

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)  
COMISION EJECUTIVA PORTUARIA AUTONOMA (CEPA)

THE DETAILED DESIGN  
ON  
PORT REACTIVATION PROJECT IN LA UNION PROVINCE  
OF  
THE REPUBLIC OF EL SALVADOR

FINAL REPORT

(DRAFT) BIDDING DOCUMENTS

Package C: Procurement of Floating Equipment

VOLUME II-C

Part I: *Bill of Quantities*

Part II: *Specifications for Tugboat*

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OCTOBER 2002

NIPPON KOEI CO., LTD.

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PORT REACTIVATION PROJECT IN LA UNION PROVINCE

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Package C: Procurement of Floating

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***FINAL REPORT***

**(DRAFT) BIDDING DOCUMENTS**

Package C: Procurement of Floating Equipment

***VOLUME II-C***

***Part I: Bills of Quantities***

***Part II: Specifications for Tugboat***

**OCTOBER 2002**

**NIPPON KOEI CO., LTD.**



1169693[7]

# LA UNION PORT DEVELOPMENT PROJECT

## Bidding Documents for Package C: Procurement of Floating Equipment

### Volume II-C

#### Part I: Bill of Quantities

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## PART I: BILL OF QUANTITIES

### A. Preamble

#### 1. General

- 1.1 The Bill of Quantities shall be read in conjunction with the Instructions to Bidders, Conditions of Contract (Part-I: General Conditions of Contract, and Part-II: Special Conditions), and Specifications.
- 1.2 The whole cost of complying with the provisions of the Contract shall be included in the items provided in the priced Bill of Quantities, and where no items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related pay items of the Goods.
- 1.3 General descriptions of the Goods are not necessarily repeated nor summarized in the Bill of Quantities. References to the relevant sections of the Contract Documents shall be made before entering prices against each item in the priced Bill of Quantities.
- 1.4 The Bidder shall sign all the pages of Part I: "Bill of Quantities" and this forms an integral part of the Bid and Contract Documents.

#### 2. Rates and Sums

- 2.1 The unit rates and prices of the Goods as entered in the priced Bill of Quantities shall, except insofar as it is otherwise provided under the Contract, include all shipbuilding yard, official sea trial, sea/land transportation, demonstration trial at site, insurance, foreign taxes and duties, profit and overhead, together with all general risks, liabilities, and obligations set out or implied in the Contract.

The prices of the Purchaser's and Engineer's attendance to tests and trials and the prices of training of the Purchaser's personnel shall be entered separately from the prices of the Goods.

- 2.2 A rate or price shall be entered against each item in the priced Bill of Quantities, whether quantities are stated or not. The cost of items against which the Supplier has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.
- 2.3 All prices shall be stated in the currencies stipulated in Clause 15 of the Instructions to Bidders.
- 2.4 All prices quoted by the Bidder shall remain fixed and valid until completion of the Contract execution. Price adjustment will not be applicable, except in the cases of any change in price resulting from variation orders.

#### 3. Provisional Item

- 3.1 The cost of optional spare parts proposed by the Bidder for the Plant to be supplied under the Contract, as prescribed in the Specifications, shall be filled in Item 04 of the Bill of Quantities. This is a Provisional Item and its use in whole or in part will be decided by the Purchaser at his own discretion.

#### **4. Taxes and Duties**

- 4.1 The unit rates and prices entered on the Bill of Quantities shall be deemed as inclusive of all foreign taxes and duties but exclusive of local taxes and duties. The amounts of taxes and duties payable in the Republic of El Salvador, including but not limited to IVA (Impuesto al Valor Agregado), goods and services tax, withholding tax, municipal tax, business tax, income tax, customs duty, import duty and others, shall be indicated in the appropriate columns in B.(1) Summary of Bid Price and B.(4) Breakdown of Taxes and Duties in the Bill of Quantities.
- 4.2 Exemption of some tax and duty categories may be granted as mentioned in Sub-Clause 26.2 of the Special Conditions of Contract. However, it remains the sole responsibility of the Bidder to make sure of all local taxes and duties imposable on him under the Contract so as to calculate the amounts of such taxes and duties properly in his Bid.

#### **5. Insurance**

- 5.1 The unit rates and prices entered in the Bill of Quantities shall be deemed as inclusive of the cost of all kinds of insurance, including third party liability insurance, as prescribed in Clause 10 of the Conditions of Contract.

#### **6. Errors**

- 6.1 Any arithmetic errors in computation or summation will be corrected by the Purchaser as follows:
- (a) where there is a discrepancy between amounts in figures and in words, the amount in words will govern;
  - (b) where there is a discrepancy between the unit rate and the total amount derived from the multiplication of the unit price and the quantity, the unit rate as quoted will govern, unless in the opinion of the Purchaser, there is an obviously gross misplacement of the decimal point in the unit price, in which event the total amount as quoted will govern and the unit rate will be corrected; and
  - (c) where there is a discrepancy between the total amount and the sum of the total price per item, the sum of total price per item will govern and the total amount will be corrected.

# ***Bill of Quantities***

**LA UNION PORT DEVELOPMENT PROJECT**  
**PACKAGE C: PROCUREMENT OF FLOATING EQUIPMENT**  
**VOLUME II-C - PART I: BILL OF QUANTITIES**  
**B.(1) SUMMARY OF BID PRICE**

No.	Description	Foreign Currency (US\$)	Local Currency (US\$)	Total (US\$)
01	Design, building, official sea trial, delivery to site, and demonstration trial of two (2) units of steel-hulled twin screw type tugboats in accordance with the Specifications, including all equipment, compulsory parts for 2-year operation, tools, and ancillaries			
02	Cost of Purchaser and Engineer's attendance to tests and trials as specified in Section 10012 of the Specifications			
03	Cost of training of the Purchaser's personnel on operation and maintenance of the tugboats as specified in Section 10017 of the Specifications			
04	TOTAL COST OF PLANT, INSPECTION AND TRAINING (01+02+03)			
05	Provisional item: Supply of optional spare parts as specified in Sub-Sections 30019.4, 40009.4 and 50009.4 of the Specifications			
06	LOCAL TAXES AND DUTIES			
07	TOTAL BID PRICE (04+05+06)			

Signature of Bidder: \_\_\_\_\_



**PART I: BILL OF QUANTITIES**  
**B.(2) BREAKDOWN OF BID PRICE**

No.	Description	Quantity	Foreign Currency (US\$)			Local Currency (US\$)			Total (US\$)
			Unit Price CIF Port of Entry	Total CIF Cost	Miscellaneous Costs *	Unit Price Ex-factory	Total Ex-factory Cost	Miscellaneous Costs *	
01	a) Design and building of steel-hulled twin screw type tugboats, including all equipment, tools, and ancillaries, in accordance with Section 10002 of the Specifications  b) Classification and registration of the vessels as specified in Section 10004 of the Specifications  c) Design verification and vessel inspection by Classification Society as specified in Section 10008 of the Specifications  d) Official sea trials as specified in Sub-Sections 10012.2 and 10012.3 of the Specifications  e) Delivery to site and demonstration trial as specified in Sections 10013 and 10014 of the Specifications	2 vessels							
<b>Total of Item 01</b>									

**Note:**

\* Miscellaneous costs include inland transportation, insurance, demonstration trial, etc.

Signature of Bidder: \_\_\_\_\_

No.	Description	Quantity	Foreign Currency (US\$)		Local Currency (US\$)		Total (US\$)
			Unit Price	Amount	Unit Price	Amount	
02	Cost of Purchaser and Engineer's attendance to tests and trials as specified in Section 10012 of the Specifications a) Transportation cost for 1st - 7th inspections ..... ..... ..... b) Accommodation cost for 1st - 7th inspections ..... ..... ..... c) Communication and other costs for 1st - 7th inspections ..... ..... .....						
<b>Total of Item 02</b>							

Signature of Bidder: \_\_\_\_\_

No.	Description	Quantity	Foreign Currency (US\$)		Local Currency (US\$)		Total (US\$)
			Unit Price	Amount	Unit Price	Amount	
03	Cost of training of the Purchaser's personnel on operation and maintenance of the tugboats as specified in Section 10017 of the Specifications						
	a) .....						
	b) .....						
	c) .....						
<b>Total of Item 03</b>							

Signature of Bidder: \_\_\_\_\_

**PART I: BILL OF QUANTITIES**  
**B.(3) BREAKDOWN OF OPTIONAL SPARE PARTS**

No.	Spare Parts	Part Code No. (if applicable)	Description	Quantity	Cost	
					F.C. (US\$)	L.C. (US\$)
04	Supply of optional spare parts as specified in Section 10006 of the Specifications: a) Hull outfitting (Sub-Section 30019.4) - Tow line for bow operation      1 set - ..... - ..... b) Machinery (Sub-Section 40009.4) - ..... - ..... c) Electrical equipment - ..... - .....					
<b>Total of Item 04</b>						

Signature of Bidder: \_\_\_\_\_

**PART I: BILL OF QUANTITIES**  
**B.(4) BREAKDOWN OF TAXES AND DUTIES PAYABLE IN EL SALVADOR**

No. (1)	Description (2)	Amount of Taxes and Duties (US\$)						Total (9)=(3+4+5+...)
		IVA (3)	Municipal Tax (4)	Customs Duty (5)	Business Income Tax (6)	.....*/ (7)	.....*/ (8)	
01	Tugboats ..... .....							
02	Attendance to tests and trials ..... .....							
03	Training of Purchaser's personnel ..... .....							
05	Optional spare parts ..... .....							
TOTAL								

Note: \*/ Add other taxes, duties or levies, if any, to those mentioned in columns (3) to (6) above

Signature of Bidder: \_\_\_\_\_

# LA UNION PORT DEVELOPMENT PROJECT

## Bidding Documents for Package C: Procurement of Floating Equipment

### Volume II-C

#### Part II: Specifications for Tugboat

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## ABBREVIATIONS

LOA	Length overall
LPP	Length between Perpendiculars
FP	Fore Perpendicular
AP	Aft Perpendicular
Breadth (MLD)	Breadth Moulded
Depth (MLD)	Depth Moulded
BL	Base Line
N° on BL	Transverse Frame N°
Bozn St	Boatswain Store
CL	Chain Locker
☐	Bollard
MP	Mooring Pipe
FL	Fair Leader
CT	Chart Table
C/S	Conjtrol Stand
LR	Life Raft (Inflatable)
R/B	Reefer Box
RG	Rope guard
H	Hatch
A/C	Air Conditioned
LKR	Locker
LWL	Low Water Level
CL	Center Line
D	downstair
U	upperstair
C/E	Chief Engineer
CAP	Capitan
1/E	1 <sup>st</sup> Engineer
C/O	Chief Officer
RM	room
SD	Sliding door
WR	Wardrobe
De	writing deck
S	sofa
☐	sinking galley
WB	wash basin
W/M	washing machine
T	table
TV	television
WBT	Water Ballast Tank
FOT	Fuel Oil Tank
LOT	Lube oil Tank
FWT	Fresh Water Tank
Coff	cofferdam
Foam LT	Foam Liquid Tank
Oil Disp.LT	Oil Dispersant Liquid Tank
FW	Fresh Water
Exp Tk.	Expansion Tank
CFWP	Cooling Fresh Water Pump
CSWP	Cooling Sea Water Pump
FWP	Fresh Water Pump

SWP	Sea Water Pump
LOP	Lube Oil Pump
GS	General Service
GSP	General Service Pump
Lo Cooler	Lube oil cooler
FO Serv T	Fuel Oil Service Tank
FO Trans P	Fuel Oil Transfer Pump
Lo Sump T	Lube oil Sump Pump
M/E	Main Engine
G/E	Generator Engine
S/B	Stand By
OJT	On the Job Training
JIS	Japanese Industrial Standards
JEM	Standard Japanese Electrical Manufacturers'
NUC	Not Under Command
IMO	International Maritime Organization
MCR	Maximum Continuous Rating
ACB	Air Circuit Breaker
CRT	Cathodic Ray Tube
GPS	Global Positioning System
VHF	Very High Frecuency
SUS	Saybolt Universal Seconds
WT	watertight
ER	Engine Room
Mess R R & Pass R	Mess Room & Passenger' Room
kW	kilowatt
PS	Metric horsepower
MT	Metric ton
m	meter
rpm	revolution per minute
kn	knots
kN	kilonewton
° C	Celsius (Centigrate) degree
kg	kilogramo
MPa	Mega Pascal
tonf	ton force
l	liter
h	hour
N.M.	Nautic Mile
V	volt
A	ampere
W	watt
Hz	hertz
Ah	ampere hour
AC	Altern Current
DC	Direct Current
CO <sub>2</sub>	Carbon bioxide
SA 2 ½	J I S symbol for primary surface preparation
Tons	Gross tonnage
dia	diameter

**SECTION 10000 GENERAL**

**10001  
General  
Description**

The vessel shall be designed and built as steel-hulled twin screw tugboat equipped with twin diesel propulsion engines totaling 2,646 kW (3,600 Ps) and two 360 degrees steerable propeller units to engage in mooring of ships by pushing or pulling, to escort ships in the navigation channel, and also to tow ships in general.

The vessel shall have suitable towing or pushing force, stability and maneuverability for the purpose intended, and shall have suitable strength and arrangement.

The vessel shall be of flush deck type with raised deck at the stern and lower forecastle (f'cle), raked stem and transom stern, having a deckhouse amid the ship as shown on the General Arrangement plan.

The vessel shall be divided by four (4) watertight bulkheads under the upper deck into a void space, a bosn's store and chain locker, a general store, an engine room and a propelling gear room.

The crew's cabin, mess and passenger room, galley, lavatory and air conditioning space shall be arranged in the accommodation space on the upper deck. The exposed upper deck shall be equipped with towing and mooring gears, windlass and rope winch on the upper deck forward and towing hook aft of the deck house on the upper deck.

A towing beam and ventilator to the propelling gear room shall be provided on the raised upper deck at the stern.

The officer's cabin shall be arranged in the accommodation space on the bridge deck.

A tow line reel winch, two ventilators to the engine room and two inflatable life rafts shall be provided on the bridge deck.

The wheelhouse shall be arranged on the navigation bridge deck, and fire monitor, searchlight, speaker, etc. shall be provided on the wheelhouse top. A radar mast with fire monitor on the top shall be provided aft of the wheelhouse on the navigation bridge.

**10002  
Principal  
Particulars**

<b>10002.1 Principal Dimensions</b>		
Length overall (except fender)		33.50 m
Length, between perpendiculars		29.00 m
Breadth, moulded		9.40 m
Depth, moulded		4.00 m
Designed loaded draft, moulded		3.10 m
Normal trim		1.00 m
Sheer at Fore Perpendicular (F.P.)		1.00 m
Sheer at Aft Perpendicular (A.P.)		0.35 m
Camber of deck in full breadth of the vessel		0.15 m
<b>Deck Height</b>		
Superstructure	Lower f'cle deck at F.P.	1.00 m
	Raised deck at the stern	0.80 m
Deck House	Upper deck - Bridge deck	

forward & aft	2.35 m
Top of the bridge deck has no sheer	
Bridge deck - Nav. bridge deck	2.35 m
Nav. Bridge deck - Wheelhouse top	2.30 m

**10002.2 Gross Tonnage (International)**

about 280 Tons.

**10002.3 Dead Weight**

about 135 MT

**10002.4 Tank Capacities (approximately)**

Fuel oil tank	80 m <sup>3</sup>
Fresh water tank	25 m <sup>3</sup>
Water ballast tank	30 m <sup>3</sup>
Lubricant oil tank	6 m <sup>3</sup>
Foam liquid tank	4 m <sup>3</sup>
Oil dispersant tank	4 m <sup>3</sup>

**10002.5 Main Engines**

No. of set: Two (2) sets  
Diesel engine, vertical, single acting, 4 cycle, trunk piston, direct injection, non reversible, with turbo charger and charged air cooler.

Output/set: 1,323 kW (1,800 PS) in the range of 720 rpm - 1,000 rpm.

**10002.6 Speed & Endurance**

Trial speed: Maximum free running speed at draft corresponding to half loaded condition at maximum continuous rating of main engines with wind force not exceeding Beaufort 2: 13.25 knots.

Service speed: On fully loaded condition at 85% rated output of main engines with 15% sea margin. 12.5 knots.

Endurance: About 1,800 nautical miles based on the total fuel oil tank capacity and sea speed of 12.5 knots.

**10002.7 Service Limitation**

Coasting service.

**10002.8 Bollard Pull**

Mean maximum bollard pull on sea trial condition at maximum continuous output of main engines. 441 kN (45 tonf) ahead (100% MCR).

**10002.9 Complement**

Officer (1B x 4)	4 persons
Crews member (2B x 1)	2 persons
Crew total	6 persons
Passenger	12 persons
Total	18 persons

**10003  
Materials and  
Workmanship**

All materials and equipment to be used for the construction shall be new. The vessel shall be constructed throughout of mild steel plates and sections as required by the Classification Society.

All steel plates and profiles shall be shot-blasted to SA 2 ½ and primed with an approved composition before fabrication.

All workmanship shall be to first class commercial shipbuilding standards, and shall be to the satisfaction of the Purchaser and the Engineer.

**10004  
Rules and  
Regulations**

The vessel, including its hull, machinery and equipment shall be built in accordance with international standards as applied by Classification Societies, such as Nippon Kaiji Kyokai (NK), Lloyd's Register of Shipping (LR), American Bureau of Shipping (ABS) and Bureau Veritas (BV), and registered under the symbols of NS \* (coasting service) Tug, MNS\* or equivalent symbols.

If rules are changed during construction, the Suppliers are to carry out work necessary to meet the new requirements. The Purchaser is to pay the additional expenses.

The vessel shall be registered under the flag of the Republic of El Salvador.

The vessel shall be designed and constructed according to the following rules and regulation:

- Rules and regulations of the Republic de El Salvador
- International Convention of Tonnage Measurement of Ship, 1969
- International Regulation for Preventing Collision at Sea, 1972

**10005  
Certificates**

The Supplier shall provide all the certificates required by the Republic of El Salvador for the operation of the vessel.

**10006  
Stability and  
Trim**

The vessel shall have enough stability and freeboard as a tugboat and as required by Classification Societies. The calculation sheets of each condition based on the result of the inclining experiment shall be submitted to the Engineer.

**10007  
Standards and  
Units**

Standards to be used are first class ones such as JIS, ISO, as far as approved by the aforementioned authorities. Measuring units of the metric system shall be applied:

- Volume            m<sup>3</sup> or liters
- Weight            kg
- Pressure          bar
- Temperature     ° C

Where applicable, all appropriate parts shall be in accordance with Constructor's Standards, which shall be always available to the Engineer upon his request before and after signing of the Contract.

All drawings and documents shall be in the English language. All name plates, and caution plates shall be written both in the English and Spanish languages.

**10008  
Appointment of  
the  
Classification  
Society**

The Purchaser will entrust the Engineer's tasks of design verification and vessel inspection to a Classification Society.

The Supplier may propose to the Purchaser a Classification Society that has classified the vessel or another who will check and approve the design drawings and inspect the vessel based on the Technical Specifications on behalf of the Purchaser, if the Purchaser approves that Classification Society.

All cost for the above mentioned work shall be borne by the Supplier.



**10009  
Drawings, Plans,  
Manuals and  
Lists**

**10009.1 Drawings for Approval**

The drawings required by the regulations of the Classification Society shall be submitted by the Supplier to the Classification Society as early as possible for its approval before commencement of the work.

In addition to the drawings mentioned above, three (3) copies of each drawing and plan required by the Purchaser for approval shall be submitted to the nominated Classification Society and one (1) copy of each drawing and plan shall be returned to the Supplier and the Engineer with approval or comments, if any, by the Classification Society.

**10009.2 Framed Plans**

The following plans shall be displayed in the accommodation quarter:

- General Arrangement Plan
- Engine Room Piping Arrangement
- Bilge and Ballast Piping System
- Firefighting and Safety Plan

**10009.3 Finished Drawings**

Upon delivery of the vessel, two (2) copies of each of the finished drawings, plans and documents, as listed below, shall be handed over to the Purchaser. In addition, one (1) copy each shall be placed on board the vessel.

The following drawings, plans and documents shall be delivered:

- General arrangement plant
- Docking plan
- Engine room arrangement
- Diagrams of all systems
- Electric power distribution diagrams
- Propulsion arrangement
- Detailed construction plans
- Deck arrangements, including deck equipment
- Safety plan
- Dock and sea trial reports
- Stability booklet
- Hydrostatic table
- Tank tables for all tanks
- Paint list and documentation
- Inventory list

**10009.4 Operation Manuals**

The operation manuals shall state the start-up procedure for every device on the vessel including all bought-in equipment, and all the points to be observed or checked during the start-up and the operation.

Corrections shall be made for any changes made during tests and trials at the

building yard and revised instruction books shall be submitted.

The manuals shall include maintenance schedule and procedures for every item.

**10010  
Identification**

Draft marks, ship's name, port of registry steel plate make shall be welded to the hull.

Furthermore, all switchboard controls shall be identified by English and Spanish labeling.

**10011  
Spare Parts**

The vessel shall be supplied complete with spare parts and tools for two (2)-year operation, in accordance with the requirements of the Classification Society. Spare parts shall be equal in design, origin and material standard in all respects to the primary parts and shall be from the same suppliers. Spare parts shall be tropicalised for long term storage, identified and listed.

The Bidder shall submit in his Bid a list of spare parts to be supplied with the vessel as mentioned above and recommended optional spare parts with a price quotation for the latter. The final list of spare parts to be provided under the Contract will be decided at the contract negotiation between the Purchaser and the successful Bidder.

**10012  
Tests and Trials**

All test specification, schedule and results shall be provided by the Supplier.

Test and trials of the vessel including its construction, outfits, equipment and machinery shall be carried out during construction and after completion in accordance with the rules and requirements of the Classification Society. The specifications, schedules of tests and trials, and results of each test and trial shall be submitted to the Classification Society and the Engineer separately.

The Purchaser's and/or the Engineer's representatives shall have the right to inspect and attend tests and trials of the vessel to confirm its conformity to the Specifications. The Engineer shall notify the Supplier in writing of the identity of any representatives designated for these purposes.

Test and trial reports and certification shall be made in accordance with the provisions of Clause 7 of the Special Conditions of Contract (Section 4).

The Purchaser's and/or the Engineer's representatives will attend a meeting with the entrusted Classification Society to determine the procedures of approval of drawings or plans and inspection of the vessel. They will also attend the launching of the vessel to confirm its workmanship and the official sea trial.

For these purposes, one representative of the Purchaser or the Engineer will visit the Shipbuilder's yard for a total of seven times as indicated below:

1st Inspection: Kick-off meeting with the entrusted Classification Society on the following items:

- Procedure of approval of drawings and plans.
- List of drawings and schedules, etc. to be approved
- Inspection schedules

2nd Inspection: - Approval of major drawings together with the entrusted Classification Society.

- Study on the results of test and inspection.

3rd Inspection: - Attending the shop test of the main engine and propeller unit for the first vessel.

- Test schedule shall be prepared by the shipbuilder.

4th. Inspection: - Attending the launching of the vessel to confirm it

workmanship.

- 5th. Inspection: - Attending the shop test of the main engine and propeller unit for the second vessel.
- 6th. Inspection: - Attending the official sea trial of the first vessel.  
- Test schedule as per Sub-section 10012.3
- 7th. Inspection: - Official sea trial of the second vessel.

All cost related to the above-mentioned attendance, including air travel (C class), local transportation and accommodation of the Purchaser's or the Engineer's representative shall be borne by the Supplier.

#### **10012.1 Test During Construction**

All tanks completed with all fittings and piping shall be tested in accordance with Classification Requirements. Tank, pipe systems, etc. shall be properly cleaned and free from debris prior to testing.

Hatch covers, port holes, windows, doors, ventilators, scuppers and discharge pipes shall be hose tested for tightness.

The main engines shall be tested on each load, total running for three hours continuously, in the presence of the surveyor at the maker's test bed according to the recommendations of the engine maker.

During these tests the fuel consumption, the mean effective pressures and the various pressures and temperatures shall be measured.

The engine maker shall guarantee the fuel consumption of the main engines as determined on the official shop trials at the maximum continuous output.

Dock trials shall be carried out in accordance with the program approved by the Engineer, to ensure correct performance of all machinery, during which the propulsion machinery, all engine room auxiliary machinery and deck machinery shall be thoroughly tested.

Hydraulic circuits shall be carefully checked for dirt, leaks or air locks, and shall be in perfect working order. Direct and remote controls shall be tested and operated to the full satisfaction of the Engineer.

#### **10012.2 Preliminary Sea Trials**

Upon completion of the vessel, except minor items of the work which may be left unfinished until after the sea trials, preliminary sea trials shall be performed by the Supplier in the presence of the surveyor of the Classification Society and the representative of the Engineer and/or the Purchaser.

Preliminary trials shall be carried out prior to Official Sea Trials to ensure correct performance of all machinery, piping system, electric system and the hull structure.

#### **10012.3 Official Sea Trials**

Official Sea Trials shall be carried out at the Supplier's site in accordance with the Supplier's program approved by the Classification Society. During Sea Trials, the vessel shall be under the command of an experienced master nominated by the Supplier who will also supply the necessary crew.

The Supplier shall prepare a loading condition for the Sea Trials, details of which shall be submitted to the Engineer for approval prior to the trials.

The trials shall conform to following conditions:

- Deep and smooth water
- Wind not exceeding Beaufort 2
- Clean and smooth shell plating and suitable trim

The sea trial program shall consist of the following items:

- Speed trial
- Endurance trial
- Static bollard pull test
- Turning test
- Steering gear test
- Crash stop astern and crash stop ahead
- Anchoring test
- Torsional vibration measurement
- Inclining test
- Other tests as required by the Classification Society
- Other tests as required to obtain the required certificates

All data obtained during the trials shall be worked out accurately, properly tabulated and delivered to the Engineer and the Classification Society.

Upon completion of the trials, machinery, equipment, outfit, etc. that may be subject to internal damage must be opened for examination as requested by the Classification Society and/or the Engineer, and if found defective shall be repaired or replaced and subjected to repeated trials.

**10013  
Transportation  
of the Vessel**

The vessels shall be transported from the Supplier's site to Cutuco Port in La Union Province, the Republic of El Salvador, by a cargo ship with heavy lifting gear and shall be taken afloat at La Union Bay.

**10014  
Demonstration  
Sea Trial**

The following sea trials shall be carried out near the Cutuco Port in the presence of the Representative of the Purchaser, the Engineer and the crew of the vessel, to demonstrate the performance of the vessel without measurement data.

- Speed trial
- Turning trial
- Crash stop astern and crash stop ahead trial

The demonstration sea trials shall be carried out under the command of an experienced master nominated by the Supplier, and a necessary number of crew shall be provided by the Purchaser to assist the master.

**10015  
Delivery**

Upon satisfactory completion of the demonstration trial program, the vessel, all compartments, tanks, machinery, accommodation spaces, bilges, tank tops shall be thoroughly cleaned and prepared for handing over to the Purchaser at the Cutuco Port in La Union Province, the Republic of El Salvador. All deteriorated paint-work must be restored and rusted areas shall be power brushed, primed and painted. The Purchaser shall collaborate with the Supplier to carry out these jobs.

**10016  
Purchaser's  
Supplies**

All stores, provisions, and consumable goods such as following items shall be furnished by the Purchaser.

- Lubricants
- Fuel oil
- Foam liquid for firefighting
- Oil dispersant liquid

- Oil and liquid consumed by test and trial shall be borne by the Supplier
- Stores and inventories over than those specified in the specifications
- Linens excluding mattresses
- Galley utensils
- Charts and navigation books.

**10017  
Training**

The Supplier shall at his own cost provide an English speaking engineer, with a translator of English and Spanish if necessary, for training of the Purchaser's personnel for the maintenance and operation of the vessel based on the following schedule.

Personnel to be trained	Two (2) crew per vessel (Captain and chief engineer)
Period of training	About two (2) months, in the period of outfitting works of the vessel
Location of training	Supplier's yard or sub-contractor's factories
Nature of training	OJT (On the Job Training) System

## SECTION 20000 HULL CONSTRUCTION

### 20001 General

The vessel shall be designed and constructed in accordance with the rules of the Classification Society. The hull shall have enough strength and water tightness to suit its purpose.

All scantlings shall be in accordance with the Classification Society's requirements for thickness of plating and modules of sections, except where specifically strengthened for the loadings specified.

The vessel shall be of all welded construction. The welding shall be done in accordance with the best practice, so as to avoid locked in stresses. All exposed welding, welding in tanks, bilges and wet spaces and in way of machinery shall be double continuous except blind parts.

Where plate edge gaps are to be excessive, filling in pieces, liners or packing places shall not be used without the permission of the Engineer.

X-rays as required by the Classification Society shall be taken at the Supplier's expense including re-examination for defects.

All tanks shall be provided with bolted manhole covers, bronze drain plugs (docking plugs), fillings, discharge and de-aeration pipes.

### 20002 Stem and Stern

The stem of the vessel shall be of built-up steel plate, and be stiffened to obtain enough strength for pushing work.

The stern shall be of transom type with well rounded corners and constructed to have sufficient strength. Additional girders and pillars shall be provided around the propeller well to bear the weight and vibration of the propeller.

### 20003 Keel and Shell Plating

Keel to be of flat plating system.

Shell plating shall be in accordance with the requirement of the Classification Society, but at least 9 mm thick. Plating of bow parts, around the propeller well, hawse pipes and sea chests shall be suitably thicker and/or be stiffened by doubling.

Rubber fender bases of steel plate shall be constructed on the upper deck level where its fenders are fitted as shown on the General Arrangement Plan. The base shall have sufficient strength to bear pushing power.

A suitable number of eye plates shall be fitted to the stern shell plate for unshipping propellers.

### 20004 Frame and Frame Bar

The transverse framing system shall be adopted, and web frames shall be arranged where necessary. The frame space shall be 550 mm throughout the vessel.

### 20005 Bottom Construction

Double bottom tanks shall be constructed and used as fresh water tanks, fuel oil tanks, lubricant oil sump tank and water ballast tanks respectively as shown on the General Arrangement Plan.

### 20006 Decks

The upper deck, bridge deck, navigation bridge deck, and wheelhouse top shall be of steel welded construction.

Deck plates under deck machinery foundations, bits and bollards, etc. shall be suitably thicker or be stiffened where necessary, and the edge part of deck opening shall be also stiffened.

Deck plates around the operating stand of windlass/rope winch, tow line reel winches and bits shall be of checkered plate.

- 20007 Deck Beams and Pillars** Beams shall have the required camper, and shaped steels or steel flat bars of specified dimensions shall be arranged on each frame. Pillars shall be provided where necessary.
- Under deck girders shall be provided where necessary and connected strongly with beams, watertight bulkheads by frames and pillars.
- 20008 Bulkheads** Bulkheads shall be of flat plated type and be reinforced with suitable stiffeners.
- 20009 Superstructure and Raised Deck at the Stern** The lower f'cle and raised deck at the stern shall be arranged as shown on the General Arrangement Plan.
- The lower f'cle shall be of steel construction and reinforced for securing the pushing power of the vessel, and shall be used as a water ballast tank.
- On the raised deck at the stern, two large circular openings of watertight construction shall be arranged for overhauling the propeller gear.
- 20010 Deck Houses** Beams at the deckhouse top shall be of steel flat bar and shall be welded to stiffeners directly.
- Partitions forming the engine casing, galley, lavatory, air conditioning room and watch room shall be made of steel.
- The plate thickness of the house shall be at least 6 mm.
- 20011 Chain Lockers** Chain lockers shall be arranged as per the General Arrangement Plan and shall have the capacity of storing the full length of the chains. Chain ends shall be provided with quick release devices. Each locker shall have a false bottom of perforated galvanized plate.
- 20012 Main Engine Beds and Auxiliary Machine Beds** Main engine beds shall be of rigid welded construction and shall be situated on the double bottom, to bear the weight and vibration of the main engines. Under engine beds shall be reinforced with strong girders and top plates.
- Under generators and the fire pump with their own prime movers, beds shall be reinforced with girders.
- 20013 Bulwarks** Steel bulwarks of 600 mm high shall be constructed on the upper deck and connected smoothly to the lower f'cle and the raised deck top at the stern. The bulwark shall have a tumble home of about 15 degrees to avoid contact with other ships.
- The top of the bulwark shall be fitted with a bulb plate with a half round steel bar of 30 mm x 60 mm outside corner for rope rubbing.
- Mooring pipes and freeing ports shall be arranged on the bulwarks as per the General Arrangement Plan.
- The bulwark shall be of enclosed type construction, that is double plate construction to increase strength and also to keep clean except places of the mooring pipes and freeing ports.
- 20014 Bilge Keels** Bilge keels made of 250 mm bulb plate shall be provided to the shell at the bilge circle on both sides of the vessel and in length of over 30% of Lpp of the vessel.

**20015  
Skeg**

One skeg of double steel plate construction shall be provided on the centerline of the stern as per the General Arrangement Plan, taking course stability and docking into consideration.

**20016  
Towing Beam**

A towing beam of steel plate shall be strongly constructed forward on the stern raised deck as per the General Arrangement Plan. The section of the beam shall be of flat oval type and the upper part in contact with the towing line shall be lined with stainless steel.



## SECTION 30000 HULL OUTFITTING

### 30001

#### Hatches, Doors, Manholes, Windows, etc.

#### 30001.1 Hatches

##### a) Hatches for propelling gear

Two large circular flush type hatches shall be arranged on the raised deck at the stern. The clear opening should be sufficiently large to remove the propelling gears.

The hatch cover shall be provided with lifting plugs and fastened on the deck by stainless steel bolts and kept watertight by means of packing.

##### b) Hatches for general use

Hatch covers shall be made watertight (WT) by means of packing. All hinges shall be adjustable and shall be provided with grease nipples. The eye bolts and pins of all hinges shall be of stainless steel.

Devices for securing hatch covers in open positions shall be provided.

The following hatches shall be fitted on the upper deck.

Location	Type	Q'ty	Dimension, mm	Coaming height, mm
To bosn's store	WT	1	600 dia	600
To general store	WT	1	700 x 700	600
To engine room (escape hatch)	WT	1	600 x 600	600
To propelling gear room	WT	1	600 x 600	600

#### 30001.2 Manholes

All tanks except expansion tanks, shall be accessible via manholes. The manholes can be closed by watertight plate covers, secured by bolts. In exposed areas the bolts shall be made of stainless steel. The access opening diameter of manholes shall be 450 mm.

#### 30001.3 Doors

The following steel doors of JIS type or equivalent shall be fitted. The figures in brackets show the clear size of door, width x height x sill height.

- Two watertight doors with 200 mm dia. fixed glass to the accommodation corridor on the upper deck: (650 mm x 1300 mm x 600 mm)
- Two watertight doors to the engine room on the upper deck: (750 mm x 1,300 mm x 600 mm)
- One weatherproof door to the deck store from aft side on the upper deck: (600mm x 700 mm x 600 mm)
- One weatherproof door to the paint store on the aft side on the upper deck: (600 mm x 700 mm x 600 mm)
- One gastight door to the engine room from the air conditioning room on the upper deck (600 mm x 1,600 mm x 150 mm)

The following aluminium alloy doors shall be fitted:

- Two weatherproof doors with square glass to the accommodation corridor on

- the upper deck: (650 mm x 1,300 mm x 600 mm)
- Two weatherproof doors with square glass to the accommodation corridor on the bridge deck: (600 mm x 1,600 mm x 150 mm)
- Two sliding type doors with large square glass to the wheelhouse: (650 mm x 1,600 mm x 150 mm)
- One door with louver to the galley: (600 mm x 1,600 mm x 150 mm)
- One door with louver to the lavatory: (600 mm x 1,600 mm x 150 mm)
- One door with large louver to the air conditioning room: (600 mm x 1,600 mm x 150 mm)
- One door with large square window to the watch room in the engine room: (600 mm x 1,600 mm x 150 mm)

The following wooden doors shall be fitted:

- One door to the mess and passenger room: (650 mm x 1,700 mm x 50 mm)
- One door to each cabin, total five: (600 mm x 1,700 mm x 50 mm)
- One door to W.C. in lavatory: (550 mm x 1,600 mm x 150 mm)

#### 30001.4 Windows

Following windows of aluminium alloy frame with hard glass shall be fitted. Side-scuttles shall be of JIS type or equivalent.

- Four side scuttles with blind cover inside to the engine casing:  
300 mm dia
- Three side scuttles with blind cover inside to the mess and passenger room:  
300 mm dia
- Two side scuttles with blind covers inside to the crew cabin on the upper deck:  
300 mm dia
- Two side scuttle with blind cover inside to galley and lavatory each one:  
300 mm dia
- One square window each for the captain room and the chief engineer's room:  
(300 mm x 400 mm)
- One side scuttle each to the chief officer and 1st. engineer room:  
(300 mm dia)

All windows in the wheelhouse shall be of fixed type and fitted as follows:

- Three windows on the front wall
  - centre: (1 x 900 mm x 1,000 mm)
  - side: (2 x 800 mm x 1,000 mm)
- Four window on the side walls, two on each side:  
(600 mm x 1,000 mm)
- Two windows on the aft wall:  
(700 mm x 1,000 mm)

One dual speed, electrical parallel window wiper shall be installed on the centre front window and one dual speed, electrical slewing type window wiper shall be installed

on each of the two side front windows.

Near each window wiper on the front windows, a window fresh water wash nozzle shall be fitted.

### 30001.5 Miscellaneous Closing Devices

All major tanks shall be fitted with docking plugs made of bronze.

## 30002 Stairs, Ladders and Handrails

### 30002.1 Stairs, Ladders

All exterior and interior stairs shall be made of steel and non-slip steps; the exterior stairs shall be galvanized. All vertical ladders shall be made of steel and shall have non-slip square bars.

The following stairs shall be installed:

- Upper deck / Bridge deck, front (part exposed to weather):  
1 position      Width 600 mm
- Upper deck / Bridge deck, aft (part exposed to weather):  
2 positions      Width 600 mm
- Upper deck / Bridge deck (in accommodation quarter):  
1 position      Width 600 mm
- Bridge deck / Navigation bridge deck (part exposed to weather):  
1 position      Width 600 mm
- Bridge deck / Navigation bridge deck (in accommodation quarter):  
1 position      Width 600 mm
- Upper deck./ Lower forecastle deck:      2 positions      Width 550 mm
- Upper deck / Engine room:      1 position      Width 550 mm

Vertical ladders shall be installed in the following spaces:

- Void space
- Bosn's store
- General store
- Engine room escape hatch
- Propelling gear room

Galvanized steel steps of non-slip type shall be fixed on entrances on the upper deck to the accommodation quarter, engine room, and on both sides of the slanted plate of the raised deck at the stern. Vertical steps of non-slip square bar type shall be fitted on the following position.

- Lower part of each manhole
- Radar mast

### 30002.2 Handrails

The following galvanized steel handrails shall be provided:

- 700 mm high rails on the top of the wheelhouse
- 1,000 mm high rails on the navigation bridge deck
- 1,000 mm high rails on the bridge deck

The top rails on the navigation bridge deck and bridge deck shall be provided with nozzles for water curtain and the top rails are used as sea water pipes.

Storm rail:

Galvanized steel storm rails shall be fitted on the front and both side walls of the upper deck.

**30003  
Mooring Fitting**

**30003.1 Bollards**

Double post bollards, 250 mm in diameter with a horizontal bar each, of steel plate construction, shall be fitted on both sides and aft and fore of the upper deck, totalling four numbers, and one bollard of the same type shall be provided on the raised deck at the stern.

**30003.2 Towing Bitts**

Crucifix type double post bitts, 350 mm in diameter, of steel plate construction and equipped with a closed chock shall be provided; one on the lower forecastle deck and the other on the aft upper deck. The face of the closed chock in contact with the rope shall be lined with stainless steel.

**30003.3 Tow Line Guards**

Tow line guards of steel pipe construction shall be fitted on both sides of the tow line reel winch on the aft engine casing top as shown in the General Arrangement Plan.

**30003.4 Mooring Pipes**

Cast steel mooring pipes, 250 mm in nominal size, shall be fitted on both sides and aft and fore of the bulwark, totalling four numbers.

**30003.5 Open Chock**

One cast steel open chock, 250 mm in nominal size, shall be fitted at the aft end of the raised deck at the stern.

**30004  
Rubber Fenders**

Hollow type cylindrical rubber fenders shall be mounted as follows:

	Q'ty	Outside dia mm	Inside dia mm	Length, m
Bow	1	800	350	12
Bow, both sides	2	500	250	4
Stern	2	400	200	5
Side	6	400	200	2

Those fenders shall be fixed on the steel base with galvanized chain and shackles.

In addition to the above, a suitable number of used rubber tires shall be fastened on the rubber fender with galvanized chains and shackles

**30005  
Mast and  
Funnel**

**30005.1 Mast**

A steel mast shall be constructed aft of the wheelhouse and equipped with a radar scanner, fire monitor, navigation lights, wind vane, antenna, etc. All cables and pipes leading to these equipment shall be laid inside the mast. A small platform with handrail shall be provided on top of the mast.

Steel rope stays shall be fitted between the top of the radar mast and the bridge deck to prevent vibration.

### 30005.2 Funnel

The funnel shall be of steel construction and arranged as shown in the General Arrangement Plan. An access door shall be provided near the engine casing top.

## 30006

### Deck Equipment

#### 30006.1 Anchor and Chains

The following anchor and chains with a size larger than that specified by the Classification Society shall be equipped.

- Anchor Stockless 2 x 420 kg
- Anchor chain Grade - 2, galvanized 22 mm dia x 275 m

An anchor chain with a quick release device shall be fitted on the upper deck.

A galvanized steel anchor chain stopper shall be fitted on the upper deck.

#### 30006.2 Mooring Lines

Three polypropylene mooring lines shall be provided, each with a 36 mm diameter and a length of 120 m. Each line shall be provided with an eye at each end.

#### 30006.3 Tow Lines

The following tow lines shall be equipped. The fore line shall be stowed on the tow line drum of the windlass/rope winch and the aft line on the tow line reel winch.

Fore synthetic fibre 1 x 95 mm dia x 100 m Breaking load 1,170 kN (119 tonf)

Aft synthetic fibre 1 x 95 mm dia x 150 m Breaking load 1,020 kN (104 tonf)

## 30007

### Deck Machinery

#### 30007.1 General

The deck machinery, windlass/rope winch and tow line reel winch shall be arranged as shown on the General Arrangement Plan.

The machinery shall be driven by hydraulic motors and a hydraulic pump shall be installed in the engine room.

#### 30007.2 Windlass/Rope Winch

A hydraulic motor driven windlass having two cable lifters, one tow line drum and one warping end shall be provided on the fore upper deck.

The windlass shall be operated remotely from the wheelhouse and/or beside the machine.

The windlass capability shall be as follows:

- Cable lifter 29.5 kN (3 tonf) x 12 m/min
- Tow line 19.6/9.8 kN (2/1 tonf) x 45/90 m/min
- Tow line drum capacity 95 mm dia x 100 m long
- Brake force of the drum 686 kN (70 tonf) on 2nd. Layer

The inside of the tow line drum in contact with the tow line shall be lined with stainless steel plate.

#### 30007.3 Tow Line Reel Winch

A hydraulically driven tow line reel winch with one tow line drum and one warping end shall be provided on the aft casing top.

The winch shall be remotely operated from the wheelhouse or operated beside the winch.

The winch shall have the following capability:

- Tow line 19.6/9.8 kN (2/1 tonf) x 45/90 m/mm
- Tow line drum capacity 95 mm dia x 150 m long
- Brake holding force 49 kN (5 tonf) on 2nd layer

#### **30007.4 Towing Hook**

A towing hook with a pneumatic quick release device, which can be operated from inside the wheelhouse and from two positions on the aft deck near the hook, shall be mounted as shown on the General Arrangement Plan.

The towing hook shall be of the type approved by the Classification Society and delivered with a class certificate.

- Safe working load 588 kN (60 tonf)

#### **30007.5 Hydraulic System**

A hydraulic system shall be installed to supply power to the windlass/rope winch and tow line reel winch.

The system shall consist of two electric driven hydraulic pumps, one for power motors of the two deck machinery and the other for the brake of the windlass and hydraulic oil circulation tank with the required outfit and piping.

Seamless steel precision pipes shall be installed between the hydraulic equipment and the pumps. On exposed decks the piping shall be made of stainless steel.

In the pressure line of each pump a non-return valve and an adjustable safety valve shall be fitted. An oil cooler shall be installed to control the temperature of the hydraulic oil in the system.

One electrically driven cooling water pump shall be fitted in the engine room to supply cooling water to the hydraulic system.

#### **30008 Life Saving Apparatus**

Life saving apparatus shall be in accordance with the Classification requirement and the Regulations of the country under which the vessel to be registered.

The following apparatuses shall be provided:

- 2 Inflatable life rafts, each for 20 persons
- 4 Life buoys (with 27.5 m life line x 2 sets and self-igniting light x 2 sets)
- 18 Life jackets (with whistle)
- 2 Self igniting lights
- 4 Parachute signals in watertight containers
- 2 Rocket signals
- 1 Self smoking signal
- 1 Emergency Position Indicating Radio Beacon (EPIRB)
- 1 Radar transponder

#### **30009 Firefighting**

##### **30009.1 Firefighting for Other Ships, External**

One (1) set of fire monitor of 1,000 l/min. shall be provided on the radar mast top

**Equipment**

and operated remotely from the wheelhouse.

One (1) set of fire monitor of 1,000 l/min. shall be provided on the wheelhouse top and operated manually.

Sea water shall be supplied to both monitors by a fire pump of 120 m<sup>3</sup>/h x 120 m, driven by a diesel engine installed in the engine room, after mixing with a foam liquid.

Eight (8) sets of water nozzle each with a capacity of 125 l/min shall be fitted on the handrail top on the bridge deck and navigation bridge deck to protect the vessel from fire. Sea water shall be supplied to the nozzles by a general service pump.

One foam liquid tank of 4 m<sup>3</sup> shall be provided on the aft side of the engine room.

**30009.2 Firefighting on Board, Internal**

Firefighting equipment shall be installed in accordance with the Classification requirements and the regulations of the Republic of El Salvador.

The following equipment shall be provided:

	Wheelhouse	Accommodation Quarter	Engine Room, Prop. G. Room
- 7 - 9 liters portable foam extinguisher		3	4
- 2 - 4.5 kg. portable CO <sub>2</sub> extinguisher	1		1
- 1 set of spare charge (foam x 2, CO <sub>2</sub> x 1)			

The fire main shall be laid from the general service pump and/or the fire pump complete with a branch line, hose valves, nozzles and boxes as follows:

- 4 Fire hydrants with coupling approved by the Engineer (upper deck, bridge deck)
- 2 Rubber lined canvas hoses (65 mm dia x 20 m) with coupling approved by the Engineer.
- 2 Fire nozzles (65 mm dia, water/spray type)
- 1 International shore connection
- 1 Fireman output

**30009.3 Oil Dispersing**

Spilled oil on the sea will be treated by spraying oil dispersant by two portable spray nozzles, each with a capacity of 200 l/min, and sea water mixed with oil dispersant liquid shall be supplied using a general service pump on board.

An oil dispersant liquid tank of 4 m<sup>3</sup> shall be provided on the aft side of the engine room.

**30010  
Hull Piping  
System**

**30010.1 General**

The pipes, valves, cocks, flanges and other accessories used with these pipings shall conform, in material and dimensions, to the Shipbuilder's standards and the requirements of the Classification Society. Pipes other than oil pipes, exhaust pipes

and pipes passing through the fuel oil tank shall be galvanized in general.

The material and schedule of hull piping shall be as specified in the Machinery Specifications in Sub-Section 40007.

### **30010.2 Fresh Water Piping System**

A fresh water line shall be arranged to supply fresh water by an electric driven pump with a small pressure tank from the fresh water tank to the following positions:

- Galley: Sink, hot water heater
- Lavatory: Wash basin, shower, flush valve of toilet, washing machine
- Wheelhouse: Front windows near each wiper
- Outside house: A suitable number of faucets fitted around the deck house for washing

### **30010.3 Sea Water Piping System**

A sea water line shall be arranged to supply sea water by an electric driven general service pump to the following spaces:

- Each water ballast tank
- Hawse pipe for washing chain
- Handrails with water nozzles for water curtain
- Wash deck line on the upper deck, fire hydrants
- Engine room, fire hydrants
- Eductors on the upper deck

### **30010.4 Bilge Piping System**

The propulsive gear room, engine room, shall be provided each with a suction line, with a rose box connected to the bilge manifold in the engine room.

The bilge in the chain locker, deck store, basin's store and void spaces shall be discharged by eductors.

### **30010.5 Scupper and Drainage System**

Scuppers and drain pipes shall be provided for all decks, top of deckhouse, galley, lavatory, wheelhouse and other enclosed spaces where necessary.

Scupper pipes shall be connected to decks exposed to weather or overboard directly according to the normal practice.

Storm valves shall be fitted for pipes where necessary.

Soil scupper pipes shall be connected to overboard directly with non-return valves.

Scuppers shall be arranged so as to be accessible and hard bending of galley scuppers and soil pipes shall be avoided as far as possible and adequate cleaning plugs shall be fitted where necessary.

### **30010.6 Sounding and Air Escape Piping System**

Sounding and air escape pipes shall be fitted on each tank, cofferdam and void space. Those pipes in the fuel tank shall not be galvanized.

## **30011 Ventilation and**

### **30011.1 Natural and Mechanical Ventilation System**

The wheelhouse, accommodation quarter and watch room in the engine room shall



**Air  
Conditioning  
System**

be equipped with a mechanical ventilation system through air ducts. The general store, bosn's store, paint store and deck store shall have a natural ventilation system through de-aeration pipes. The engine room and propelling gear room shall have a forced ventilation system.

Aluminium inlet gratings shall be of the mist eliminator type.

The air grating for the ventilation outlet shall be made of stainless steel.

**30011.2 Mechanical Ventilation, Engine Room**

Two electrically driven axial ventilators of 300 m<sup>3</sup>/min x 294 Pa with two speeds and a mushroom type ventilator head shall be fitted for ventilation of the engine room, and air ducts shall be laid suitably.

Two exhaust outlet openings shall be provided on the aft bulkhead of the deckhouse of the engine casing.

**30011.3 Mechanical Ventilation, Propelling Gear Room**

One electrically driven axial ventilator of 100 m<sup>3</sup>/min x 196 Pa with a mushroom type ventilator head shall be fitted on the raised deck at the stern to supply fresh air through an air duct to the floor and naturally exhausted through the other mushroom type ventilator provided on the opposite side.

**30011.4 Air Conditioning**

A unit type air conditioner shall be installed in the air conditioning room to supply air to the wheelhouse, crew's cabin, mess and passenger room, and watch room in the engine room.

The cooled air in the accommodation quarter shall be returned through louvers installed on the doors and alley way, but for the watch room in the engine room, cooled air shall be supplied through a fire damper and no air shall be returned and exhausted to the engine room.

**An Air Conditioner (A/C) unit shall have the specified capacity under the following conditions:**

- Inside temperature (approx.) 24° C at 55% relative humidity
- Outside temperature (approx.) 32° C at 70% relative humidity
- Sea water temperature (approx.) 25° C.

One electrically driven A/C cooling water pump shall be installed. The pump will be used also for cooling oil of the hydraulic deck machinery ,too.

**30011.5 Exhaust Fan**

Two electrical exhaust fans shall be installed, one in the galley and the other in the lavatory. Each fan shall have the capacity of changing air 15 times per hour.

**30012  
Painting**

**30012.1 General**

The hull plates shall be cleaned and cleared of millscale by blast cleaning grade SA 2½ and coated with a primer at steel mill.

The paint color shall be determined after consultation with the Purchaser.

The primer shall have no deteriorative effect on subsequent welding work and shall be compatible with paints or other coatings subsequently applied. All welds and damaged areas shall be hand-painted with a "pre-layer" before spraying.

Attention shall be paid to avoid sharp edges and other paint unfriendly construction details in order to optimise the protection and maintainability of the paint system.

For future maintenance the Supplier shall supply a Painting Manual for the complete vessel, including maintenance procedures, materials to be used and further relevant recommendations and information.

Galvanized surfaces shall be degreased and coated with a primer before painting. The paint specification for galvanized surfaces is the same as for steel.

### 30012.2 Painting Schedule

**Table - 1 Painting Schedule**

Painting Area		Under Coating		Finish Coating	
		Paint	No.	Paint	No.
Outer Shell	Above draft line (including bulwark)	BTE	2	CFP	2
	Below draft line	TEAC-HB VTAC	1 1	TFAF	2
Steel Deck	Weather deck	BTE	2	CDP Non-slip CDP	1 1
	Under deck Machinery and gutter way	TE-HB	2		
Steel Deckhouse	Outside	BTE	2	CFP	2
Bulwark	Inside	BTE	2	CFP	2
Outfits on Deck	Outside	BTE	2	CFP	2
Mast	Outside	BTE	2	CFP	2
Engine Room and Propelling Gear Room	Upper surface of inner bottom plating and structural member of single bottom	TE-HB	2		
Engine Room and Propelling Gear Room	Aux. Machinery bed on inner bottom plating	WRP-HB	2		
	Ceiling and side wall	WRP-HB	1	FP	2
Tank	Lube oil tank Fuel oil tank	Oil wiping	1		
	Fresh water tank	PEP	1	PEF	1
	Water ballast tank	TE	2		
Tank	Foam liquid tank	No paint			
	Oil dispersant tank	BTE	1		
	Cofferdam	TE-HB	2		
Chain Locker	Ceiling	TE-HB	2		
	Side wall and floor	TE-HB	2		
Cabin	Steel under lining	WRP-HB	1		
	Ceiling and side Wall (Bare Steel)	WRP-HB		FP	2
Stores	Ceiling and side wall	WRP-HB	1	FP	2
	Floor	WRP-HP	1	DP	2
Draft mark		CAC	2	FP	2

Ship's name and Port of Registry		CAC	2	FP	2
Wooden material in weather part	Hard wood			Varnish	2
	Soft wood			FP	2
Void space		WRP-HB	2		

**Abbreviations:**

TEAC-HB	Tar Epoxy Anti-Corrosive Paint High-Build
VTAC	Vinyl Tar Binder Coat
TFAF	Tin Free Self Polishing Anti-Fouling Paint
BTE	Non Bleed Tar Epoxy Paint High-Build Type
CFP	Chlorinated Rubber Finish Paint
CDP	Chlorinated Rubber Deck Paint
CAC	Chlorinated Rubber Anti-Corrosive
WRP-HB	White Rust Resisting Pint High-Build Type
FP	Finish Paint
NT	Non-Tar Paint
DP	Deck Paint
TE	Tar Epoxy Paint
TE-HB	Tar Epoxy Paint High-Build Type
PEP	Pure Epoxy Primer Paint
PEF	Pure Epoxy Finish Paint

**30012.3 Cathodic Protection**

The underwater parts of the hull shall have a cathodic zinc anode protection, sufficient for 2 years in tropical conditions, placed at significant positions, such as propeller nozzles, bilge keel and around the sea chest. Anodes placed on the ships hull shall have double plates.

**30012.4 Galvanizing**

The following parts shall be galvanized

- Handrail and steel stairs
- Clips for steel doors and hatch, etc.
- Anchor chain
- Lashing chain and shackles for rubber fender including rubber tire

**30012.5 Ship's Name, Draft Mark and Name Plates**

a) Ship's name and draft marks

The name of the vessels shall be written on the bow port and starboard and name and port of registry of the vessel on the stern.

The draft mark of arabic numeral in metric system, the numbers of 100 mm high, spaced 200 mm apart shall be written on the stem and the stern, port and starboard.

The Purchaser's logo shall be affixed to the funnel, port and starboard.

Name, draft marks, etc. shall be of steel plate welded on the shell plate and painted.

b) Cabin name plates, etc.

Each room, store, etc. shall be provided with a name plate written in English and Spanish languages.

Name plates of machinery, instruments, etc. to be written in both English and Spanish language.

c) Name plates, others

Where applicable, filling, sounding and de-aeration pipes, valves, pumps, doors, ventilation hatches, goosenecks, etc. shall be marked by name plates.

**30013  
Deck Covering  
and Insulation**

**30013.1 Deck Covering in Accommodation Quarter**

The following floors in the accommodation quarter shall be covered as the follows:

- Alley-ways Rubber/synthetic floor composition
- Wheelhouse and crew's room Rubber/synthetic floor composition
- Captain room
- Chief Engineer room
- Passenger and mess room
- Galley, sanitary
- Wheelhouse

Rubber/synthetic floor composition covered with vinyl tile

Ceramic tiles

Rubber/synthetic floor covering

Ceramic tiles shall be laid in cement and shall extend 10 cm up the side wall.

**30013.2 Insulation**

Walls and decks exposed to weather and walls of the watch room shall have a thermal and sound insulation layer made of glass wool fitted firmly against the steel plate of the steel structure. The insulation layer shall have a thickness of 50 mm.

**30014  
Accommodation  
Quarter**

**30014.1 Joiner Works**

Walls and ceiling of the wheelhouse and living rooms shall be lined and insulated as specified below:

- Face of steel wall: Hard plastic coated plywood, 5.5 mm thick.  
Parts exposed to weather shall be insulated by glass wool, 50 mm thick.
- Partition wall: Hard plastic coated plywood, 22 mm thick.
- Ceiling: Plastic coated plywood, 5.5 mm thick.

**30014.2 Furniture and Fixtures**

a) Furniture

- The berth shall be 2.0 m long x 0.8 m wide, with a 0.15 m thick mattress and two drawers.
- Desks and table shall be made of wood with a hard plastic plate on top.
- All chairs shall be covered with vinyl leather and fitted with sea-fastening metal.

b) The accommodation quarter shall be equipped with the following:

Cabins	Each officer's room	Crew's room
Single berth with two drawers	1	-
Double tier berth with two drawers	-	1
Writing deck	1	1
Chair	1	1
Book shelf	1	2
Wardrobe	1	2
Sofa	-	1
Hook	2	2
Clock	1	1
Mirror	1	1
Mattress	1	2
Pillow with cover	1	2
Bed curtain	1	2
Window curtain	1	2

c) Mess Room and Passenger Room

- Table	2 x 700 mm x 700 mm
- Long sofa	1 x 600 mm x 3,800 mm
	1 x 600 mm x 2,200 mm
- Hook	6
- Clock	1
- Mirror	1
- Ice box	1, 180 liters
- TV	1, 14 inches
- Window curtain	3

d) Wheelhouse

The house shall be equipped with the following excluding the control stand for main engines, propellers deck machinery, etc. and nautical equipment specified in the Machinery and Electric Installations specifications.

- 1 pilot chair
- 1 chart table with drawers and dimmer lamp
- 1 clock
- 1 book shelf
- 1 flag box
- 1 curtain for chart table
- 4 rack for nautical equipment

e) Galley

- 1 cooking table with stainless steel top and single sink
  - 1 electric range with 4 hot plates
  - 1 electric refrigerator, 300 liters
  - 1 electric hot water heater, 10 liters
  - 1 dish rack
  - 1 cup hanger
  - 1 bottle rack
  - 1 exhaust fan
- f) Lavatory
- Toilet with fresh water flush
  - Wash basin
  - Shower with curtain
  - Mirror
  - Grating for shower
  - Towel hanger
  - Soap dish
  - Washing machine, 5 kg
  - 1 exhaust fan

**30015**  
**Store Outfits**

a) General Store

Wooden vertical sparrings of a suitable size shall be fitted inside shell plates, with two sparrings in every frame.

A one tier wooden shelf, 1.20 m wide, shall be fitted on each shell side. The tanks' top shall be covered with a closed wooden ceiling.

b) Boatswain's store

Wooden vertical sparrings of a suitable size shall be fitted inside shell plates, with two sparrings in every frame.

A one tier wooden shelf, 0.75 m wide, shall be fitted on each shell side.

c) Paint Store and Deck Store

A one tier wooden shelf, 0.75 m wide, shall be provided on the ship's center wall and aft wall of the engine casing in the paint store and deck store.

**30016**  
**Canvas Covers**

Canvas covers shall be furnished and fitted as follows:

- 1 for the windlass/rope winch control stand
- 1 for two line reel winch control stands
- 2 for chain pipes
- 1 for each projector including a search light
- 1 for the magnetic compass
- 1 for each speaker

- 1 for each ventilator

**30017**

**Deck Outfits**

The following outfits shall be supplied

- \* 2 Bower anchors (Stockless) 420 kg
- \* 1 Bower anchor cable (Grade-2, galvanized) 22 mm dia x 275 m
- \* 3 Mooring ropes, synthetic fibre 36 mm dia x 120 m
- \* 1 Tow, fore, synthetic fibre 95 mm dia x 100 m
- \* 1 Tow, aft, synthetic fibre 95 mm dia x 150 m

- 1 Anchor swivel
- 2 Anchor shackles
- 2 Joining shackles (spare)
- 1 Shackle hammer
- 1 Bolt punch
- 2 Chain hook
- 1 Pin hammer (one hand)
- 1 Pin punch
- 2 End shackle

\* Marked items are specified in Sub-sections 30006.1, 30006.2, and 30006.3

**30018**

**Navigation  
Outfits and  
Equipment**

**30018.1 Navigation Outfits**

- 1 Magnetic compass (small reflector type)
- 1 Spare bowl for the above (with box)
- 1 Log (director reading, paint type)
- 1 Thermometer
- Binoculars (7 x 50)
- Barometer (aneroid)
- Clinometer (pendulum, 150 mm)
- Hand lead (3.2 kg x 46 m)
- Chart instrument (1 set square, 2 dividers, 1 magnifier, 4 weights, 1 brush)
- 1 Bell (300 mm)
- 3 Black ball (610 mm, net type)
- 1 Black diamond shape
- 2 National flags (3 width x 1,2 width x 1)
- 1 International signal flag

**30018.2 Navigation Lights**

(Specified in Electrical Installations Specifications in Sub-section 50007.3)

Navigation lights shall be of International Marine Organization (IMO) type.

- 3 Mast lights (electric, 2 lamp type)
- 1 Pair-side light (electric, 2-lamp type)
- 1 Stern light (ditto.)
- 1 Towing light (ditto.)
- 1 Anchor light
- 1 Morse signal light
- 1 Daytime signal light
- 1 NUC (Not Under Command) light and restricted maneuverability lights

**30019  
Spare Parts &  
Tools**

**30019.1 General**

Spare parts and tools for the hull part shall be supplied for two-year operation. The following listed items shall be included at least and stowed in suitable boxes.

**30019.2 Compulsory Spare Parts.**

(1) Windless/rope winch

Cable lifter/brake lining, bolts and nuts 2 sets for each

Drum brake lining, bolts and nuts 1 set for each

Grease nipple 5 pcs

(2) Tow line reel winch

Drum brake lining, bolts and vents 1 set for each

Grease nipple 3 pcs

(3) Marine ventilating fan

Bearing for engine room 2 pcs

Bearing for propelling gear room 1 pc

(4) Side scuttle

Glass for B-300 2 pcs

Frosted glass for B-300 1 pc

**30019.3 Tools Standard**

Tools for the deck machinery and equipment conforming to the respective maker's standards shall be supplied and stowed at suitable positions.

**30019.4 Optional Spare Parts**

In addition to the list of spare parts indicated in Sub-section 30018.2 above, the Supplier may propose a list of optional spare parts if, in his opinion, the same are required for proper operation and maintenance of the vessel. Tentatively the optional spare parts may include the following:



- One tow line for bow operation

The price of such optional spare parts shall be entered in the Bill of Quantities as a Provisional Sum.

**30020**  
**Deck Inventory**

The deck equipment and instruments shall include, but not be limited to, the following:

- 1 Aluminium ladder (about 5 m), folding type
- 1 Complete set-room name plates and lock sets
- 1 Key box
- 2 Frames for certificates (Certificate of ship's nationality, Certificate of ship's inspection)
- 1 Carpenter tool (claw hammer, hand saw, hatchet, claw bar) and box
- 1 Spanner for sounding pipe head
- 1 Sounding scale (for fresh and sea water, 10 m)
- 1 Spanner for bottom plug
- 1 Hand bilge pump (with hose of 40 mm dia x 2 m)
- 1 Rubbered canvas hose deck washing (40 mm dia x 10 m)
- 1 Nozzle for deck washing
- 2 Buckets
- 2 Mops with hand
- 1 Boat hook
- 1 Oil funnel
- 1 Oil can
- 1 Oil pan