

**7000 DWT IMO II CHEMICAL/OIL TANKER
OUTLINE SPECIFICATION**



SOLi SHIPYARD

HULL NO: NB.08, NB.09, NB.10, NB11

**OUTLINE SPECIFICATION FOR OIL TANKER/CHEMICAL TANKER
IMO TYPE II (EPOXY COATED TANK) /7000 DWT/ 8000 m³**

REV.1, 05.11.2007

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1. GENERAL DESCRIPTIONS:

Single screw diesel driven Tanker for Oil Products and certain Chemicals according to the vessel's technical specification, I.M.O. II Type vessel with Marine Line coated cargo tanks.

- * The vessel to be built with one continuous single deck from fore to aft.
- * Four-tier accommodation block located above poop deck aft, with wheelhouse offering all-round vision located above.
- * Five corrugated main transverse bulkheads subdividing the cargo area below main deck.
- * One (1) longitudinal center bulkhead in cargo area.
- * Water ballast tank in double bottom, double skin and fore peak tank.
- * HFO / DO tanks in a way of engine room to be arranged. (Clean Sea Location with double walls to sea)
- * Stainless Steel Heating Coils to be installed in cargo tanks slop tanks.
- * Gangway above main deck from poop to fore castle deck.
- * Pump room is be arranged.
- * Asymmetric and alternative tank loading is allowable.

2. INTENDED CARGOES:

- * Chemicals, IMO type II
- * Petroleum products
- * Vegetable, animal and fish oils.

3. PRINCIPLE DIMENSIONS:

Loa	109,92 m
Lbp	103,18 m
B (Mid.)	17,20 m
Depth main deck	8,80 m
Design draught	7,10 m

4. TONNAGE AND CAPACITY:

4.1 Tonnage:

- Deadweight : about 7,000 mts
- Gross Tonnage : about 4920

4.2 Capacity:

Cargo & Slop (CBM at 100 %)

Cargo Tank No : 1P	557 m ³
Cargo Tank No : 1S	559 m ³
Cargo Tank No : 2P	632 m ³
Cargo Tank No : 2S	636 m ³
Cargo Tank No : 3P	657 m ³

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Cargo Tank No : 3S	653 m ³
Cargo Tank No : 4P	900 m ³
Cargo Tank No : 4S	904 m ³
Cargo Tank No : 5P	287 m ³
Cargo Tank No : 5S	283 m ³
Cargo Tank No : 6P	840 m ³
Cargo Tank No : 6S	844 m ³
Deck Tank No P:	131 m ³ (SLOP)
Deck Tank No S:	131m ³ (SLOP)

TOTAL **8018 m³**

Fuel Oil Tanks abt.	: 511 m ³
Diesel Oil abt.	: 88 m ³
Fresh Water abt.	: 110 m ³
Technical F.W abt.	: 216 m ³
Sea Water Ballast abt.	: 2684 m ³

5. SPEED AND ENDURANCE :

5.1 Service & Trial speed

The service speed of about 14.2 knots will be achieved with the main engine working at 85% M.C.R., 5% sea margin and propeller speed of 142 RPM at about 7.10 draught.

5.2 Fuel Consumption

Estimated Heavy Fuel Oil Consumption at 85% MCR : 13 m.tons/day. Fuel consumption is calculated 182 g/kWh.

5.3 Range

Cruising range will be approx. 10000 nautical miles at 14.2 knot service speed using only HFO with 5 % unusable fuel and without cargo heating.

6. CLASSIFICATION

BV, I + HULL + MACH, OIL TANKER/CHEMICAL TANKER, ESP, UNRESTRICTED NAVIGATION, +AUT-IMS, CLEANSHIP, AVM-APS, MONSHAFT, INWATERSURVEY, CARGO CONTROL, IG, SYS-NEQ1, SYS-COM, VCS-TRANSFER, MANOUVR, AUT-PORT, COMF

The design and construction of the vessel and selection of requirement for installation onboard to be based the latest and amendments of the following regulations:

- Flag State's Rules and Regulations.
- International Convention for the Safety of Life at Sea, 1974 (SOLAS), incl. Protocols and amendments.
- International convention for the Prevention of Pollution from ships 1973 together with protocol of 1978 - MARPOL 73/78, including proposed amendments and Unified Interpretation of the Provisions of Annex I, II, IV and V IMO 1983, Annex VI 1997

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- International Convention on Load Lines, 1966, incl. Supplements and amendments.
- International Convention on Tonnage Measurements of Ships 1969
- Convention on the International Regulations for Preventing Collisions at Sea, 1972 with the amendments of 1981, 1987 and 1989 and later resolution and amendments
- IMO-IBC Code, International Code for the construction and Equipment of Ship Carrying Dangerous Chemicals in Bulk. Type II vessels, incorporating amendments to date

- USCG's regulations for vapor return control system CFR 46 Part 39.

- Rules and Regulations, including Tonnage measurement, governing navigation in Panama Canal and in Suez Canal

- International Telecommunications and Radio Regulations 1985/86 with annexes and revisions
- Suez Canal Navigation Regulations
- IEC Compliance for Electric installations (1992)
- Recommendations of Exxon minimum safety criteria 2002
- Recommendations of O.C.I.M.F. for oil tanker manifolds (where applicable)
- Recommendations of O.C.I.M.F. for Effective mooring arrangement (where applicable)

Note: - OCIMF and Exxon minimum safety criteria to be adapted as far as applicable for this size of vessel.
-The vessel to comply with the latest edition of the above regulations prior to date of keel laying.

7. COMPLEMENT (up to Flag State rules)

Captain Class Officer : 4
Engineer Officer : 3
Crews : 11
Total Complement : 18

8. HULL STRUCTURE

Within cargo area, in tanks and weather exposed areas, bulb profiles to be used. All structural steel is to be free from rust pitting, cracks, laminations or any other defects.

The hull to be built with longitudinal stiffeners and transverse web-frames in cargo area, outside cargo area transverse framing will be used. Longitudinal stiffening to overlap into pump room as required to ensure longitudinal continuity.

A continuous double bottom to be fitted. The double bottom to be sloped in cargo area. All transverse deck webs and deck longitudinal in way of cargo tanks to be fitted above deck.

Pump room will be arranged.

Longitudinal side bulkheads in cargo area to be of plane type with stiffeners facing into side tanks. Upper part of bulkhead, to incline towards centerline.

Transverse bulkheads and longitudinal bulkhead in CL to be of corrugated type. Cargo tanks and slop tanks to be designed for

The vessel is a single screw, double hull vessel, which is capable to carry the cargo a large range of liquid cargoes IMO II type, petroleum products and vegetable oils.

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The hull is designed with bulbous bow, raked stem and transom stern and withstands cargoes of specific gravity 1.54 t/m³ at 80 C. The service area is unrestricted. The construction also enables both asymmetric and alternate loading conditions for cargo tanks.

9. PAINT&COATING SPECIFICATION

* Abrasion resistant mastic epoxy system is used for the underwater surfaces sufficient for 5 years dry docking intervals. Marine Line coating shall be applied in cargo tanks.

10. HULL PROTECTION

Aluminium anodes to be fitted for protection of hull, rudder and propeller. Number of anodes to be recommended by manufacturer, sufficient for 5 years protection.

11. MANOEUVRING SYSTEM

11.1 Rudder

- One flap type rudder, able turn to 2x45 degrees

11.2 Rudder Machinery

- Rotary Vane Steering System,
- 170 kNm effective tork
- 2 x 45 degree rudder angle

11.3 Bow Thruster

- One (1) FP electric driven tunnel thruster
- Capacity: 450 kW
- Propeller type & diameter:FP type & abt.1240 mm.
- Maker : Schottel

12. ANCHORING AND MOORING EQUIPMENT

Equipment number of the vessel is 1078

Anchors :

- 2 x 2475 Kgs and to be HHP.

Anchor Chains :

- Chain cable of ϕ 46 mm. Q3 steel 27.5 mtrs x 18 length,
- Insurance rope etc. To be supplied acc. to class requirements.

Windlass :

- Two (2) pieces electric hydraulic combined anchor mooring winches for chain 46 mm. Q3 with one chain whells, two (split) mooring drum and one warping head.
- SWL 8 ton pull, 45 m/min loose rope speed.

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Aft Mooring Winches :

- Two (2) pieces electric hydraulic mooring winches with one (split) drum and one warping head on the poop deck aft.
- swl 8 ton pull, 50 m/min loose rope speed
- All winches to have manual controls.

13. DECK OUTFITTING

13.1 Combined Rescue Boat&Liferaft&Provision Crane

- One electro-hydraulic combined launching&stores and provision crane to be fitted,
- SWL 1.5 ton min. approximately 6.5 m. outreach,
- In case of emergency, lifting by hydraulic hand-pump,

13.2 Cargo Hose Crane

- One hydraulic hose-handling crane,
- SWL 5 ton, at max. outreach 16 m.

14. LIFE SAVING EQUIPMENT

- * One (1) free fall life enclosed boat 28 persons
- * One (1) MOB boat with hook release device
- * Two (2) inflatable life rafts. Cap. 25 persons (one davit-launched).
- * Survival suits acc. to SOLAS requirements.

15. HATCHES AND MANHOLES

- Cargo Tank Hatches : abt. 910 mm 14 pcs
- Portable Cleaning&Ventilation Hatches : abt 320 mm 25 pcs.
- Other access hatches, manholes and working holes shall be fitted acc. to rule and yard practice.

16. CARGO HANDLING SYSTEM

- Segregation : Fourteen (14) Segregation with double valves
- Cargo Sys. : The sys.have butterfly Valve capable of being remotely operated on each tank filling and discharge line and two manually operated butterfly valves manifold line port and starboard.
- Unloading Rate : 250 m³/h per tank,
- Loading Rate : 500 m³/h per tank, max.loading 1385 m³/h

- Cargo Pumps

- 12 pcs. 250 m³/h, 100 mlc + 2 pcs. 100m³/h, 100 mlc (for Slop tank)

16.1 Portable Cargo Pump

- One (1) pcs. Hydraulic driven transportable cargo pumps Cap: 70m³/h, 70 mlc, 1 set of 12 m. Hydrolic hose mounted on pump with cont. Valve and quick couplings, 1 tripot winch for hoisting.

16.2 Cargo Lines

- All cargo pipes to be DN150 stainless steel, AISI 316 L

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- All cargo valves to be of AISI 316 L stainless steel, wafer type, double eccentric, drop tight butterfly type valves.

16.3 Cargo Tank Washing

Tank wash lines to be designed for simultaneous operation of a total of four (4) machines.

The fixed tank washing system to be arranged with the following capabilities:

- * Washing with hot and cold fresh water&sea water.
- * All operation of tank cleaning system to be from open deck.
- * Each cargo and slop tank to be fitted with tank-washing hatches for use of portable machines.
- * Tank Washing Machine : abb. 24 pcs Fixed Tank Cleaning Machine (will be arrange to shadow diagrams) is about 15 m³/h, 10 bar, twin Nozzle, including hoses, ball valves with cam lock male coupling. 2 pcs Portable Tank Cleaning Machines will be provided which is ab.8 m³/h, 10 bar inlet pressure with necessary hoses, valves, quick couplings.
- * One tank cleaning pump arranged of 80 m³/h at 13 Bar
- * Tank cleaning heater situated in Heat Exchange Room, capacity 3600 kW which Works 4 fixed machine simultaneously when tem. difference 75 C

16.4 Cargo Sampling

- * One (1) store room to be arranged for cargo samples in accordance with the IBC-code.
- * Two hermetic sampling devices to be onboard.

16.5 Cargo Tank Venting System

- * All cargo and slope tanks have separate controlled tank venting system which pressure/vacuum valve system. These system keep the tank pressure 0.20 bar and 0.035 bar maximum. The PV valves are combined two group PV vent post aft and fore manifold. Pipes are designed so that self draining to the tanks any condition of the ship and to keep pressure drop minimum.
- * 12 pcs.+ 2 pcs.(slop tanks) P/V valves, material GGG.40 Body and SS 316 L trim.
- * Tank ventilation pipes are DN 100 SCH 5S min st-steel 316 L
- * The estimated loading capacity of to each tank are 500 m³/h
- * The estimated unloading capacity from each tank are 250 m³/h

16.6 Cargo Vapour Return

- * Vapour return manifolds midship from main cargo lines. System is designed that vapour line connected to the each tank ventilation pipes by means of the spectacle flange. Vapour Pipe is DN 125 arranged aft and fore of the manifold . Vapour manifold valves is DN 125 PN 16 St-Steel butterfly valves. The estimated loading capacity while using vapour line is 1385 m³/h

16.7 Cargo Tank Drying&Ventilation

- * Tank venting by means of central fan system.(about 15000 m³/h hot air by steam heater)
- * 1 portable fans, air driven.

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- * Gas freeing fan is anti sparking type and its electric motor is suitable ex-proof type. Gas freeing line is connect to the cargo tanks by means of the flexible hoses.

16.8 Cargo heating

- * Cargo and Slop Tanks heating coils are DN 50 SCH 10S 316 L stainless steel, single loop in cargo and slop tanks are arranged.
- * Heating Medium is Hot Water, 260/220 C . Cargo heater capacity is about 2000 kW
- * Heating up capacity : 7 C / day for HFO
- * Maintain Cap. : 5 deg.C/day, maintain 6.HFO at 66 deg.C

16.9 Cargo Level Gauging

- * A closed ullage measurement system to be fitted for each cargo-and slop tank, incl. integrated high-high level alarms at 98% filling.The level gauging system to have readout in cargo control room.
- * Separate high/high-high level system to be fitted for each cargo-and slop tank,incl. integrated high level alarms at 95%filling.The level gauging system to have readout in cargo control room.
- * Aft and forward ship's point draft measurement.
- * Cargo temp. sensors (two or points) for each cargo and slope tanks
- * All ballast tank levels and service tanks which are above 30m³ levels shall be monitored from Cargo Room
- * Manual ullage system (MMC) to be arranged for all cargo tank and slop tanks, additional to the remote system.
- * One hermetic UTI tapes to be onboard.

16.10 Cargo Controls

The following cargo control equipment to be fitted in cargo control room:

- * Remote control of cargo pumps and slop pumps, ballast and tank washing pumps incl. START/STOP, rpm and delivered pressure gauges.
- * Remote ullage measurement of all cargo and slop tanks
- * Temp. and high level alarm in all cargo tanks
- * Temp. monitoring of all cargo and slop tanks
- * Loading measurement
- * Remote level gauging of all ballast tanks
- * Controls&Indicators showing position of valves in cargo system.
- * Loading computer with two (2) terminals and display unit, printer installed in cargo control room.
- * Valve Remote System by mimic panel.

16.11 Cargo Tank Ladders

- * St.steel 316 L inclined

17. BALLAST SYSTEM

- * Ballast tanks&piping is fully segregated from cargo system.
- * No ballast tank is located aft of cargo area. Ballast tanks are located surrounding cargo area and fore side.
- * Ballast valves are operated from Cargo Control Room by hydraulic remote system.

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- * Ballast pumps : 2 pcs. 300 m³/h
- * Pump Location : Inside Pump Room
- * Ballast Valves : Hydraulic Actuated vafer type fully controlled from Cargo Room.

18. OIL CONTENT METER

- * An overboard discharge oil content monitoring system to be installed in accordance with regulations (MARPOL I and II)
- * Chemical discharge pipe DN 150 is connected to the cargo manifold common line by means of the spool pieces.
- * ODME Sys. is installed in Pump room with overboard & slope return valves.
- * Chemical discharge pipe is arranged on Portside

19. ACCOMODATION

18 Single cabins, cabin with en-suite facilities. Study space in the cabins of captain and chief engineer.

- * Captain cabin, at second deck
- * Chief Engineer cabin, at second deck
- * Owner&Pilot room, at second deck
- * 2nd Officer cabin, at second deck
- * 3rd Officer cabin, at second deck
- * 3rd Engineer cabin, at second deck
- * 2 crew cabins, at second deck
- * Two stores, at second deck
- * 1st Officer cabin, at first deck.
- * 2nd Engineer cabin, at first deck
- * 8 crew cabin, at first deck
- * Hospital at first deck
- * Laundry at first deck
- * One store at first deck
- * 1 Galley, at poop deck.
- * Provision&Dry provision room,at poop deck.
- * Combined mess/dayroom for crew, at poop deck.
- * Combined mess/dayroom for officers, at poop deck.
- * Dressing room and shower at poop deck
- * Ship Office at poop deck.
- * Cargo control room at poop deck.
- * Fire – resistant modular paneling system to be used in accommodation
- * Wet units to be conventional modular type.

Accommodation Ladder/gangway

One (1) Aluminium portable ladder

Heating / Ventilation / A.C.

- * All cabins and day-rooms to be provided with a middle pressure single duct air conditioning system, designed to cool or heat the supply air.
- * Air flow to each cabin to be individually controlled from each cabin.

Design Data :

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Summer 35 C – 70 % RH outside
Accommodation 27 C – 50 % RH outside
Seawater temp 32 C

Winter - 20 C outside
Accommodation + 20 C
Seawater temp. 0 C

Fresh Air Rate 50 %
Re-circulation rate 50 %

Cooling Section : with cooling for direct expansion R404a. with cooling capacity of 102 kW.

Heating Section : with coils suitable for steam, with capacity of 109 kW.

Ventilation

PLACE	FAN CAPACITY(m3/h)	AIR CHANGE PERIOD IN HOUR	EXHAUST/SUPPLY	QUANT.
ENGINE ROOM	70.000			
BOW THRS. ROOM	2.500	15	EXHAUST	
PUMP ROOM	5.400	45	EXHAUST	
PAINT STORE	700	15	EXHAUST	
SEPARATOR ROOM	2.500	50	EXHAUST	
GALLEY	2.000	20	EXHAUST	
EMG. GEN. ROOM	1.000	60	SUPPLY	
SAMPLE ROOM	500	45	EXHAUST	
CO2 ROOM	450	15	EXHAUST	
TANK DRYING	15.000	6	SUPPLY	
DRY PROVISION	750	10	EXHAUST	
SANITARY SPACES	1050	6	EXHAUST	

Sanitary system

- * Fresh water generator
- * UV sterilizer and hardener
- * Sewage treatment plant
- * Fresh water supply system
- * Hot water supply/circ. system
- * Hot water heater in engine room
- * Sanitary/sewage discharge system

Isolation of accommodation areas and engine room

- Isolation of normal accommodation areas' side walls and ceilings to be 50 mm thickness ROCKWOOL material with 32 g/m³ density.
- Isolation of adjacent bulkheads , floors to engine room to be A-60 by 30mm+ 30mm thickness ROCKWOOL material with 130 gr/m³ density .

Interior panelling , doors and furnitures

- Side and bulkhead panels to be 25 mm thickness standard sandwich type panels with one side (interior side) decorated PVC covered galvanized steel , other side (blind side) to be galvanized steel and 25mm rockwool between two shells .

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- Separation panels to be 50 mm thickness standard sandwich type panels with both sides decorated PVC covered galvanized steel and 50mm rockwool between two shells.
- Ceilings panels to be 30 mm thickness standard sandwich type panels with one side (interior side) decorated PVC covered galvanized steel , other side (blind side) to be galvanized steel and 30mm rockwool between two shells .
- All edge joints of side and ceiling panels to be covered by aluminium joint bars.
- Doors to be same material as panels with ventilation ducks and self closing devices.

Interior floors

- Accomodation floors; cabins, wheelhouse, internal corridors to be straightened with special light concrete and thinner final layer. Finally to be covered with decorative PVC floor material according to class rules.
- Wet floors like, cold stores, galley, toilets and showers to be isolated against leakage and then to be straightened with special light concrete and finally to be covered with decorative ceramics.

20. SYSTEM FOR MACHINERY AND COMPONENTS

GENERAL

Machinery System will be built according to diagrams approved by the Classification Society, National Authorities and Manufacturer recommondations

Pumps preferable to be of vertical type and as far as possible and of the same maker. All pumps shall be installed above the floorings where applicable.

All pumps will have mechanical seals, unless otherwise is specified and will be provided with necessary spares.

Sea water cooling pumps will have casing of bronze, shaft of stainless steel, impeller of al. bronze. All pumps shall be equipped with manometer / vacuum meter.

Cooler and heaters will be equipped with termometer on inlet and outlets.

Water pumps and cooler capacities shall be determined from calculations based on sea water temparatures of 32 C and engines running at MCR. Piping lines will have sufficent drain with plugs.

Where it is necessary, expansion joints, compansators or other expansions possibilities will be installed, particularly cooling water and the steam systems.

Fuel oil, steam and lube oil pipes to be shielded against heat sources where necessary. Flanged connections will be used for pipe dimension ND 50 and bigger. Fittings will be used for high pressure pipes and less than ND 50 where applicable.

All valves, pumps, tanks, starters, ventilation and filling pipes etc. have to be clearly marked with name plates of metal to be used outside and E/R, plastic to be used inside accommodation, service rooms etc.

MATERIALS

- Sea water pipes galvanised mild steel
- Fresh water pipes mild steel
- Domestic water pipes galvanised mild steel

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- Sawage pipes galvanised mild steel,
- Fuel oil pipes mild steel
- Lube oil pipes mild steel
- Bilge and Balast pipes galvanised mild steel
- Fire and Foam lines galvanised mild steel
- Cargo lines St-Steel
- Tank Ventilation Lines St-Steel
- ODME & Underwater discharge St-Steel
- Cargo Drains St-Steel
- Cargo Tank Heating Coils St-Steel
- Steam pipes in E/R and open deck mild steel
- Hydraulic oil for valves remote cont. St-Steel
- Compressed air pipes mild steel
- Tank Cleaning and drying pipes galvanised mild steel

20.1 MAIN ENGINE

Type : MAN 7L-32/40 One medium speed, 7 cylinders, clockwise rotation, four stroke cycle, Compressed air starting, HFO max. viscosity 738 cst at 50 C, turbocharged, quality requirement to CIMAC

Output/rpm : 3500 kW at 750 rpm

Fuel Oil : H.F.O. 380 cst at 50 C and M.D.O.

Air Temp. : 45 C

Cool.Wat.T. : 38 C % 60 Humidity

S.F.O.C. : 179 g/kWh at % 85 with 5% allowance

Referance Cond.: ISO 3046, Cal.Value. 42.700 kJ/kg, 1 bar, intake air temp. 25 C, charge air temp 45 C, Cool.Wat.Inlet Temp. Charge air cool. 25 C

NOx Emission : Acc. to MARPOL 73/78 Annex IV

Remote Control : W/H, E.C.R. and local stand

Accessories : according to makers standarts.

21. PROPELLER AND SHAFTING

Proppeller Hub & Blades : Controlled Pitch Propulsion (CPP) type, The propeller hub is made of non – split design. The pitch adjustment and its Hydraulic servo-cylinder inside the hub. The connection of the blades to the hub is done by 4 bolts located on yhe pressure side and 3 bolts on the suction side. The blades will be delivered machined, polished, varnished and statically balanced acc. to ISO R484, class I.

Hub material : G – CuAl 10Ni

Blade material : G – CuAl 10Ni

Propeller speed : 142 rpm

Propeller diameter : 4200 mm.

Number of blades : 4

Maker : BERG

1 pc. Propeller Shaft :

Hollow-bored shaft made of forged steel to run in an oil-lubricated stern tube. The flange coupling is hydraulically fitted for connection between the propeller shaft and the output shaft of the gear box.

Oil Tube :

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Oil tube is to deliver the pressure oil to the hydraulic servo cylinder located inside the hub. The oil tube serves also as a part of the mechanical feedback system to deliver the actual position of the servo cylinder inside the hub.

O.D. Box :

O.D. is located at the forward side of the feedback mechanism mounted. On the O.D. Box is one angular transmitter. Signal is 4.20 mA.

Hydraulic Power Pack :

Number : Two electric pumps
Type : Axial piston variable displacement
Filter : Double filters

22. GEARBOX

- One gear box with ratio app. 5,28:1
- One clutch able PTO for 1200 kW at 1800 rpm
- On ebuild on input driven lube oil st-by pump
- St-by E pump unit with flange conn.
- One oil filter twin type
- One build on oil cooler for fresh water of 38 C
- Mounting of two flexible coupling hubs
- One electric junction box
- One flexible flange coupling with spacer ring between engine and gear box
- One PTO/PTI shaft coupling

23. SHAFT GENERATOR

- * 1200 kW as shaft alternator, 1200 KW as electric motor.
- * Nominal Power 1200 kW, 450 V, 60 Hz, 1800 rpm
- * Can be run as electric motor with starting transformer.
- * Power Factor of φ : 0.95
- * Shaft Generator is also used for to power propeller at 7 knots speed in case of main engine failure.

24. AUXILARY GENSET

Engine :

- * Number : Three (3) Auxiliary Generator Sets
- * Output/rpm : Each 620 kW (approx), 1800 rpm,
- * Type : Water cooled, four stroke diesel engine, turbo charged, Suitable for parallel operation
- * Fuel : MDO
- * Remote control : ECR and local side
- * Starting : Air start (30 Bar)
- * Foundation : Common for engine and generator

Alternator :

- * Number : Three (3) sets
- * Capacity : 590 kW, 450 V, 60 Hz at power factor of 0.8, IP 44

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25. EMERGENCY GENSET

Engine :

- * Number : One (1) Emergency Generator Set
- * Output/rpm : 200 kW , 1800 rpm,
- * Type : Air cooled, four stroke diesel engine, turbo charged
- * Fuel : MDO
- * Remote control : ECR and local side
- * Starting : Electric, 24 V DC (Dual) & Hyd. Start for Emg. Starting
- * Foundation : Common for engine and generator

Alternator :

- * Number : One (1) set
- * Capacity : 150 ekW, 450 V, 60 Hz at power factor of 0.8, IP 23

26. BOILERS

Aux Boiler :

- * Number : Two (2) sets
- * Type : Thermal Oil
- * Fuel : H.F.O. at 380 cst, 50 °C
- * Capacity : 2 x 1800kW
- * Tank Clean.Heater : 3600 kW,

Exhaust Gas Economizer ;

- * Number : One (1) set
- * Type : thermal oil, Double Flap by-pass arr, double circulation pumps.
- * Capacity : 500 kw According to 85% MCR of main engine

27. AIR COMPRESSOR and RESERVOIRS

Starting air comp. : Two (2) sets, 30 m³/h, 30 kg/cm², Elect, motor driven, two stage, two cylinder line, air cooled, auto start/stop device.

Working air comp. : One (1) Screw Type, Elect. Motor driven, 51 m³/h, 7 bar

Starting Air Bottles:

Number : 2 Sets with press. gauge, filling, relief and drain valves
Type : Cylindrical / Vertical
Capacity : 2 x 400 ltrs , 30 bar

Service Air Dryer : 54 m³/h

Working Air Reservoir :

Number : One (1) set with press. gauge, filling, relief and drain valves
Type : Cylindrical / Horizontal
Capacity : 270 It, 7 bar

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28. PURIFIERS

H.F.O purifier ;

Number : Two (2) sets
Viscosity : 380 cSt at 50 C
Density : 1.01 g/ml at 15 C
Capacity : based on 380 cst at 50'C
Supply Equip. : Motor, pump, heater and cont. Cabinet, starter proses monitor

M.D.O purifier ;

Number : One (1) set
Supply Equip. : Motor, pump, heater and cont. Cabinet, starter process monitor

L.O purifier :

Number : One (1) set
Supply Equip. : Motor, pump, heater and cont. Cabinet, starter proses monitor

29. HFO MODULE

Number : One (1) set

30. FRESH WATER GENERATOR

Number : One (1) set
Capacity : 20 m³/day
Ejector pump : One set centrifugal
Distillate pp. : Acc. To maker standarts

31. OILY WATER SEPERATOR

Number : One (1) set
Type : MEPC 107-(49)

32. SEWAGE TREATMENT PLANT

Number : One (1) set
Type : Biological type IMO MEPC 2(VI) approved,
Capacity : 25 persons / day

33. HOT WATER HEATER

Number : Two (2) set
Type : Steam & Electric Type with temp.controller and safety
Capacity : 500 lt
In/Out Temp : 10 / 70 C
Circulating P. : Two (2) set, 3.0 m³/h – 4 Bar

34. E/R VENTILATION FANS

**7000 DWT IMO II CHEMICAL/OIL TANKER
OUTLINE SPECIFICATION**

Number : Two (2) sets
Type : 2-speed Electric motor driven, axial flow with fire damper. One of the fans to be reversible
Capacity : 70000 m³/h

35. E/R HOIST

Number : One (1) set
Capacity : About 4 t SWL
Lifting : Electric motor
Travelling : Electric motor
Beam : single beam for travelling

Two manuel hoists.

36. ELECTRIC GENERAL

Electric works on the vessel to be carried out in accordance with this specification and builder's practice,

37. ELECTRICAL SYSTEM

From generator	: 440V, A.C. 60 Hz
Power circuits	: 440V, A.C. 60 Hz 220V, A.C. 60 Hz
Lighting circuits	: 220V, A.C. 60 Hz
Inter-commUNICATION Equip.	: 220V, A.C. 60 Hz 24V, D.C.
Nautical and radio equipment	: 440V, A.C. 60 Hz 220V, A.C. 60 Hz 24V, D.C.

38. POWER PLANT

- * 3 main diesel generators, 590 kW, 1800 rpm, 450V, A.C. 60 Hz 3PH generator set
- * Auto synchronizing device to be provided.
- * Generators to be capable of operating in parallel with each other continuously,
- * One (1) Shaft Generator 1200 kW 450V, A.C. 60 Hz 3PH
- * One (1) Emergency generator, 150 kW 450V, A.C. 60 Hz 3PH
- * One (1) Main switchboard of dead front type.
- * One (1) Shore connection box, A.C, 230 A, 3x 450 V.60 Hz.
- * 2 x D.C. 24V, 300AH, dry type batteries for general use (Radio battery and em'cy generator starting battery to be provided according to maker's standard)
- * One (1) Engine control room console
- * One (1) Wheelhouse control console
- * Two (2) Wing Consoles
- * One (1) Cargo Control Console

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All computers supplied will be protected by UPS against power failures.

39. ELECTRIC CABLE

In general, electric cables are in convenience with MGG, MGCG, FMGCG types and approved by classification society (BV } except those for thermometer, antenna circuit etc.

40. POWER EQUIPMENT

Motors ; In general, motor on open deck and under engine room floor to be of totally enclosed type, and other motors to be of drip-proof type end to be of marine construction. Space heater to be provided for motors on weather deck humid atmosphere.

Starters ; In general, starters to be individual according to their purpose, Remote control function to tie incorporated for motors, Starters to be built into drip-proof enclosed steel cubicle with hinged door and any cubicle shall be repaired / sheeked safely without de-energizing the starters. Motors of 0,2 KW and below to be manually operated by line switch and motors above 37 KW to have S/D starters.

In general, starting of motors to be direct on line start. Max, Voltage drop to be % 15 of rated voltage, when starting largest motor. And the control voltage to be 230 V AC.

Hourmeter to be provided for essential service motors.

41. ELECTRIC LIGHTING

The vessel to be adequately lighted with fixtures suitable for marine use.

42. SERVICE OF GENERATOR

The generator shall be served as follows:

Service condition	No. of set in service
	<u>Diesel generator</u>
Normal sea service	None (shaft generator)
Departure and arrival	One
Unloading/loading	Two
In harbour	One
In PTI Mode	Three

43. INTERIOR COMMUNICATION

Batteryless Telephone System :

- Wheelhouse controle console
- Engine control room console
- Steering gear room
- Engine room M/E post
- Bow thruster room
- Emergency generator room

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Automatic telephone system

1 steel cabinet with terminals, 30 digit extensions, 15 simultaneous calls, 2 trunk lines for stcom shore/gsm, programmable functions, all telephones in system are with loudspeaker for public address.

Intercom(talkback) with gen alarm system

Wheel House control console, Central panel mounted 5 lines 24 V DC supply 2 amperes.

Forecastle, steering room

Aft position with loudspeaker

ECR console

Sound Reception System :

Wheel house controle console : Main station w/input for 4xmic and led indication with loudspeaker 24 VDC supply PS&STB side of the W/H.

Forecastle & aft positions : Microphone station watertight, for bulkhead mounting.

Engineer Call System :

Three position switch in ECR to be provided. (call/off/patrol)

Audible sound and visual system to be incorporated machinery alarm in ER.

TV / Radia Set Antennas

Entertainment system with 16 outlets and 6 TV.auto track sattlate antenna

Master Clock system

Master clock with slave clock control to be provided, Slave clocks for forward&backward impulsing.

Location : Officer and crew messroom, Captain and Chf engineer cabins, ECR console

44. NAVIGATION

Wheelhouse arranged with good all-round visibility, incl. the following equipment:

- * Magnetic compass with Autopilot connection
- * Gyro/Autopilot ; one set of combined type gyro/autopilot to be provided with repeaters ;
 - 1 pc. Steering stand with master compass
 - 1 pc controlpanel of W/H,2 pcsi Wing Consollar,2 pcs Compass Bridge deck
 - 1 pc.Steering Room
- * 2 pcs. Radar 18,1 ", X-Band, 8 feet antenna, 30 kW (ARPA display + AIS connected)
 - 1 pc. Radar 18,1 ", S-band, 8 feet antenna, 25 kW (ARPA display + AIS connected)
- * Antenna interswitch installed.

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- * Gyrocompass and Autopilot with TMC (hand wheel included)
Magnetic compass has connection to auto-pilot
- * Course Recorder ; fully combined with gyrocompass and autopilot system outputs
- * Echo sounder ; One set with two transducers and indicator

- * GPS ; Normal
- * D- GPS ;
- * Speed log
- * AIS (automatic identification)
- * VDR with data recorder, hard disk
- * Weather Fax
- * Wind Data System
- * Ship Security Alert System

45. RADIO EQUIPMENT

General

One Radio station to be arranged in accordance with SOLAS 1998 amendments and GMDSS, incl. the following equipment:

Inmarsat - C

2 sets of JRC INMARSAT C SYSTEM
AH antenna systems and connectors cover A3 area.

GMDSS – SSB :

1 Set GMDSS/SSB radiotelephone &DSC set

GMDSS VHF/DSC SET :

2 sets gmdss vhf/dsc

Cargo Room VHF :

1 Set marine vhf

VHF (portable with chargers)

3 Set of handheld

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Ex. Proof VHF (for Operations/ Purposes}

3 sets of exproof hand held

NAVTEX

1 set of navtex receiver

EPIRB

1 set of Epirb

SART

2 sets of SART

Inmarsat - F

1 set INMARSAT- F Model

Wind Speed – Direction Indicator

1 set of wind speed indicator with wind direction indicator
One set marine Weather Fax

46. ALARM SYSTEM

Watch Alarm System :

One (1) pc. Automatic watch alarm unit.

Nautical Alarm System :

One (1) pc. Bridge alarm indicator panel.
One (1) pc. Bridge selector switch for activating the cabin panels
Three (3) pcs. Triangle light signal column for cabin panels
One (1) pc. Triangle light signal column for Cold Chamber
One (1) pc. Cold Chamber call button

General Alarm System :

One (1) pc. Signal generator
Five (5) pcs Triangle light signal column for accommodation
Two (2) pcs Triangle light signal column for Fore deck&Emc. Generator room

Luminous Call Alarm System :

Luminous call system for engine room

1 pc. Relay control unit in ECR desk
1 pc. BTS-LCS for ECR.
Three (3) pcs. BTS-LCS.6 for ECR.

47. ENGINE ROOM ALARM AND MONITORING SYSTEM

General

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The alarm and monitoring system shall be of modern microprocessor design for centralized observation to meet "unmanned engine room" operation. The components of the system shall be as follows ;

- Extended alarm display
- Alarm and data log printer
- Alarm input/output
- Calling system for Engineers

48. MAIN ENGINE REMOTE CONTROL SYSTEM

Bridge control

Operation of the main engine such as starting, stopping, speed and load control shall be carried out safely and accurately according to the pre-set program by operation of the engine maneuvering handle at the bridge control console after the control position shall be transferred from engine control room.

Control room console

The main engine shall be started, stopped and RPM controlled by the operation of speed setting lever & telegraph receiver (Commonly used as reversing handle) on the engine control console.

Emergency control at engine side

In emergency such as failure of governor and / or ordinary pneumatic manoeuvring system main engine to be controlled using the fuel handle and reversing lever on the em'cy stand at engine side.

49. FIRE PROTECTION

- * Fire and deck wash line with hydrants on main deck
- * Fixed foam extinguishing system in cargo area
- * Fire hydrants in engine room
- * CO2 smothering for ER
- * Local Application Sys. For M/E, Generators, Boilers and Separators
- * Portable fire extinguishers in accommodation
- * Fire detection and alarm system for ER and accommodation

Fire Detection and Alarm System :

Addressable alarm system with alarm bells for general to be used for the fire alarm through a relay that rings the bells intermittently at predetermined interval.

50. SERVICE TANK SOUNDINGS :

- * Remote and manual sounding of all WB, FW, MDO, HFO storage tanks which are above 30 m³.
- * Remote and manual ullage measurement for all cargo and slop tanks.