SPECIFICATIONS
OF
CONSTRUCTION
FOR
A STEEL SKIPJACK POLE AND LINE FISHING VESSEL
FOR
PAPUA NEW GUINEA

MARCH, 1977

JAPAN INTERNATIONAL COOPERATION AGENCY

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CHAPTER 1. GENERAL

1.1 Purpose

The vessel to be of the steel skipjack pole and line fishing vessel, and to served in area of 200 sea miles from the coast of PAPUA NEW GUINEA.

1.2 Rules and Regulations, Supervision

1. Rules and Regulations to be applied

   The Japanese Ships Safety Rules and other related Rules and Regulations to be applied.

2. Supervision

   The vessel to be supervised by the Supervisors (hereinafter called "supervisors") nominated by the Owners.

1.3 Vessel's Type

The vessel to be of single decker with sunken forecastle, raised quarter deck and deck house.

1.4 Stability, etc.

1. To keep good stability and seaworthiness.
2. To have good maneuvability.
3. To construct to endure impact of waves, and consider to keep good ventilation and prevent vibration , wetness and heat.
4. To consider in advance ballast to adjust stability, trim and heel of the vessel.

1.5 Principal Particulars

1. Principal Dimensions

Length (registered)	27.50 m
Breadth (moulded)	5.80 m
Depth (moulded)	2.70 m

2. Gross Tonnage — about 100 tons
3. Main Engine — output of not less than 550 ps 1 set

   Medium speed diesel engine, with a fixed pitch propeller.

4. Capacity

Fish hold (total)	about 49 m^3 (bale)
Centerline hold (three holds)	" 26 m^3 (")
Side hold (six holds)	" 23 m^3 (")
Fuel oil tank	about 39 m^3
Fresh water tank	" 7 m^3

5. Speed

Designed trial max. speed	about 11 knots

6. Duration of fishing operation — about 7 days
7. Complement — 24 persons

1.6 Others

1. The vessel to be built in accordance with this Specifications. and the attached General Arrangement and Midship Section.
   Details to be decided by mutual consent between the supervisors and the builder.
2. Necessary matters for the purpose of the vessel to be provided, even if they are not mentioned in this Specifications.
3. Workmanship for the vessel to be of good, and easy repairing and maintenance to be taken into consoderation.
4. Approval drawings, final drawings and instruction books to be in English.
   Every sign and mark inboard to be in English.

CHAPTER 2. HULL PART

2.1 Materials and Construction

1. Materials of hull construction to be complied with the authorized Standard. Scantlings of hull structual members to be in accordance with the requirements of the Rules and Regulations stated in 1.2 of CHAPTER 1., and attached Midship Section Plan. The efforts to make weight down and to make center of gravity down, the attention to be given to keep good succession in strength between each member and to prevent hull from vibration.

2. Hull construction to be as follows.

(1) Keel to be flat plate keel and false keel to be settled in under part.

(2) Stem to be of steel, and above part to be of fashion plate.

(3) For bottom part of bow, considering about panting, and for stern part, preventing vibration, suitable reinforcement to be provided.

(4) Rudder to be of stream line formed double steel plated balanced type.

(5) At the place where anchor and chains touch, hull plate to be thickened or suitable reinforcement to be provided.

(6) All decks to be of water tight steel plated construction.

Deck covering of exposed deck to be as follows.

Upper deck	:	wooden plank, thickness of not less than 65 mm
Sunken forecastle deck	:	do.
Raised quarter deck	:	do.
Top of deck house	:	wooden plank, thickness of not less than 50 mm
Compass deck	:	latex-deck composition, thickness of not less than 8 mm

3. Zinc anodes for cathodic protection to be fitted on the shell plate around propeller, bilgekeel, stern frame, rudder and sea chest. Quantity and place to be decided by supervisors.

2.2 Tanks

1. Each tank to be provided with suitable swash plate and manhole, and appointed tanks to be provided with piping, considering adjustment of trimming and heeling.

2. Fresh water tank to be similar to oil tanks in construction.

3. Ballast water tank to be able to be filled with sea water.

2.3 Stores

1. Boatswain's Store

The boatswain's store to be installed at the bow, and provided with

removable wooden boards, shelves, etc.

The steel water tight hatch to be fitted on the sunken forecastle deck and to be provided with lock.

2. Aft Store

The aft store to be installed in the stern part under upper deck and provided with removable wooden boards, shelves, etc.

3. Provision Store

The provision stores to be installed in the stern part under upper deck, and to be equipped with shelves, etc. according to the supervisors' instruction.

The inner surfaces of the stores are to be of galvanized steel sheet.

Door locks to be fitted at the stores.

2.4 Anchoring Gear and Mooring Equipment

1. Anchors to be weighed by the capstan (1.5t x 13m/min., 3.7kw electric motor driven) on the sunken forecastle deck through the tripple rollers (gun metal bushed) and fairleaders.

Anchor lashing device to be fitted on the sunken forecastle deck.

2. Mooring to be done by the above mentioned capstan and the stern capstan (1.5t x 13m/min., 3.7kw electric motor driven).

The following mooring equipments to be provided.

One bitt on sunken forecastle deck, Each one bitt (port & starboard) on fore and after bulwark, Tripple rollers (gun metal bushed), Ring plates, Cleats, etc.

2.5 Cargo Gear

The rigging of steel wire to be fitted between the fore mast and the front of wheel house, and cargo blocks and wires to be provided above the hatches of centerline holds.

One 0.5t electric motor driven hoist to be installed on the top of companion. One derrick boom (0.5t) to be fitted on starboard of deck house. Necessary fittings, such as goose neck bracket, topping bracket, blocks, wires, cleats, etc. to be provided. This boom to be employed for handling of dinghy and others. 0.5t electric hoist on the top of companion or capstan on the sunken forecastle deck to be used for cargo handling of the 0.5t boom, and blocks and other necessary fittings to be provided.

2.6 Steering Gear

The steering apparatus to be a electro-hydraulic gear (1.5t-m x 1.5kw) and also emergency hand operating apparatus to be provided.

The steering stands set in with magnetic compass pilot & portable remote control system to be installed in the wheel house and on the compass deck. These to be exchanged at each other by a hydraulic valve.

2.7 Ladder and Handrail

1. Ladder

Ladder to be of galvanized steel or wood. The wooden ladders to be with metal fittings for non-slip.

Also handrail to be fitted as possible.

2. Handrail

Handrails outside to be of galvanized steel, and ones inside to be of chrome-galvanized steel or of stainless steel pipe.

3. Storm rail

Storm rails to be fitted at the outside walls of deck house, the inner wall of wheel house and other places.

Storm rail to be of galvanized steel pipe at the outside of room and of chrome-galvanized steel pipe or stainless steel pipe at the inside of room.

2.8 Mast and Standing Riggings

1. All masts to be of steel tripod type.
2. Span stays to be installed between the masts, and two flag lines to be fitted on the fore span stay.
3. Fore mast to be fitted with fore stay.
4. The standing riggings to be covered with vinyl pipe and to be fitted with rigging screw.
5. The following principal equipments to be fitted on each mast.

Fore mast	Fishing light	Mast light	Working light (2)	Anchor light
Radar mast	Radar scanner	Loop antenna for direction finder	Motor siren	Vane-type anemometer
After mast	Stern light	Working light		

6. Flag staffs to be installed at the bow and stern, and fitted with blocks and wires.

2.9 Awning and Cover

1. Awning

The awning to be of synthetic fiber, and to be installed over the fore & after parts of the upper deck, and the compass deck.

The awnings to be consist of center-ridge, stanchion, reach rope, etc.

2. Covers

The covers to be of synthetic fiber and to be fitted at the followings.

Hatch	Ventilator	Main engine	Search light	Motor siren
Deck machineries	Working light	Others if necessary		

2.10 Life Saving Appliances and Dinghy

1. Life Saving Appliances

(1) As the life saving appliances, provide the following items.

- o Inflatable life raft, with FRP container, for 25 persons, Ko type — 1 set
- o Inflatable life jacket — 25
- o Ring life buoy — 4
- o "SOS" Auto-alarm (2182 KHz, output 5 W) — 1
- o Self igniting light — 2
- o Self activating smoke signal — 2
- o Rocket — 2
- o Parachute signal — 4

(2) The inflatable life rafts to be installed, on the top of deck house, and dropping platforms, releases, etc. to be fitted.

(3) Other life saving equipments except the above said to be provided in accordance with the Japanese Special Rules for Fishing Boats CLASS II.

2. Dinghy

A dinghy to be about 3.5 m length rubber boat with 9 PS outboard engine, and stowed instructed place on board.

Binding appliance, handling appliances and other necessary fittings to be provided.

On handling appliances, refer to "2.5 Cargo Gear".

The following equipments to be provided.

One foot stepping type air pump

One pair of oars

2.11 Fire Extinguishing Appliances

1. Fire hydrant to be installed at following places, and each one hose and one nozzle to be attached to each hydrant.

Engine room opening x 1, Engine room x 1, Near the companion x 1, No. 2 crew space x 1, Mess room x 1

2. Portable fire extinguisher (powder type x 3, liquide type x 6) to be provided.

3. Other fire extinguishing appliances to be provided in accordance with the Japanese Special Rules for Fishing Boats CLASS II.

4. An international shore connection for fire extinguishing (1960, SOLAS) to be installed.

2.12 Various Piping

Various pipings to be installed in accordance with the followings.

Fresh water pipe, sea water pipe, oil pipe, air pipe, filling pipe and sounding pipe on the decks are to be fitted with name plates in English and to be arranged for convenience of installation, inspection and repair.

Pipings to be fixed by steel bands, and fitted with covers at the necessary parts.

All pipes except oil pipe to be of galvanized steel pipe.

1. Bilge pipe

(1) The following spaces bilge to be discharged by the motor driven pump and/or hand bilge pump.

Place	Bilge pump		Remark
	Motor	Hand	
Bo'sn store		o	
No. 1 crew space	o	o	
Fish hold	o	o	
Bottom space under fish hold	o	o	
Engine room	o	o	
Fore peak tank	o		
After peak tank			to drop in engine room through the stop valve fitted at bulkhead
Steering gear room		o	do.
Aft store		o	including provision store

(2) Two (2) hand pumps to be provided.

(3) Rose boxes to be installed at the end of bilge pipes.

2. Wash deck pipe

(1) Wash deck pipe to be arranged along the ship's side of the upper and sunken forecastle deck from a motor driven general service & fire extinguishing pump. Hose coupling and stop valves to be fitted at suitable positions.

(2) Three (3) rubber hoses (each 8 m length) with nozzle for deck washing to be provided.

3. Fresh water pipe

(1) Fresh water line to be arranged to exchange fresh water among fresh water tanks, by motor driven fresh water service pump.

(2) Fresh water line to be arranged to supply fresh water from each fresh water tank to following places by motor driven fresh water service pump (automatic start and stop, home pump).

Sink in galley, Wash basin in No. 1 W. C. & No. 2 W. C., Shower, Wash basin in mess room and engine room.

(3) Fresh water line to be arranged to supply fresh water made by distilling plant to fresh water tank.

(4) Besides above mentioned, a hand fresh water pump to be provided to supply fresh water to the sink of the galley from fresh water tank.

4. Sanitary pipe

Pipe line to be arranged to supply sanitary water to following place by electric motor driven sanitary pump (continuous running).

Sink in galley, No. 1 & No. 2 W. C. (for stool and floor cleaning), Shower.

Also connecting piping between wash deck pipe line and sanitary pipe line to be provided.

Besides above mentioned, a hand sea water pump to be provided to supply sea water to the sink of the galley from bottom.

5. Scupper pipe

Scupper pipe to be thick steel pipe and of larger diameter than standard.

The scupper pipes to be arranged at the following spaces,

Sunken forecastle deck, Upper deck, Compass deck, Top of deck house, Wheel house, Companion, Galley, Water closet, Raised quarter deck and other spaces, if necessary.

Rose plates to be provided at the deck part of scupper pipe.

Also to be provided blockages for soil and waste water on deck not to flow outboard.

6. Sewage pipe

Sewage pipes to be arranged to discharge soil water outboard from the stools in water closets and sink in galley, and non-return valves to be fitted at shell outlets.

7. Other pipe

Sounding pipe, air pipe, oil filling pipe, water filling pipe, etc. to be provided for oil tank, fresh water tank, fish hold, etc.,

where necessary.

8. Oil pipe

Refer to Machinery Part.

9. Freeing port

Suitable number of freeing ports to be installed on bulwark. The freeing ports to be constructed for waves not to flow inboard directly, and to be provided blockage for soil and waste water on deck not to flow outboard.

2.13 Communications and Signalling

1. Voice tube

Voice tubes to be installed at the following places.

Wheel house — Near magnetic compass on compass deck
Wheel house — Engine room

The voice tube between wheel house and engine room to be fitted with whistles, and the tube in wheel house to be of non-magnetic material.

2. Buzzer

Buzzers (ordinary or emergency use) to be fitted at the following places.

Wheel house — No. 1 crew space (answer type)
Wheel house — No. 2 crew space (")
Wheel house — No. 3 crew space (")
Wheel house — Mess room (")
Wheel house — Engine room (")

3. Motor siren

A motor siren to be of water proof type and 400W output.

4. Telegraph

Telegraphs to be of elect. type, and the telegraph in wheel house to be of console mounting type and in engine room to be of wall-setting type.

2.14 Lighting and Ventilation

1. Lighting to be installed as follows.

Designation	Type	Material	Place
Square window	Lifting type, reinforced glass	Light metal alloy frame	Front of wheel house (with shifting board) (7)
	"	"	Side of wheel house (2)
Scuttle	Opening type with blind lid (* marked: without blind lid)	"	Companion, No. 2 crew space, No. 3 crew space, Mess room, Galley, Wheel house*, Captain room*
	Fixed type (with blind lid)	"	No. 1 W. C., Door of No. 2 W. C.
Skylight	Opening type (water tight)	Steel	No. 1 crew space (or emergency hatch), Engine room, Galley

(1) Eaves to be installed on the upper part of square window and opening type scuttle.

(2) One of the square windows in front of wheel house is to be of fixed type, and fitted with one motor driven clear view screen.

(3) The skylights to be operated at inside and outside.
The skylight in No. 1 crew space to be fitted with a light intercepting cover.

2. Mechanical ventilation

Motor driven axial blowers to be installed at the following places.

Place	Type of motor	Output of motor	Quantity
Engine room	Reversible type	2.2 KW	1
		1.5 KW	1
Galley	"	0.4 KW	1

(1) Ducts to be made of galvanized steel plate, and at the necessary place damper and pankalouvers to be fitted. Inlets and outlets for engine room to be fitted with steel net.

(2) The air inlets of ventilator to be provided with closing appliance for emergency, and emergency stopper to be installed in wheel house.

3. Natural ventilation

Mush-room, goose-neck ventilators or wall ventilator to be installed at the following places.

Place	Quantity	Place	Quantity
Wheel house	1	Store	each 1
Mess room	1	Galley	1
Engine room	1	Air conditioner	each 1
W. C.	each 1	Battery room	1
Crew space	each 1	Other spaces, if necessary	

4. Air Conditioning

(1) Two air conditioning plant (automatic) with refrigerant of R-22 ($CHCLF_2$), to be installed, and to supply cooled air to the specified spaces and to keep the described temperature and humidity.

(2) The condition of temperature and humidity to be following.

	Condition		Air change
	outside	inside	
Dry temperature	35°C	30°C	12 times/hour, fresh air to be more than 40 percent of total air
Humidity	70 %	50 %	

(3) The following spaces to be air conditioned. But * marked spaces to be of spot cooling system, and to be exempted from above mentioned condition.

Plant	Space
No. 1 plant	No. 1 crew space
No. 2 plant	No. 2 & No. 3 crew space, Captain room, Mess room*

(4) Ducts to be of galvanized steel plates, and to be covered with insulation. At the suitable place, drain hole, damper and grille to be fitted.

(5) Air conditioning plant to be of more capacity than follows.

Plant	Compressor	Fan
No. 1 plant	5,600 Kcal/hr x 1.5 KW	20 m^3/min x 0.05 KW
No. 2 plant	15,000 Kcal/hr x 3.75 KW	45 m^3/min x 0.6 KW

(6) This equipment to be provided with protectors, accessories, spare parts, inventory, tools and others necessary.

(7) Emergency stop device for fan motor of air conditioning plant to be installed in wheel house.

2.15 Nautical and Measuring Instruments

The following nautical and measuring instruments to be provided, and also necessary stands, wiring, accessories and spares to be provided.

1. Magnetic compass (card dia. 150 mm table type, set in magnetic compass auto pilot) 2 sets
   With adjustable tools, azimuth mirror, azimuth circle, azimuth rod.
   (each one set, in wheel house and on compass deck)
2. Electric rudder angle indicator 1 set
   Indicator to be fitted in wheel house and on compass deck.
3. Radar (table type) 1 set
   Braun tube dia. of 7 inches, peak power of not less than 10 KW, range of not less than 30 sea miles.
4. Automatic radio direction finder (automatic direct reading type) 1 set
   Able to spot receive of not less than 20 waves, direction finding range 400 KHz - 9 MHz.
5. Vertical type fish finder (table type) 1 set
   Frequency 50 KHz - 200 KHz, two wave type, depth range 0 - 2,000 m, two indicators (line belt recording type).
6. Sonar type fish finder 1 set
   Frequency about 75 KHz, range about 0 - 800 m, horizontal detecting angle about 360°, sector angle about 180°.
7. OMEGA receiver 1 set
   2 lop type.
8. Electric anemometer (vane type) 1 set
9. Electric sea water thermometer (with one thermosenser) 1 set

10. Electric thermometer 1 set

Switching over reading type, for fish hold and cooling plant, with two indicators.

11. Binocular (8 cm x 15, with stand) 1

2.16 Radio Equipment

The following radio equipment and public addressor to be provided, and also necessary spare parts, inventory, tools and documents to be provided.

1. SSB system radio telephone apparatus

Name	Transmitter & receiver
Quantity	1
Antenna power output and type	MHF, HF } A_3J50W, $A_3H12.5W$
Frequency range	2 MHz ∿ 8 MHz
No. of channel	Tx 10, Rx 10
Electric source	A.C. 110V, 60 Hz, D.C. 24V
Remarks	Simplex

2. Receiver

Name	Receiver
Quantity	1
Frequency range	535 KHz ∿ 1605 KHz, 2.3 MHz ∿ 20 MHz
Type of reception	A3
Circuit system	Superheterodyne
Electric source	A.C. 110V
Remarks	Transistor type, portable

3. Emergency automatic receiver 1 set

(2182 KHz, wall-hanging type)

4. Public addressor 1 set

(1) Main apparatus

output (no strain) : 30 W

circuit system : superhetrodyne system

frequency range : B.C. and short wave zone

This to be coupled with receiver, monitor, cassette type player and emergency alarm.

(2) Speaker

30 W, water proof type trumpet 1

(able to be turned in wheel house)

2 W, 6.5 inches, permanent 4

(able to be forced, with volume adjustor)

(3) Microphone (hand type, with cord) 1

On the front wall in wheel house, one microphone jack to be fitted.

5. Radio switchboard

To be of dead front type, and to have branch of rectifier for B.K. electric source.

6. Antenna separating equipment 1

7. Antenna

To be suitably provided for the above mentioned wireless equipments.

8. Electric source

Each apparatus to be operated by inboard ordinary source in ordinary case, and S.S.B. transmitter & receiver, to be operated by emergency source (24 V x 200 AH, 1 set) in an emergency.

2.17 Fishing Gears

The following fishing gears to be installed. The detail of gears, i.e., size, installation, arrangement, etc. to be decided according to the supervisors instruction.

Suitable reinforcement to be provided under fishing machineries.

1. Skipjack fishing gears

(1) Sprinkling pipes to be installed on the fishing platform, and fitted with gun-metal sparkling nozzles.

The pipe to be provided with stop valves at an appropriate place. Angle and volume of sprinkling water to be adjusted at each nozzle. Pitch of nozzle to be 500 - 600 mm.

(2) As skipjack fishing equipment, temporary covers of steel wire net for the bait hold's hatches to be provided.

(3) Bait tubs, fishing pole places and other necessary equipments for fishing to be provided. Sea water to bait tubs to be supplied from wash deck pipe.

(4) Fish suppressing boards & concrete blocks for shipjack fishing are to be provided.

(5) One set of automatic pole fishing machine (2.2 KW electro-hydraulic driven, with one fishing pole) to be fitted on port-side. Two fishing poles (GRP) including working one to be provided.

(6) Others

Followings to be provided.

(a)	Fishing pole (GRP)	90 rods
(b)	Hook	1,600 pcs.
(c)	Artificial bait with hook	800 "
(d)	Seizing wire (one coil : 200 m)	10 coils
(e)	Fishing line (Nylon-tex, one coil : 100 m)	30 "

2. Small size stick net fishing gears for fishing bait

(1) Small size stick net fishing gears for skipjack fishing bait to be provided.

(2) The stick net fishing winch to be of one set of four (4) drums winch and driven by electro-hydraulic system (electric motor 15 KW).

(3) Davits and other fittings for stick net fishing to be provided.

(4) Fishing lamp

The following to be provided.

(a)	Under water lamp (incandescent) (with slide regulator, 30 m electric cord, reel, etc.)	1.5 KW	2 sets
(b)	Lamp above water (incandescent) (with slide regulator, 30 m electric cord, reel, etc.)	1 KW	1 set

Fishing lamps to be controlled by the switch board on compass deck.

(5) Net

The following to be provided.

Net 2 sets

(length : 20 m, depth 23 m, with floating bamboo, sinker, rope, etc.)

2.18 Fish Hold

1. The fish hold to be refrigerated hold and to be divided nine compartments.

Three centerline holds to be also used as bait holds.

Caught fish to be stowed and preserved in the holds by cooled sea water.

Hatches for centerline holds to be of square, and other hatches to be of circular type.

Each hatches to be provided with insulated inner lids.

(1) Refrigerated holds (9 holds)

(a) Each hold to be refrigerated by hair pin type cooling pipe.

(b) Cooled sea water to be circulated between each hold and sea water cooler by circulating pump, and necessary pipings to be provided.

(c) Water in each hold to be discharged by bilge & circulation pump.

(2) Centerline holds (3 holds)

To use these holds as bait holds, followings to be installed and provided.

(a) Sea water in these holds to be changed by overflow system. Fresh sea water to be charged by the circulating pumps for bait hold, and sea water in holds to be discharged through the overflow ports on hatch coamings to out board.

(b) Lighting appliance (with spare light and alarm) to be provided.

(c) Dead bait discharging appliances by hand pump to be installed.

(d) For easy take out of bait, up and down appliances including wire mesh with frame, etc. to be provided.

2. Insulation

Material of insulation to be of fire retarding polyurethane-foam or equal.

Linings to be of marine use water proof plywood and to be coated with GRP.

Thickness of insulator and linings to be as follows:

	Insulator (mm)							Lining (mm)	
			Wall face to -						
	Ceiling	Floor	Eng. room	F.W. tank	Side shell	Fish hold	No.1 crew space	Ceiling	Floor & wall
C.L. hold	100	75	125	75	-	75	100	12	22
Others	100	75	-	75	100	75	100	12	22

Note: Minimum thickness of insulator in way of frame, stiffener, beam, etc. to be 50 mm.

2.19 Compass Deck and Top of Deck House

1. Compass deck

At the front and a part of side, steel bulwark to be installed, and at other places galvanized steel handrail to be installed.

A vertical ladder to be fitted at the port side.

The following equipments to be installed on the deck.

Table type magnetic compass	Radar mast	Search light	Rudder angle indicator
Steering stand	Main engine remote controller	Ventilator	Binocular
Side light	Hoip antenna for wireless	Voice tube	Fish finder indicator
Other			

2. Top of deck house

Steel handrail to be installed around the top of deck house and a vertical steel ladder to be fitted at the aft wall and port side wall.

The following equipments to be installed on the top of deck house.

Engine room skylight	Funnel	Ventilator	Life raft
Aft mast	Galley skylight	Small size stick net fishing winch	Other

2.20 Wheel House

1. The ceiling and wall to be insulated with insulation material of not less than 50 mm in thickness, and to be lined with water-proof treated plywood for marine use.
2. The floor to be laid with linoleum on latex-deck composition (8 mm).
3. The doors to be of light alloy and provided with thick square glass. Also rubber packings to be fitted around the door touching places.

4. The following equipments to be provided in the room.

Steering stand	Engine remote controller	Radar indicator	Fish finder indicator
Table type magnetic compass	Electric thermometer	OMEGA receiver	Soner indicator
Rudder angle indicator	Direction finder	Portable rudder controller	Public addressor
Sea water thermo meter indicator	Chart table with chart box and blind	Anemometer indicator	SSB system radio-telephone & auto-alarm
Clock	Buzzer	Barometer indicator	Voice tube
Motor siren push button	Binocular	Navigation light indicator	Clinometer
Black board	Book case	Instrument stand with locker underneath	Wall type ash tray
Fire extinguisher	Pen stand	Signal flag box	Others

Note: 1. Gutter way to be provided around the wheel house floor and fitted with drainnage.

2. Compartment of the wheel house shall be changed according to the type of selected instrument.

2.21 Interior Fitting

The furnishing in living room and mess room to be as follows.

1. The ceiling and wall of each room to be lined with water proof treated plywood for marine use.

Insulator (50 mm or more) for heat to be inserted between linings and steel deck and steel wall, and insulator for noise to be used for the part face to engine room.

Special care to be paid for preventing sweat on the after bulkhead of No. 1 crew space.

2. Covering and finishing of floor to be as follows.

Place	Covering		Finishing
	Material	Thickness (mm)	
Captain room	Latex-deck composition	8	Vinyl tile
No. 1 crew space	Cement (40 mm) + insulator + plywood (50mm)		do.
No. 2 "	Wood deck	50	do.
No. 3 "	do.	50	do.
Mess room	do.	50	do.
Galley	Cement	30	Non-skid tile
Water closet	do.	30	do.
Companion	Latex-deck composition	8	
Entrance to No. 2 crew space	do.	8	

Note: Gutter way to be provided on the floor around the captain room, No. 2 crew space and mess room, and fitted with drainage.

3. Inventory of each room to be as follows.

Room / Items	Captain room	No.1 crew space	No.2 crew space	No.3 crew space	Mess room	Remarks
Berth	Double berth for 2 P.	Double berth for 8 P.	Double berth for 12 P.	Double berth for 2 P.	-	with curtains
Mattress	for 2 persons	for 8 persons	for 12 persons	for 2 persons	-	with 48 sheets
GOZA (mattress)	2	8	12	2	-	
Pillow	2	8	12	2	-	Stuffing Panya, with 48 covers
Blanket	4	16	24	4	-	Single size, with 42 covers
Locker	2	8	12	2	-	
Book case or rack	1	1	1	1	-	
Hat hook	4	10	12	2	10	
Table or writing desk	Writing desk x 1	Writing desk x 1	-	-	Table x 2	With drawers
Chair	Folding type x 1	Folding type x 1	-	-	Sofa x 1 Bench x 2	Sofa and benches with locker underneath
Table ware rack	-	-	-	-	2	
Cup and pitcher rack	1	1	1	-	1	
Mirror	1	1	1	1	1	
Waste basket	1	1	1	1	2	
Clock	-	1	1	-	1	Transistor, marine type
Ash tray	1	2	2	1	3	
Shoe case	1	1 set	1 set	1	-	
Life jacket locker	2	8	12	2	-	

Note 1. Effective size of berth to be 1.9 m in length & 0.65 m in breadth, as standard.

2. Mattress to be foam mattress of not less than 5 cm in thickness.

3. Sofa to be stuffed with foam mattress (with spring) and to be with vinyl covered back. Benches to be covered with vinyl.
4. Locks to be fitted at desks, lockers and necessary parts.
5. Rolling stopper to be fitted at dining table.
6. Medicine rack to be provided in mess room.
7. Black board (of magnetic steel) to be provided in mess room.
8. Notice boards (2) to be provided at the appointed places.

2.22 Galley, Sink, etc.

Galley to be located in mess room without screen bulkhead.

1. In the galley, a oil fire cooking range (with one burner) to be installed. A air tank (hand charging type) for the burners to be provided.

   A service oil tank (with a gauge) for the cooking range to be installed on the top of deck house above galley. Pipe between the service oil tank and cooking range to be of copper.

   Funnel of the cooking range to be insulated, and led to the top of deck house.
2. Two electric rice cooker (2.8 ℓ, 0.95 KW) to be provided.
3. One electric refrigerator (400 ℓ, with freezing room) to be provided.
4. Plate rack, tool rack and other necessary equipments to be provided in galley.
5. Each one cock for fresh water and sea water to be provided in sink of galley.

2.23 Shower and Water Closet

1. Shower

   On starboard side of deck house, shower to be provided. Four shower nozzles to be fitted.

   Fresh water and sea water to be supplied for shower nozzles, and necessary piping to be provided.

   Fresh water and sea water supply to be changed over by cock.

   Removable canvas cover and accessories to be fitted.

2. Water closet

The following equipments to be installed in water closet.

Item \ Place	No. 1 W. C.	No. 2 W. C.
Western style stool (with storm rail)	1	
Japanese style stool (with storm rail)		1
Paper holder	1	1
Wash basin	1	1

Note 1. Sea water cleaning pipe to be fitted at each stool.

2. Sea water pipe (with cock) for floor cleaning to be fitted in each water closet.

3. Sewage pipe to be fitted with non-return valve.

4. Fresh water pipe (with cock) to be fitted at wash basin.

2.24 Battery Store

Battery store to be arranged in the engine room opening.

The inner surface to be covered with anti-acid paint, and gas outlet to be provided.

2.25 Steering Gear Room

The hatch cover to be of steel and to be water tight.

In the room, steering gear and accessories to be installed, and necessary pipings to be provided.

2.26 Painting and Cementing

Surface treatment and painting to be as follows. Coloring to be in accordance with the instruction of the supervisor except otherwise specified. Final painting of shell plates to be done in the dock before delivery.

1. Surface treatment

(1) Outside of shell plates to be treated by shot blast or sand blast. Inner plates of shell, surface of steel structures and steel outfittings on upper deck to be treated by sand paper or wire brush.

(2) Wooden part to be painted after sealed.
(without treated ply-wood)

2. Lower part of deck house wall and floor of engine room where is easy to be stained, to be coated with appointed color up to the suitable height.

3. Painting scheme

(1) Galvanized steel to be coated with appointed color.

(2) Fire extinguisher, piping for fire extinguishing and emergency alarm to be coated with red paint.

(3) Painting of the place not appointed in the table to be in accordance with supervisor.

(4) Painting scheme to be as follows.

Painted place		Lower painting (anti-rusting)	Times	Final painting	Times
Shell plate	under water line	wash primer	1	Chlorinated rubber A/F	2
	above water line			Chlorinated rubber paint	2
	water line part	Chlorinated rubber A/C	2	Chlorinated rubber A/F	2
Rudder	outer surface				
	inner surface	bituminous solution	1		
Exposed deck and water way		oily A/C	2	diallyl phthalate	2
Exposed steel part					
Steel deck under wooden deck		bitumatic solution	2	asphalt pate	1
Steel part covered with boards		anti-rusting paint	2		
Battery store		anti-rusting paint liquid enamel (floor)	1 2	diallyl phthalate	2
Fish hold	bottom	liquid enamel	2		
	other	anti-rusting paint	2		
Oil tank		oil wiping after cleaning			
Water tank		after cleaning inner surface: water cement bottom part: thick cement or epoxy paint		remove the hardness or water washing	
Ballast tank		wash primer oil A/C	1 2		

Painted place		Lower painting (anti-rusting)	Times	Final painting	Times
Bottom of engine room		water cement and thick cement or tar epoxy paint			
Others		anti-rusting paint	2	diallyl phthalate	2
Tank top		tar epoxy paint			
Under part of deck machinery stand		thick cement or tar epoxy paint			
Anchor, etc.		coal tar	2		
Machinery		anti-rusting paint	2	diallyl phthalate (maker standard color)	2
Steel outfittings		anti-rusting paint	2	diallyl phthalate (maker standard color)	2
Accom-moda-tion lining	Part of hard board			color lac paint	2
	Part of soft board			color paint	2
Furniture				color lac paint	2
Wooden part without described				color paint	2

2.27 Marks

Letters to be in English and figures to be of Arabic.

1. Name of vessel and port of registry

   The followings to be written on shell plates.

   Bow each side — name of vessel

   Stern — name of vessel and port of registry

2. Draft marks

   To be indicated on each side of bow, stern and midship.

3. Name plate of room

   To be fitted at the entrance of each room.

4. Life raft, dinghy, others

   Necessary marks to be indicated.

5. Fish finder and sonar to have projecting part under bottom shell, and the position of projecting part to be indicated by marks on both side shell.

2.28 Spares of Hull Part

1. Spares to be provided in accordance with the Japanese Special Rules for Fishing Boats CLASS II.
2. Other spares for machines and equipments on the vessel to be supplied according to the Builder's or Maker's standard, excluding specially noted in this specifications.

2.29 Anchors, Chain Cables and Ropes

Anchors, chain cables and ropes to be provided as follows.

Bow anchor (Danforth type)	70 Kg x 2 sets
Bow anchor chain cable (welded type)	14 mm dia. x 5 m x 2
Bow anchor rope (vinylon rope)	38 mm dia. x 110 m x 2
Stream anchor	40 Kg x 1 set (without stock)
Stream anchor rope (vinylon rope)	38 mm dia. x 75 m x 1
Towing rope (vinylon rope)	38 mm dia. x 135 m x 1
Hawser (vinylon rope)	20 mm dia. x 165 m x 1
Bow anchor shackle	4 (including two spares)
Buoy shackle	2

2.30 Accessories

1. To be provided in accordance with the Japanese Special Rules for Fishing Boat CLASS II.
2. The following accessories to be provided. (including rules requirement)

Items	Quantity	Items	Quantity
Gong	1	Stern light (elect. lamp)	1
Clock	5	Anchor light (elect. lamp)	1
Binocular (7 times x 50 mm)	2	Red light (oil lamp)	2
Barometer	1	Fishing light (elect. lamp)	1 set
Hand lead (3.2 kg lead with 46 m line)	1	Fishing ball	1 set
Log	1 set	Black ball	3
Deck clock	1	Driving anchor (parachute type)	1
Sextant	2	Nationality flag	2
Magnetic compass (table type)	2	International signal flag	1 set
Mast light (elect. lamp)	1	Sign flag	1 set
Side light (elect. lamp)	1 pair	International communication book	1
		Medecine kit	1 set

2.31 Inventory

1. To be provided in accordance with the Japanese Special Rules for Fishing Boat CLASS II.
2. Followings to be provided (including rules requirement).

Items	Quantity	Items	Quantity
Stop watch	1	Spanner (various kinds)	each 1
Chart (indicated)	14 sheets	Simple observation table	1
Chart weight (circular type, covered)	4	Observation outline	1
		Observation calculation sheet	1
Triangle for chart	1 set	Clinometer	1
Divider	1	Hand flag	1 set
Nautical diary (Hull Part)	3	Owner's flag	2
Channel chart (neighboring PAPUA NEW GUINEA)	1 set	Tide table	1
Official nautical diary	2	Wooden block (with rope)	2
Light house table (neighboring PAPUA NEW GUINEA)	1 set	Steel block (with rope)	2
		Steel & wooden snatch block	each 2
Vinylon fender	3	Picture frame	2
Tire fender (with rope)	6	Register of crew's name	1
Megaphone	1	Oil feeder (trumpet & mouse type)	each 1
Painting tool	1 set	Spike (wooden & steel)	each 2
Sounding scale (for water and oil)	each 1	Bucket (alumite & poly)	each 2
Hammer (large, medium and small size)	each 1	Whetstone (various kinds)	each 1
		Driver (± large, medium, small)	each 1
Nail pole	1	Sand Box	2
Elect. torch (water proof, with 3 cells)	2	Whistle	2
Sail sewing tool	1 set	Mooring rope (vinylon rope 30 mm dia. x 50 m with shackle)	4
Scupper driver	2		
Throwing rope	2	Small oil can	2
Sea knife	2		
Room cleaning tool	1 set	Funnel	1

Items	Quantity	Items	Quantity
Square mat	5	Deck washing brush	5
Step board	1	Soap brush	5
Folding chair	3	Pliers	1
Chisel (with goose and flush)	each 2	Nipper	1
Carpenter tool (with box)	1 set	Pipe wrench (large & small)	each 1
Cutting plier	1	Claw bar	1
Scissors (various kinds)	each 1	Scissors for oil core	1
File (various kind)	each 1	Tape measure (steel 10m, 2m)	each 1
Set file	1 set	Folding measure (steel & wood)	each 1
Nail & steel wire	a few	English spanner	1
Search light (with 6 cells)	1	Wash basin (poly)	3
Chain block (for 0.5 t)	1 set	Wash tub (poly)	2
File (various kinds)	each 1	Pail (with 5 m rope)	3
Name plate hanger	1	Vinyl hose	10 m
Monkey wrench (100 mm, 200 mm)	each 1	Mansl	1
Paint (various kinds)	a little	Test hammer	2
		Wind sail	1 set

2.32 Cooking Utencil

The following cooking utensils to be provided.

Items	Quantity	Items	Quantity
Pan (aluminium, large, medium and small)	each 1	Fork (stainless)	30
Tempura pan	2	Knife (stainless)	30
Fly pan (stainless, large)	1	Spoon (stainless)	30
Water spoon (100 mm)	2	Whipping tool (medium, small)	each 1
Soup spoon (stainless)	2	Bowl (aluminium and plastic)	each 2
Rice spoon	2		
Kettle (large, small)	each 1	Food can (aluminium)	2
Cooking knife	2	Grater	2
Sashimi knife	1	Earthenware mortar (with bar)	1 set
Petit knife	1	Peeler	2
Shoyu & sauce pot	each 3	Whetstone	2
Large dish (plastic)	30	Electro jar (2 liter)	2
Small dish (plastic)	30		
Curry dish (plastic)	30	Chopping board (plastic)	2
Soup bowl (plastic)	30	Pot	2
Chopstick (bamboo including large chopstick)	30 sets	Butt (alumite large & medium)	each 2
Cup	30	Circular & square tray	each 2
Coffee set (cup, dish, spoon, pot, etc.)	30 sets	Basket (polyethylene)	2
		Poly. bucket	2

CHAPTER 3. MACHINERY PART

3.1 General Description

Machinery part of this vessel, considering automation and rationalization of work in engine room as far as practicable, to be provided with such machinery and equipments as to operate free from overhauling and adjusting in a long time and also to consist of the most economical and man-power-saving engine room.

Machinery and equipment installed on this vessel to be provided in line with the above and also machinery arrangement and outfitting work to be carried out in line with the above.

3.2 Main Engine

Main engine to be specified as follows and free from injurious torsional and engine vibrations.

1. Type and No. of set

4-cycle diesel engine	:	1 set
Output (continuous rating)	:	Not less than 550 ps
Revolution (continuous rating)	:	Not more than 900 rpm
No. of cylinder	:	6
Starting method	:	by compressed air
Cooling system	:	Sea water cooling system
Fuel oil	:	Diesel oil (A oil)

2. Reduction-Reversing Gear

Reduction gear to be free from overhauling in a long time and remote-operated easily. All reduction gears to be hardened and polished and to be of good accuracy and sufficient durability.

Coupling connected with main engine and reduction-reversing gear to be durable to be used continuously in a long time.

Revolution of propeller	:	380 rpm and under
Clutch	:	Hydraulic, multi-disc type
Lubricating system	:	Forced lubricating system

Hydraulic pump and oil cooler to be provided.

3. A sea water cooling pump, a lubricating oil pump, a fuel oil supply pump to be main engine driven type.
4. The governor to be of all-speed type and to have over-load fuel oil limitting device and over-speed trip as safety devices.
5. Main engine to be provided with revolution indicator, lubricating oil pressure gauge, cooling water pressure gauge and other necessary instruments.

6. Main engine to be started and stopped locally in principle. As for remote control and watching system, refer to 3.6.

3.3 Shafting and Propeller

1. Shafts to be of forged steel of good quality and propeller shaft to be of Class I with rubber lining.
2. Propeller to be of fixed pitch type.
   Blade to be of aluminium bronze of manganese bronze and to be good at dynamical and statical balance.
3. Stern tube to be cooled by sea water supplied from stern tube cooling water pump.
   Bearing to be of lignumvitae and in contact with the cut end.
   Gland packing of stern tube forward part to be such that shaft sleeve to wear little.
4. Anti-corrosion device such as brush apparatus installed between shaft and hull to be provided for shafting.

3.4 Generator Engines

Generator engines to be specified as follows and free from injurious torsional and engine vibrations.

1. Type 4-cycle diesel
   No. of set 2
   Output (Rating) 130 PS and above
   Revolution (Rating) 1,200 rpm and below
   No. of cylinder 6
   Starting method by compressed air
   Cooling system Sea water
   Fuel oil Diesel oil (A oil)
   Generator 110 KVA AC generator (parallel running)
2. Each part of engine to be automatically lubricated.
   Cooling sea water pump and lubricating oil pump attached to engine to be directly driven by engine.
   Hand operated type lub. oil pump to be provided.
3. Engine and generator to be installed on common bed.
4. Watching system for these engines to be referred to 3.6.
   Starting and stopping of engines to be done locally.

3.5 Air Compressors and Air Reservoirs

1. Main Air Compressor
   (1) Type and No. of Set : Sea water cooled, 2-stage compression type, 1 set
   Capacity : 22 m^3/h and above
   Pressure : 30 kg/cm^2
   Motor : 5.5 KW and above

(2) It to be started and stopped automatically by the pressure of air reservoir.

2. Emergency Air Compressor

Type and No. of Set	:	Sea water cooled, 2-stage compression type, 1 set
Capacity	:	9 m^3/h and above
Pressure	:	30 kg/cm^2
Prime mover	:	3.5 PS diesel engine (hand started)

Air compressor and prime mover to be installed on common bed.

3. Air Reservoir

(1) For diesel engine	:	2 sets
Pressure	:	30 kg/cm^2
Capacity	:	150 lit. and above
(2) For general service	:	1 set
Pressure	:	30 kg/cm^2
Capacity	:	75 lit. and above

(3) Air reservoirs to be provided with pressure gauges, pressure switches, safety valves, pressure reducing valves, etc. as necessary.

3.6 Automatic Operation, Remote Control

1. Principal machinery

Main engine: Remote control (to start and stop locally) with alarm device. (as for lubricating oil low pressure of main engine, and for hydraulic oil low pressure of reduction-reversing gear, alarming in the first step and engine stop in the second step, as for overspeed, engine stop.)

Generator engine	:	Local start and stop with alarm device.
Main air compressor	:	Automatic start and stop
Fuel oil service pump	:	Automatic start and stop
Fresh water service pump	:	Automatic operation
Sanitary pump	:	Continuous operation
Other main pumps	:	Remote start and stop (Refer to 3.11)
Air conditioner	:	Automatic operation
Distilling plant	:	Complete automatic operation with alarm device

All alarm device to consist of alarming buzzer and alarming lamp.

Instrumentation for local operation to be provided as necessary.

2. Main Engine Remote Control System

Speed control, clutch engage/disengage operation, reversing and emergency stop of main engine to be done from control stand in wheel house and compass deck. But start and stop of main engine to be done

locally in principle.

(1) Wheel House Control Stand 1 set

Following equipments to be combined in control stand with testing apparatus for lamps and buzzer.

(a) For main engine

Control apparatus	One (1) control handle for Revolution control, Clutch engage/disengage control, and Reversing control.
	Emergency stop (Electric type with push button having protecting cover)
Watching apparatus	Indicating lamp for operation
	Main engine running lamp
	Operating position (wheel house, engine room, compass deck)
	Running operation (ahead-neutral-astern)
	Main engine revolution indicator of electric type
	Indicating lamp for electric source
	Others
Alarming device	Overload
	Low pressure of main engine lub. oil
	High temperature of main engine cooling sea water
	Emergency stop of main engine
	Low pressure of cooling sea water for stern tube
	Low pressure of starting air pressure
	Control electric source failure
	Low oil pressure for reduction-reversing gear
	Automatic stop of main engine (each for over speed, lubricating oil low pressure of main engine, and hydraulic oil low pressure of reduction-reversing gear)

(b) For other machinery

Generator engine	Low lubricating oil pressure alarm
	High cooling water temperature alarm
Fuel oil service tank	Low level alarm
Pumps	Refer to 3.9

(c) Other necessary equipments

Illumination device for instrumentation to be provided.

Illumination device including running indicators to be of illumination adjustable type.

(2) Compass Deck Control Stand 1 set

To be same as wheel house control stand.

(3) Engine Room Watching Panel 1 set

Following equipments to be combined in watching panel (hanging type) with testing apparatus. Watching panel to be installed near main engine operating handle.

(a) For main engine

Operating position changing switch (wheel house, engine room, compass deck)	
Watching apparatus	Indicating lamp for operation
	Operating position (wheel house, engine room, compass deck)
	Running operation (ahead-neutral-astern)
	Indicating lamp for electric source
Alarming device	Overload
	Low pressure of main engine lub. oil
	High temperature of main engine cooling sea water
	Emergency stop of main engine
	Control electric source failure
	Low oil pressure for reduction-reversing gear
	Automatic stop of main engine (each for over speed, lubricating oil low pressure of main engine and hydraulic oil low pressure of reduction-reversing gear)

(b) For other machinery

Generator engine	Low lubricating oil pressure alarm
	High cooling water temperature alarm
Fuel oil service tank	Low level alarm
Distilling plant	High salinity alarm
Pumps	Refer to 3.9

(c) Other necessary equipments

3.7 Refrigerating Plant for Fish Hold

Use	Type	Refrigerant	Capacity of compressor	Compressor output	No. of compressor
Sea water cooler and fish hold	Brine condensing unit	R-22 and $CaCl_2$	Abt.19,000 Kcal/hr. CT +30°C ET -15°C x 1,000 rpm	11 KW	1
Fish hold	"	"	Abt. 6,600 Kcal/hr. CT +30°C ET -15°C x 900 rpm	3.7 KW	1

1 Refrigerant (R-22) is feeded to brine cooler and brine ($CaCl_2$) is cooled down.
Brine which has been cooled down is feeded to sea water cooler and cooling coils inside fish hold by brine pump.
Brine cooler (1 set each), brine pump (1 set each) and 1 set of sea water cooler must be provided.
Sea water cooler must have such capacity that 12 m^3 of sea water at 32°C can be cooled down to +2°C within 20 hours and protection device against freezing of water must be provided.

2 Condenser receiver (2), oil separator, drier, strainer, expansion valves (which are combination use of automatic & manual operation) heat exchanger, protection device, etc. must be provided.

3 Refrigerant, silicagel, brine, ref. oil, etc. must be supplied including spares, moreover, gas detector, thermometer, spare parts, and tools must be equipped.

4 Watch and control panel for cooling system must be provided in engine room.
(1) Electric thermometer for fish hold. (change over type)
(2) Indication lamp or alarm showing drop of pressure because of shortage of lubricating oil or stop of compressor caused by abnormal rise of high pressure.
(3) Water protection device & indication lamp of cooling water pump.
(4) Protection device against freezing of water cooler (including alarm).
(5) Pressure gauge
high pressure
low "
oil "
(6) Indication lamps must be provided for followings, compressor (each one), cooling water pump (1 set), solenoid valve (1 pce).

(7) Other necessary fixtures

3.8 Distilling Plant

One (1) set of distilling plant of following capacity to be provided. Piping system and necessary outfittings to use main engine and generator engine cooling water for evaporation of sea water to be provided. Electric motor driven type condenser cooling pump, ejector pump, brine pump and distilled water transfer pump for this plant to be provided. The plant to be operated automatically and to be used a long time without overhauling. And salinity detector to be provided and in case of emergency alarm to be indicated on engine room watching panel.

Distilling capacity 1.5 t/day

Salinity to be 10 PPM and below under the condition of feed water temperature 46°C and sea water temperature 30°C.

3.9 Pumps

Specification of principal pumps of electric motor driven type to be as follows.

1. Engine driven pumps and engine auxiliary pumps

	Name	Type	No.	Capacity Head	Driving system	Remark
Main Engine	* Cooling sea water pump	Centri-fugal	1	Sufficient one	M/E driven	
	Lubricating oil pump	Gear	1	Sufficient one	M/E driven	
	* Stand-by lubricating oil pump	Gear	1	$15m^3/hr \times 40m$	Electric motor driven, 5.5 KW	
	Fuel oil supply pump	Gear	1	Sufficient one	M/E driven	
Reduction-Reversing Gear	Hydraulic oil pump		1	Sufficient one	Reduction gear driven	
	Stand-by hydraulic oil pump for reduction-reversing gear		1		Electric motor driven	
Main Generator Engine	Cooling sea water pump	Centri-fugal	Each 1	Sufficient one	Engine driven	
	Lubricating oil pump	Gear	Each 1	Sufficient one	Engine driven	

2. Other Pumps (capacity and head to be indicated as standard.)

	Name	Type	No. of set	Capacity (about)	Head (about)	Motor	Remark
				(m^3/hr)	(m)	(KW)	
o	G.S. & fire pump	Centrifugal (self-priming)	1	40	20	5.5	Commonly used for stand-by main engine cooling and bilge
	Bilge & water circulation pump	Centrifugal (self-priming)	1	40	20	5.5	
*	Stern tube cooling water pump	Centrifugal	1	3	15	0.75	
	Fresh water service pump	Centrifugal				0.2	Home pump
	Sanitary pump	Centrifugal	1	10	20	2.2	
	Fuel oil transfer pump	Gear	1	8	20	2.2	
	Fuel oil service pump	Gear	1	3	15	0.75	
	Cooling pump for ref. machine	Centrifugal	1	20	14	1.5	for sea water cooler
	"	"	1	5	9	0.4	for fish hold
	Brine pump	Centrifugal	1	13	25	3.7	for sea water cooler
	Brine pump	Centrifugal	1	5	14	1.5	for fish hold
	Circulating pump	Centrifugal	1	13	19	1.5	for sea water cooler
	Cooling pump for ref. machine of air conditioning	Centrifugal	1	7	14	1.5	
	Circulating pump	Centrifugal	3	55	13	5.5	for bait hold
	Sprinkler pump	Centrifugal	1	115	20	11	

3. Impeller for sea water, bilge and fresh water handling pumps to be of cast bronze and shaft for them to be of 18-8 stainless steel.
4. Fresh water service pump to be automatically started and stopped by pressure of hydro-tank.
5. Fuel oil service pump to be automatically started and stopped by level of fuel oil gravity tank.
6. Pump with mark o to have start/stop switch and running indicator both at pump side and at control stand in wheel house, while pumps with mark * to have start/stop switch and running indicator both at pump side and engine room watching panel.
7. Hand pumps to be provided as necessary.
8. Each pump to be provided with vacuum gauge and pressure gauge for watching.

3.10 Oil Tanks

Following tanks to be installed in engine room. Capacity to be decided after discussion with supervisors.

Name	No.	Remark
Fuel oil gravity tank	1	
Lub. oil tank	1	in double bottom
Daily service lub, oil tank	1	
Washing oil tank	1	
Refrigerator oil tank	1	
Dirty oil tank (fuel oil, lub. oil)	2	
Other necessary tanks		

1. Inside of each tank to be washed and cleaned sufficiently. Each tank to be provided with level gauge, manhole, connecting pipe, air pipe, drain pipe, valves, cocks and other necessary fittings.
2. Fuel oil and lub. oil tanks to be provided with oil tray and dirty oil to be led to dirty oil tank.

3.11 Installation in Engine Room

1. Main engine, auxiliary engines, generators, switch board, air compressors, refrigerators, distilling plant, pumps, etc. to be arranged, considering easy maintenance and sufficient prevention of vibration. And dangerous parts to be insulated or protected from personal.
2. Ventilating ducts to be led in engine room and two (2) ventilating fans to feed and exhaust air. Natural ventilator to be also provided to feed air to engines sufficiently as well as to exhaust air in

engine room.

Inlet of ventilator to be constructed as free from sea water and spray entering.

3. Low sea chest, on which Kingston valves to be fitted, to be specially considered so as sea water flow not to be reduced at simultaneous operation of all machinery. High sea chest to be also provided as well as low one. Sea water sucked from high sea chest to be led only to main engine, auxiliary engines, refrigerators, general service pump and sanitary pump.

Sea chests to be provided with sea water blow-off valve for cleaning obstacles and air pipe, which to be led to upper deck.

4. I-beam and lifting gear to be provided to overhaul main engine. Overhauling equipments to be also provided above shafting, auxiliary engines, generators, etc.

Checkered steel plate to be laid on passages and necessary part in engine room and steel gratings, steel ladders, steel handrails, ventilating ducts, etc. to be arranged completely.

Around main engine handle, engine watching panel, electric engine telegraph, interphone and gong to be arranged and clinometer, thermometer, fire extinguisher, basin, etc. to be also provided at suitable place in engine room.

Engineer's store to be located at suitable place in engine room. Electric grinder (0.4 KW), electric drilling machine (0.2 KW), electric welder with accessories, gas welder with accessories, black board, vice, etc. to be installed and also necessary tools, boxes to be provided.

Door of engineer's store to be locked and shelves, hooks, etc. to be arranged according to indication of supervisors.

3.12 Exhaust Gas System

1. Each main and auxiliary engines to be provided with exhaust gas silencer respectively.
2. Funnel to be of steel plate and designed for good internal ventilation. Each exhaust gas pipe and silencer to be free from vibration and to be provided with expansion joint of stainless steel at necessary part. Furthermore they to be insulated strongly by asbest cloth of enough thickness.

3.13 Piping System

Piping in engine room to be arranged for machinery to be maintained easily and also arranged that drain, air, etc. not to stagnate in pipes.

1. Sea water, bilge and fresh water pipings.

All sea water, bilge and fresh water pipings to be of galvanized steel pipe. And pipings of inner dia. 40 mm and above to be galvanized after manufacturing.

Ballast piping to be arranged for appointed fuel oil tanks in order to be ballasted and deballast in emergency case.

2. Oil Pipes

Rotring filter or other suitable fine filter to be provided for fuel oil purification. As for spare elements same number of working ones to be supplied.

Fuel oil flow meter (one for M/E and one for gene. engines) to be provided on piping to each engine from fuel oil gravity tank to measure fuel oil consumption of main and auxiliary engines.

3.14 Painting and Name Plates

1. Kind, capacity and interval of exchange of lub. oil to be indicated by name plates for principal machines.
2. Filter to be provided with caution plate indicating interval and means of cleaning.
3. Machinery in engine room to be painted by anti-corrosive paint and also specified colors.
4. Pipings to be distinguished by colors for the purpose.
5. Name plates to be fitted on principal valves and gauges and on each tank name and capacity to be indicated.

3.15 Spare of Machinery Part

1. Spare to be provided in accordance with the Japanese Special Rules for Fishing Boats CLASS II.
2. Followings to be supplied. (including rules requirement)

(1) Each kind of packing : 1 set
Kind to be limited to especially necessary ones used actual piping for main and generator engine

(2) Fuel pump and fuel valve : Quantity for 1 unit each
for main and generator engine

(3) Inlet and exhaust valve for each engine:
for main and generator engine
Quantity for 1 unit each

(4) Piston ring : Quantity for 1 unit each
for main and generator engine

(5) Refrigerant for refrigerator (with bottle) 200 Kg

(6) Refrigerator oil 100 lit.

(7) Wess (white cotton) 100 Kg

3. Other spares for machines and equipments on this vessel to be supplied according to the Builder's or Maker's standard.

3.16 General Tools of Machinery Part

1. General tools to be supplied in accordance with the Japanese Special Rules for Fishing Boats Class II.
2. Followings to be supplied as well as tools necessary for overhauling assembling and maintenance of machinery. (including rules requirement)

Item	Quantity
Diary of ref. plant	3
Diary of machinery plant	3
Stop watch	1
Pressure indicator (for main engine)	1
Injection valve testing device (for main engine, aux. engine)	each 1 set
Grinding tool for valve (for main engine, aux. engine)	each 1 set
Deflection gauge (for main engine, aux. engine)	each 1 set
Bore gauge (with location gauge) (for main engine, aux. engine)	each 1 set
V - block	1 set
Steel straight edge (length 60 cm)	1
Steel scale (length 30 cm, 60 cm)	each 1
Steel tape measure (length 10 m)	1
Feeler gauge	3
Divider	1
Electric drill (0.4 KW, pistol type)	1
Drill for the above (up to 13 mm ϕ)	total 20
Flat file (rough, medium, fine)	each 2
Round file (do.)	each 2
Semi round file (do.)	each 2
Square-file (do.)	each 2
Triangle-shape file (do.)	each 2
Set files (10 pieces)	1
File handle	2
Brush for file	2
Steel hammer (hand)	2
Chipping hammer	2

Item	Quantity
Test hammer	1
Lead hammer	1
Beam clamp	4
Wedge (steel, wooden)	each 4
Scaffolding board	3
Square lumber for scaffolding	2
Combination pliers	2
Carborundum (rough, medium, fine)	each 2 cans
Emery cloth (#60, #120, #400)	each 50 sheets
Pical (kneading type)	3 cans
Bar (1 m)	1
Grease (300 C° high pressure 25 KG/can)	2 cans
Marking needle	2
Micrometer (inside, outside)	each 4
Surface plate (60 cm x 60 cm) (30 cm x 30 cm)	each 1
Surface gauge	1
Adjustable wrench (large, medium, small)	each 1
Ring spanner (each size)	total 20
Center punch	3
Hand drill	1
Drill for the above (each size)	total 120
Dies & tap (hand type, metric thread)	1 set
Packing knife	1
Cutting pliers	2
Cutting nipper	2
Pliers (flat & round)	each 1
Electric soldering iron (with solder & paste)	1 set
Vice (large, small)	each 1
Torch lamp (small type)	1
Dry cell (1.5 V, U-1)	20
Steel tackle (single sheave, with rope)	1 set
Wooden tackle (single sheave, with rope)	1 set
Tongs for forging (round and flat)	each 1
Electric torch (with 2 cells)	3
Bucket (polyethylene made)	2
Tachometer (hasler type)	2

Item	Quantity
Rust scraper	2
Thermometer (100°C, 500°C)	each 6
Ignision wrench (7 pieces)	1 set
Socket wrench (1/4 - 3/4)	each 1
Pipe wrench (large, middle, small)	each 1
Manila rope (12 mm dia., 16 mm dia.)	each 100 m
Wire rope (9 mm dia., 12 mm dia.)	each 100 m
Chain block (1 ton, 0.5 ton)	each 1
Sand box	2
Belt punch (4, 6, 8, 10, 13, 17, 20, 23, 26 mm)	each 1
Chisel (each kind)	total 100
Scissors for tin (flat, round & willowech)	each 1
Scissors for packing	1
Hacksaw flame (with one dozen blades)	2 sets
Oil feeder (mouse type)	5
Oil feeder (trumpet type)	5
Turning tool for valve handle (large, medium, small)	each 1
Jack (large, small)	each 2
Swage block	1
Pulley knocker (large, small)	each 1
Hydraulic jack	1
Sand paper	20
Vernier calipers	2
Figure punch, the Roman alphabet punch	each 1 set
Three bond (No. 1, No. 2)	each 1
Collapsible chair	5
Oil funnel (large and small)	each 1
Black board	1
Wooden hammer	2
Shackle (12, 18, 22, 30 mm)	each 2
Small oil can (1 lit, 2 lit)	each 1
Flashing tray (large 1, middle 3, small 3)	7
Radio plier	1
Nipper pliers	1
Cutting pliers, electric insulated	1
Folding scale	2

Item	Quantity
Spanner (each kind, each size)	total 20
Box spanner (each size)	total 20
Screwdriver (large, medium, small)	each 1
Oil stone	2
Electric disc sander	1
Wire brush (Teeth brush type)	3
Spray gun	1
Sounding scale (for oil, water)	each 1
Steel wire binded vinyl hose (for oil and water)	each 1
Oil sylinge	1
Anvil	1
Bellows	1
Bolt & nut, steel plate, zinc plate (0.32 mm), steel bar, steel pipe, washer, split pin, steel wire, copper plate, etc. (for repairs)	some
Shoe mat	3
Rubber hose for dusting (10 m, 5 m)	each 1
Wing pump	1
Oxygen with bottle	3
Acetylene with bottle	1
Arc welding rod (3.2 mm, 4 mm)	each 15 KG
Low temperature welding rod (3.2 mm)	5 KG
Gas welding rod (3.2 mm steel)	10 KG
Do. (3.2 mm brass)	10 KG
Glass for welding protector (50 mm x 100 mm, transparent one)	3
Do. (50 mm x 100 mm, dark blue)	1
Do. (50 mm x 100 mm, light blue)	2

CHAPTER 4. ELECTRIC PART

4.1 General Description

Electric power distribution system to be as follows.

Main source	Ship's main generator	AC 225 V 3φ 60 Hz	General power equipments.
		AC 105 V 1φ 50 Hz	General lighting, heaters, radio equipments, small appliances, measuring equipments, interior communication equipments, etc.
Auxiliary source	Ship's storage battery	DC 24 V	Emergency lights, interior communication and alarm equipments, etc.

4.2 Electric Source and Transformer

1. Main generator 2 sets

   AC 225 V 3φ 60 Hz, 110 KVA 1200 rpm

   Each generator is to be drip-proof and self-excited type

2. Transformer 1 set

   Primary 225 V/220 V Secondary 105 V

   1φ 60 Hz 20 KVA

   Drip-proof, dry and self-cooling type of B class insulation,

   Scott connection.

4.3 Auxiliary Source

Following storage battery and rectifier (for battery charging) to be provided as auxiliary source.

1. Storage battery

   For emergency lights 24 V 200 AH 1 set

   For radio equipments 24 V 200 AH 1 set

2. Silicon rectifier

   Input AC 220 V 3φ 60 Hz

   Output DC 22 V - 35 V Sufficient current capacity

   Rectifier to be of full-wave rectification and to have a condensation and rarefaction voltage adjuster.

   Charging of battery for emergency lights to be float-charging.

   Charging and discharging of battery for radio equipments to be controlled at the radio switchboard.

4.4 Switchboard

1. Construction

   The switchboard to be of self-supported and dead front type and to consist of print painted steel plate and steel angle, which keeps electrical good contacts.

Suitable ground terminal to be fitted with framework, which to be grounded perfectly.

Hand rail, panel light (fluorescent light) and emergency light to be provided in front of the switchboard.

Insulating material to be of choice goods carried out perfect moisture-proof treatment on processing surface.

Floor surrounding the switchboard to be covered with non-skid insulating mat and due consideration for anti-danger to be necessary.

2. Device

The switchboard to have incoming circuits of main source and auxiliary source.

Main generators to be capable of running in parallel at any time easily.

Necessary disconnecting switch, switch, change over switch, push botton switch, etc. and following instruments to be provided in the switchboard.

(1) Measuring instrument

Voltmeter (AC and DC)

Ammeter (")

Wattmeter (AC)

Frequencymeter

Synchroscope (meter type with synchronizing lamps)

Others

(2) Protective device

Three (3) poles type air circuit breaker with inverse time trip and instantaneous trip device (more than 2 poles)

Reverse power reley

Rectifier with reverse current interrupting device (for pre-exciting)

Cellolite fuse

Non-fuse breaker

Others

(3) Watching device

Each source indicating lamp

Air circuit breaker "ON" "OFF" indicating lamp

Earth lamp

Charging indicating lamp

Others

(4) Emergency light auto-exchanger (with indicating lamp)

(5) Pre-exciting device

(6) Other necessary device

3. Others

(1) Meters permitted change over using to be capable of change over using after approval.

(2) Precision of ammeter and voltmeter to be class 1.5.

4.5 Power Device

1. Motors and accessories for machines to be completely carried out wiring and connection.

2. Starter for motor of automatic operation to have auto-manual change over switch.

3. Starter and speed controller to have source lamp and ammeter except for special ones.

4. Starter to be auto-starter with source disconnecting switch (manual).

5. Suitable number of spare concents for AC 220 V power device to be provided at appointed places.

4.6 Lighting Device

1. General lighting

(1) At the suitable points of the lighting wire way, necessary section and distribution box, cable connection box and junction box to be provided, through that cables to each lamps and lighting fixtures to be wired.

(2) Bed light to have a milk-white globe.

(3) Ceiling light in the accommodation space, to be fitted at the ceiling directly.

(4) Lighting fixtures provided at the space exposed to some mechanical damage, such as engine room, steering engine room, store, outer passage, etc., to have protective metal fitting.

(5) Lighting fixtures and accessories provided at the exposed space and high humidity space to be of the water-tight type.

(6) Fluorescent light to be what does not give the inductive interference to the communication wire way and devices.

(7) Emergency lights to be combined in the ordinary lights in principal, but according the fitting space, emergency lights to be provided individually as the ordinary lights after approval.

(8) Lighting fixtures and concents may be increased within each 5.

(9) Navigation light indicator panel for navigation lights to be provided in the wheel house.

2. Standard installation lighting to be as follows.

(1) Electric service for ceiling lights, desk lights and bed lights to be A.C. 100 V, and for emergency lights to be D.C. 24 V.

(2) Spare plug sockets to be installed separately as following table, and its capacity to be 105 V - 10 A.

Kind / Place	Ceiling light		Desk light		Bed light		Emergency light		Spare plug socket	Remark
	W	No.	W	No.	W	No.	W	No.		
1. Room Light										
Wheel house	(20)	4	60	1			10	1	2	Desk light to be chart table light
Captain's room	(20)	1	15	1	(10)	1				Desk light to be attached on a wall
No.2 crew's room	(20)	2			(10)	12			2	Mirror lamp (15) x 1
No.3 crew's room	(15)	1			(10)	2				
No.1 crew's room	(20)	3			(10)	8			2	
Mess room & Galley	(20)	5					5	1	2	
No.1 toilet	(15)	1								
No.2 toilet	(15)	1								
Bo'sn store	60	2							1	
Provision store	40	each 1								
Aft store	60	2							2	
Steering engine room	(20)	2							1	
Engine room	(20) 60	8 4							2	
Engine room opening	(20) 60	2 2							2	
Battery room	(15)	1								
Companion	(15)	1							1	
Engine store	(20)	1							1	

Kind / Place	General light		Emergency light		Remark
	W	No.	W	No.	
2. Outside Light					
Fore wall of wheel house	60	1	10	1	
Side wall of wheel house	60	each 1	10	each 1	
Aft wall of wheel house	60	1	10	1	
Side wall of deck house	60	each 2	10	each 2	
Aft wall of deck house	60	1	10	1	
Aft wall of companion	60	1	10	1	
3. Working Light					
Search light	2,000	1			
Working light	500,	6			
4. Portable Light					
Deck part	60	3			With captire cord (10 m)
Engine part	60	2			With captire cord (10 m)
5. Others					
Navigation light	40	1 set			
Anchoring light			40	1	
Fishing light		1 set			
Magnetic compass	10	each 1			
Fishing lamp (above water)	1,000	1			
Fishing lamp (under water)	1,500	2			

Note: ( ) mark to indicate fluorescent light.
Others to indicate incandescent light.

4.7 Marks

Inboard electric wire and plug sockets to be fitted with marks at suitable position, to discriminate easily A.C. or D.C. and kind of voltage.

4.8 Spare Parts of Electric Part

1. Spare parts of generator (with exciter), electric motor, starter and switch board to be supplied in accordance with manufacturer's supplying standard.
2. Five spare electric light bulbs to be supplied for each candle power. One search light bulb and two working light bulbs and three fishing lamp bulbs to be supplied for spare respectively.
3. Each kind of fuse to be supplied in suitable number.

4.9 Supplementary Outfit of Electric Part

1. D.C. 500 V megger	1
2. Universal tester	1
3. Grease pump	1
4. Tools for repair and overhaul	1 set

CHAPTER 5. MISCELLANEOUS TESTS AND PLANS

5.1 Miscellaneous Tests

1. Shop Tests

About principle machines and equipments described in this specification, shop tests to be carried out, and if necessary, supervisors to be present at shop tests.

2. Final Tests

After completion, in the presence of supervisors, following official trials and performance tests to be carried out.

Builders to supply all articles consumed at tests; fuel oil, lubricating oil and so on.

(1) Sea Trials

(a) Between mile posts, progressive speed trials at 1/4, 2/4, 3/4, 4/4 of main engine output and dead slow speed trial to be carried out, and during these periods, followings to be carried out besides speed measuring.

Temperature and pressure of each kind of oil, sea water, air, gas. Revolution of engine, Fuel oil consumption, Torsional vibration.

(b) During trials, following tests to be carried out timely.

Turning test, Steering test, Anchor test, Main engine starting test, Inertia test, Go-ahead, and go-stern test, Clutch test, Hull vibration and noise measurement, Main engine remote control test, Governer test, Others appointed.

(2) Performance Tests

After completion, following tests to be carried out.

(a) Hull Part

Inclining test, Rolling test, Navigation and measuring instrument test, Communication and signalling test, Ventilating test, Fishing gear test, Radio apparatus test, Galley equipment test, Deck machinery test, Lighting test, Air conditioning test, Fish hold cooling test, Others appointed.

(b) Machinery Part and Electric Part

Generator test, Refrigerating plant test, Electric apparatus test, Pumps (piping) test, Distilling plant test, Others appointed.

(c) Others appointed by supervisors.

5.2 Approval Drawings and Final Drawings

1. Approval Drawings

In line with specifications and attached plans, following approval drawings to be submitted to supervisors for approval and to be returned to builder with supervisors' signature of approval before laying down.

(1) General

General arrangement, Lines, Hydrostatic curves, Weight & CG calculation, Cross curves, Stability calculation, Stability curves, Free board calculation, Gross tonnage calculation, Assumed power calculation (Propeller calculation), Capacity plan, Principal particulars of hull, machinery & electric part, List of makers & type of main equipments, Methods of tests, Schedule.

(2) Hull Part

Midship section, Shell expansion, Construction profile & plans.
Hull strength calculation,
Construction of engine bed,
Construction of rudder, Construction of stern frame,
Block plan of hull construction,

Deck outfitting arrangement, Wheel house arrangement, Accommodation plan, Deck piping diagram, Navigation meter plan, Radio equipment arrangement, Measuring equipment plan, Deck machinery, Air conditioning arrangement, Fishing gear plan, Mast plan, Painting scheme, Anticorrosion plan, Ventilation arrangement, Fishing apparatus arrangement, Insulation plan of fish hold, Inventory.

(3) Machinery Part

Engine room arrangement, Main engine, Shafting & propeller, Auxiliary engine, Pumps, Air compressor & reservoirs, Piping diagram in engine room, Main engine remote control system, Torsional vibration calculation of main engine, Bottom valve plan, Cooling system, Distilling plant, Inventory.

(4) Electric Part

Switchboard, Generator & main motors, One line diagram of electric power system, Electric load analysis table, Electric equipment arrangement.

(5) Others

Other appointed by supervisors.

2. Final drawings

Final drawings to be the said approval drawings and followings. Finished principal particulars, Results of miscellaneous tests, Instruction book of principal apparatus (in English), Inventory, Docking plan, Framed color photo (ones of this vessel sailing, quater size, 5 sheets), Color photograph noted principal particulars (300 sheets, postal size)

3. The number of approval drawings and final drawings to be decided according to understanding.

5.3 Appendix

1. Doubt occurring about this specification and drawings to be decided upon deliberation with supervisors.
2. Purchase of principal machines, apparatus, etc. to be deliberated with supervisors beforehand.
3. Change of general arrangement owing to purchased machines, apparatus, etc. to be deliberated with supervisors.
4. Grade of miscellaneous machines, apparatus, cloth, etc. to be deliberated with supervisors.
5. Double described item and note in this specifications to be decided in accordance with the principal article.
6. The small items about size and arrangement described in this specification to be changed with supervisors approval, if they were admitted not to spoil necessary performance of this vessel.

(E n d)