



MINISTERIO  
DE DEFENSA  
NACIONAL

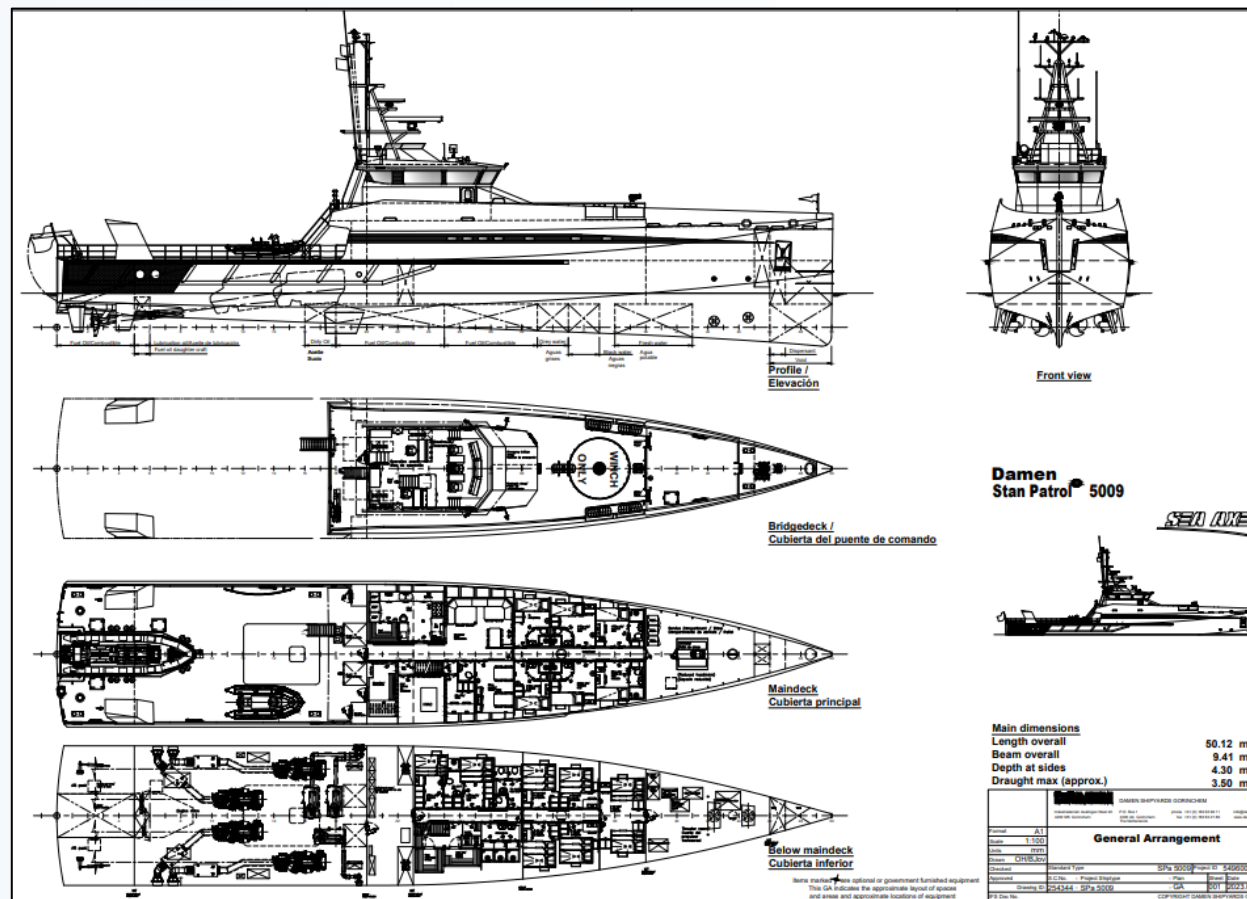


ASTINAVE EP  
ASTILLEROS NAVALES ECUATORIANOS



## ANNEX A TECHNICAL SPECIFICATIONS

The material's kit to be supply must be the one that allows ASTINAVE EP to build a sea axe offshore patrol vessel – Stan Patrol 5009 type. The general arrangement of the vessel to be built is as follows:



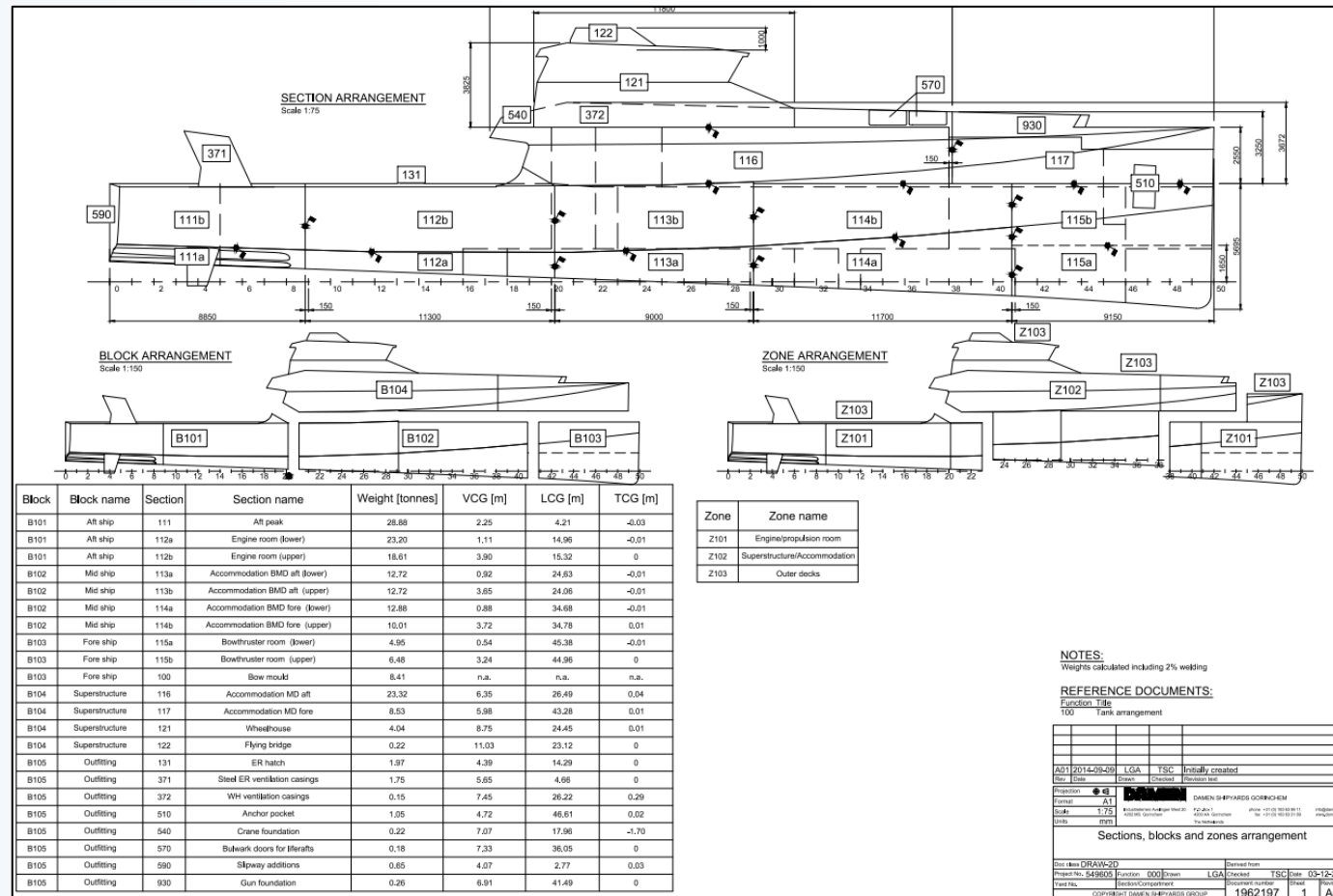
\*Drawing and design property of Damen Shipyard Gorinchem



EL NUEVO  
ECUADOR

## ANNEX A TECHNICAL SPECIFICATIONS

The block/section arrangement of the vessel to be built is as follows:



\*Drawing and design property of Damen Shipyard Gorinchem



**ANNEX A**  
**TECHNICAL SPECIFICATION**

Besides what is indicated in the previous figures, the vessel must accomplish the following specifications:

**1. GENERAL DESCRIPTION**

**MAIN CHARACTERISTICS**

Length overall (including appendages)	:	50.12 m
Length moulded	:	50.00 m
Beam over all (including appendages)	:	9.41 m
Beam moulded	:	9.00 m
Depth at side (at half length)	:	4.30 m
Draught max. (approx.)	:	3.50 m
Weather condition	:	Sea state $\leq 2$ Beaufort $\leq 3$ Water depth $> 15$ m
Speed (*)	:	22.00 knots

22.00 knots @ 40% of fuel and freshwater tanks, all other tanks must be empty

**CLASSIFICATIONS / OTHER AUTHORITIES / CERTIFICATES**

The Vessel will be classed by Bureau Veritas and the notation will be:

I  $\boxtimes$  Hull • MACH • AUT UMS  
Light Ship / Fast Patrol Boat  
Sea area 4

The vessel must have a GMDSS for area A3

The vessel must comply with the following regulations:

- IACS No. 99  
International Convention for Safety of Life at Sea (SOLAS), 1974  
International Convention on Load Lines (1966/1988)  
COLREG - International Regulations for Preventing Collisions at Sea 1972  
International Code on Intact Stability 2008

The following certificates/statements are supplied at the time of delivery of the Vessel:

- Builder's certificate
- Material certificates (as far as required by Class)
- Classification certificates (as far as required by Class)
- Inclining test report
- Radio certificates / statements
- International tonnage certificate / statement
- Load line certificate / statement
- Marpol certificates / statements as far as indicated above
- Anti fouling certificate / statement
- EIAPP certificate(s)

**TANKS CAPACITY**

Fuel oil	:	85.58 m <sup>3</sup>	/	71.89 tones
Fuel oil daughter craft	:	1.48 m <sup>3</sup>	/	1.24 tones
Fresh water	:	17.27 m <sup>3</sup>	/	17.27 tones







## ANNEX A TECHNICAL SPECIFICATION

Waste water (black)	:	8.95 m <sup>3</sup>	/	8.95 tones
Waste water (grey)	:	9.25 m <sup>3</sup>	/	9.25 tones
Bilge water	:	2.45 m <sup>3</sup>	/	2.45 tones
Dirty oil	:	2.45 m <sup>3</sup>	/	2.21 tones
Clean oil	:	1.48 m <sup>3</sup>	/	1.33 tones
Dispersant	:	4.65 m <sup>3</sup>	/	4.65 tones

### MANUALS / DOCUMENTATION

Upon completion of the Vessel, four complete sets of documents and manuals are to be delivered. When available at a manufacturer, manuals will be delivered in the Spanish language. The following documents will be delivered:

General Arrangement Plan  
Docking or hoisting plan  
Engine room arrangement  
Diagram of all relevant systems  
Electric Power Distribution Diagram  
Harbor and sea trial test reports  
Safety plan (Fitted in aluminum frame at suitable location)  
Inventory list  
Manuals of components (as far as available)  
A stability booklet

The supplier must provide all the necessary drawings for the shipbuilding.

The following plans (in the Spanish language) are fitted in frames at the location of the system

1. Bilge / Ballast / internal fire-fighting system
2. Fuel oil system
3. Cooling water system
4. Fresh water system
5. Waste water system

### 2. SHIPBUILDING (HULL AND OUTFITTING)

#### MATERIALS

The hull material to be of steel as mentioned in this specification equals to steel grade A (equivalent to EN 10025 - S235 JRG2, St 37 / Fe 360).

The hull is manufactured from steel plates, certified by a major Classification Society

The steel plating and its members to have a minimum yield strength of 235 N/mm<sup>2</sup>

Where applicable, stainless-steel type 316L or 321 is used unless mentioned otherwise

The wire welding material to be supplied with the constructive kit.

#### HULL SCANTLINGS

All the below-mentioned thicknesses are indicative only and can be changed based upon final construction analysis:

Side plating: 5 mm

Bottom plating: 6/8/10 mm





## ANNEX A TECHNICAL SPECIFICATION

Bottom plating i.w.o. propellers: 12 mm  
Deck plating (steel): 5/10 mm  
Bulkheads: 4 mm  
Transom plating: 5 mm

### SUPERSTRUCTURE

1. The superstructure is manufactured from aluminum plates, certified by a major Classification society.
2. The aluminum superstructure is welded to the steel hull using explosively bonded structural transitional joints (Triplate).
3. Material type EN-AW 5083 (equivalent to ISO Al Mg 4.5 Mn).
4. All the below-mentioned thicknesses are indicative only and can be changed based upon final construction analysis:
  - a. Side and aft plating: 4/5 mm
  - b. Deck plating: 4mm
  - c. Front plating: 5 mm

### TANKS

The following tanks are integrated into the hull construction, and must comply with the tank's capacity indicated in **Tanks capacity**:

- a. Fuel tank (s)
- b. Fresh water tank (s)
- c. Bilge water tank
- d. Dirty oil tank
- e. Clean oil tank
- f. Dispersant tank

### HATCHES

1. All hatch covers are watertight / weathertight by means of gaskets or rubber. All hinges are made from stainless steel (hinges are adjustable and provided with grease nipples, if applicable). All outside hatches can be locked (if applicable) either with a sea-water resistant padlock or from the inside. If necessary for safety, provisions for securing hatch covers with corrosion resistant fittings in open position are provided. Hatches are positioned in accordance with the "General Arrangement Plan"
2. **For the Fore peak hatch**, an aluminum flush hatch, with a central locking device is fitted on the fore deck. The hatch is hinged and provided with a stainless-steel knife-edge sealing and a drain,
3. **For the Engine removal hatch**, Steel flush hatch(es) for the removal of the main engines are fitted on the main deck. Each hatch is fitted with rubber seals and is bolted down from the inside with steel bolts. Threaded inserts for lifting eyes are provided. Furthermore, a smaller service hatch is provided,
4. **For the aft peak and engine room hatches**, an aluminum entrance hatch is fitted at the aft peak(s). Furthermore, an engine room escape hatch is provided on the aft deck. Each hatch is provided with a coaming. Dimensions approx. 800 x 800 mm. Coaming height 600 mm,





## ANNEX A TECHNICAL SPECIFICATION

5. **For the Accommodation escape hatch**, one aluminum flush mounted hatch with a central locking device is fitted for escape from the accommodation. The hatch is provided with a stainless-steel knife-edge sealing and secured with a small chain/wire,
6. **For the Bow thruster escape hatch**, one aluminum flush escape hatch for the bow thruster room is provided. The hatch is provided with a stainless-steel knife-edge sealing,
7. **For the Inspection hatches**, where necessary inspection hatches are provided for tanks, voids, bilges, etc. All integrated tanks (except expansion tanks) are accessible via manholes. The manholes are closed by watertight plate covers, secured by bolts. In exposed areas the bolts are of stainless steel,
8. **The air duct and ventilator openings** have the following closing devices:
  - a. The engine room ducts are provided with fire flaps.  
The accommodation air inlet and/or outlet ducts are provided with fire flaps or closing hatches"

### WATERTIGHT / WEATHERTIGHT DOORS

1. All outside doors are fitted with stainless steel / synthetic hinges and toggles and can be secured in an open position,
2. Watertight doors are positioned generally according to the rules of a major Classification Society,
3. The internal watertight hinged door(s) are of a steel construction. Each door is provided with a central handle. The doors are non-remote controlled, with open/close alarms and provided with a sign "keep closed at sea,
4. The external weathertight doors are of an FRP construction. Each accommodation door is provided with a window or porthole and a central handle,
5. The wheelhouse is provided with three access doors,
6. The external weathertight wheelhouse doors are of an FRP construction,
7. The interior of the Vessel is adequately illuminated with marine-type lights. All Exterior lights are marine-type and water-resistant lights.

### MAST

An aluminum mast for navigation lights, flags and aerals is mounted on the top deck bolted on four flanged foundations:

1. Foundations for antennae, radars, sensors and navigation lights,
2. Four attachments for halyards (cleats fitted on deck),
3. Aluminum steps for climbing in the mast (incl. safety rail),
4. Two attachments for day shapes,
5. Flag poles, on the bow and at the stern a flagpole is fitted. Each pole is provided with attachments to a flag.

### GUN FOUNDATION

On the fore deck, at center line, a foundation for an automatic operated 0.50" gun is provided.

### ANCHOR STORAGE

1. The Vessel is provided with two anchor pockets,





## ANNEX A TECHNICAL SPECIFICATION

2. A chain locker(s) fits in the forepeak and is provided with sufficient drainage.
3. The anchor chain is stored between plastic (LDPE) planked walls and a removable synthetic grating

### FIXED FINS

Fixed fins are placed in the aft ship for improved directional stability

### TECHNICAL SPACES FLOOR PLATING

Aluminum floor plates are fitted in technical spaces, such as in the engine room, aft peak, and other technical space(s). The floor plates are fixed with stainless steel screws. The plates are mounted on angle section frames in such a way that all equipment can easily be reached for operation and maintenance. Thickness plates Approx. 5 mm.

### 3. MAIN MACHINERY AND PROPULSION SYSTEM

The design and layout of the propulsion installation is in accordance with Builder's standard and with the relevant rules of the Classification Society and are such that permanent attendance in the engine room is not required.

Each marine diesel engine drives a fixed pitch propeller via a shaft with flexible coupling and reverse / reduction gearbox with clutch.

### PROPULSION DIAGRAM

1. Type, conventional: engine – reduction gearbox – shaft – propeller,
2. Quantity of propulsion lines: 04,
3. Main engine specificatio:
  - a. Rating D  
6400 bhp,  
2000 - 2300 RPM,  
The main engines are electrically started and are provided with turbo charging and charge air-cooling,  
Each main engine is resiliently mounted on the longitudinal bottom girders. The solid construction of the girders minimizes hull vibrations exerted by the engines,  
Similar as the ones from the 549604/05 project

### REDUCTION GEARBOX

1. The reduction ratio is selected to meet the Vessel's performance with an optimized propeller design,
2. The built-in clutch for reverse, neutral and forward operation is hydraulically operated with a built-on, direct driven hydraulic pump,
3. A highly flexible coupling is installed between the engine and the gearbox,
4. The type and size of the coupling are individually determined for the engine- gearbox combination,
5. The gearbox is provided with a lubrication oil cooler, connected to the engine cooling water system,
6. The reverse / reduction gearboxes are rigidly mounted
7. Similar as the ones from the 549604/05 project



## ANNEX A TECHNICAL SPECIFICATION

### SHAFTS

1. The shaft diameter is determined in accordance with the Classification Society's rules.
2. The main engines drive the propellers through stainless steel shafts.
3. The propeller and propeller boss are fitted to the shaft with a cone with key and is secured with a nut.
4. Shaft material AISI 431

### SHAFTS BEARINGS

The shafts are supported by three water lubricated bearings.

### STERN TUBES

Steel stern tubes are welded to the hull construction.

### PROPELLER SHAFT SEALING AND LUBRICATION

Each shaft is provided with an independent closed water lubrication system, with a tank, level indicator, flow meter and an electrically driven pump. Shaft seals are fitted on both sides of the stern tubes.

### V – STRUTS

1. Each propeller shaft is supported with a steel V-strut
2. Each V-strut is welded to the ship construction
3. The hull plating is locally reinforced and full penetration welds are used
4. The bearing in the V-strut is seawater lubricated

### PROPELLERS

1. Type Class 1,
2. Material NiAl-Bronze,
3. Diameter to be determined during design process,
4. Number of blades to be determined during design process,
5. The propellers are dynamically and statically balanced,
6. finished smoothly and have anti-singing edges,
7. Each propeller is marked with a serial number,
8. A flat propeller guard is bolted to the shaft bracket or stern tube, to protect the gap in front of the propeller hub.

### PROPULSION CONTROL SYSTEM

1. Each propulsion installation is controlled by an engine speed electronic remote-control system in combination with the gearbox control,
2. The system incorporates the following components:
  - a. One handle electronic transmitter for engine speed and gearbox position (ahead, astern and neutral),
  - b. A class approved back-up control system is provided if required by Class.





## ANNEX A TECHNICAL SPECIFICATION

- c. An additional control station for the engine and gearbox control is provided on the flying bridge,
- d. A selector switch is fitted on the main control station. On the flying bridge station an acceptable button is provided.

### RUDDERS

1. Two stainless steel rudders are fitted. Each double plate rudder with streamlined profile is welded to a stainless steel (duplex) rudder stock,
2. The lower bearing of the rudder stock is water lubricated. The upper bearing is a spherical roller type.

### TRANSVERSE THRUSTERS

1. Each electric motor drives a bronze fixed pitch propeller
2. Control of the bow thrusters is from each control station
3. Number to be installed 2
4. Diameter to be determined during design process,
5. Electrically driven bow thrusters are fitted, Electric power  $\pm 110$  kW.
6. Electrically driven bow thrusters are fitted.
7. Each tunnel is integrated in the ship's construction and is provided with gratings at both sides

### ENGINES EXHAUST SYSTEM

1. The exhaust system of each main engine and generator engine is made up of the following components,
2. Compensator of stainless steel,
3. Dry silencer of steel,
4. Water injection of stainless steel or duplex,
5. Overboard connection with non-return flap,
6. Thermal insulation,
7. Resiliently mounted exhaust system

### 4. ELECTRICAL SYSTEM

1. The design and layout of the electric system, the materials, installation and testing are to Builders' standards and comply furthermore with the relevant rules of a major Classification Society,
2. All electric cables and materials are suited for marine application and in accordance with requirements for safe and efficient operation of the Vessel,
3. All electric equipment, whose function or application is not evident, will be provided with notices. Care will be taken to ensure electrical components are accessible, considering the limitations of the Vessel design,
4. All electric components comply with I.E.C. 92.201 standards,
5. The Vessel's electrical / electronic installation is such that mutual electromagnetic interference does not prevent any equipment from reaching its specified performance

### ELECTRICAL NETWORKS

## ANNEX A TECHNICAL SPECIFICATION

1. A three phase + neutral network, nominal voltage 440 V, 60 Hz,
2. A three phase + neutral network is provided, nominal voltage 440 V - 60 Hz, neutral point of the generator connected to earth, using a separator,
3. A single-phase network, nominal voltage 127 V, 60 Hz,
4. A single-phase network is provided, nominal voltage 127 V - 60 Hz, connected between phase and neutral from the 220V network
5. A three-phase network, nominal voltage 220 V, 60 Hz,
6. A three phase is provided, nominal voltage 220 V - 60 Hz, via a transformer from the 440V network. The transformer is provided with taps to adjust secondary voltage for high or low voltage conditions. The transformer has two 2.5% taps above and four 2.5% taps below normal that can be adjusted manually,
7. A bipolar 24 V network, free from earth:
  - a. One network supplying the Vessel's consumers
  - One network supplying the diesel engines' starter motors
  - One network supplying selected radio and communication equipment
8. All electric cables and materials are suited for marine application and in accordance with requirements for safe and efficient operation of the Vessel
9. The design and layout of the electric system, the materials, installation and testing are to Builders' standards and comply furthermore with the relevant rules of a major Classification Society

### ELECTROMAGNETIC COMPATIBILITY

10. The Vessel's electrical / electronic installation is such that mutual electromagnetic interference does not prevent any equipment from reaching its specified performance

### EMERGENCY POWER SUPPLY

1. In case of a failure of the main power supply, emergency power is provided by a battery set through the 24V switchboard(s).
2. In selecting which consumer qualify as emergency consumers, Classification requirements are followed

### GENERATOR SET

1. A generator set is fitted to serve the single and three phase networks. The generator set is equipped with a built-in auto voltage regulator and is driven by a marine diesel engine.

The generator in service provides enough capacity for the supply of the total Vessel's normal operating load.

The wheelhouse dashboard is equipped with a signal light, which is activated when the generator is running.

Each generator set is flexibly mounted, provided with a freshwater internal cooling system, double walled fuel piping with leakage detection.

The generator sets must have the following characteristics:

- a. Number installed: 3
- Voltage: 440 V
- Phase(s): 3
- Frequency: 60 Hz
- Capacity: 150.0 ekW - 188.0 kVA

The diesel engine is electrically started and stopped locally on the engine.



## ANNEX A TECHNICAL SPECIFICATION

The generators are intended for parallel use. The main switchboard is fitted with (manual) synchronizing equipment and automatic load sharing

### SHORE CONNECTION

1. Length of cable: 2 units / each of 50 m

A cable and connection for shore power supply is provided. The cable is fitted with a male plug on the shore side and female plug on the vessel side

Total maximum: 125 A

Voltage: 440 V  $\pm 10\%$

Frequency: 60 Hz (max. + 5%)

The shore power supply connection is intended to provide power to all ship consumers, up to the current given below

### BATTERY SETS

The following battery sets are installed

1. Battery set(s) for starting the engines,
2. One battery set for the service / emergency,
3. In case of a failure of the main power supply, emergency power is provided by a battery set through the 24V switchboard(s),
4. One battery set for radio / communication.
5. The UPS system or its equivalent will be determined during the design,
6. A battery change over facility ensures the starting of the engines with another battery set

### BATTERY CHARGER

Each battery set is connected to a charger. Each charger is intended for floating charging the batteries with an automatic change-over to trickle charging.

- a. Voltage: 24V

Capacity: up to 1800 W

The battery charger for the radio/communication to be determined during the engineering phase.

### SWITCHBOARDS

The installation and the materials used in the switchboards are sufficiently shock-proof, suitable for the environmental conditions and according to the requirements of a major Classification Society.

All circuits are identified by a diagram on the inside of the cover of circuit boxes.

1. A 440 / 220 / 127 V switchboard is mounted with outgoing circuits for the required consumers. Combined switches/automatic circuit-breakers are used,  
The 440 V, 220 V and 127 V outgoing circuits are provided with each of the two spare circuit breakers.

All live parts are covered to prevent contact when switchboard doors are open.







## ANNEX A TECHNICAL SPECIFICATION

All doors are equipped with door positioners. Outside the switchboard insulated handrails are fitted. In front of the main switchboard a carbon free rubber mat is fitted on the floor plates

The 24 V main switchboard fits in the wheelhouse. A second switchboard is placed below the main deck. The switchboard(s) provide:

- a. A main switch

Earth detection on each pole

A voltmeter and ammeter of the emergency battery.

A voltmeter and ammeter of the starting battery(ies). Both switchboards are fitted with combined switches/automatic circuit breakers for the outgoing circuits.

The switchboard is provided with:

- a. Main circuit breaker for each generator and the shore supply.

Voltmeter for each generator and the shore supply.

Ampere meters for each generator phase and the shore supply.

Frequency meter for each generator.

Power indication for each generator and the shore supply.

Start equipment for electric motors.

All relevant relays and fuses.

Three spare switches, 127 V.

Three spare switches, 220 V.

Three spare switches, 440 V.

Indication and controls for paralleling generators

### INTERNAL LIGHTNING

The interior lighting of the Vessel is based on 127 V. All locations shall be adequately lit, and the following table will be used as guidance:

- 1. Aft peak(s) 4 units LED Ceiling Light 2100
- Engine room 12 units LED Light 3900
- Switchboard room 2 units LED Ceiling 2100
- 1 unit Desk lamp (if applicable) 400
- Wheelhouse 4 units LED ceiling light 2100
- Wheelhouse 2 units Desk lamp 400
- Bow thruster room 4 units LED ceiling light 2100
- Mess room 4 units LED ceiling light 2100
- Officer's mess 2 units LED ceiling light 2100
- Galley 2 units LED ceiling light 2100
- 1 unit Light in canopy 800"
- Corridor LED ceiling light (according to the arrangement) 2100
- Nursery 1 unit LED ceiling light 1200
- Each cabin 1 unit LED ceiling light 1200
- 1 unit Desk lamp (if applicable) 400"
- Sanitary space(s) 1 unit per sanitary LED ceiling light 1200
- General store 1 unit LED ceiling light 2100
- Bed reading light (according to the arrangement) 500

### EXTERNAL LIGHTNING



## ANNEX A TECHNICAL SPECIFICATION

The exterior lighting of the Vessel is based on 127 V. All locations shall be adequately lit and the following table will be used as guidance:

1. Aft deck 2 units LED light 2100
- Deckhouse entrance 1 unit LED step light 1200
- Wheelhouse entrance 1 unit LED step light 1200
- Life rafts 4 units LED step light 1200
- Each side 2 units LED step light 1200
- Lights for ships name 2 units LED light 2100
- Floodlight aft 2 units LED wide beam light 3000
- Floodlight forward 1 unit LED wide beam light 3000

### SOCKETS

127V Free sockets are fitted at the following locations and the following table shall be used as guidance:

1. Wheelhouse 3 units Double indoor 127V
2. Mess room 3 units Double indoor 127V
3. Officers' mess 3 units Double indoor 127V
4. Galley 3 units Double indoor 127V
5. Each sanitary space 1 unit Shaving socket 127V
6. Nursery 1-unit Double indoor 127V
7. Each cabin 1-unit Double indoor 127V
8. Each cabin near headlight 1-unit Single indoor 127V
9. Aft peak 2 units Splash watertight 127V
10. Engine room 2 units Splash watertight 127V
11. Bow thruster room 2 units Splash watertight 127V
12. Aft deck 2 units Splash watertight 127V
13. Foredeck 2 units Splash watertight 127V

### EMERGENCY LIGHTNING

1. Emergency lighting (24 V) powered by the emergency power supply is installed near essential equipment, along the path to this equipment and near exits.
2. Emergency lighting is fitted in main compartments and in all escape routes and near escape hatches and doors,
3. Emergency lighting is incorporated in the main lighting fixtures (if applicable), emergency lights will be of normal size lamp holder,
4. Emergency lighting is not a part of the normal lighting and will only light up in case of a black-out of the normal lighting system

### NIGHT ADAPTATION LIGHTING

1. An adequate system of red lighting is installed in the wheelhouse and in the wheelhouse stairway to support night vision. The red lighting system is provided as an extra above the emergency lighting system.

Dedicated dimmers are provided in the wheelhouse for navigation and communication equipment. Darkening arrangements are provided at all portholes and windows (excl. wheelhouse) and at any other openings to prevent light escaping outboard and to prevent white light from in accommodation areas from entering the wheelhouse.

The darkening arrangements consist of curtains, deadlights or similar measures."

**ANNEX A**  
**TECHNICAL SPECIFICATION**

**CABLE**

1. Cables are properly secured on cable trays or cable strips. Cables with stranded conductors are used.
2. For electronic equipment cables with an earth- screen are used.
3. Cables used for signalling and communication with a voltage less than 100 V have a minimum conductor cross-section of 0.75 mm<sup>2</sup> (Cables for control current may be less).
4. Other cables have a minimum conductor cross-section of at least 1.5 mm<sup>2</sup>.
5. The design and layout of the electric system, the materials, installation and testing are to Builders' standards and comply furthermore with the relevant rules of a major Classification Society.
6. All electric cables and materials are suited for marine application and in accordance with requirements for safe and efficient operation of the Vessel.
7. All electric equipment, whose function or application is not evident, will be provided with notices. Care will be taken to ensure electrical components are accessible, taking into account the limitations of the Vessel design.
8. All electric components comply with I.E.C. 92.201 standards.

**ALARM / MONITORING SYSTEM**

1. A central Alarm Monitoring System (AMS) with modularly structured process monitoring and control stations is provided. The master unit is installed in the switchboard room and a slave unit is fitted in the wheelhouse. The alarms are individually presented. The system consists of:
  - a. Computer main unit for the switchboard room.  
Computer slave unit for the wheelhouse.  
Analogue and digital inputs on main unit.  
Main and auxiliary engine mimics with alarm indication.  
Propulsion overview mimics with alarm indication.  
Electric installation overview mimics with alarm indication.  
Tank level monitoring / mimic  
Outputs for horn / flashing light  
Output port for printerThe system is provided with a watch entrance unit, mounted at the engine room entrance.
2. The number and type of alarms are according to the Classification Society regulations.
3. To prevent serious damage, auto stops are installed on essential parts of the propulsion installation.
4. The central alarm and monitor system is provided with on/off alarm indication unit(s) on the following locations:
  - a. Chief engineer's cabin  
Officers' mess"
5. An audible and visible alarm is fitted in the wheelhouse for indicating high bilge water level in the following compartments:
  - a. Aft peak  
Engine room  
Switchboard room  
Accommodation lower deck  
Bow thruster room





## ANNEX A TECHNICAL SPECIFICATION

### FIRE DETECTION SYSTEM

1. A fire detection and warning system is installed on board. The system covers the following zones:
  - a. Aft peak
  - Engine room
  - Switchboard room
  - Accommodation lower deck
  - Bow thruster room
  - Accommodation on the main deck
  - GalleyThe system is provided with heat / smoke detectors.
2. The system provides audible warning throughout the Vessel, by means of the general alarm bells.
3. In case of engine room fire, all ventilation fans, pumps, heaters, etc. can be shut down in accordance with the requirements of the Classification Society

### GENERAL ALARM

1. A general alarm system is provided. In the wheelhouse a switch is fitted to activate the general alarm which can be heard all over the Vessel.
2. Bells are installed in the following positions:
  - a. Wheelhouse
  - b. Accommodation
  - c. Engine room (siren and flashing light)
  - d. Aft peak

### BRIDGE NAVIGATIONAL WATCH ALARM SYSTEM

1. A Bridge Navigational Watch Alarm System (BNWAS) is installed in the navigation area of the wheelhouse
2. The system consists of the following components:
  - a. A main unit (flush mount) with timer function and on/off switch
  - b. Two cabin units (1x Mess room and 1x Captain's cabin)
  - c. A siren for 3rd stage alarm
  - d. The system is provided with an input from the autopilot and output to the General Alarm system.

### NAVIGATION LIGHTS

1. The navigation lights are provided with a main and, where required, an emergency power supply.
2. All lights fitted conform the COLREGS' requirements. Some lights can be used for more functions and can be switched individually. An alarm is fitted to indicate a broken circuit.
  - a. Two (2) side lights, portside is red and starboard side is green, double executed
  - One (1) stern light, white, double executed
  - One (1) masthead light, white, double executed
  - One (1) anchor light, white
  - Yellow tow light to be determined during the engineering phase
  - N.U.C. lights, red + red, double executed



## ANNEX A TECHNICAL SPECIFICATION

R.I.M. lights, red +white+ red, double executed

3. The navigations lights are controlled from an inter-chair console in the navigation area of the wheelhouse.

### SEARCHLIGHT

1. A searchlight is mounted on the wheelhouse top deck, electrically operated.
  - a. Voltage 127 V
  - b. Range at 1 lux > 1540 m (according to factory specification)"
2. The flying bridge console is also provided with a remote control

### RED/BLUE LIGHT

A flashing light, controlled from the wheelhouse, is fitted in the mast, color Red / Blue.

3. A police siren is fitted on the wheelhouse top deck or in the mast. For operation a push button is situated on the wheelhouse dashboard.

### HORN AND SHIP'S BELL

1. A horn is fitted on the wheelhouse top deck or in the mast. For operation a push button is situated on the wheelhouse dashboard, a second push button is situated on the flying bridge.
- A brass ship's bell is mounted on board engraved with the Vessel's name and year of delivery.

### 5. NAUTICAL / COMMS / AUTOMATION

An integrated navigation system is provided with equipment connected as far as reasonable and practicable. The navigation area comprises a wide forward console with three large navigation screens for excellent overview from the forward operator chairs.

The inter-chair consoles are provided with navigation and communication equipment.

An overhead panel is provided for indicators and meters.

1. The integrated navigation system is provided with the following:
  - a. Three 43" TFT navigation screensNavigation radars, refer to 822  
An electronic chart system, refer to 823  
Video and network switches  
One trackball per navigation screen  
Several control buttons

The center TFT screen presents:

- a. Conning screen, or
- Outside CCTV cameras

The port TFT screen presents:

- a. X-band navigation radar, or
- b. S-band navigation radar, or
- c. ECDIS

The starboard TFT screen presents:

## ANNEX A TECHNICAL SPECIFICATION

- a. X-band navigation radar, or
- b. S-band navigation radar

The conning software package for the conning screen(s) provides the following information on the display, as far as installed:

- a. (D)GPS data
- b. Heading and Rate of Turn
- c. Speed overground
- d. Speed through water
- e. Depth
- f. Wind direction and wind speed
- g. RPM of the main engines
- h. Rudder indicators
- i. Main alarms
- j. Watertight door(s)

A slave conning screen is fitted on the flying bridge.

### MAGNETIC COMPASS

1. A magnetic compass is mounted on the wheelhouse top deck.  
The compass is provided with a pick-up coil for connection to other equipment. A course repeater is mounted in the wheelhouse ceiling.  
The compass is provided with a small light.  
Voltage 24 V

### GYRO COMPASS

1. Accuracy according to the standard
2. Repeater(s) are provided near each steering gear in the aft peak
3. A bearing repeater of the gyro compass is installed on the wheelhouse top deck. The repeater is provided with a Pylorus."

### ECDIS

1. An ECDIS system is provided and can be displayed on a screen.
2. The system consists of an industrial personal computer with the required ECDIS software package and a UPS.
3. Sea charts of the operational area are delivered and are available through the chart plotter.

### WEATHER SYSTEM

1. A weather system is installed. The sensor is mounted in the mast with solid state sensor
2. Relative wind speed and direction
3. Air temperature and pressure
4. Display Via conning screen
5. Voltage 24 V

### GPS



## ANNEX A TECHNICAL SPECIFICATION

The equipment will be classified only if required by class.

### ECHO SOUNDER

1. An echo sounder is provided with a digital display
2. Frequency 50 / 200 kHz
3. Two transducers are installed at an appropriate place in the hull
4. The echo sounder is provided with shallow depth alarm. The display is fitted in the navigation area. The correct work of the echo sounder depends on undisturbed water underneath the oscillator.
5. Deviations or read-out failure is possible at higher speeds.
6. Display 6.5" TFT LCD
7. Voltage 127 V

### SPEED LOG

1. A Doppler speed log is provided with digital display
2. The transducer is installed at an appropriate place in the hull. Deviations or read-out failure is possible at higher speeds.

### AUTOPILOT

1. An autopilot is supplied.
2. The steering system is provided with a feedback unit to the autopilot.
3. The autopilot is provided with an off-course alarm.

### X-BAND RADAR

1. An X-band radar system is installed. The radar can be displayed on the screens as indicated in item 821. An open scanner with an incorporated transceiver is fitted.
2. Radar scanner 6ft
3. Power 10 kW
4. ARPA 100 targets
5. The radar is provided with an AIS interface.

### S-BAND RADAR

1. An S-band radar system is installed. The radar can be displayed on the screens as indicated in item 821. An open scanner with an incorporated transceiver is fitted. The radar is provided with an AIS interface.
2. Radar scanner 12ft
3. solid State
4. ARPA 100 targets
5. The radar is provided with an AIS interface.

### AUTOMATIC IDENTIFICATION SYSTEM

1. An Automatic Identification System (AIS) is installed. The antenna is mounted on the wheelhouse top deck or in the mast. The AIS system communicates the following information between other AIS stations, if applicable:



## ANNEX A TECHNICAL SPECIFICATION

- a. Ship's name,
  - b. MMSI number,
  - c. IMO number,
  - d. Call sign,
  - e. Type of vessel,
  - f. Loa & beam,
  - g. position,
  - h. UTC,
  - i. COG,
  - j. SOG,
  - k. Ship's heading,
  - l. Rate of turn,
  - m. navigation condition.
2. Furthermore, a pilot plug is provided.
    - a. Display 4.5" LCD
    - b. Voltage 24 V

### ELECTRO-OPTICAL SYSTEMS

A night vision system is fitted in the mast or on the top deck and is displayed in the wheelhouse. The system is equipped with a Long Wave Infra-Red sensor with 4x optical zoom and an HD Day/Low light system. The system is fitted with video tracking.

Field of View 25° to 6° (LWIR)"

### INTERCOM AND LOUDHAILER

1. An intercom system is supplied with a central station in an inter-chair navigation console. The system can be used as PA system.
2. The following substations are provided:
  - a. 2x Aft peak (with headphone)
  - Engine room (with headphone)
  - Switchboard room (with headphone)
  - Bow thruster room (with headphone)
  - Aft deck (HP 10 speaker)
  - Fore deck (HP 10 speaker)
  - Top deck or mast (uses the horn speaker)The central wheelhouse station is provided with a gooseneck microphone and footswitch  
The flying bridge station is provided with a speaker, call button and hand microphone.  
Accommodation (speakers only)

### INTERNAL TELEPHONE EXCHANGE

1. A telephone exchange system is provided on board.
2. The following substations are provided:
  - a. Speaker phone in each cabin
  - Main console on the bridge
  - Speaker phone in the switchboard room
  - Speaker phone in each cabin
  - Speaker phone in each cabin





## ANNEX A TECHNICAL SPECIFICATION

- Speaker phone in each cabin
- Speaker phone in the mess room
- Speaker phone in officers' room
- Speaker phone in the galley

### OFFICE (W-) LAN SYSTEM

A local area network (LAN) is provided in the ship and consists of the following:

1. Cable terminated on patch panel
2. Cables are terminated on wall sockets in the following spaces
  - a. Two in the wheelhouse
  - b. Two in the ships office
  - c. Two in the mess room
  - d. Two in the officers' mess room
  - e. One in each cabin"
3. A network infrastructure based on Cat 7 SFTP cable
4. Network Quality 802.4 Gigabit (1000 Mbps)
5. Patch panels and wall sockets are foreseen with RJ45 sockets.

A Wi-Fi system is provided in the vessel and consists of the following:

1. A 5GHz 300 MBps CPE internet reception antenna mounted on the wheelhouse top deck or in the mast.
2. Two tri-band internet routers (1.8GHz in CB 100 / CB 200)
3. Three WI-FI repeaters
  - a. One in the wheelhouse
  - b. One in the corridor between the officers' cabins
  - c. One near the crew mess room

### VHF DSC-A RADIO TELEPHONE

1. Two VHF radio telephones with all international channels is installed.
2. Both radiotelephones are equipped with integrated DSC unit and DSC watch receiver, class A (Ch. 70)
3. RF output power 25W
4. One VHF is provided with a one-man control, consisting of control switch and gooseneck microphone.
5. The satellite compass/GPS data input provides a continuous position update for the DSC function. The VHF is provided with voice recording

### VHF FIXED PROGRAMMABLE RADIO

1. One fixed programmable VHF radio is installed
2. The antenna is mounted on the wheelhouse top deck or in the mast.

### VHF RADIO TELEPHONE SLAVE STATION ON FLYING BRIDGE

A VHF radio telephone slave station (without DSC) is mounted on the flying bridge.

### VHF DIRECTION FINDER







## ANNEX A TECHNICAL SPECIFICATION

A VHF direction finder is installed. The antenna is mounted on the wheelhouse top deck or in the mast

### PORTABLE VHF RADIO

A portable VHF radio is provided as part of the GMDSS equipment. The portable VHF radio complies with both the GMDSS and fire-fighting regulations and is ATEX approved.

Number 2.

### AIR-BAND VHF

An air-band VHF radiotelephone with all international channels is installed

Capacity 8 W

### MF/HF RADIOTELEPHONE

A MF/HF (SSB) radio telephone is installed. The radio is provided with an integrated DSC watch receiver. The antennae (approx. 8 m) are mounted in an appropriate place.

Capacity 150 W

### NAVTEX

A Navtex receiver is installed, including antenna.

- a. Display 5.7" LCD
- b. Voltage 24 V.

### INMARSAT C

1. An Inmarsat C system is installed. The system is provided with a distress alert button
2. The Inmarsat C unit is provided with software for Long Range Information
3. Tracking (LRIT). This will respond to an Automatically generated Position Report (APR) for:
  - a. Ship identity
  - b. Ship position
  - c. Date and time of the position"
4. A second Inmarsat C unit, without LRIT is provided
5. Furthermore, the system is provided with keyboard, monitor and printer.

### EPIRB

An EPIRB is supplied operating at 121.5 / 406 MHz and AIS

Approved according to class if class required

### SART





## ANNEX A TECHNICAL SPECIFICATION

Two AIS search and rescue radar transponder is supplied of which is one fitted on the RHIB.

### CCTV SYSTEM

1. A CCTV system is provided for the engine room and deck observation.
2. The screen of the engineering console is connected to the following color cameras:
  - a. Engine room (2x)
  - b. Aft peak (2x)
  - c. Ammunition store
3. The screen of the navigation console is connected to the following color cameras
  - a. Aft deck (fitted in the mast)
  - b. Fore deck (fitted in the mast)
  - c. Port and starboard deck (fitted in the mast)
4. A hard disk recorder with 4 TB hard disk is provided in the wheelhouse.

### CCTV SYSTEM

1. The Vessel is equipped with a car style 9" touch screen multi-media system with android auto/apple car play, Wi-Fi network integration capability and internal memory in the wheelhouse. Two speakers are provided.
2. The Vessel is equipped with a car style 9" touch screen multi-media system with android auto/apple car play, Wi-Fi network integration capability and internal memory in the galley. Two speakers are provided.
3. The Vessel is equipped with a car style 9" touch screen multi-media system with android auto/apple car play, Wi-Fi network integration capability and internal memory in both mess rooms the commander's cabin and the officer's cabins. Speaker(s) is provided
4. The Vessel is equipped with a 32" LCD Android smart TV screen in both mess rooms the commander's cabin and the officer's cabins.
5. A marine stabilized satellite television antenna system is provided on board. The antenna is located on the top deck. The system is interfaced with the TV's that are provided on board.
6. An antenna for reception of radio / TV signal is fitted. In each cabin a radio / TV socket is provided.

### CODE SHAPES

One set of code shapes is provided with the Vessel and stored on board.





ANNEX A  
TECHNICAL SPECIFICATION

6. PRIMARY SHIP SYSTEMS

FILLING, SOUNDING, AND DE-AERATION

1. In general tanks are provided with a filling/discharge and a separate de-aeration pipe. The exposed de-aeration pipes are equipped with a (self) closing device, except sewage tank(s). All filling pipes have corrosion resistant material caps, secured by chains.
2. Some engines require a crankcase de-aeration pipe vented to the open air.
3. Fuel tank ventilation caps are fitted with flame traps. A drip tray is mounted below the fuel filling point to prevent oil spillage on deck.
4. A gauge glass with a self-closing valve is fitted on the fuel oil header tank(s).
5. Filling and de-aeration below deck: Material - Steel, galvanized steel
6. Filling and de-aeration above deck: Material - Galvanized steel, stainless
7. Electric content gauges are provided with sensors on the tank and a display on the central alarm and monitoring system.
8. Indication(s) provided for the following tank(s):
  - a. Fuel tank(s) (except fuel header tank)
  - b. Fresh water tank(s)
  - c. Grey water tank(s)
  - d. Black water tank(s)
  - e. Clean oil tank
  - f. Bilge water tank(s)
  - g. Dirty oil tank(s)
  - h. Dispersant tank
9. Filling connections for the following tanks are fitted with international shore connections:
  - a. Fuel oil tank(s)
  - b. Clean oil tank(s)
10. The filling connections for the following tanks are fitted with filler caps:
  - a. Fresh water tank(s)
  - b. Dispersant tank
11. Discharge connections for the following tanks are fitted with international shore connections:
  - a. Grey water tank(s)
  - b. Black water tank(s)
  - c. Bilge water tank(s)
  - d. Dirty oil tank(s)"

NATURAL AND MECHANICAL VENTILATION SYSTEM

1. The following spaces are provided with an electrical fan(s):
  - a. Ventilation ducts supply fresh air into the engine room and accommodation
  - b. The air intake for the engine room is to allow sufficient airflow towards the engines
  - c. The air intake for the accommodation is adequate for the number of persons on board
  - d. Sanitary spaces and the pantry/galley are provided with extractor fans
  - e. Bow thruster room
  - f. Sanitary lower deck
  - g. Laundry lower deck
  - h. Store lower deck
  - i. Switchboard room





## ANNEX A TECHNICAL SPECIFICATION

- j. Aft peak
- k. Sanitary main deck
- l. Store main deck
- m. Emergency battery room
- n. Wet gear room
- o. Boatswain store
2. Engine room ventilation ducts are manufactured of aluminum. Each duct can be closed from outside the engine room.
  - a. Number: 02
  - b. Capacity approx.: 24.000 m<sup>3</sup>/hr. (each)
  - c. Voltage and frequency 440 V, 60 Hz."
3. An extractor fan is fitted above the cooking range. The cooking hood is provided with a three-step controller, lighting and a removable grease filter.
  - a. Capacity approx.: 570 m<sup>3</sup>/hr.

### AIR-CONDITIONING SYSTEM

1. A seawater cooled air conditioning system is installed for the accommodation and the wheelhouse. Fresh air is supplied via ventilation ducts. Recirculation grills are installed for air intake in the air-handling room.
2. In each compartment the quantity of air can be controlled
3. The air-conditioning system is based on an air handling unit and a condensing unit
4. The air handling unit consists of a filter section, cooling section with water elimination and a V-belt driven fan. The unit is built on a common frame.
5. The condensing unit consists of two compressors (each approx. 55% capacity) and a condenser built on a common frame.
6. In the accommodation and wheelhouse, cabin units are placed, providing the conditioned air. Each unit is locally controlled and supply more or less air to the room.
7. Capacities
  - a. Cooling capacity approx. 440.000 BTU/hr.
  - b. Air capacity approx. 8.500 m<sup>3</sup>/hr.
  - c. Voltage: 440 V
  - d. Frequency: 60 Hz
8. "The air-conditioning system in the switchboard room is based on a seawater cooled self-contained system. A dedicated seawater pump is installed below the waterline.
  - a. Air capacity approx.: 3.300 m<sup>3</sup>/hr
  - b. Cooling capacity approx.: 60.000 BTU/hr
  - c. Voltage: 440 V
  - d. Frequency: 60 Hz"

### AIRDUCTS

1. The air inlet ducts for the engine room and accommodation are fitted with aluminum mist eliminators, mounted with stainless steel bolts
2. The outlet air ducts for the engine room are fitted with aluminum air gratings.
3. Outlet air ducts for the accommodation are provided with air gratings, goosenecks or mushrooms



**ANNEX A**  
**TECHNICAL SPECIFICATION**

**BILGE / BALLAST / INTERNAL FI-FI**

1. All watertight compartments are connected with pipes and valves to a bilge system. Foot valves are fitted at different suction points providing an efficient drainage of the watertight compartments. The bilge pumps will pump the bilge water directly overboard.
2. Some compartments in the fore ship are connected to the bilge system with an ejector system.
3. The bilge system is combined with a general service system for firefighting, deck wash purpose, chain wash and black water tank flush
4. The bilge system is provided with two electrically driven bilge pumps, which can be activated locally and from the wheelhouse
  - a. Voltage: three-phaseCapacity: 25 m<sup>3</sup>/hr. at 2.5 bar
5. A bilge water separator is fitted in the engine room for separation of free hydrocarbons from the bilge water. The system is provided with a bilge water monitor.
  - a. Capacity: 0.5 m<sup>3</sup> / hr.
6. The bilge water tank is connected to the bilge water system.
7. The pump has a suction hose and discharge hose that can be fitted to the bilge water tank
8. A bilge water hose is provided in order to discharge pockets of bilge water in the engine room, which cannot be removed by the normal bilge system.
9. The bilge system has a hose connection fitted for this purpose.
10. A portable stripping pump is provided to discharge oily bilge water to a bilge water tank
  - a. Capacity Up to 1.5 m<sup>3</sup>/hr.
11. Bilge / General Service / Internal fi-fi pipes are PVC-C type or its equivalent.
12. An independent diesel-driven fire-fighting pump to be used as an emergency is provided on board. The air-cooled diesel engine is manually started and complete with built-on fuel tank.
  - a. Capacity approx.: up to 60 m<sup>3</sup>/hr.
  - b. Pressure: up to 3.1 bar
13. The hydrants will be connected according to design and class regulation
14. The hydrants will be arranged according to design and class regulation
15. Each hose is stored in a plastic box, mounted at a suitable place near by the hydrant
16. Each hydrant will be:
  - a. Coupling type: NH/NST
  - b. Coupling Diameter: 1.5"

**EXTERNAL FIFI / SALVAGE SYSTEM**

1. The Vessel is provided with an external fire-fighting system. A fire-fighting pump is situated in the bow thruster room and connected with piping to a fire-fighting monitor on the fore deck.
2. The fire-fighting system can be flushed with freshwater via a tap in the bow thruster room.
3. An electrically driven fire-fighting pump is fitted. The pump is started from a control panel near the pump.
4. The pump is provided with a dedicated sea water inlet.
  - a. Capacity approx.: 120 m<sup>3</sup>/hr. at 6bars



## ANNEX A TECHNICAL SPECIFICATION

- b. Electrical capacity: 55 kW
- c. Revolutions: 2900 rpm
- 5. An electrically operated fire-fighting monitor is fitted on the fore deck and controlled from the wheelhouse. Manual control on the monitor is provided as back-up.
  - a. Throw length approx. 50 m

### FIXED INTERNAL FIFI SYSTEM

- 1. The engine room is provided with a fixed gas flooding fire-fighting system.
- 2. The bottle is placed outside the engine room.
- 3. The system is activated from a control box outside the engine room
- 4. When opening the control box, the engine room fan(s) stops automatically, and a warning signal sounds in the engine room.

### COOLING WATER SYSTEMS

- 1. The sea water cooling system pipes are made from PVC-C or CuNiFer (where applicable)
- 2. The freshwater cooling system integrated in the engine layout is a closed system with a built-on freshwater cooling pump. Cooling systems are charged with additives (e.g. corrosion inhibitor protection), all according to the manufacturer's recommendations,
- 3. The seawater cooling system comprises a sea inlet with a strainer, a seawater pump driven by a main engine, a heat exchanger to the closed freshwater cooling system and a discharge overboard. Where necessary, the system is cathodically protected with anodes.
- 4. Each seawater cooling system has a sea inlet with an inlet strainer box. The system is designed for cleaning the strainer while the Vessel is in the water, strainer's material: Stainless steel
- 5. The sea cooling water discharges overboard
- 6. For the cooling water generator engine
  - a. Each generator engine is cooled via an inter-cooling system, comprising a closed freshwater system and an open seawater system
  - b. A heat exchanger is fitted to cool the freshwater system with the seawater system
  - c. Fresh water and seawater pumps are engine driven
  - d. The sea cooling water discharges overboard
- 7. For the cooling water air conditioning
  - a. The air conditioning system is provided with a seawater cooling pump.
  - b. The pump discharges directly overboard at the Vessel's side
  - c. A dedicated seawater inlet for the air-conditioning system of accommodation is provided (near the condenser).
  - d. A seawater back-up is provided via the general service system
- 8. For the cooling water cold/freeze store
  - a. The cold/freeze store system is provided with a seawater cooling pump.
  - b. The pump discharges directly overboard at the Vessel's side

### FRESH WATER SUPPLY SYSTEM

- 1. Fresh and wastewater pipes Copper / PVC-C / hose (where applicable)
- 2. Each filling pipe is mounted at the bridge deck, inspection covers are fitted on the tank



ANNEX A  
TECHNICAL SPECIFICATION

3. The freshwater tanks are connected to a hydrophore, which supplies fresh water to the tap(s).
4. An electrically driven pressure set is fitted for the tap(s), the pump is activated by opening the tap(s):
  - a. Capacity approx.: 4000 l/hr., up to 3.0 barVoltage Single phase  
A second pump, same description as above, is provided.
5. Electrical freshwater heaters are installed. A circulation pump is provided for the hot water system.
  - a. Capacity heater 120 lVoltage Three phase.  
Electrical capacity approx. 5000 W  
Number 2 units  
Hot water is supplied via a water heater(s)
6. A U.V. sterilizer and filter is fitted in the freshwater system, capacity 4080 l/hr.
7. Isolating valves are installed to isolate major hot and cold branches from the system. All freshwater pipes behind carpentry are insulated.
8. Showers are provided in the sanitary spaces in accordance with the General Arrangement Plan.
9. In sanitary space(s) with only a toilet, a cold-water tap is provided at wash basin(s).
10. The pantry/galley is provided with a stainless-steel sink with hot and cold-water tap
11. The Vessel is provided with a Reverse Osmosis type freshwater maker, complete with the necessary filters and inhibitor tank, Capacity approx. 3.800 l/24 hr.

**FUEL OIL SYSTEM**

1. Fuel oil pipes Steel / Steel seamless precision
2. The fuel oil system is designed to comply with the fuel oil type as specified for the engines by the engine manufacturer.
3. Fuel is supplied from the storage tank(s) to the header tank(s). From the header tank(s) the fuel will be supplied via filters and water separators to the engines. The return lines of the engines, if applicable, are connected to the header tank(s).
4. The system is capable of providing a self-contained supply to each engine via the header tank(s). A cross over connection complete with isolating valves is provided between the fuel storage tank(s) and between the header tanks. Fuel suctions are situated at the lowest practical position in the tanks taking due consideration of the Vessel's trim.
5. A water drain is fitted at the bottom of each fuel tank. Each header tank is fitted with a low-level switch with an alarm and a gauge glass. Each header tank is provided with an overflow to a storage tank.
6. In case of an emergency, the fuel oil supply to the engines can be stopped from outside the engine room
7. Each main engine is provided with a built-on duplex fuel oil filter
8. "An electrically driven (three phase) header pump is fitted for the fuel transfer to the header tank.
9. Capacity 2.4 m<sup>3</sup>/h at 2.0 bar"
10. A dynamic non-self-cleaning fuel separator is fitted in the engine room for the fuel transfer to the header tank(s). The capacity must be according to the class standards and the consumption of the fuel oil equipment.

## ANNEX A TECHNICAL SPECIFICATION

11. An assembled static water separator module, comprising multiple units, is fitted in the fuel oil supply line feeding the main- and auxiliary engines. One of the units acts as back-up, the other units combined have a capacity equal to- or exceeding the maximum fuel supply to all connected users. A high-water level alarm is provided and is displayed on the wheelhouse dashboard.
12. The fuel storage tanks are provided with a manual water drain pump. The pump is connected to the dirty oil tank. The fuel drain pump is also connected to several drip trays for drainage.

### LUB-OIL / DIRTY-OIL / SLUDGE SYSTEM

1. Each engine has its own lubrication oil system including pump, filters and coolers incorporated in the engine layout.
- A lubricant reference chart is provided with the following items:
- a. Make and type of oil / grease per equipment  
Content per equipment
- A clean oil tank is provided for the Vessel. The tank can be filled from the main deck. Clean oil can be delivered with an electrical pump through a hose.
- a. Capacity approx. 2000 l/hr up to 3.0 bar
  - b. Two additional loose clean oil storage tanks are provided for the Vessel. Each tank can be filled locally from the main deck. Oil can be delivered with a small can.
- Each main engine is provided with duplex lubrication oil filters
- An electrically driven pump is provided to empty the sump of a main engine or gearbox. The pump can also be used to empty the dirty oil tank to a deck connection. Hoses and hose connections are provided where necessary
- a. Capacity approx. 2400 l/hr. up to 4.0 bar
- The fuel storage tanks are provided with a manual water drain pump.
- The pump is connected to the dirty oil tank.
- The fuel drain pump is also connected to several drip trays for drainage.
- The bow thruster is provided with a lubrication oil system. A tank is placed above the bow thruster and is provided with filling and de-aeration cap

### SANITARY DISCHARGE SYSTEM

1. Sanitary discharge pipe Copper / PVC-C / hose (where applicable)
2. The wastewater system is based on gravity discharge. All grey wastewater drains to the grey water tank. All black wastewater from the toilets is collected in the black water tank. Both tanks are emptied with a pump to a deck connection or directly overboard.
3. The black and grey water tanks are provided with a high-level alarm, displayed on the alarm system
4. The wastewater tank(s) can be emptied with an electric (three phase) pump. A second pump is fitted as stand-by.
  - a. Capacity approx. 6000 l/hr"
5. Toilets are provided in the sanitary spaces in accordance with the General Arrangement Plan.
6. The black wastewater can be pumped from the black water tank into a chemical sewage treatment plant. "The discharge of the plant is directly overboard. The black wastewater will be diluted with seawater before it will be treated by the sewage treatment plant.

### STEERING GEAR SYSTEM

## ANNEX A TECHNICAL SPECIFICATION

1. Two hydraulic steering cylinders are fitted, one for each rudder stock lever, each controlled by a separate hydraulic system at each side
2. Each steering system is powered by a three-phase electrical pump
3. Each steering system is provided with a hydraulic oil tank with a level alarm
4. Between the pump, tank and cylinder, steel precision pipes are installed. High pressure hoses are applied where necessary
5. Both rudders are coupled electronically.
  - a. Control system 24 V
6. For each rudder independently, an (emergency) non-follow-up system is fitted in the navigation area
7. A follow-up tiller is fitted on the flying bridge
8. Rudder position indication, illuminated at night, is displayed at each control station in the wheelhouse. The rudder angle transmitter is connected to a steering lever.
9. Position indication is provided at the aft peak, as per class requirements.
10. In case of hydraulic failure in one of the steering systems (SB or PS), it is possible to sail the Vessel with only one steering system
11. Manual steering through the operating of the hydraulic valves is also possible
12. In case of a total hydraulic or electrical failure, the rudders can be fixed with tackles, steering can be done with both engine controls.

### HYDRAULIC OIL SYSTEM

1. Seamless steel precision pipes are installed between the hydraulic equipment and the pump(s). High pressure hydraulic hoses are applied where necessary. On exposed decks the piping is stainless steel
2. A hydraulic oil system is installed for the power supply of hydraulically driven equipment.
3. The system is equipped with electrically driven pumps, a hydraulic oil circulation tank, fine filters and with the required piping and hoses, based on the capacity of the equipment.
4. The following equipment is driven by this hydraulic system:
  - a. Winch RHIBCrane  
Slipway door  
Stabilizers
5. Hydraulic fine filters are incorporated in the return lines to the circulation tank.
6. An electrically driven hydraulic pump for the hydraulically driven equipment is fitted on the hydraulic oil tank. The pump capacity is based on the largest consumer.
7. The tank is fitted out with at least:
  - a. Hand hole for inspection and cleaning purposes
  - b. Filling opening with filter
  - c. Level indicator(s) and alarm.
8. A sea cooling water system for the cooling of the hydraulic oil is fitted.
9. The system is provided with a separate pump
10. After completion, the complete system (including the filters) shall be flushed.
11. The system will be pressure tested at 1.5 times the nominal working pressure.

### STABILIZER SYSTEM





## ANNEX A TECHNICAL SPECIFICATION

1. A hydraulically driven stabilizer system is provided. On both sides of the hull a steel fin is fitted.
  - a. The system becomes effective at the speed of approx. 12 knots.
  - b. Fin size approx. 3.5 m<sup>2</sup>

### ANCHOR EQUIPMENT

1. The anchor equipment and installation is in accordance with Builder's standards and is in conformity with the requirements of a major Classification Society
2. The characteristics of the anchor with chain are:
  - a. Number installed 02
  - b. Anchor type HHP Pool TW
  - c. The anchor weight 270 kg
  - d. Chain length: 137.5 m
  - e. Chain diameter: 17.5 mm (Grade Q2) galvanized
  - f. A spare anchor is provided, of the same type as described above.
  - g. The anchor is stored in an anchor pocket against the bow, in accordance with the General Arrangement Plan.
  - h. The chain runs via the winch to a chain locker below the fore deck
  - i. The end of the anchor chain is connected to a quick release device, fitted on the deck
3. An electrically operated horizontal anchor winch is fitted on the fore deck. The direction of rotation can be reversed for lowering the anchor. The anchor winch can handle one anchor at a time.
  - a. Max. speed: 11 m/min
  - b. Holding power: 115 kN
  - c. All wearing parts (e.g. Gipsy wheel, brake etc.) are manufactured from mild steel.
4. A chain stopper(s) is fitted for relieving the anchor winch when anchored.
5. The end of the anchor chain is connected to a quick release device, fitted on the deck
6. Capstans aft deck:
  - a. Number: 2
  - b. Fitted on the aft deck in accordance with the General Arrangement PlanThe capstan(s) are electrically operated, foot controlled and provided with overload protection.

Hauling speed Up to 8 m/min  
Pull (approx.) 3000 kg"  
The capstan drum is manufactured from mild steel.
7. Mooring lines are provided with the vessel according to:
  - a. Number: 6
  - b. Diameter approx. 40 mm
  - c. Length 50 m
  - d. Type Braided
  - e. Stowage of the mooring ropes is provided in non-corrosive box(es).
8. The bollards are generally positioned in accordance with the General Arrangement Plan according to:
  - a. The bollards on the aft deck at the transom are based on a S.W.L. of 5.0 ton.
  - b. Double bollards at both sides aft of the superstructure
  - c. Double bollards at both sides of the fore deck





**ANNEX A**  
**TECHNICAL SPECIFICATION**

- d. Double bollards at both sides of the aft deck at the transom
- e. A set of towing equipment is provided with the Vessel. The set is based on the emergency towing of a similar (weight and resistance) vessel at slow speed of maximum 5 knots. The set includes a towing bridle.
- f. The bollards are designed to be used as towing points.

**TENDER / WORKBOAT**

1. A RHIB on the slipway is provided:
  - a. RHIB on the slipway  
A RHIB with diesel / waterjet propulsion is fitted on the slipway.  
Length overall (approx.) 8.7 m  
Speed (2 pers) 45 knots  
Number of seats 6  
The RHIB is equipped with:
    - 6 shock absorbing seats
    - Righting frame + bag
    - Battery with charger
    - Navigation lights
    - Control panel with VHF system, GPS plotter and echo sounder
    - Fuel tank of approx. 300 ltsAn electrically driven pump is fitted for fuel delivery to the daughter craft and/or other vessels.  
A hose and a filling nozzle are provided.  
Capacity approx. 1400 l/hr. at 1.5 bar  
The fuel is stored in a separate tank, not connected to the ship's system  
A slipway fits in the aft ship complete with hydraulically operated stern door and winch to launch and retrieve the RHIB.  
The slipway door is provided with two hydraulic cylinders connected to the central hydraulic system. In case of emergency the cylinders can be manually operated.  
The bottom of the slipway is fitted with hakorite protection.  
The arrangement is designed and tested to operate in sea states 4-6 and at ship speeds of up to 6 knots.  
Depending on the wave pattern/ frequency the heading to the wind may vary from head seas to beam or following seas  
On the aft deck, forward of the slipway, a hydraulically operated winch is provided for handling of the RHIB.  
The winch is horizontally mounted on a pedestal and controlled with a footswitch.
    1. S.W.L. approx. 1700 kg
2. A workboat on the aft is provided:
3. The boat is stored on an aluminum foundation, padded with rubber fendering and will be handled with the deck crane
  - a. Capacity: Minimum 06 persons
  - b. 70hp

**LIFESAVING / FIRE PROTECTION**





## ANNEX A TECHNICAL SPECIFICATION

1. The number and capacities of the life-saving equipment can be altered according to the classification Society or National Authorities concerned and/or optionally to the Buyers' requirements.
  2. The equipment is properly fitted in convenient locations on board of the Vessel.
  3. 21 portable fire - extinguishers are placed around the vessel according to class society (The exact number and type of extinguishers and spares will be according to the applicable regulations).
  4. Six lifebuoys are stored in frames and fitted on the Vessel. Two lifebuoys are equipped with a line, two with a light and two with a smoke signal.
  5. Life jackets for 32 persons and 2 extras are stored in appropriate places. Life jackets are of SOLAS approved type. Life jackets for the crew are of the inflatable type.
  6. Five inflatable life rafts are provided with a capacity of 16 persons. Each raft has a hydrostatic release and is stored on board in accordance with the General Arrangement Plan. Each life raft is marked with the Vessel's name and the homeport.
  7. SOLAS approved immersion suits are provided for the crew.
  8. The following emergency signals are provided:
    - a. Parachute flares: 12 Red
    - Hand flares: 6 Red
    - Smoke markers: 2 Orange
- Four first-aid kits are supplied.  
One fire blanket is stored on board.  
Five fireman's outfits are supplied and stowed on board  
A line throwing appliance is delivered with the Vessel  
A rescue net is provided and can be fitted on both sides of the Vessel.  
The net is stored on board.  
Emergency notices are provided in accordance with the regulations of a Classification Society and the requirements of the National Authority (if applicable). Highly visible escape route arrow/markers are situated at appropriate places

### HOISTING EQUIPMENT

1. A hydraulically operated knuckle boom crane is mounted on the Vessel in accordance with the General Arrangement Plan
  - a. S.W.L. 842 kg at 5.94 m
  - b. S.W.L. based on harbor conditions and hook
  - c. The crane will be type approved as a normal goods crane
2. The knuckle boom crane is provided with a hydraulically driven winch.
  - a. Line pull 1100 kg at 1st layer

### DIVING EQUIPMENT

1. Storage space is provided for diving equipment  
A diving air compressor is installed. An air filter is provided between the intake and the compressor.
  - a. Capacity compressor: 100 l/min
  - b. Voltage: 440 V"
2. Diving air cylinders are stored on board.
  - a. Capacity each: 10 l at approx. 225 bar
  - b. Number: 6







## ANNEX A TECHNICAL SPECIFICATION

### 7. JOINERY / ACCOMMODATION

#### FENDERS

Special attention is given to the arrangement, materials and fastening of the fenders. Fenders are generally positioned in accordance with the General Arrangement Plan.

Fenders are high quality products, selected for durability. The lifespan of the fenders, occurrence of wear / tear and damage is however strongly related to the severity of use. Connection details are optimized to allow relatively easy replacement of damaged sections of the fender.

A hollow rubber fender with a hakorite low friction top side is fitted at the Vessel sides. The fender is fitted between stainless steel flat bars with stainless steel bolts. The fender is fitted at the following location: On main deck level

Dimensions approx.: 200 x 200

The aft part of the Vessel's side is protected with trapezium shaped hakorite fender. The fender is fitted with stainless steel bolts on a strip on the hull.

#### PORTABLE FENDERS

Portable fenders will be supplied with the Vessel and stored on the aft deck / bridge deck in dedicated provisions.

- a. Number: 12
- Size approx. 380 x 1000 mm

#### MARKINGS HULL / SUPERSTRUCTURE

1. For the Pennant number, naval emblem and name
  - a. The pennant number or name will be painted on both sides of the bow and the stern. The home port will be painted on the stern.On the bulwark of the bridge deck, wooden name plates of the Vessel are installed on welding bushes.  
The text "Guardacostas" is painted on both sides of the hull.  
Stripping at both sides of the Vessel is applied as per the Buyer's standard.  
A naval emblem will be fitted on the bow on top of the striping.
2. Permanent hull markings are fitted on the hull indicating the following:
  - a. Positions of the waterline (bead welds)
  - b. Draught marks, spaced at 200 mm (welded)
  - c. Freeboard marks
  - d. Bow thruster marks
  - e. Stripping
3. The international vessel call sign will be painted on the wheelhouse roof. The figures are painted black and will be at least 600 mm in height and 100 mm in width for easy identification by aircraft.
4. A yellow dashed circle of approx. 3600 mm diameter is painted on the bridge deck in front of the wheelhouse indicating the winching area.



## ANNEX A TECHNICAL SPECIFICATION

5. Identification nameplates and labels are fitted at all relevant pipelines, deck equipment, deck fittings, valves etc. On switchboards and dashboards plastic identification name plates and labels are fitted. All doors, lockers and service spaces are provided with nameplates. All nameplates and labels are provided in the Spanish language

### RAILINGS / HANDRAILS / GRIPS

1. All railings on weather decks use aluminum stanchions with aluminum pipes or plastic-coated stainless-steel wires. The railing is removable where necessary.
2. Handrails and grips will be provided wherever necessary to provide adequate safety
3. See the relevant General Arrangement Plan for the layout
  - a. Height of the railing: minimum of 1000 mm  
Diameter of railing pipe: approx. 25/35 mm
4. A railing is fitted all around the aft main deck and the aft side of the bridge deck.
5. Boarding gates are provided in the railing, and closed with plastic-coated stainless-steel wires as indicated on the General Arrangement Plan
6. A shore gangway is provided at the aft deck with the following characteristics:
  - a. The gangway can be moved outboard manually
  - b. Length: 4300 mm  
Width: 610 mm  
Material: AluminumThe gangway is fitted with wheels, stainless steel / aluminum tubular stanchions and plastic-coated stainless-steel wires. The stanchions are removable  
Suitable storage fittings for the gangway are provided.

### STAIR / LADDERS

1. The stairs in the accommodation are covered with rubber steps
2. The following are fitted:
  - a. One steel stairway from the main deck to the wheelhouse  
One steel stairway from the main deck to the lower deck accommodation.  
Three integrated aluminum stairways in the wheelhouse.  
One aluminum stairway from the main deck to the aft bridge deck (outside)  
Three stairways (steps) in front of the wheelhouse (outside).  
One aluminum stairway from the bridge deck to the top deck (outside).
3. Ladders are generally made of steel, fixed with bolts at top and bottom and can be removed, when necessary, the following ladders are fitted:
  - a. A ladder in the aft peak(s)
  - b. A ladder in the engine room
  - c. A ladder in the bow thruster room
  - d. A ladder in the fore peak
  - e. An aluminum escape ladder in the accommodation on main deck
  - f. An aluminum escape ladder in the accommodation lower deck
  - g. An aluminum collapsible embarkation ladder on the transom

### CORROSION PROTECTION / COATING SYSTEM

1. The coating system must consider the following areas:
  - a. Hull below waterline
  - b. Hull above waterline

**ANNEX A**  
**TECHNICAL SPECIFICATION**

- c. Decks
  - d. Railings, bollards, deck equipment.
  - e. Hull inside with paneling
  - f. Hull inside without paneling
  - g. Bilges
  - h. Superstructure outside
  - i. Superstructure inside with paneling
  - j. Superstructure inside without paneling
  2. The estimated color scheme is:
    - a. Hull outside below the waterline: Red (  $\pm$  RAL 3011)
    - b. Hull outside above the waterline: Grey (  $\pm$  RAL 7045)
    - c. Decks: Grey (  $\pm$  RAL 7045)
    - d. Railings, bollards, deck equipment. Black (  $\pm$  RAL 7045)
    - e. Superstructure outside Grey (  $\pm$  RAL 7045)
    - f. Top Deck: Grey (  $\pm$  RAL 7045)
    - g. Mast: Grey (  $\pm$  RAL 7045)
  3. Cathodic anode protection is provided for all hull parts including propellers, shafts, rudders and seawater inlets, etc.:
    - a. In general, the anodes will be bolted to the hull in recessed foundations
    - b. The number and type of anodes are suited for two years operational use in seawater.
    - c. Material anode: Aluminum
- All major underwater and electrical parts are bonded with a cable according to Builder's standards
- An iron anode is installed in the sea-inlet strainers for the connected CuNiFer piping system, the capacity of the anode is sufficient for approx. one year
- An impressed current anti-fouling system is installed in the sea-inlet strainers, except for CuNiFer/Copper piping system:
- a. The capacity of the anode is sufficient for approx. one year
- The seawater inlet for the water maker(s) is not provided with ICAF protection
- The voltage setting (activity) of the system is the responsibility of the crew and influences the consumption of the anode(s) significantly.

## INSULATION

1. The choice and application method of the insulation materials (fire, sound and thermal, as far as applicable) will be applied in accordance with Builder's standards and the regulation of the Classification Society
- To reduce sound levels, the following measures are taken:
- a. The wheelhouse, mess room, officer's mess and cabins are provided with an acoustic ceiling.
- Engines are resiliently mounted.
- Floating floor in the accommodation.
- Sound absorbing material i.w.o. the engine room inlet ducts
- Main and generator engines are provided with resiliently mounted and water cooled exhausts.
- Silencers are fitted in generator engine exhaust gas lines.
- Silencers are fitted in with main engine exhaust gas lines.
- Thermal insulation is fitted over the frames. Vapor barriers are provided where necessary.
- a. Insulation is placed at the following locations:

All exposed decks in the wheelhouse.



## ANNEX A TECHNICAL SPECIFICATION

All exposed decks in the accommodation.

The sides, front and aft bulkheads below the windows in the wheelhouse.

The sides, front and aft bulkheads of the deckhouse.

The sides in the lower deck accommodation.

The exposed deck of the main deck forward service compartment.

Thickness Approx. 50 mm.

The fire insulation types will be in accordance with the Classification requirements as far as appropriate. Insulation is placed at the following locations:

a. Deck between the switchboard room and the accommodation. (A-60)

Bulkhead between the switchboard room and the accommodation. (A-60)

Bulkhead between the galley and the accommodation. (A-0)

Around engine inlet ducts up to the fire flaps. (A-60)

Around inside staircases. (B-15)

Deck and bulkhead between wheelhouse and galley. (A-60)

Thickness A60 deck Approx. 50 mm.

Thickness A60 bulkhead Approx. 50 mm.

### WINDOWS

1. All wheelhouse windows are manufactured with toughened glass
2. Wheelhouse door windows are grey tinted
3. Solar screens of the rolling type are fitted to all the wheelhouse windows, excluding doors
4. Window thickness
  - a. 10 mm for the wheelhouse front window
  - 8 mm for the wheelhouse side windows
  - 6 mm for the wheelhouse aft / door windows
  - 10 mm for the deck house scuttles
5. The wheelhouse is provided with three access doors and is provided with the following windows:
  - a. Three windows at the front
  - Three windows at each side
  - Four windows at the back
  - One in each access door at the side
  - Two in the aft access door
6. Electrical (24V) pantograph window wipers are fitted on all front wheelhouse windows and most forward side wheelhouse windows.
  - a. The window wipers will be controlled in groups. The wipers in each group will be synchronized
  - b. The windows with window wiper(s) are provided with washing nozzles. The water is supplied by a separate tank and offers the possibility of adding additives to the system. The tank has to be filled manually.

### JOINERY WHEELHOUSE

1. Floor: Vinyl based covering
2. Lining: Marine quality plywood, plastic coated on one side and a backing board on the other side.
3. Lining i.w.o. windows Vinyl-based covering
4. Ceiling Sound absorbing system

**ANNEX A**  
**TECHNICAL SPECIFICATION**

5. Thickness lining approx. 20 mm"
6. In the front of the wheelhouse the navigation area is provided:
  - a. comprising of three large screens and two inter-chair consoles.
  - b. Navigation area: 3 seats
  - c. All seats are provided with height adjustment and motion damping.
7. The aft part of the wheelhouse is provided with two consoles, one Engineer's Console and one Operations Console:
  - a. comprising of three large screens and two inter-chair consoles.
  - b. Engineer's console: 1 seat
  - c. Operations console: 1 seat
  - d. All seats are provided with height adjustment and motion damping.
8. Space reservation is made for three operating consoles and chairs in accordance with the General Arrangement plan. These consoles and chairs are not part of the scope of supply and no other provisions are included in the design.
9. The wheelhouse is provided with a chart table with drawer and desk light.
10. The wheelhouse is provided with lockers as indicated on the General Arrangement Plan
11. Time clock diam. 4".
12. 5 units 7x50 binoculars, one stored in a binocular box
13. "A night vision system is fitted in the mast or on the top deck and is displayed in the wheelhouse. The system is equipped with a Long Wave Infra-Red sensor with 4x optical zoom and an HD Day/Low light system. The system is fitted with video tracking.
  - a. Field of View 25° to 6° (LWIR)Make Current (or equivalent)  
Type Night navigator 3025 VT"

**FLYING BRIDGE**

1. A flying bridge is situated at the top of the wheelhouse. Polycarbonate wind screens are fitted at the front and the sides
2. The flying bridge is provided with a console with control and monitoring equipment.
3. The console is provided with the following equipment:
  - a. Engine, gearbox and steering controlBow thruster control  
Conning screen  
Remote control station of one VHF  
Intercom with talkback  
Seat for the helmsman  
24V socket

**COMMUNICATIONS AND CONTROL CONSOLE**

1. Two 19" TFT screen
2. GMDSS equipment (if not fitted in the front console)
3. Several emergency switches
4. Stabilizer Control panel
5. A CCTV system is provided for the engine room and deck observation.
6. The screen of the engineering console is connected to the following color cameras:
  - a. Engine room (2x)
  - b. Aft peak (2x)
  - c. Ammunition store



## ANNEX A TECHNICAL SPECIFICATION

7. The screen of the navigation console is connected to the following color cameras:
  - a. Aft deck (fitted in the mast)
  - b. Fore deck (fitted in the mast)
  - c. Port and starboard deck (fitted in the mast)
8. Navigation panels (if not fitted in the other consoles)
9. One 24" TFT screen. This screen presents:
  - a. X-band navigation radar (slave) or
  - b. S-band navigation radar (slave) or
  - c. ECDIS or
  - d. Night Vision Camera

### JOINERY

1. The layout of the accommodation and wheelhouse is shown on the relevant General Arrangement Plan.
2. The accommodation must include:
  - a. Settees are upholstered with heavy duty artificial leather. Underneath settees store facilities are made accessible via the seats. Chairs are fitted with armrests and are provided with secure facilities for sailing in sea conditions. Chairs are marine type with chromium plated steel frames and with heavy duty artificial leather
  - b. Bunks are delivered with mattresses.
  - c. Drawers are fitted under bunks wherever possible
  - d. Writing desks are fitted as indicated on the General Arrangement Plan.
  - e. Above the desk a reading lamp and a bookrack is fitted
  - f. Floor: Synthetic floor in sanitary spaces and galley Vinyl based covering in other areas
  - g. Lining: Marine quality plywood, plastic coated on one side and a backing board on the other side.
  - h. Partition walls Marine quality plywood, plastic coated on one side and a backing board on the other side.
  - i. Furniture Marine quality plywood, plastic coated on both sides.
  - j. Ceiling Sound absorbing system in mess room, officer's room and cabins. Marine quality plywood, plastic coated on one side and a backing board on the other side for the other areas.
  - k. Each clothing locker is provided with 3 coat hangers, a shelf and sufficient ventilation facilities. Doors are fitted with hinges, which can fix the door in an open position. Doors have a lock with key.
  - l. Inspection panels are fitted at appropriate places in the joinery for inspection of equipment, pipe couplings, voids, etc.
3. For the interior doors:
  - a. They are generally made of steel. Interior doors forming part of a fire protected bulkhead have as a minimum the same fire protection classification as the bulkhead and are provided with a door closer. Gratings for free air flow are fitted where necessary.
  - b. Door locks, door handles, clamps and door hooks are made from chrome-plated brass. The other inside doors are fitted with hold back hooks as far as is allowed by the Classification Society. Each cabin door is provided with a lock. Doors of sanitary spaces are provided with "free/occupied" locks.
  - c. Number of keys per lock 3







ANNEX A  
TECHNICAL SPECIFICATION

- d. Number of master keys 3
- 4. A cabin for the commander is provided, comprising:
  - a. A single bunk with mattress and with drawers
  - b. If berths are provided above each other, curtains alongside the berths are provided where possible.
  - c. For each berth the following linen is provided:
    - 1. A pillow
    - 2. An eiderdown
    - Two sets of bed linen
    - Two towels
  - d. Two clothing lockers with key lock
  - e. Writing desk with chair
  - f. Bookshelf above the desk
- 5. Officer's cabins, each with the capacity of one officer, are provided, each comprising:
  - a. Number of single cabins: 1
  - b. One bunk with mattress and with drawers
  - c. If berths are provided above each other, curtains alongside the berths are provided where possible.
  - d. For each berth the following linen is provided:
    - 1. A pillow
    - 2. An eiderdown
    - Two sets of bed linen
    - Two towels
  - e. Two clothing lockers with key lock
  - f. Writing desk with chair
  - g. Bookshelf above the desk
  - h. A dustbin
  - i. A double-clothes hook
  - j. A double towel hook
  - k. A noticeboard
  - l. A clock Ø 4"
- 6. Officer's cabins, each with a capacity of two officers, are provided, each comprised:
  - a. Number of double cabins: 3
  - b. Two bunks each with mattress and the lower bunk with drawers
  - c. with key lock
  - d. If berths are provided above each other, curtains alongside the berths are provided where possible.
  - e. For each berth the following linen is provided:
    - 1. A pillow
    - 2. An eiderdown
    - Two sets of bed linen
    - Two towels
  - f. A clothing locker with key lock for each person
  - g. Writing desk with chair
  - h. Bookshelf above the desk
  - i. A dustbin
  - j. A double clothes hook for each person
  - k. A double towel hook for each person
- 7. Crew cabins, each for three crew, are provided, each comprising:
  - a. Number of triple cabins: 6





ANNEX A  
TECHNICAL SPECIFICATION

- b. Three bunks, each with mattress and the lower bunk with drawers
- c. If berths are provided above each other, curtains alongside the berths are provided where possible.
- d. For each berth the following linen is provided:
  - 1. A pillow
  - 2. An eiderdown
  - Two sets of bed linen
  - Two towels
- e. A clothing locker with key lock for each person
- f. Writing desk with chair
- g. Bookshelf above the desk
- h. A dustbin
- i. A double clothes hook for each person
- j. A towel hook for each person
- 8. One crew cabin for multiple crew, is provided, comprising:
  - a. Number of in multiple dormitory cabin 6
  - b. One bunk for each person, each with mattress and the lower bunks with drawers with key lock
  - c. Clothing lockers with key lock.
  - d. For each berth the following linen is provided:
    - 1. A pillow
    - 2. An eiderdown
    - Two sets of bed linen
    - Two towels
- 9. If berths are provided above each other, curtains alongside the berths are provided where possible.
- 10. An officers' mess is located on the main deck in accordance with the General Arrangement Plan. The officers' mess is provided with:
  - a. Two dining tables, each with four chairs
  - b. A cupboard.
- 11. A mess room is located on the main deck in accordance with the General Arrangement Plan. The mess room is provided with:
  - a. Two dining tables with eight chairs
  - b. large settee with two tables
  - c. One small locker
- 12. A nursery is fitted as indicated on the General Arrangement Plan. The room is fitted with a double door entrance from the mess for casualties and a standard door from the corridor. The room is provided with:
  - a. One double bunk, each with a mattress and the lower bunk with drawers with key lock
  - b. A clothing locker with key lock for each person.
  - c. A dustbin.
  - d. A double clothes hook.
- 13. In the accommodation a galley is installed in accordance with the General Arrangement Plan:
  - a. A stainless-steel work top with double sink
  - b. Cupboard underneath the sink
  - c. A cooker with six plates and fiddle (pan fixation)
  - d. Two stainless steel refrigerators, capacity approx 385 l
  - e. A stainless-steel freezer underneath worktop, capacity approx 100 l





## ANNEX A TECHNICAL SPECIFICATION

- f. A stainless-steel oven, capacity approx. 1500 W
- g. A stainless-steel microwave, capacity approx. 900 W
- h. A toaster
- i. Dish washer
- j. An ice-cube maker
- k. The galley is provided with crockery, cutlery and basic kitchen utensils based on the number of crew
- l. The galley is provided with crockery, cutlery and basic kitchen utensils based on the number of crew
- m. The main deck forward store is equipped with three freezers in accordance with the General Arrangement Plan, capacity approx. 220 l each
- n. The galley has a service hatch with roller shutter to the mess room.
- o. The service hatch has the same fire rating as the surrounding bulkhead.

The Vessel is provided with cleaning equipment

Two garbage containers are provided as indicated on General Arrangement Plan:

- a. Capacity 120-liter (each) Color Black

The garbage containers are provided with: Lid and Synthetic wheels.

Tools are supplied with the main equipment.

Two garbage containers are provided as indicated on the General Arrangement Plan:

- a. Capacity 120-liter (each) Color Black

The garbage containers are provided with: Lid and Synthetic wheels.

Standard tools:

- a. Tools are supplied with the main equipment.

Standard tool set from engine manufacturer(s)

- 1. 1 grease gun with a set of required heads
- 1 propeller nut spanner
- 1 propeller-pulling device
- 1 industrial scale

- b. A work bench with a wooden top and a 5" vice is installed in a technical space.

- c. A washbasin is fitted.

- d. A service kit is provided for the replacement of small parts, when damaged, and for the fitting of replacements parts in a proper way, to reduce the risk of consequential damage to a minimum. This kit can be used for 1st line maintenance by the Buyer.

An international code flags set is provided on the Vessel. The flags are fitted in a locker with separate compartments on the bridge.

Watertight covers are provided for:

- a. Anchor winch

Fire monitor(s)

Workboat

Console and seats of the slipway RHIB

Deck crane

Search light(s)

Bearing repeater

### COLD STORE / FREEZING ROOM SYSTEM

- 1. The Vessel is provided with a cold store as indicated on the General Arrangement Plan:
  - a. Volume approx. 3.5 m<sup>3</sup>
  - b. Minimum temperature 5 °C
- 2. A freeze store is installed in accordance with the General arrangement Plan:







ANNEX A  
TECHNICAL SPECIFICATION

- a. Volume approx. 4.5 m<sup>3</sup>
- b. Minimum temperature -18 °C

LAUNDRY

1. Laundry is provided as indicated on the General Arrangement Plan. The laundry is equipped with:
  - a. Two 8kg capacity washing machines
  - b. Two 8kg tumble dryers (condenser type)
  - c. The washing machine and tumble dryer are of a domestic type

STORES / WORKSHOPS

1. Stores are fitted as indicated on the General Arrangement Plan and are provided with shelves.
2. Stores are fitted at the following locations:
  - a. Aft peak
  - b. Lower deck accommodation
  - c. Service compartment
  - d. Boatswain store
  - e. Store on the aft deck
  - f. Dry store:
    - g. Two 8kg capacity washing machines
    - h. Two 8kg tumble dryers (condenser type)
    - i. The washing machine and tumble dryer are of a domestic type
3. A space for wet gear is fitted in accordance with the General Arrangement Plan.
  - a. The space is provided with clothes hanging area and wooden shelves

Responsabilidad	Nombre	Código de Operador de compras públicas y fecha de caducidad	Firma de Responsabilidad
Aprueba -Jefe de Proyecto Enc.	Ing. Stefano Costa Crespo	Código: O7E332w1F4 Fecha de caducidad: 08 de febrero 2027	

