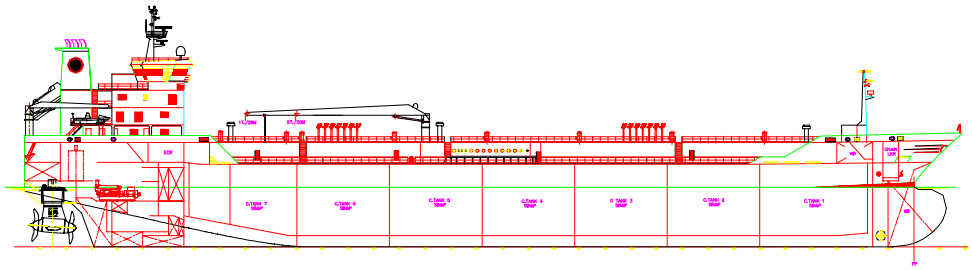
S Johnsson/ C Claeson/UGn

20.000 m³ Product and chemical tanker for Donsötank Rederi AB.

General Description.

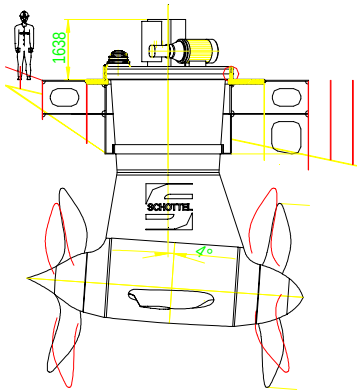
The vessel is a chemical and petroleum product tanker (IMO type 2) with a double hull and a single deck, forecastle and poop and the entire accommodation located aft.

The vessel is fitted with diesel electric propulsion system delivered by Siemens/Schottel.
Four medium speed diesel generators supply power to the propeller aggregate called propulsor (POD), as well as to the bow thruster, cargo and ballast pumps, living quarters and all other electrical consumers.

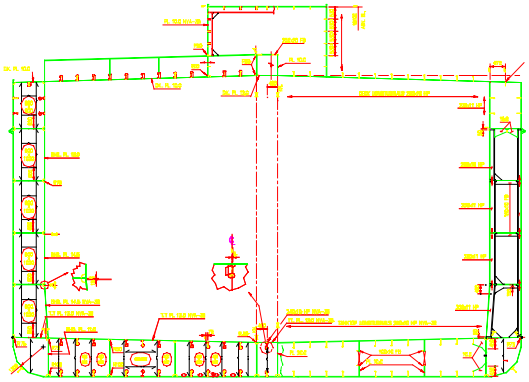


Propulsion machinery system.

The propulsion system consist of a submerged 360º turnable azimuth propulsor with a streamlined body and twin propellers, frequency converters, transformers and four diesel generator sets. The propulsor is located in centre line close to stern, behind a skeg. Inside the propulsor a permanent excited synchronous propulsion motor and a propeller shaft is arranged, which has direct drive to the two propellers, one thrusting and one pulling.



Hull design.



All tanks intended for oil and chemical products, including bunker, service and sludge tanks are protected against collision and groundings by a cofferdam. The hull in the cargo area are designed with a double hull according to the latest IMO rules.

The cargo tanks are designed with no structure inside, such as brackets and stiffeners. The hull is strengthening to navigate in first year ice equivalent to unbroken level ice with a thickness of 0,6 m. On bottom and top sides the ice area is protected by a reinforced painting system.

The aft ship lines are of barge type. This gives more displacement compared to conventional design without impairing of the resistance of the hull..
With a POD there will be no axle arrangement inside the ship. The construction and design of the skeg are less complex.

Cargo System.

The fourteen (14) independent cargo tanks are coated with epoxy paint and each tank fitted with a frequency controlled electrically driven cargo pump.

The cargo system is designed to provide 7 segregation. Totally enclosed loading, discharging and sampling system with vapour return to terminal.

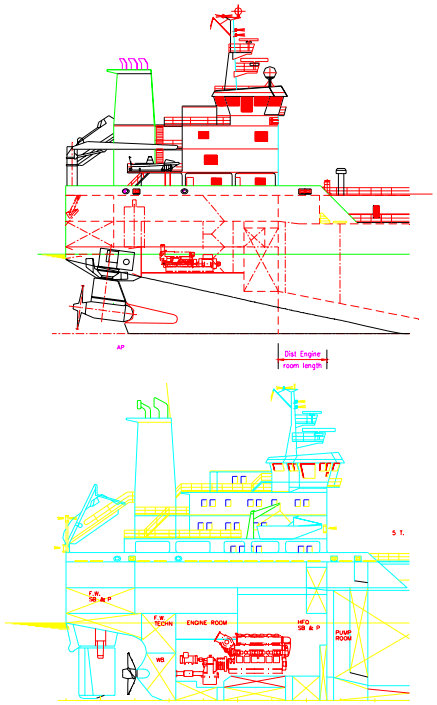
Stainless steel is used for all cargo systems such as loading and discharging system, stripping and super-stripping system, vapour return, cargo heating and cargo cleaning system. Most pipes are running inside a heated and well ventilated protected pipe tunnel, which extends between forecastle and poop.

All cargo tanks are arranged for stripping of cargo according to classification rules. A tailor made super-stripping system is also fitted, which reduce the cargo rest to some cm^3.

The cargo is heated by a primary and secondary thermal oil system via a heat exchanger located in the pipe tunnel.

Machinery arrangement.

For a diesel-electric machinery the engines are disconnected from the shaft line, which allows the installation of the electrical equipment and the engines in the best possible locations. There is no space requirement in the skeg for engine, gear or other equipment, as for a conventional machinery. The lines can be optimised and the water stream to the propeller will be more homogenous. This results in higher propulsion efficiency and lesser vibrations.

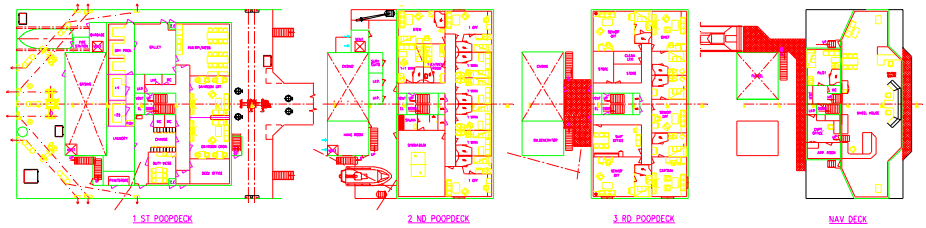


This means that the engine room can be shorter and the cargo volume will be increased. For this size of vessel the volume is increased by 5%, i.e. 1000m^3.

For a conventional propulsion line the main engine, gear and shaft are exposed in case of stranding. For the DE-machinery the main engines, frequency converters etc. are well protected.

Accommodation.

The accommodation is arranged for 15 crew, all single cabins with private lavatories and for officers with separate bedroom.



The bridge wings are closed and the bridge including all navigation and communicating system approved for Watch-one service. Control and monitoring of cargo and ballast system is normally managed from control station on bridge. The vessel is also equipped for unattended machinery space.

Safety and Redundancy.

The diesel-electric power plant concept with POD provides multiple redundancy in power production. Take me home capability is obtained with the double-winded motor and two frequency converters. If one winding or converter fails the other is still working and half of the max power is available.

Four Generator sets are separated into two compartments for redundancy in case of fire.

Any diesel engine can be served and overhauled at any time, at sea during voyage, even at terminals, and keep the vessel in full service. There are always a number of gen. sets available.

The steering capability will dramatically improve manoeuvrability than with any conventional rudder system, especially at slow speed, at steering astern and in ice as the propeller stream can be directed in any direction.
Manoeuvrability during crash stop is improved and shorter crash-stop distance is achieved.

Harbour time is improved, especially in ice season and in current water.

Ice breaking ability are improved. A ship with POD will have even better ice breaking ability going astern than forward.
There is no risk for loss of rudder.

Environment.

For a diesel-electric propulsion machinery the exhaust emissions is lower due to better load rate of diesel engines at all speeds. The ship is prepared for catalytic exhaust gas emission control system.

The high redundancy minimise the risk of a non manoeuvrable ship.

The ship is provided with cofferdams towards shell for all cargo and oil tanks to minimise the oil pollution.

Totally closed loading, discharging and sampling system, with vapour return system, minimise the harm to environment and crew. All pollution are collected and transported back to terminal.

Main ship data.

Main particulars

Length o.a abt	145,7 m
Length p.p prel	132,0 m
Breadth mld	22,00 m
Depth mld	12,80 m
Design draught mld	9,25 m

Deadweight

At design draught	16 800 tonnes

Speed

At design draught	14,5 knots

Capacities

Cargo tanks	20 200 m^3
Cargo drain tank	50 m^3
Cargo service tank	150 m^3
Heavy fuel oil tanks	500 m^3
Diesel oil tanks	50 m^3
Fresh water tanks	100 m^3
Technical freshwater tanks	100 m^3
Urea tank	50 m^3
Water ballast tanks	7 500 m^3

Accommodation

Accommodation for 15 persons in single cabins with separate shower and toilet.

Class

*1A1, tanker for Chemicals and Oil products ESP, ship type 2, IMO 2, EO, Ice class 1B, a2, b3, c3, v3, f2, k, hl (1,59 ton/cm^3), Str 0.1, ETC, W1-OC.

Flag Swedish.

Cargo equipment

Maximum cargo loading capacity 7 x 1 200 m^3/h, Totally 8400 m^3/h

Cargo pumps	14 x 250 m^3/h at 120 mlc. Totally 3500 m^3/h.
Cargo drain tank pump	1 x 70 m^3/h at 120 mlc
Heating thermal oil	Primary and secondary system. Heating via heat exchanger one for each tank located in pipe tunnel. Heating coils of stainless steel in drain and cargo service tanks.
Tank cleaning	Programable single nozzle type in stainless steel. Number of machines acc to ETC class.
Tank gauging	Remote level measuring system of radar type.
Cargo tank ventilation	30 000 m^3/h, temp 60^o above ambient air temp.
Inert gas system	One nitrogen plant 50 m^3/h.

Ship equipment

Deck crane	5,0 ton SWL - 20 m outreach with single telescopic jib of 8,0 m.
Comb windlasses / mooring winches	Capacity acc to class single drums.
Mooring winches	4 x 10 tonnes x double drums 2 x 10 tonnes x single drums
Life boat freefall	1 x closed FRB for 20 persons, diesel engine
Rescue boat	1 x 5,8 m for 6 persons, outboard engine
Bow thruster	Thrust of 10 tonnes

Machinery

Engines	4 x 1 620 kW at 1 000 rpm
Emergency generator	1 x 450 kW at 1 500 rpm
Propulsor	1 x 5 100 kW at 120 rpm
Propeller	Twin each four bladed in nickel-aluminium bronze
Boilers, thermal oil	2 x 2 900 kW x 8 bar 4 pcs exhaust gas boilers
Steam generator	1 x 1 500 kg/h x 8 bar
Purification plant	2 x HFO purifiers FOPX65 2 x DO purifiers MMPX303 2 x Lub oil purif LOPX705
Cooling system	Centralized box cooling system. Coolers of CuNi
Starting air compressors	2 x required std 30 bar
Service air compressors	1 x 200 m^3/h at 7 bar
Fresh water generator	1 x 20 ton/day