessel	Dimensions to be determined for safe and efficient operations of the vessel.
2.5	Propeller	Bronze	2 No. per vessel	Dia. to be determined for safe and efficient operation of vessel.
2.6	Gearing	-		Gear reduction ratio to be determined for



				safe and efficient operation of vessel.
2.7	Exhaust system	Above water standard package	2 No. per vessel	May incorporate generator exhaust
2.8	Meters and panels	All standard meters and panels	1No. set per vessel	
2.9	Generator	230V output,, 12V electric start battery, thru hull exhaust system	2 No. per vessel	Actual KW capacity to be determined from electrical power balance
2.10	Bilge pumps	24VDC self-priming pumps	2 - 3 Nos. per vessel	Actual number and capacity of bilge pumps to be determined for the number of bulkhead and the area to be serviced.
2.11	SW service pumps	Supply to saltwater distribution system (deckwash/firefighting)	1 No. per vessel	May be 230VAC engine driven (generator power supply) or 24VDC (service battery supply).  Pump capacity will be determined in accordance with relevant Rule.
2.12	FW service pump	24VDC self-priming for freshwater distribution system	1 No. per vessel	Capacity will be determined in accordance with service requirements.
2.13	Ballast water pump	230VAC engine driven	1 No. per vessel	If required. The capacity will be determined in accordance with service requirements



2.14	Hand/manual bilge pump.	2lit./stroke, rotary	1 No. per vessel	
2.15	Macerator/ discharge pump	Sewage / grey water disposal	1 No. per vessel	As proposed by bidder for direct overboard discharge from shower/toilet trap or discharge from sewage/grey water tankage room.
<b>3. Steering and Engine Control</b>				
3.1	Engine control	Cable driven with standard 2 lever control set to the wheelhouse	2 No. per vessel	
3.2	Steering	Hydraulic steering system w/wheel, cylinder, pump pipes to the wheelhouse	2 No. per vessel	
3.3	Rudder blade	Steel blade	2 No. per vessel	Dimensions to be determined for safe and efficient operation of vessel  Material proposed by Bidder
3.4	Rudder system	Rudder cylindrical cutluss bearing stock with arm	2 No. per vessel	
<b>4. Electrical Department</b>				
4.1	Charging alternator	35Amp, 24V output smart type with regulator for cranking batteries and service battery recharge when engine is operating.	1 No. per vessel	Actual capacity to be determined from electrical power balance.
4.2	Battery charger	230AC-24VDC	1 No. per vessel	-



4.3	Step down transformer	24VDC- 12VDC	1 No. per vessel	May be required for 12VDC equipment
4.4	Cranking battery bank	Engine starting (2 x lead acid 200Ah, 24V batteries)	2 No. per vessel	Or as recommended by engine supplier
4.5	Service battery bank(s)	24VDC lead acid batteries to supply to vessels main electrical circuit	Per vessel	Actual capacity and number of service battery banks to be determined from electrical power balance
4.6	Battery switches	On-off, switch and isolate service battery supply connections.	2 No. per vessel	Or as otherwise proposed by Bidder
4.7	DC and AC wiring, main cabling, conduits, and earthing bars	Colour coded and flame proof		As proposed by bidder
4.8	DC/AC distribution control/ fuse panel(s)			Nos. and gangs to be proposed by Bidder
4.9	Mini Circuit breaker/RCD		1 No. per vessel	Or as proposed by Bidder
<b>5. Electrical equipment &amp; Accessories</b>				
5.1	Engine/generator compartment ventilation	24VDC engine/generator compartment intake and exhaust blowers  AND/OR  Grilled ventilators aluminum anodized with dorate box to engine/generator compartment	2 No. pair per vessel	Or as proposed by Bidder
5.3	Windscreen wiper(s)	24VDC to wheelhouse	1 Nos. set per vessel	May be 12VDC to wheel house if supplied from step down transformer



5.4	Oscillating fans	24VDC wall mounted: 2 x wheel house	2 Nos. per vessel	Maybe 12VDC to wheelhouse if supplied from step down transformer
5.5	Air horn	24VDC to wheel house	1 No. per vessel	May be 12VDC to wheel house if supplied from step down transformer
5.6	Search light	24VDC 2000W to wheel house	1 No. per vessel	Maybe 12VDC to wheelhouse if supplied from step down transformer
5.7	Deck lights	24VDC lights	As required	
5.8	GPS	Navman 5500, DC 10-16V, screen 5"+	1 No. per vessel	or equivalent
5.9	Marine VHF with DSC function and antenna		1 No. per vessel	As per National
5.10	Navigation lights	24VDC, Red/ Green Stbd and Port side, anchor light, stern light, steaming light	1 No. set per vessel	Maybe 12VDC if supplied from step down transformer
5.11	Fire alarms	12VDC hardwired fire alarms to engine/generator compartment, bunk cabin accommodation and wheelhouse	3 Nos. per vessel	Or as otherwise in accordance with national Rule requirements
5.12	AC sockets outlet(s)	15 Amp to engine/generator compartment ( x1) double socket  15Amp weather proof to rear of wheel house (x1) double socket  13 Amp to wheelhouse (x1) double socket	3 per vessel	Or as otherwise in accordance with Rule requirements
5.13	Ceiling lights	24VDC marine grade to:  <ul style="list-style-type: none"> <li>• Wheelhouse</li> <li>• Bunk compartment</li> </ul>		Or as otherwise in accordance with



		<ul style="list-style-type: none"> <li>• Toilet shower room</li> <li>• Shower room (x)</li> <li>• Generator/engine compartment</li> </ul>		national Rule requirements
5.14	DC light switches	Marine grade one way, one gang		Gang number may be determined by Bidder
5.15	AC fluorescent lights	2" with heat resistant covers to engine generator room	2 nos. per vessel	Emergency lighting when service battery bank isolated.
5.16	AC light switch	Marine grade one way, one gang	1 no. per vessel	For fluorescents in engine/generator room
<b>6. Wheelhouse equipment and accessories (other equipment and accessories)</b>				
6.1	Compass		1 No. per vessel	
6.2	Helmsman chair	Molded shell with seat and lumber cushion type	1 No. per vessel	
6.3	Helmsman switch panel	Navigation lights, bilge pumps, air horn, wipers etc.	1 No. per vessel	<b>If not included in item 4.8</b>
6.4	Helmsman console	Integral console for mounting of navigation equipment, switches panel etc.		
6.5	Windscreen	Watertight with tempered, flat panel glass and steel/ anodized aluminum frames		
6.6	Side windows	aluminum anodized w/tempered glass		
6.7	Wheelhouse door	W/proof door to rear of wheelhouse with acrylic viewing panel.	1 No. per vessel	
6.7	Grab rail	Port and Stbd side of wheelhouse.	2 Nos. per vessel (one each side of wheelhouse)	



<b>7. Wheelhouse Annex</b>				
7.1	Equipment locker(s)	Integral equipment storage for tarpaulin, shovels/ brooms, tie down ropes etc.		As proposed by Bidder
7.2	Chart table	For storage of chart and make chart corrections	1 No. per vessel	As proposed by Bidder
<b>8. Toilet/Shower room compartment (other equipment and accessories)</b>				
8.1	Entry door	Wooden panel doors and frames.	1 No. per vessel	
8.2	Toilet	Western type, marine toilet with discharge macerator pump	1 No. per vessel	May be FW or SW as proposed by Bidder
8.3	Muslim shower	Fitting, hose and head	1 No per vessel	
8.5	Tap ware	F/W PVC tap to basin	1 No. per vessel	
8.6	Mirror		1. No per vessel	
8.7	Shower set	Rail, cold water mixer, hose and head	1 No. set per vessel	
8.8	Towel rail/ hanger		1 No. per vessel	
8.9	Drainage sump and pump	For shower and basin discharge	1 No. per vessel	Or as proposed by Bidder for direct discharge or gravity feed to sewage/grey water tankage.
<b>9. Deck fittings</b>				
9.1	Aft rings	Steel	4 Nos. per vessel	Or as proposed by Bidder
9.2	Mooring post	Steel		Or as proposed by Bidder



9.3	Forward fairleads	12" Steel	4 Nos. per vessel	Or as proposed by Bidder
<b>10. Finish</b>				
10.1	Anti-fouling	Antifouling primer antifouling	2 Nos.	Underwater hull
10.2	Hull and superstructure finish	Durable, marine grade paint		As proposed by Bidder for construction hull material
10.3	Deck, stairs and interior service areas	Durable, nonslip, marine grade finish		
10.4	Doors, windows and port holes	All weathertight doors to be steel	As appropriate	Or as proposed by Bidder
10.5	Zinc anodes	Adequate to cover the full under water area		In accordance to relevant Rule.
10.6	Steel pipes	Durable, marine grade paint with appropriate colour code		
10.7	Cargo tanks, ballast tanks and void spaces	Durable, marine grade paint		As proposed by Bidder for construction hull material
<b>11. Safety equipment and other equipment and accessories not specified elsewhere</b>				
11.1	Flag set		1 No. per vessel	
11.2	Life jackets		4 Nos. per vessel	
11.3	Life ring	Mounted to rear of wheelhouse	1 Nos. per vessel	
11.4	First aid kit		1 No. per vessel	Type in accordance with National Rules



11.5	Life raft	Sufficient to accommodate all crew onboard		Number and type in accordance with National Rules
11.6	Fire extinguishers	Powder and Co <sub>2</sub>		Number and type in accordance with National Rules
11.7	Fenders		6 Nos, per vessel	
11.8	Anchor	120 kg bow anchor	1 No per vessel	Or as proposed by the bidder in accordance with Rule requirements for admission to Class
11.9	Anchor chain and rope	24mm x 100m bow anchor rope with chain	1 No per vessel	
11.10	Mooring rope	24mm x 100 m mooring rope	2 No per vessel	
11.11	Latches, levers, hinges & locks etc.	Heavy duty marine grade Stainless Steel to exterior doors and storages. Marine grade brass to interior.		
11.12	Deck locker, hatch covers, and below deck bulkhead door fittings.			In accordance with National Rule requirements
<b>12. Spare parts and Servicing Requirement</b>				
12.1	(i) Mandatory spare parts and tools and (ii) spare parts and tools offered by manufacturers/s suppliers of components and appliances etc. in their standard supply package for	Spare parts for all machinery should be readily available at the Purchaser's country i.e. the Republic of Maldives	1 No. set for mechanical and 1 No set for electrical per vessel	To be supplied with the vessel on delivery. The cost of replacement of mandatory spare parts thereafter will be the responsibility of the Client.



	the principle electrical and mechanical components or appliances.			
12.2	Major replacement components	As recommended for replacement by the manufacturer of the engine for a period of 5 years service from the date of delivery of the completed vessel		For evaluation purposes only
12.3	Engine servicing	As undertaken by a service agent of the manufacturer which is recommended by the manufacturer for the period of 5 years from the date of delivery of the completed vessel		For evaluation purposes only



