

TECHNICAL INFORMATION

P-ECO 2859

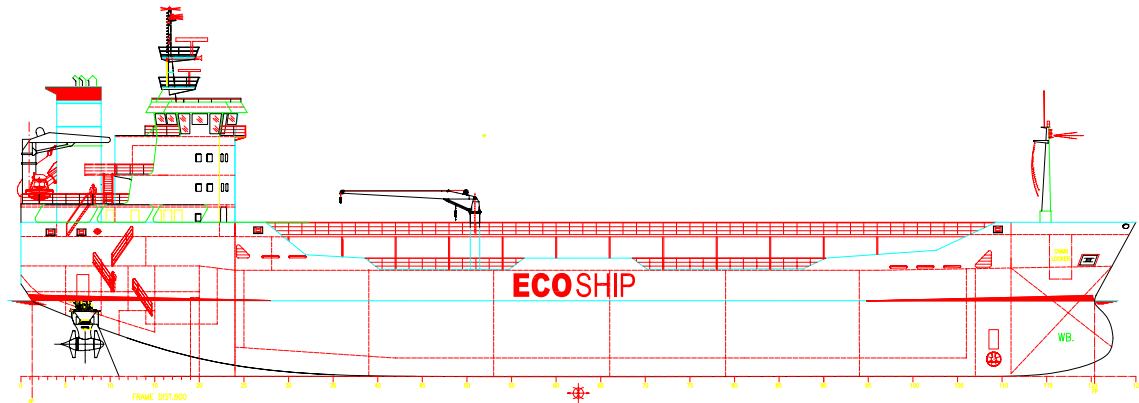
6 200 dwt Tanker Vessel for Chemicals & Oil Products

Revision: 3

Date 2004-02-04

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Prep.: B. Carlsson



ECOSHIP ENGINEERING AB

ECOSHIP P – ECO 2859

6 200 dwt. / 7650 m³

Tanker Ship for Chemicals & Oil Products

MAIN PARTICULARS

6 200 dwt. Tanker Ship for Chemicals & Oil Products

GENERAL DESCRIPTION

The vessel is a petroleum oil product and chemical tanker of ECOSHIP design with double skin, one continuous deck, forecastle and poop deck. The vessel is also designed for carry crude oil and equipped and arranged for world wide operation.

The hull form to be of ECOSHIP – patented type.

The cargo tanks to be epoxy coated.

Deckhouse for accommodation and navigation is located aft.

The vessel is divided in forepeak, bow thruster room, 11 cargo tanks, where of one dedicated slop tank and 2 x 6 wing tanks with DB tanks for WB, FO tanks and engine room. All tanks with cargo, FO or LO are not located close to the ship's side, thus complying with the Clean Design class notation.

Forecastle to accommodate a rope store room and chain lockers. The aft part comprises deck WB tanks.

The ship is designed for a crew of eleven (11) all in single cabins. One pilot and one spare cabin are also arranged.

First poop deck to accommodate officer's and crew's mess room, two day rooms, galley, provision rooms, laundry and linen, change room, garbage room, fan room fire station/chemical store and a paint store.

Second poop deck to accommodate crew's cabins, recreation room, sauna, linen lockers.

Third poop deck to accommodate officer's cabins, captain's cabin and apparatus room.

Navigation deck to be arranged with wheelhouse and cargo control station. The wheelhouse is prepared for efficient one-man operation. The bridge is to contain steering navigational and communication consoles designed for ergonomic operation.

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Arrangement to be in accordance to drawing General Arrangement Plan P-ECO2859 100-002-3 (Preliminary).

The vessel to have two masts.

One hydraulic deck crane to be arranged on main deck for handling cargo hoses.

One hydraulically operated crane, equipped with electro motor, for handling rescue boat, free-fall lifeboat and provision store to be mounted on 1st poop deck aft.

The vessel is designed for docking periods of five (5) years.

The ship will be of diesel / electric type with two separate engine rooms aft. The propeller system will consist of two electrically driven mechanical thrusters units.

The vessel is powered by four high speed or medium speed diesel generator sets which are generating power to frequency converters which are driving the two electrical motors that in turn drive the thrusters. The bow thruster is also driven by frequency converter drives.

The ship to be advanced environmentally friendly equipped and arranged according to DNV Clean Design and equipped with SCR-converters and soot cleaning.

The ship is also to be built and arranged with fully redundant machinery arrangement, RPS, and safety arrangements according to DNV class notation.

To make navigation in heavy ice conditions possible the ship to have an ice class notation ICE 1A (Finnish / Swedish).

The vessel to be designed for the carriage of following cargoes for both full and partial filling:

- Petroleum products according to class notation, technical construction and compatible with cargo tank coating
- Chemical products type II and III which the vessel can lawfully carry according to class notation and technical construction, provided the same is suitable and not harmful to the vessel's coating and cargo system and specific gravity up to

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1,025 t/m³ at full filling. Higher values of specific gravity (up to 1,54 t/m³) are allowed but only with part filled tanks.

MAIN PARTICULARS (APPROXIMATE)

Length over all:	100 m	Gross Tonnage:	Abt. 4365 tonnes
Length Water line:	95 m	Net Tonnage:	Abt. 1818 tonnes
Breadth moulded:	17,5 m	Lightship:	2 550 tonnes
Depth to upper deck	9,7 m	Installed power:	Abt. 3 900 kW

Capacities

Loading capacity:	2 000 m ³ /hour	Bunkers, Stores:	250 tonnes (Included in DW)
Discharge capacity:	1 650 m ³ /hour	Cargo capacity:	7 650 m ³ (100 %)
No of segregations:	6	Ballast tanks:	Abt. 3 000 m ³ (100 %)
		Vapour return:	Yes

No. of tanks: 11

No. of Cargo Pumps /
Capacities 11 x 150 m³/h

Design Data

	(Water dens 1,025 t/m ³)		
Draught Design:	6,80 m	Homogenous Cargo dens:	0,73 t/m ³
Speed:	Abt. 14,0 kts	DWT:	5 750 tonnes

Scantling Data

	(Water dens 1,025 t/m ³)		
Draught Design:	7,10 m	Homogenous Cargo dens:	0,79 t/m ³
Speed:	Abt. 13,5 kts	DWT:	6 200 tonnes

MACHINERY

Alt 1 (HFO/MDO)

3 x Wärtsilä 6L20, 1 080 kW (mech), 1000 rpm
1 x Wärtsilä 4L20, 720 kW, 1 000 rpm

Alt 2 (MDO)

3 x Volvo Penta D49, 1 120 kW, 1 500 rpm
1 x Volvo Penta D25, 515 kW, 1 500 rpm

PROPULSION

2 x Schottel STP 1215 LS, 1 500 kW each. Twin propeller thruster units. Alternatively 2 x Lips Azimut thrusters 1 500 kW 2 x EMC Electric motors and frequency converter system

Deadweight as cargo vessel at maximum waterline appr. 6 200 tonnes with water density 1.025 t/m³.

CARGO TANK CAPACITIES approx:

Tank		1: 650 m ³
Tankpar	2:	2 x 650 m ³
Tankpar	3:	2 x 730 m ³
Tankpar	4:	2 x 730 m ³

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Tankpar	5:	2 x 730 m ³
Tankpar	6:	2 x 650 m ³
Tot: abt.		7 650 m ³
Sloptanks on deck:		2 x 60 m ³

TANK CAPCITIES approx:

HFO or MDO Fuel Oil	250 m ³
MGO Fuel Oil	50 m ³
Lubricating oil	5 m ³
UREA	35 m ³
Fresh Water	50 m ³
Techn. Fresh Water	80 m ³
Ballast Water	3000 m ³

SPEED

14 knots at design waterline with 5% seamargin.

CLASSIFICATION

Vessel designed for unlimited trade according to the regulations and under survey of Det Norske Veritas class notation:

DNV+ 1A1, Tanker for Chemicals and Oil Products ESP, Ship type2, IMO 2, a2, b3, c3, v3, f1, k, Str 0,1, EO, Ice 1A, ETC, RPS, ICS, NAUT-AW, CCO, LCS-(SID), VCS-2, OPP-F, CLEAN DESIGN, COAT-1.

Authorities:

Flag of Registry to be

The vessel to be built according to rules corresponding to World Wide Trade. In addition to Classification rules, the vessel is to comply with Authorities and Regulations, where applicable and valid at contract date.

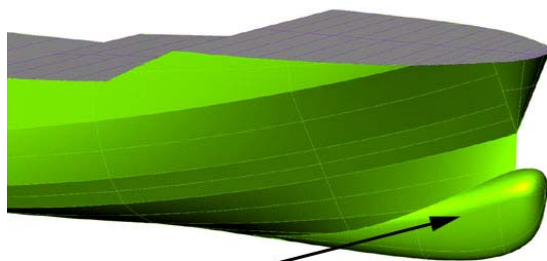
ECOSHIP DESIGN FEATURES FOR ICE GOING

The Ecoship design proposal has been developed with good ice going capabilities for the vessel in mind. Ice class requirements have been set to 1A and calculated in accordance with the new Swedish and Finnish regulations. The hull design has been altered slightly to incorporate features for improved ice going characteristics. The main areas are:

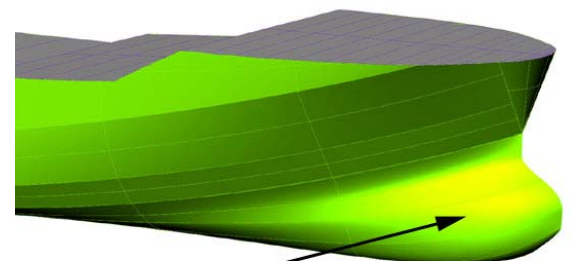
- New bulbous bow design
- A “raised transom design”
- Lines optimised for low ice-resistance (R_{CH}) according to formulas given in the new Swedish ice class requirements for ice 1A.
- The Ecoship intended propulsion system with either POD or Thruster units is advantageous over conventional systems as it gives good manoeuvrability. Further on the electric motors produce a high torque also at low rpm's and can therefore deliver a high thrust force.

The new bulb design

The Ecoship hull design has been proven to have very good open water characteristics; however the ice going and breaking capabilities of the hull may earlier have been slightly overlooked. In design proposal P2854 a new bulb design has been suggested that has the potential of being almost as efficient in open water as the old one, but also gives the ship low resistance when sailing in icy waters.



Original bulb design



New bulb design

Inspiration and facts on the design of “ice-breaking” bulbous bows has been found in HSVA magazine “NewsWave 2002/2” in an article by K-H Rupp and V Bertram. They have tested a conventional ice-breaking stem against a conventional bulbous bow and an ice-breaking bulbous bow and have concluded that it is possible to have a bulbous bow that gives a low ice resistance and at the same time low resistance in open water. (See figures below!)

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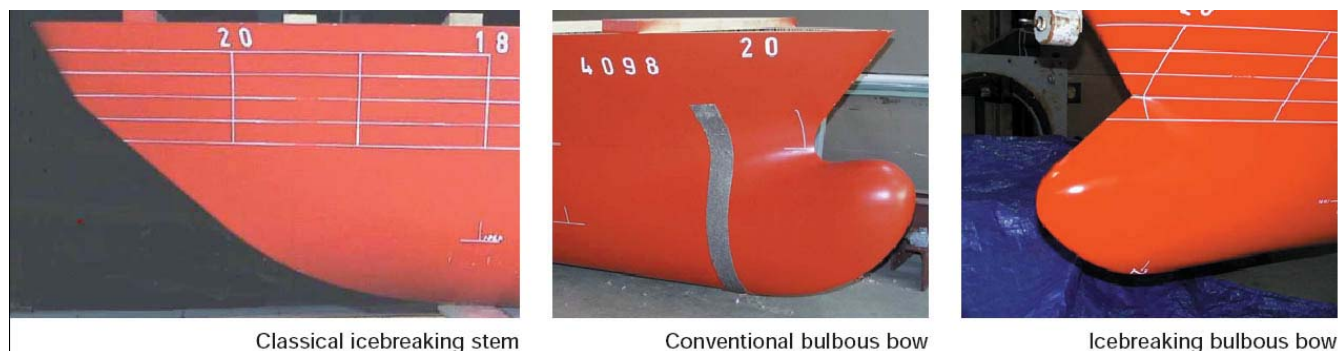
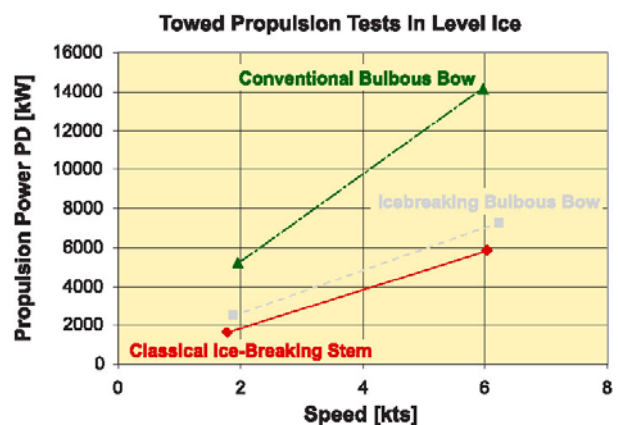
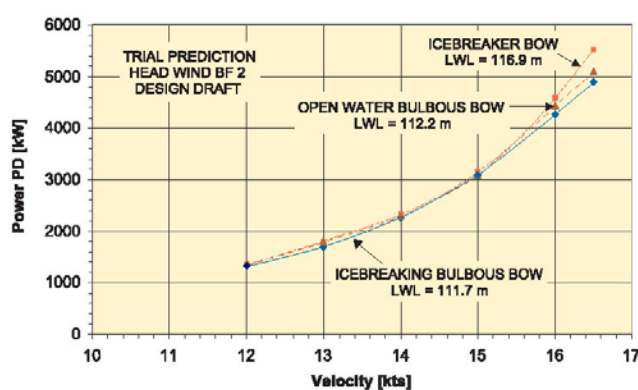


Figure 1. Bow shapes tested at HSVA.



Ice-Going Coaster
Loaded Draft,
Tf = 7.50 m

Level Ice:
Ice Thickness 0.40 m
Flexural Ice Strength 600 kPa

The new transom design

The old Ecoship designs have a submerged transom design at scantling draft. To reduce the power needed for going astern and thereby increasing the vessels possibilities of sailing and manoeuvring under severe ice conditions the transom has been raised in order to have an emerged transom. See figures below!

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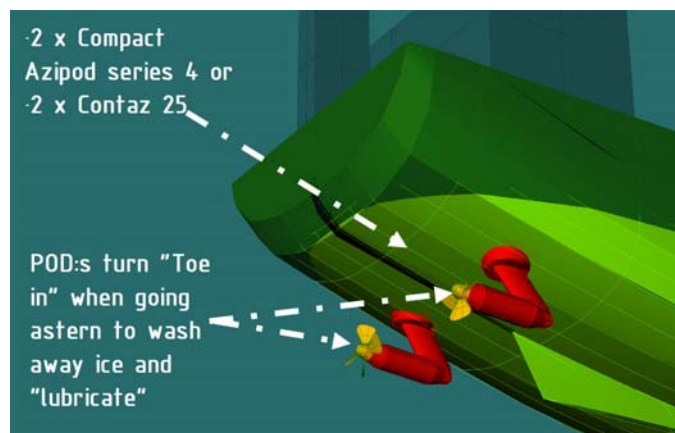
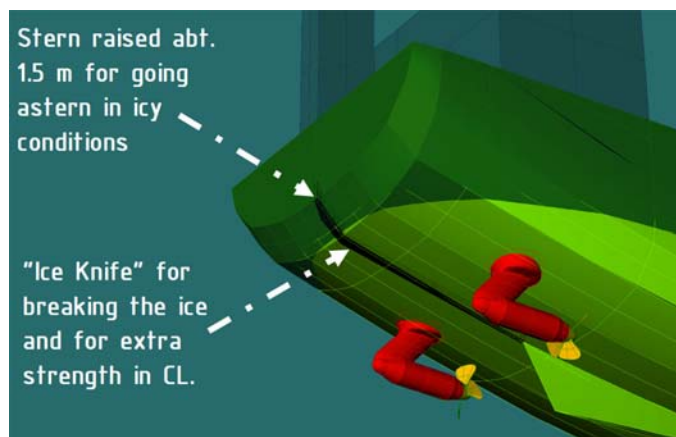
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The HSVA testing facilities have concluded that a submerged transom gives about 2,5 times the required power for going astern compared to an emerged transom. (HSVA NewsWave 2002/2)

