SIGNIFICANT SHIPS OF 2019

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SIGNIFICANT SHIPS OF 2019

Welcome to Significant Ships of 2019, the 30th edition in this long-running series. As is customary, the following is a selection of some of the most notable vessels over 100m in length delivered during 2019. By significant we mean ships that are the first in a series or type for a particular shipowner or builder, vessels that may be one-offs or those which differ in some important way from an earlier sister ship.

At some point in what may be the not too distant future, the first autonomous ships and those powered solely by fuel cells or with zero carbon emissions will begin appearing in this publication. However, while there are vessels within that feature cutting-edge power systems or which run on alternative fuels, the majority have what would be considered conventional power arrangements.

A very large number of the ships in the following pages have been constructed in compliance with the 2020 global sulphur cap as a prime consideration. This means that the number of dual-fuel and LNG-fuelled vessels is quite high this year, reflecting the growing popularity of gas-fuelled vessels, but there are also many scrubber-fitted ships. In some cases, shipowners have kept their options open so that ships may be LNG or scrubber ready. Alternative fuels have not been overlooked, with ships able to run on methanol, ethane or LPG also making an appearance.

This year's crop of significant ships contains a wide spread of vessel types. There are bulk carriers, crude oil tankers, chemical tankers, FSRUs, LNG and LPG carriers, ore carriers, cruise ships, passenger ferries and freight ro-ros. Container ships are heavily featured, ranging in size from 1,800TEU feeder vessels to 23,000TEU mega ships and including specialised reefer container ships, wood chip and wood pulp carriers, general cargo ships and even a rare reefer ship included in the following pages.

The vessels come from yards around the globe with examples from China and South Korea, of course, but also from Azerbaijan, Australia, Germany, Romania, Turkey and Russia, to name just some. The owners are based in an even wider range of nations. In some instances the ships represent a breakthrough for a yard that has constructed the first ship of a type and for some owners, the divergence into new markets and industry sectors.

No selection of significant ships will please everyone and without doubt some readers will find that one ship or another which they would expect to be included is not there. Those involved in producing this publication have spent much of the year identifying candidates and asking the yards and owners to provide the technical details that make up the accompanying text. Unfortunately, some of those yards and owners have declined to participate, which explains the absence of some of the ships that are, by any definition, significant.

So, what of the ships which have been included? There is *MSC Gulsun* for a start – delivered as the world's largest container ship, a title which has changed hands with monotonous regularity over recent years. It is just one of several of the included ships that will be using an exhaust gas cleaning system to meet the 2020 sulphur rules.

There is a certain cachet about being the largest of a type. Among this year's selection there is *Bow Orion*, the chemical tanker claimed as the world's largest stainless steel vessel of the type, *Express 4*, the largest vessel by gross tonnage ever produced by Austal, and *Zhong Hua Fu Xing*, claimed to be the largest luxury cruise ferry in Asia. The freight ro-ro *Tasmanian Achiever II* earns its place for various reasons, including being the largest vessel under the Australian flag.

At the other end of the scale, *Lachin* is one of the smallest ships to feature in this year's selection. But size isn't everything and as the first ever tanker built in Azerbaijan few would argue that it is not a significant ship. Its importance was certainly recognised by the government of Azerbaijan, with the country's president performing the launching ceremony.

Innovation, and being the first ship to feature a new development, is another way of being considered as significant. *Hourai Maru* meets that criteria by being a new type of LPG carrier, with the world's first IMO type B independent prismatic cargo tanks. So too does *Maran Gas Andros*, the first ever LNG carrier fitted with an air lubrication system and *Saga Dawn*, the world's first LNG carrier to feature the LNT A-BOX gas containment system. Samnøy – a hybrid ferry built in Turkey for Norwegian owners – is included on its merits as a ship, but also as it is the first ship, along with its sister, to bunker with LNG at the Spanish port of Ferrol.

Malcolm Latarche
Associate Editor,
February 2020

Notes

In the tables which form part of each ship description, all dimensions, also deadweight and displacement tonnages, are metric unless otherwise stated. Machinery powers have been specified as 'bhp' or 'kW' in accordance with information received from the shipbuilder or owner. Emergency alternators are not normally included in the number of alternators. When a dash (-) has been included against an item, this generally denotes lack of information but where it is known that features have not been included, this is indicated by 'nil'. The number of sister ships completed or on order does not include the ship presented. Some ships shown as 'on order' may have been delivered by the time this publication appears.

ADMIRAL SCHMIDT: Mini Capesize bulker

Shipbuilder: ..... **Shanghai Shipyard Co, Ltd. China**
Vessel's name: ..... ***Admiral Schmidt***
Owner/Operator: ..... **Arctic Shipping & Trading SA**
Country: ..... **Latvia**
Designer: .**Shanghai Merchant Ship Design & Research Institute (SDARI)**
Country: ..... **China**
Model test establishment used: **CSSRC / HSVA**
Flag: ..... **Bahamas**
IMO number: **9838838**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: ..... **nil**

Built as the first of two Polar class 'mini Capesize' bulkers by China Shipbuilding Industry Corporation's Shanghai Shipyard for Estonian owner Platano Eesti OÜ, *Admiral Schmidt* marked the entry into the bulk sector for an owner who previously operated only reefers. The ship was designed by SDARI with input from newbuilding project managers SeaQuest Marine Project Management Ltd. The initial order was for two ships plus one option not exercised. The second vessel, *Vitus Bering*, was delivered in October 2019.

The dimensions of 249.97m loa, 43m beam and draught of 14.3m allows the ship to pass easily through the New Panama locks. Designed to operate in temperatures as low as -25°C, the 104,553dwt *Admiral Schmidt* features an icebreaker bow with no bulb and winterised equipment including four 40tonne cranes located on the starboard side of the vessel. The vessel has a double hull and is ice-classed to DNV GL PC6. The ship's size and extent of its ice-strengthening will allow it an extremely wide-ranging operational area.

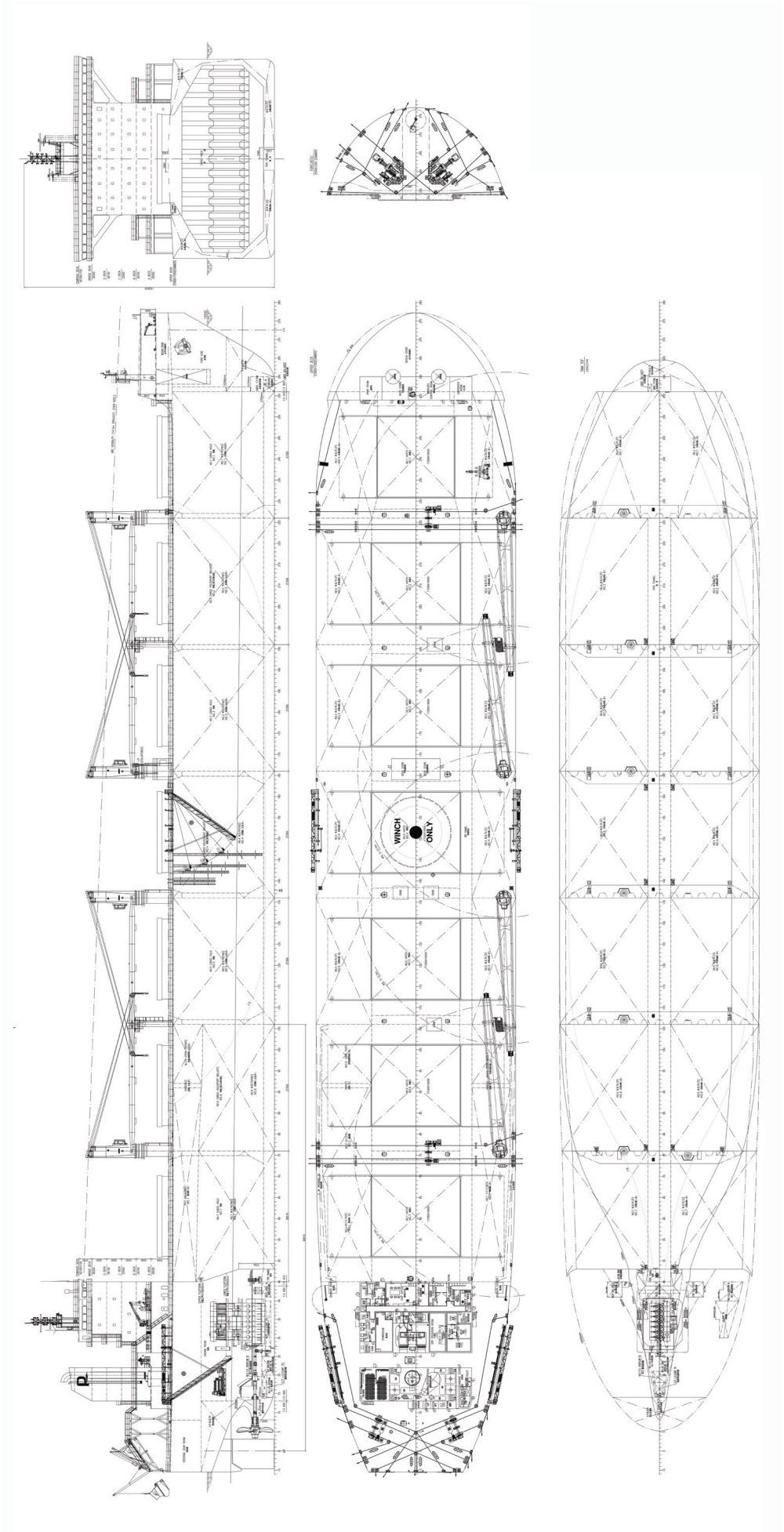
The cranes are an unusual feature on a ship of this size but have been included as the ship is intended to operate in Arctic waters, calling at ports that are not well equipped with cargo handling facilities. The ship has seven holds and hatches, making it more akin to a Panamax than a typical nine-hold Capesize vessel. Although primarily intended for bulk cargoes (including several dangerous cargoes), the ship can carry project cargo and 152TEU on upper deck and 35,000tonnes of steel coils in cargo holds.

Power for *Admiral Schmidt* comes from a single HHM-built WinGD 7X62-B two-stroke main engine which, unusually for a bulk carrier, is connected to a controllable pitch propeller. Tier III NOx emissions are controlled by HP SCR. At maximum continuous revolutions, the engine can output 18,620kW but will mostly operate at 60% and 86rpm to give an operational speed of 14knots. Fuel consumption is around 37.5tonnes of MGO per day.

TECHNICAL PARTICULARS

Length oa: ..... abt. 250m
Length bp: 241.79m
Breadth moulded: 43m
Depth moulded
to main deck: 21.8m
Width of double skin
side: 1.3m
bottom: 2.35m
Draught
scantling: 14.5m
design: 13m
Gross: 66,291gt
Displacement: 126,357.6t
Lightweight: 21,804.6t
Deadweight
scantling: 104,553t
design: 89,808.7t
Block co-efficient (please state relevant draught): 0.8157
Speed, service: .....14.08knots (60% MCR)
Cargo capacity (m^3)
Grain: ..... 130,468.4m^3
Liquid volume: .....Refrigerated storage:
Bunkers (m^3)
Heavy oil: ..... 3,005.1m^3
Diesel oil: ..... 1,025.7 m^3
Water ballast: ..... 41,216.8m^3
Daily fuel consumption (tonnes/day)
Main engine only: 37.5t/d
Auxiliaries: 4.7t/d
Classification society and notations: .....DNV-GL +1A, Bulk carrier, BC(A), CSR, Hold 2, 4 and 6 may be empty, GRAB(30), COAT-PSPC (B), BIS, LCS, CLEAN (Tier III), Recyclable, E0, BWM-T, TMON(Oil lubricated), ESP, PC(6), DG(B), DBC
% high-tensile steel used in construction: .. 80%
Propulsion
Design: .....WinGD
Model: ..WinGD W7X62-B TIER III WITH HP SCR Low Load Tuning + SPC
Manufacturer: ..... HHM
Number: 1
Type of fuel: ..... HFO (380 cSt/50°C) MGO
Output of each engine: .....CSR (0.6 CMCR) 9,960kW x 86rpm
Is this a diesel-electric or hybrid?: .....No
Propeller(s)
Material: .....Cu-Ni-Al
Designer/Manufacturer: ..... Wärtsilä
Number: 1
Fixed/Controllable pitch: ..... Controllable
Diameter: 7.9m
Speed: 86rpm
Diesel-driven alternators
Number: 3
Engine make/type: .....CME-MAN 6L23/30H
Type of fuel: ..... HFO (380 cSt/50°C) MGO
Alternator make/type: : CMXD/HFC6 508-84E
Output/speed of each set: 1,125kVA
Boilers
Number: 2
Type: .....FMV-VS/CMB-VS
Make: .....SAACKE
Output, each boiler: ....5,000kg/h @ 0.7 Mpa; 2,500kg/h + 1,400kg/h @ 0.7Mpa
Stern appendages/special rudders: ....Ice skate, Becker Schilling rudder
Deck machinery
Cargo cranes/cargo gear
Number: 4
Make: ..... MacGregor
Type: .....Electro-hydraulic
Performance: .....40t SWL
Other cranes
Number: 1
Make: .....CSSC Luzhou Zhenjiang Marine Auxiliary Machinery Co.Ltd
Type: .....Electric
Tasks: .....Provision
Performance: 5t
Mooring equipment
Number: 6
Make: ..... MacGregor
Type (electric/hydraulic/steam): .....Electric
Special lifesaving equipment
Number of each and capacity: ..... 1 free-fall lifeboat 27
Make: .....Jiaoyan
Type: : JYM-FN-6.65
Cargo/capacity
Hatch covers
Design: ..... MacGregor
Manufacturer: .....Hudong
Type: .....Upper deck
Containers
Total TEU capacity: 152
On deck: 152
Ballast control system
Make: ..... Pleiger
Type: ..... Electric-hydraulic package
Ballast water treatment system
Make: .....Sunrui
Capacity: ..... 1,800m^3/h(per set); 2 sets
Complement
Officers:..... 13
Crew: 11
Supernumaries/Spare: 2
Suez/Repair Crew: 1
Single/double/other rooms: ..... Single rooms
Navigation and other equipment
Bridge control system
Make: ..... Nabtesco (M/E remote control system)
Type: M-800-V
Is bridge fitted for one-man operation? ..... Yes
Radars
Number: 2
Make: .....Furuno
Model(s) wave band: ..... S-band and X-band
Fire detection system
Make: .....Consilium
Type: .....Salwico cargo
Fire extinguishing systems
Cargo holds: .....CO_2
Make/Type: ..... NK
Engine room: ...CO_2; low pressure water mist
Make/Type: ..... NK
Cabins: ..... Sea water / portable
Public spaces: ..... Sea water / portable
Waste disposal plant
Incinerator
Make: Teamtec .....Model: OG200CS
Waste compactor
Make: Shanghai Dizhou...Model: DZ10T10
Sewage plant
Make: JOWA ..... Model: STP2016-40
Efficiency
Required EEDI value: 3.51
Attained EEDI vaue: 3.23
Installed Fuel Meters: ....M/E flow meter: 1 set (max.120 l/min); D/G flow meter: 2 sets (max.120 l/min); Boiler flow meter: 2 sets
Other installed monitoring tools: ..... Shaft power meter (torque + thrust), draughts
Performance Monitoring Regime: ..... Ship performance monitoring system
Contract date: .....30 May 2017
Launch/float-out date: ..... 27 March 2019
Delivery date: .....6 September 2019

ADMIRAL SCHMIDT



AURORA SPIRIT: Shuttle tanker

Shipbuilder: ..... **Samsung Heavy Industries**
Vessel's name: ..... ***Aurora Spirit***
Owner/Operator: ..... **Teekay Offshore**
Country: ..... **Bermuda**
Designer: ..... **Samsung Heavy Industries**
Country: ..... **Republic of Korea**
Model test establishment used: ..... **Samsung Ship Model Basin**
Flag: ..... **NIS**
IMO number: **9837169**
Total number of sister ships already completed (excluding ship presented): ..... **Nil**
Total number of sister ships still on order: **3**

Described by its owner Teekay Offshore as one the most environmentally friendly shuttle tankers ever built, *Aurora Spirit* was launched in March 2019 as the first of a four-ship series. Two further ships in the E-Shuttle series – *Rainbow Spirit* and *Tide Spirit* – have also been launched with a fourth under construction at Samsung's Geoje yard.

With a deadweight of 128,800tonnes and a length oa of 277m, *Aurora Spirit* falls approximately in the middle of Teekay Offshore's fleet in terms of size. But it's the ship's power and propulsion systems which are its claim to significance. The ship has a hybrid propulsion system with Corvus batteries and a diesel-electric power plant configured around Wärtsilä 34DF engines. The propulsion system comprises four Wärtsilä electric motors each rated at 3,800kW connected in twos through a pair of Brunvoll reduction gearboxes to twin Brunvoll thrusters for a service speed of 14.5knots.

It is planned to run the engines mostly on LNG, however, the ships will also utilise Wärtsilä's innovative VOC recovery and liquefaction system, which will mix the VOCs with the LNG to be used as fuel. It is anticipated that CO_2 equivalents are cut by more than 40%, compared to conventional shuttle tankers. NOx emissions will be cut by more than 80%, SOx emissions will be virtually nil and particulate emissions will be reduced by more than 95%.

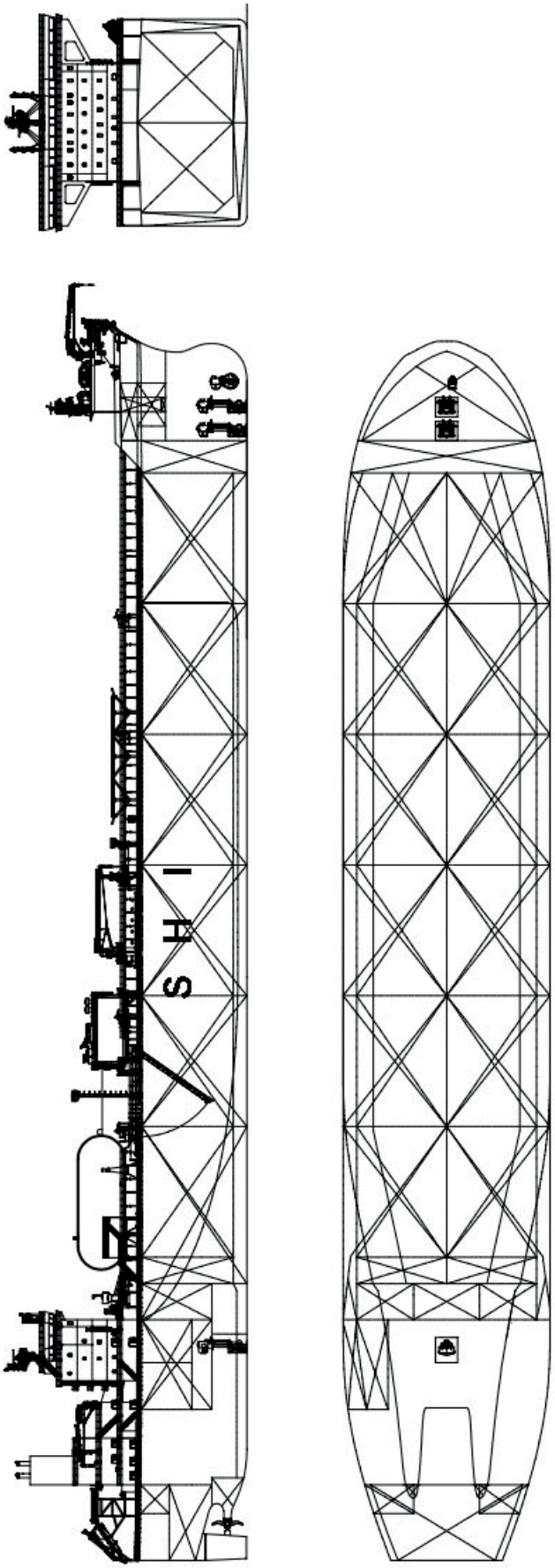
TECHNICAL PARTICULARS

Length oa: ..... Approx. 277m
Length bp: 265.0m
Breadth moulded: 46.0m
Depth moulded
to upper deck: 23.4m
Width of double skin
side:..... 3.0m
bottom: 3.0m
Draught
scantling: 15.4m
design: 15.0m
Displacement: 156,300t
Lightweight: 32,000t
Deadweight
scantling: 128,800t
design: 124,300t
Block co-efficient: .....0.84 at design draught
Speed, service (--%MCR output): 14.5knots
Incl. 15% power margin (91% of MPP)
Cargo capacity
Liquid volume: ..... 141,200m^3
Bunkers
LNG Fuel: ..... 2,000m^3
Diesel oil: ..... 3,300m^3
Water ballast: ..... 60,000m^3
Tankers – percentage segregated ballast: ...100%
Daily fuel consumption (tonnes/day): ..... 72.0t per day at NPP with hotel load

Classification society and notations:..... DNV GL X1A, Tanker for oil, ESP, CSR, E0, BIS, TMON, DYNPOS(AUTR), BWM(E[s], T), Clean(Design), NAUT(AW), Bow loading, VCS(2B, 3), F(A,M,C), Plus, CSA(FLS2), COMF(V-3, C-3), CCO, ESV(DP, HIL-IS), ECA(SOx-A), COAT-PSPC(B, C), RP(2, 50), Recyclable, SPM(except for 4.2.2 regarding the distance of fairlead), HMON(A1, B, C1, G4), LCS, HELDK(S, H, CAA-N), Battery(Safety), Gas fuelled, BMON
% high-tensile steel used in construction: ..... Approx. 55%
Propulsion
Design: ..... El. motor propulsion
Model: MDH-08008B-J088F
Manufacturer: ..... Wärtsilä
Number: 4
Type of fuel: .....Electric power
Output of each propulsion motor: 3,800kW
Is this a diesel-electric or hybrid?: .....No
Gearbox(es)
Make: ..... Brunvoll
Model: .....AG TS 1400
Number: 2
Output speed : 85.3rpm
Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer : ..... Brunvoll
Number: 2
Fixed/Controllable pitch: ..... Controllable
Diameter: 6.9m
Speed: .....85.3rpm at NPP
Diesel-driven alternators
Alternator make/type: ..... Wärtsilä / GNH-07110A-P108N & GNH-08012A-P108N
Output/speed of each set: ...2 x 4,611kVA + 2 x 6,144kVA / 720rpm
Boilers
Number: 2
Type: .....OL
Make: .....Aalborg
Output, each boiler: 25,000kg/h
Stern appendages/rudders:.... Full spade rudder
Bow thruster(s)
Make: ..... Brunvoll
Number: .....2 azimuths, 1 tunnel thruster
Output (each): 2,200kW
Stern thruster(s)
Make: ..... Brunvoll
Number: .....1 azimuth
Output (each): 2,200kW
Deck machinery
Cargo cranes/cargo gear
Number: 2
Make: .....SSII
Type: .....High pressure, electro-hydraulic self-contained, single jib type
Performance: .....15.0t SWL, each
Other cranes
Number: 2
Make: .....SSII
Type: .....High pressure, electro-hydraulic self-contained, single jib type
Tasks: ...Engine room equipment handling
Performance: ..... 8.0tons SWL, each
Mooring equipment
Number: ....Two (2) - 1 C/L + 2 M/D + 1 W/H, each, Six (6) - 2 M/D + 1 W/H, each
Make: ..... MacGregor
Type: High pressure, electro-hydraulic driven
Special lifesaving equipment
Number of each and capacity: ....1x 36 persons
Make: .....Norsafe
Type: .....Totally enclosed free-fall type
Cargo tanks
Number: 12
Grades of cargo carried: .....2 segregations
Product range: .....Crude oil
Coated tanks – make and type: .....Jotun, Epoxy A/C according to PSPC
Cargo pumps
Number: 4
Type: .....Centrifugal, electric motor driven
Make: ..... Wärtsilä
Capacity (each): ..... 3,000m^3/h x 135m at S.G 1.025
Cargo control system
Make: ..... Scana
Type: ..... Hydraulic type valve remote control
Ballast control system
Make: ..... Scana
Type: ..... Hydraulic type valve remote control
Ballast water treatment system
Make: .....Alfa Laval
Capacity: .....3,000m^3/h x 2 sets
Complement
Officers:.....17 persons
Crew: .....13 persons
Suez/Repair Crew: .....6 persons
Single/double/other rooms: .....30 cabins (single), 3 cabins (1 double)
Bridge control system
Make: ..... Brunvoll
Is bridge fitted for one-man operation? ..... Yes
Integrated bridge system: ..... Yes
If yes, make: .....Furuno
Model: .....FMD-3300 and etc.
Radars
Number: 3
Make: .....Furuno
Model(s): ..... 1 x FAR-3330S-SSD + 2 x FAR-3320
Fire detection system
Make: .....Consilium
Type: .....Salwico Fire Alarm System CCP
Fire extinguishing systems
Engine room:
Make/Type:Survitec / high expansion foam
Cabins:
Make/Type: ..... Fire hydrants
Public spaces:
Make/Type: ..... Fire hydrants
Waste disposal plant
Incinerator
Make: Teamtec ..... Model: GS900CRSX
Efficiency
Installed Fuel Meters: ..... Mass flow
Other installed monitoring tools: ..... Ship performance monitoring system
Energy Saving Technologies*: .....Rudder bulb, LNG fuelled, battery (2 x 309 kWh), LED (E/R, accommodation and etc.), VFD (propulsion motors, thrusters), Multi-VFD (IGG CSW pumps / ballast pumps / cargo oil/ cargo stripping / Ref. compressor)

Contract date: ..... 25 August 2017
Launch/float-out date: ..... 20 March 2019
Delivery date: .....November 2019

AURORA SPIRIT



BERGE LOGAN: Ore carrier

Shipbuilder: ..... **Guangzhou Shipyard International Company Limited**
Vessel's name: ..... ***Berge Logan***
Owner/Operator: .....**Berge Bulk Maritime**
Country: .....**Singapore**
Designer: .**Shanghai Merchant Ship Design & Research Institute (SDARI), CSSC**
Country: ..... **China**
Flag: .....**Isle of Man**
IMO number: **9739525**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: .....**Nil**

Delivered by Guangzhou Shipyard International to Berge Bulk Maritime in February 2019 as the first of two sister ships, the 302,000dwt ore carrier *Berge Logan* bears more than a slight resemblance to an earlier series of ships built by the same yard for the same owner.

In fact, the ship is an evolution of that earlier series which include the *Berge K2*, *Berge Makalu*, *Berge Cho Oyu* and *Berge Annapurna*. Built within the exact same hull dimensions of 327m loa, 57m beam and a depth of 25.5m, *Berge Logan* has a deadweight that is considerably higher than the 263,166tonnes of its earlier 'sisters', allowing for a much better EEDI rating. This is mainly due to the higher draught of 21.5m, compared to 18.85m of the first four ships.

The draught differential may not be so obvious as the other main difference between the two types is that the *Berge Logan* has six holds and sets of side sliding hatch covers, while its predecessors had just five. The vessel also underwent testing in the model basin to ensure optimal trim, which contributes to better fuel efficiency.

The main engine is the same MAN B&W 6G80ME-C9.2 model as the earlier ships but runs at a slightly higher speed to produce an additional 1,560kW for a total of 19,800kW output at 62rpm.

The vessel is equipped with several energy saving devices: the ENSaver, an energy monitoring software that provides a dashboard overview of all vital sensors to ensure the ship runs on optimum parameters; a rudder bulb and the Hub Vortex Absorbed Fins (HVAF) to reduce energy losses from the large propellers. A fuel oil shifter reduces need for heating the bunkers adding to energy savings.

Berge Logan is fitted with a Yara Marine scrubber to meet the 2020 SOx reduction rules.

TECHNICAL PARTICULARS

Length oa: 327.00m
Length bp: 320.89m
Breadth moulded: 57.00m
Depth moulded
to main deck: .....28.70m + 1.00m (camber)
to other decks: .....32.60m (A-deck); 43.80m (E-deck); 46.60m (Bridge); 49.50m (Compass deck)
Draught
scantling: 21.50m
design: 21.40m
Gross: 151,969gt
Displacement: 339,965.10t
Deadweight
scantling: 302,000t
design: 300,000t

Block co-efficient: .....0.852 at scantling draught
Speed, service: ..... 14.5kN @ 90% SMCR
Cargo capacity (m^3)
Grain: 180,000
Bunkers (m^3)
Heavy oil: 9,000
Diesel oil: 1,050
Water ballast (m^3): .....138,600 incl APT

Classification society and notations: .....LR, +100A1, Ore Carrier, ESP, ShipRight (SDA, FDA, CM, ACS(B,D)), strengthened for regular discharge by heavy grabs, *IWS, LI, ECO (BWT, EEDI, IHM, P), +LMC, UMS, with descriptive notes: ShipRight (BWMP(T), SCM, SERS)
% high-tensile steel used in construction: 88.9%
Heel control equipment: .....Reading in Ballast control system
Propulsion
Main engine(s)
Design: ..... MAN B&W
Model: .....6G80ME-C9.2 Tier II with low load exhaust gas bypass tuning
Manufacturer: ..... CSSC MES Diesel Co., Ltd (CMD)
Number: .....1 set
Type of fuel: .....HFO
Output of each engine: ...19,800kW x 62rpm
Is this a diesel-electric or hybrid?: .....No

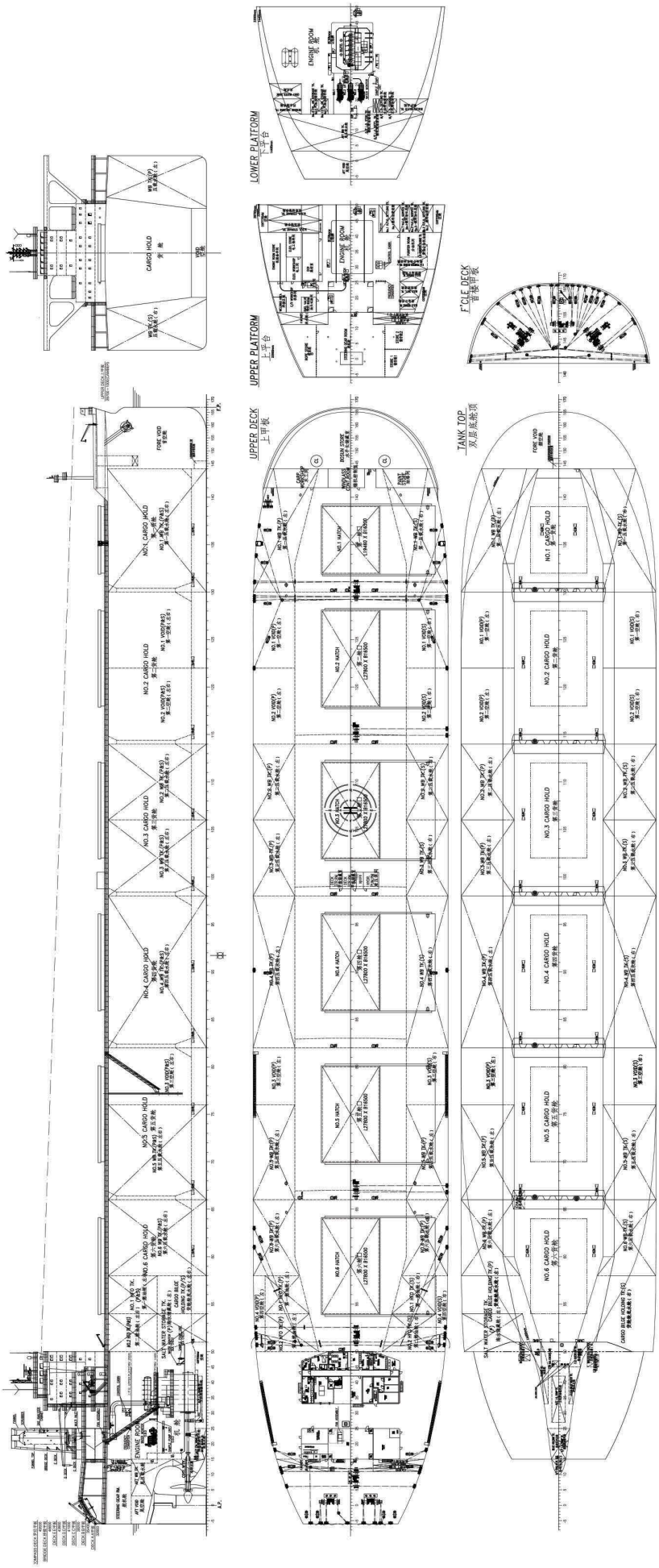
Propeller(s)
Material: ..... Ni-Al-Bronze Cu3
Designer/Manufacturer: .....Wärtsilä / Wärtsilä-CME Zhenjiang Propeller Co.,ltd
Number: 1
Fixed/Controllable pitch: .....Fixed
Diameter: 10.4m
Speed: 62rpm
Special adaptations: ... Fitted with Hub Vortex Absorbed Fins (HVAF) cap
Diesel-driven alternators
Number: 3
Engine make/type: ..... CMP-MAN 6L23/30H MK2
Type of fuel: .....HFO
Alternator make/type: .... CM-Hyundai / HFC6 564-84K
Output/speed of each set: ..1,000kW x 900rpm
Exhaust-gas scrubbing equipment
Manufacturer: .....YARA Marine Technologies AS
Type: .....Yara GTM-R
On main engines?: ..... Yes
On auxiliary engines?: ..... Yes
Boilers
Number: .1 x Oil fired boiler & 2 x Exhaust gas boilers (1 set for M/E & 1 set for 2 set D/G's)
Type: ..... Smoke tube
Make: ..... SAACKE Qingdao Marine Boiler
Output, each boiler: .....3,000kg/hr (oil fired); 800kg/h – M/E EGB; 880kg/h – D/G's EGB
Other cranes
Number: 2
Make: ..... CSSC Luzhou ZhenJiang Marine Auxiliary Machinery Co., Ltd.
Type: HDC10-19
Tasks: ..... Provision and E/R spares handling
Performance: .....SWL 10t x 19m
Mooring equipment
Number: .... 2 x combined windlass / mooring winches and 8 x mooring winches
Make: ..... Hatlapa / CSSC Nanjing Luzhou Machine Co., Ltd.
Type: .....Hydraulic type with Auto-tension

Special lifesaving equipment
Number of each and capacity: ..... 1 x Free fall lifeboat x 30 persons; 2 x liferaft 16DK (16 persons); 2 x liferaft 16DKF (16 persons) & 1 x liferaft 6DK for 6 persons;
Make: .....Jiangsu Jiaoyan Marine Equipment Co., Ltd.; Viking liferaft
Type: ..... Lifeboat JY-FN-6.8; 16DKF (launchable type) ; 6DK & 16DK (throw overboard type)
If MES, vertical or sloping chutes?: ... Sloping
Hatch covers
Design: .....TTS
Manufacturer: TTS Hua Hai Ships Equipment
Type: .....Upper deck – Sliding type
Ballast control system
Make: ..... Emerson
Type: ..... Marine tank management system
Ballast water treatment system
Make: ..... Samsung Purimar TM
Capacity: ..... 7,000m^3/h
Complement
Officers: 11
Crew: 16
Supernumaries/Spare: 3
Suez/Repair Crew: 6
Navigation and other equipment
Bridge control system
Make: ..... Nabtesco
Type: M-800-V
Is bridge fitted for one-man operation? Yes
Integrated bridge system?: .....No
Radars
Number: 2
Make: .....JRC Japan Radio Co., Ltd.
Model(s): .....JMR-9230-SN /JMR-9225-9XN
Fire detection system
Make: ..... Consilium Marine & Safety AB
Type: ..... Salwico CCP
Engine room: ..... High-expansion foam
Make/Type: ..... Unitor / Survitec CHP2604-13C
Cabins: .....Portable fire extinguishers
Public spaces: .....Portable fire extinguishers
Waste disposal plant
Incinerator
Make: .....Hansun (Shanghai) Marine Technology Co., Ltd.
Model: HSINC-80
Waste compactor:
Make: .....Exa Industries Group
Model: EX103
Sewage plant
Make: .....Jiangsu Nanji Machinery Co.,Ltd.
Model: ..... WCMBR-50(U)

Efficiency
Attained EEDI value: 1.85
Required EEDI value: 2.11
Installed Fuel Meters: .....Mass flow type
Other installed monitoring tools: Trim, draughts, TORXmeter (shaftpower&torquemeter), En-Saver (Energy Efficiency Management System), online PMI for M/E, oil in water and bearing wear-down monitor on M/E.
Energy Saving Technologies*: ..... Propeller with Hub Vortex Absorbed Fins (HVAF), rudder bulb, M/E exhaust gas economiser, D/G's exhaust gas economiser.
Performance Monitoring Regime: .....En-Saver, noon reporting

Contract date: ..... 5 March 2014
Launch/float-out date: .....3 September 2018
Delivery date: .....28 February 2019

BERGE LOGAN


LOWER PLATFORM
下平台
UPPER PLATFORM
上平台
UPPER DECK
上甲板
F'CLE DECK
首楼甲板
TANK TOP
双底底板
ENGINE ROOM
机舱
CARGO HOLD
货舱
FORE VOID
首尖舱
NO.1 CARGO HOLD
第一货舱
NO.2 CARGO HOLD
第二货舱
NO.3 CARGO HOLD
第三货舱
NO.4 CARGO HOLD
第四货舱
NO.5 CARGO HOLD
第五货舱
NO.6 CARGO HOLD
第六货舱
NO.1 HATCH
NO.2 HATCH
NO.3 HATCH
NO.4 HATCH
NO.5 HATCH
NO.6 HATCH

BOW ORION: Chemical tanker

Shipbuilder: ..... **Hudong-Zhonghua shipyard**
Vessel's name: ..... ***Bow Orion***
Owner/Operator: ..... **Odfjell**
Country: ..... **Norway**
Designer: . **Shanghai Merchant Ship Design & Research Institute (SDARI)**
Country: ..... **China**
Model test establishment used: ..... **China Ship Scientific Research Centre (CSSRC)**
Flag: ..... **Norway (NIS)**
IMO number: **9818515**
Total number of sister ships already (excluding ship presented): **1**
Total number of sister ships still on order: **2**

Designed by SDARI and built by Hudong-Zhonghua shipbuilding Group, the 49,000dwt *Bow Orion* delivered to Odfjell is one of a breed of chemical tankers known within the sector as a super segregator.

Such tankers are operated by a relatively few of the leading chemical tanker operators and the title refers to the fact that such ships have far more tanks and of many different sizes than more conventional vessels. On delivery in August, *Bow Orion* became the largest stainless steel chemical tanker in operation.

The ship has no less than 33 cargo tanks for a total of 54,000m^3 ranging in size from 595m^3 to 2,919m^3 all suited to IMO Type II cargoes. The ship can carry cargoes with a range of specific gravities and at temperatures up to 80°C. Each of the stainless steel cargo tanks is equipped with its own dedicated piping system and a Framo hydraulic submerged pump as well as Scanjet tank cleaning systems. The cargo management system needed to ensure appropriate pressure and temperature in each tank has been supplied by Kongsberg.

Bow Orion is intended for use in Odfjell's 'Round-the-World' service where the flexibility of the vessel is very much demanded by customers. Odfjell's motive in ordering the vessel was a combination of satisfying customer demand for such ships and replacing its ageing fleet.

Another driver in the design was energy efficiency provided both by an optimised hull form that dispenses with the traditional bulbous bow. Power comes from a MAN B&W 6G50ME-C9.5-type main engine. The arrangement allows a 14% fuel reduction and a more than 30% increase in cargo capacity compared to other vessels in the Odfjell fleet. Environmental compliance comes from a SCR system for NOx reduction and the use of compliant fuel for meeting 2020 SOx rules.

TECHNICAL PARTICULARS

Length oa: 182.88m
Length bp: 179.43m
Breadth moulded: 32.20m
Depth moulded
to main deck: 19.80m
Draught
scantling: 13.2m
design: 11.0m

Gross: 34,646gt
Deadweight
scantling: 49,000t

Speed, service (--%MCR output): 14.0knots

Cargo capacity (m^3)
Liquid volume: ..... 54,600m^3
Bunkers (m^3)
Heavy oil: ..... 2,119m^3
Diesel oil: ..... 567m^3
Tankers – percentage segregated ballast: 18,513m^3

Daily fuel consumption (tonnes/day)
Main engine only: ... 19.02(NCR) 29.26(SMCR)

Classification society and notations: .....DNV + 1A1 tanker for chemicals and oil products esp, E0,CSR,ETC,BIS,NAUT(OC),TMON,CCO,F(A), COAT-PSPC(B,V),VCS(2),BWM(T),BMON,Recyclable, HL(1.67,CentreTankC1-C13Only),ShipType2,a2, b3, c3, f2, str 0.075, k, ss

Propulsion
Design: ..... 7,820kW (SMCR)
Manufacturer: ..... HHM
Number: 1
Type of fuel: .....HFO
Output of each engine: ..... 7,820kW (SMCR)
Is this a diesel-electric or hybrid?: .....No

Propeller(s)
Number: 1
Fixed/Controllable pitch: .....Fixed
Diameter: 7.0m

Diesel-driven alternators
Number: 4
Engine make/type: ..... CSSC Marine Power/ 5L2832 & 6L2832
Type of fuel: .....HFO
Alternator make/type: .....
Output/speed of each set: .....1,060kW & 720rpm/5L2832 1,320kW & 720rpm/6L2832

Boilers
Number: 2
Make: .....Alfa Laval
Output, each boiler: 12.5t/h

Bow thruster(s)
Number: 1
Output (each): 1,200kW

Deck machinery
Cargo cranes/cargo gear
Number: 1
Make: ..... TTS Bohai
Type: .....Electro Hydraulic Hose Crane
Performance: ..... 10t 4.9~24m
Other cranes
Number: 2
Make: ..... TTS Bohai
Type: .....Electric Hydraulic Crane
Tasks: .....Provision and engine spare handing
Performance: ..... 4t 2.2~10m

Mooring equipment
Number: 7
Make: .....TTS Marine
Type (electric/hydraulic/steam): .... Hydraulic

Special lifesaving equipment
Number of each and capacity: ....38 Persons
Make: .....Jiangsu Jiaoyan Marine Equipment Co.,Ltd
Type: .....Free-fall lifeboat

Cargo tanks
Number: 33
Grades of cargo carried: 33
Product range: ..... Chemicals, IMO type II and III; Clean petroleum oil products (flashpoint below 60°C)
Stainless steel – structure/piping: ..... Duplex 2205 for cargo tank/ AISI 316L for piping;

Cargo pumps
Number: 33
Type: .....Hydraulic motor driven submerged centrifugal pump
Make: .....Framo
Stainless steel: .....AISI 316L
Capacity (each): ... 600m^3/Hx120mlc. or 330m^3/Hx120mlc. S.G.:0.8, Viscosity: 1.0cSt

Cargo control system
Make: .....Kongsberg
Type: .....K-Gauge CLS 600

Ballast water treatment system
Make: .....Alfa Laval
Capacity: ..... 2x750m^3/h

Complement
Officers:..... 14
Crew: 17
Suez/Repair Crew: 6

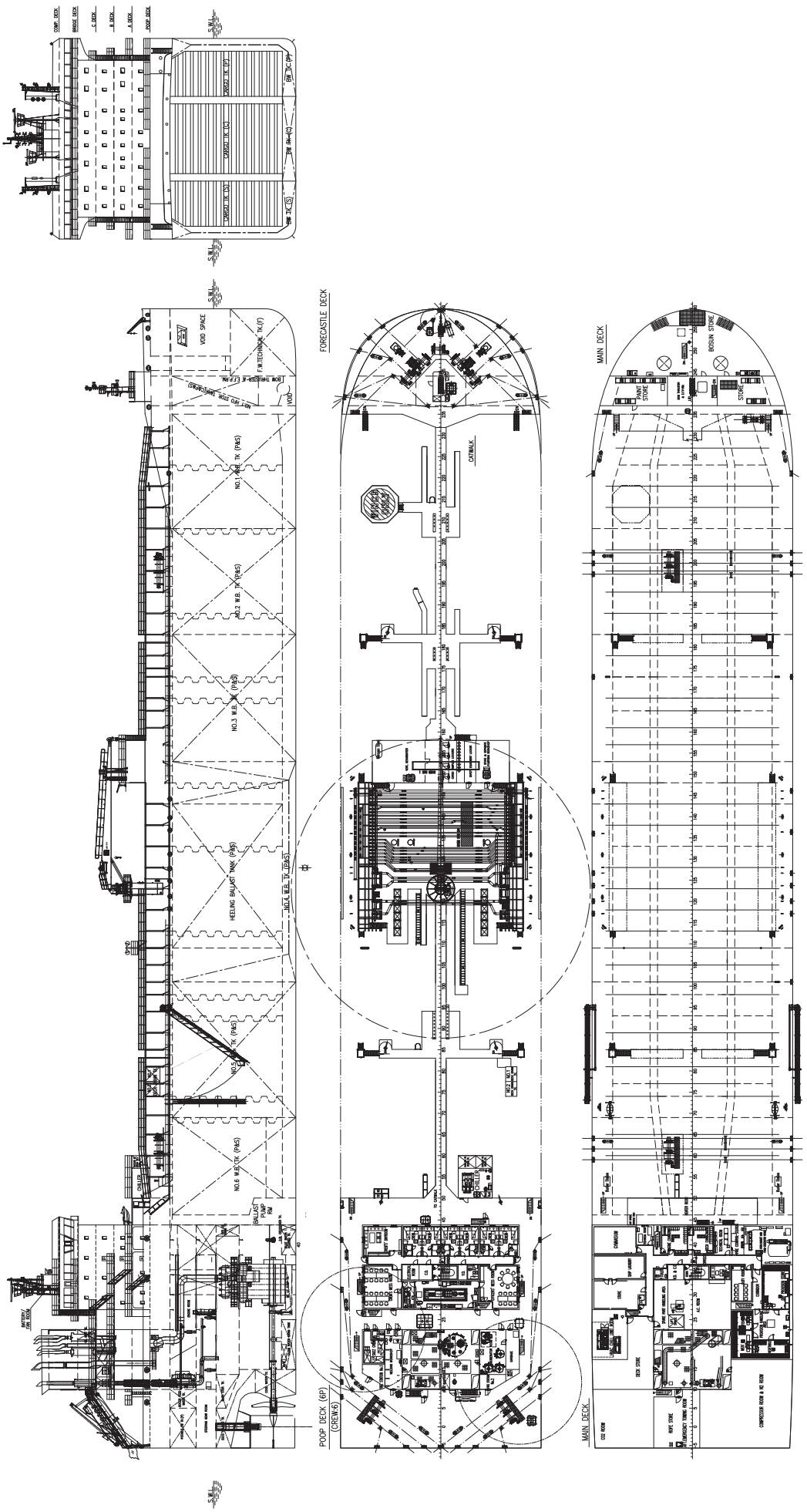
Navigation and other equipment
Bridge control system
Make: .....NanJing Friend
Type: .....DNV NAUT-OC arrangement
Is bridge fitted for one-man operation?: .. Yes
Integrated bridge system?: ..... Yes
If yes, make: .....Sperry Marine
Model: ..... DNV NAUT-OC
Radars
Number: 2
Make: .....Sperry Marine
Model(s): .....X-Band Chart Radar Antenna 65608/A-7 8ft S-Band Chart Radar Antenna 65612/A-16 12ft

Fire detection system
Make: ..... Autronica
Type: .....116-BZ-500 4 address loops

Efficiency
Attained EEDI value: ..... Phase II
Required EEDI value: ..... Phase I

Contract date: .....31 October 2016
Delivery date: ..... 26 August 2019

BOW ORION


FORECASTLE DECK
MAIN DECK
POOP DECK (6P)
(CREW:6)
MAIN DECK
CATWALK
VOID SPACE
FW TECHNICAL TK (P)
HEELING BALLAST TANK (P&S)
NO.1 W.B. TK (P&S)
NO.2 W.B. TK (P&S)
NO.3 W.B. TK (P&S)
NO.4 W.B. TK (P&S)
NO.5 W.B. TK (P&S)
NO.6 W.B. TK (P&S)
BALLAST PUMP RM
CHILLER
BOSUN STORE
STORE
CO2 ROOM
COMPRESSOR ROOM & AC ROOM

CB ADRIATIC: Chemical tanker

Shipbuilder:..... **Jiangsu New Hantong Ship Heavy Industry Co., Ltd.**
Vessel's name: ..... ***CB Adriatic***
Owner/Operator: ..... **Elfte Büttner Schiffahrtsgesellschaft mbH & Co. KG / Carl Büttner**
Country: ..... **Germany**
Designer: ..... **Shanghai Merchant Ship Design & Research Centre (SDARI)**
Country: ..... **China**
Model test establishment used: . **Hamburg Ship Model Basin (HSVA)**
Flag: ..... **Portugal**
IMO number: **9851696**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: **3**

In 2017, German chemical tanker operator Carl Büttner took a decision to rejuvenate and expand its fleet of chemical tankers and ordered a new series of four 38,000dwt vessels with two options. The vessels were labelled Project Green, have been designed by SDARI and are being built by Jiangsu New Hantong Ship Heavy Industry. *CB Adriatic*, the first in the series, was delivered in late October with its three sisters scheduled for delivery in January, March and May 2020.

The Project Green label indicates that the vessels have been designed with efficiency as a main driver but flexibility has also been important. To achieve the latter, the ship has been designed with a wider beam of 32m and shallower draught than similar size vessels to allow trading to more ports in Northern Europe.

CB Adriatic has an optimised hull form featuring a vertical bow, an asymmetric stern, a semi-balanced rudder with bulb and a single-screw CPP. The asymmetric stern allows the flow to the propeller to be modified with a pre-swirl generated without the addition of appendages. Environmental technologies include an SCR system to reduce NOx emissions to Tier III requirements and a SAAKE hybrid scrubber.

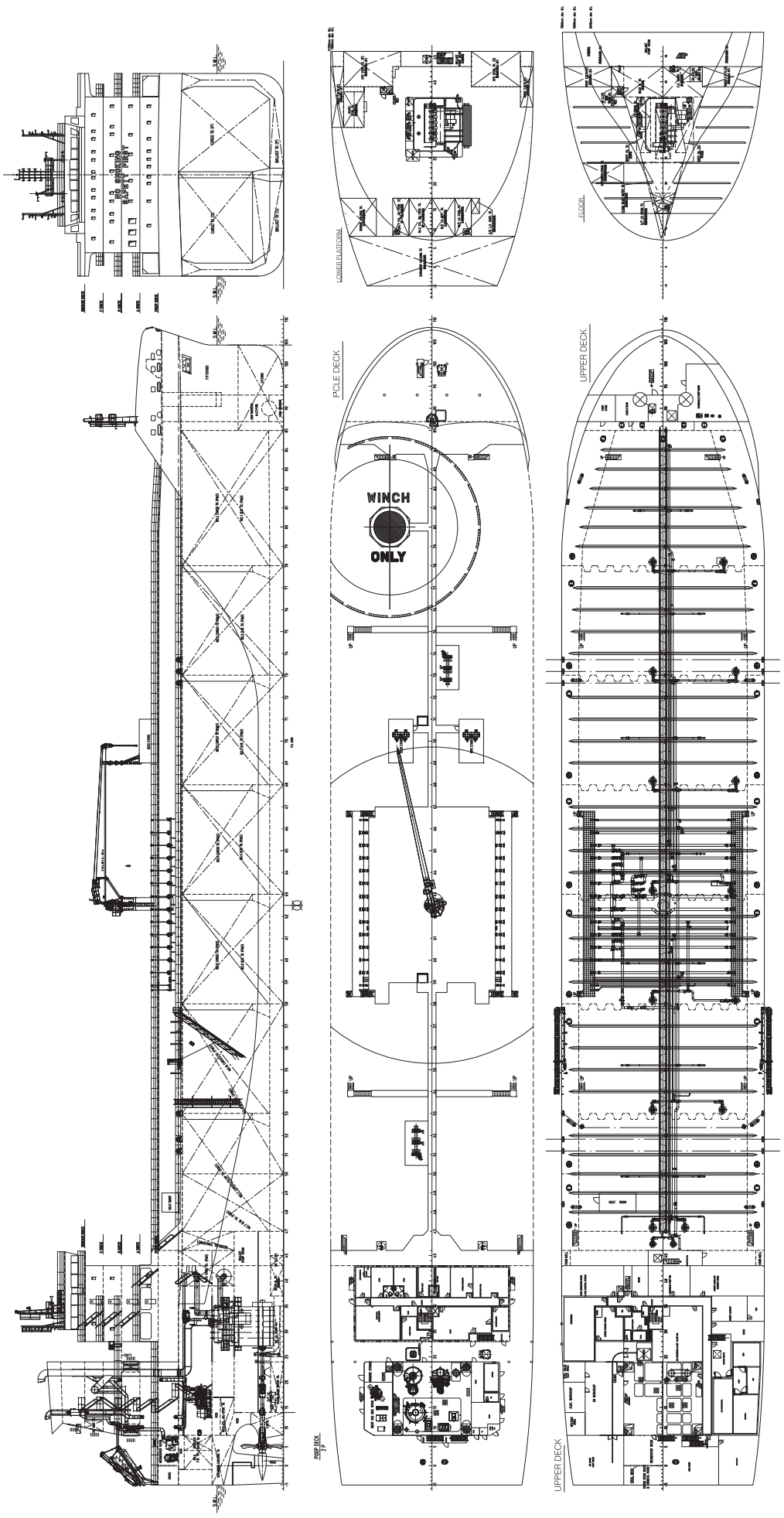
The ship's hull form, its MAN B&W 6S50ME-C9.6 electronically controlled main engine and the CPP allow for an intended consumption some 40% below more conventional vessels and an EEDI rating that meets the most stringent Phase 3 level.

There are 14 cargo tanks for a total capacity of 44,500m^3 suited to IMO type II and III cargoes, as well as oil products. The tanks are equipped with pumps with loading rates of 5,000m^3/h and discharge rates of 3,750m^3/h.

TECHNICAL PARTICULARS

Length oa:..... 183.00m
Length bp:..... 177.00m
Breadth moulded: 32.00m
Depth moulded: 16.00m
to upper deck: 16.6m
Width of double skin
side: 2.05m
bottom: 2.18m
Draught
scantling: 10.50m
design: 9.50m
Gross: 27,250gt
Displacement: 48,903.6t
Lightweight: 11067.17t
Deadweight
scantling: 37,836.43t
design: 32,517.23t
Block co-efficient: .....0.8008(scantling)
Speed, service (69.2 %MCR output): 13.65knots
Cargo capacity (m^3)
Liquid volume: 45,930.4
Bunkers (m^3)
Heavy oil: 900.8
Diesel oil: 262.4
Water ballast (m^3): 18,061.6
Daily fuel consumption (tonnes/day)
Main engine only: 16.56
Auxiliaries: 3.93
Classification society and notations: ..... DNV GL ✠1A Tanker for chemicals, Tanker for oil, CSR, ESP, Coat-PSPC(B), BIS, NAUT-OC, VCS(2, B), CCO, ETC, LCS, SPM, ICE(1B),BWM(E(s)), BWM(T), Clean(Tier III), ECA(SOx-A), Recyclable, TMON, BMON, E0, ECO. With register information: Ship type 2, a2, b3, c3, f2, str 0.075 % high-tensile steel used in construction: ... 80%
Propulsion
Design: ..... MAN
Model: .... 6S50ME-C9.6-HPSCR with scrubber
Manufacturer: ..... STX
Number: 1
Type of fuel: ..... HFO, MGO
Output of each engine: 6,502kW
Is this a diesel-electric or hybrid?: .....No
Propeller(s)
Material: ..... Ni-Al-Bronze
Designer/Manufacturer:..... MAN
Number: 1
Fixed/Controllable pitch: ..... Controllable
Diameter:..... 6.6m
Speed: 79.2rpm
Diesel-driven alternators
Number: 3
Engine make/type: Yanmar/6EY22ALWS
Type of fuel : ..... HFO, MGO
Alternator make/type: Taiyo/FE553A-8
Output/speed of each set: 950kW/900rpm
Exhaust-gas scrubbing equipment
Manufacturer: ..... Saacke
Type: ..... Hybrid Multistream EGCS 2600
On main engines?: ..... Yes
On auxiliary engines?: ..... Yes
Boilers
Number: 2
Type: .....FMB-VM 16.0, CMB-VS-1.5+1.7
Make: ..... Saacke
Output, each boiler: ..... 16t/h, 1.5+1.7t/h
Stern appendages/special rudders: ..... A semi-balanced rudder with rudder horn& rudder bulb
Bow thruster(s)
Make: ... Wuhan Kawasaki Marine Machinery Co. Ltd
Number: 1
Output (each): 1,200kW
Deck machinery
Cargo cranes/cargo gear
Number: 1
Make: ..... Jiangsu Masada
Type: .....Electro-hydraulic cylinder luffing hose handling crane
Performance: .....SWL: 10t; Max. Outreach: 25m; Min. Outreach: 6m; Hoisting speed: ~12m/min; Slewing speed: 0.8rpm; Luffing time:~90s
Other cranes
Number: 1
Make: ..... Jiangsu Masada Heavy Industries Co.,Ltd
Type: .....Monorail crane
Tasks: .....Provision crane
Performance: .....SWL: 4t; Max. Outreach: 5m from beam; Hoisting speed: ~10m/min; Traversing speed: ~10m/min
Mooring equipment
Number: 6
Make: ..... Jiangsu Masada Heavy Industries Co.,Ltd
Type: ..... Hydraulic
Special lifesaving equipment
Number of each and capacity: 28P
Make: ..... Hatecke Gmbh
Type: .....Free-fall lifeboat
Hatch covers
Type: .....Upper deck: oil tight small hatch cover
Cargo tanks
Number: 14
Grades of cargo carried: .....IMO II/III
Product range:..... Chemical & product oil
Coated tanks: ..... Pure Epoxy (special coat)
Cargo pumps
Number: 14
Type: .....Electric motor driven, deep well, single stage centrifugal
Make: .....Marflex
Stainless steel: AISI316L
Capacity (each): ..... 450m^3/h
Cargo control system
Make: ..... Scanjet
Type: .....Radar beam
Ballast control system
Make: ..... Scanjet
Type: .....Air purge
Ballast water treatment system
Make: ..... Alfa Lafal
Capacity: ..... 2,000m^3/h
Complement
Officers:..... 12
Crew:..... 13
Supernumaries/Spare: 0/3
Suez/Repair Crew:..... 6/0
Single/double/other rooms: 28/0/1
Navigation and other equipment
Bridge control system
Make: ..... Schneider
Type: .....DNV NAUT-OC arrangement
Is bridge fitted for one-man operation? ..... Yes
Integrated bridge system?: ..... Yes
If yes, make: ..... Furuno
Model: ..... DNV NAUT-OC
Radars
Number: 2
Make: .....Furuno
Model(s): ..... X-Band FAR-3320 S-Band FAR-3330S-SSD
Fire detection system
Make: .....Consilium
Type: ..... Addressable
Efficiency
Attained EEDI value: 4.27
Required EEDI value: 6.40
Energy Saving Technologies*: .....Asymmetry stern, rudder bulb
Contract date:.....24 January 2017
Launch/float-out date:.....7 June 2019
Delivery date:.....28 October 2019

CB ADRIATIC


LOWER PLATFORM
FLOOR
PCLE DECK
WINCH
ONLY
UPPER DECK
UPPER DECK

CHINA STEEL LIBERTY: Bulk carrier

Shipbuilder: ..... **CSBC Corporation, Taiwan**
Vessel's name: ..... ***China Steel Liberty***
Owner/Operator: ..... **China Steel Express Corporation**
Country: ..... **Taiwan**
Designer: ..... **CSBC Corporation**
Country: ..... **Taiwan**
Model test establishment used: . **SSPA Sweden**
Flag: ..... **Taiwan, R.O.C.**
IMO number: **9832975**
Total number of sister ships already completed (excluding ship presented): **2**
Total number of sister ships still on order: **1**

As part of a fleet renewal programme, begun in 2017, Taiwanese shipowner China Steel Express ordered a pair of ECO Newcastlemax bulkers at local builder CSBC. The order was later extended to four ships and the first of these was *China Steel Liberty* delivered in May. Two sisters *China Steel Harmony* and *China Steel Brilliance* followed in 2019 with the final vessel *China Steel Prestige* due for delivery early in 2020.

China Steel Liberty has been built to the limits of the Newcastlemax dimensions of 300m loa and 50m beam. Like many of the latest ships built to these dimensions, its deadweight of 208,600 comfortably exceeds the 185,000 tonnes that was once usual for this class of vessel. Cargo arrangements are typical for a Capesize ship with nine holds and nine hatches.

The ECO ship label applies to this deadweight and to the reduced fuel consumption compared to older ships. The attained EEDI is 2.20 which is comfortably below the 2.51 required for the vessel. The ship's accommodation has been built to a low resistance design aiding in reducing fuel consumption.

The vessel features a number of energy saving measures including the yard's sea-sword bow form, which is another of the vertical bulbless variants that have replaced the old bulbous bow designs of just a decade or so ago. Other measures featured are a rudder fin, twisted rudder, rudder bulb and a 9.1m high efficiency fixed pitch propeller. The main engine is a Mitsui-built MAN B&W 6S70ME-C8.5 type producing 14,900kW at 73rpm allowing a service speed of 16.5knots.

In order to have some flexibility for meeting the 2020 sulphur cap rules, the ship has been constructed as scrubber ready but none was installed on delivery.

TECHNICAL PARTICULARS

Length oa:..... 299.7m
Length bp:..... 295.2m
Breadth moulded:..... 50.0m
Depth moulded:..... 25.0m
to main deck: ..... Nil
to upper deck: 25.0m
to other decks: ..... Nil
Draught
scantling: 18.5m
design: 16.0m
Gross: 105,964gt
Displacement: ..... abt. 236,100t
Lightweight: ..... abt. 27,500t
Deadweight: ..... abt. 208,600t
scantling: ..... abt. 208,600t
design: ..... abt. 17,400t
Block co-efficient: ..... abt. 0.84/scantling
Speed, service (80%MCR output): 14.5

Cargo capacity (m^3)
Bale: ..... abt. 210,500
Bunkers (m^3)
Heavy oil: ..... abt. 4,600
Diesel oil: ..... abt. 460
Water ballast (m^3): ..... abt. 133,000
Daily fuel consumption (tonnes/day)
Main engine only: 46.6

Classification society and notations:.....
CR CR100+E Bulk Carrier, BC-A{Holds 2,4,6 and 8 may be empty}, GRAB[21], ESP, PSPC, PMA, NR-II, IWS, LCS, BWM, EEDI, SEEMP, SRE, Sox Scrubber Ready-I, CMS(CAU)+ PCM LR+100A1,BulkCarrier,ESP,ESN,BC-A,strengthened for heavy cargoes, 'hold nos. 2, 4, 6 & 8 may be empty', ShipRight (SDA, FDA, CM, ACS(B,D)), strengthened for regular discharge by heavy grabs[21],*IWS,LI,ECO(BWT,IHM),+LMC,UMS, "ShipRight(BWMP(F,T),SERS,SCM)",EGCS-R(A)

Propulsion
Design: ..... MAN B&W
Model: 6S70ME-C8.5
Manufacturer: ..... MITSUI
Number: 1
Type of fuel: .....HFO
Output of each engine: . 14,900kW x 73.0rpm
Is this a diesel-electric or hybrid?: .....No

Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer: ..... CSBC/Dalian Huarui Heavy Industry Group Co., Ltd
Number: 1
Fixed/Controllable pitch: .....Fixed
Diameter: 9.1m

Diesel-driven alternators
Number: 3
Engine make/type: .....Yanmar 6EY22(A)LW
Type of fuel ..... MDO / HFO
Alternator make/type: ..... Taiyo Electric Co., Ltd
Output/speed of each set: 950kW
Boilers
Number: 1
Type: ...MA type boiler, vertical oil fired boiler
Make: .....Kangrim Heavy Industries Co.,Ltd
Output, each boiler: 1,300kg/h
Mooring equipment
Number: .....2 x mooring winch/windlass + 4 x mooring winch
Make: .....Manabe Zoki
Type: .....Electric

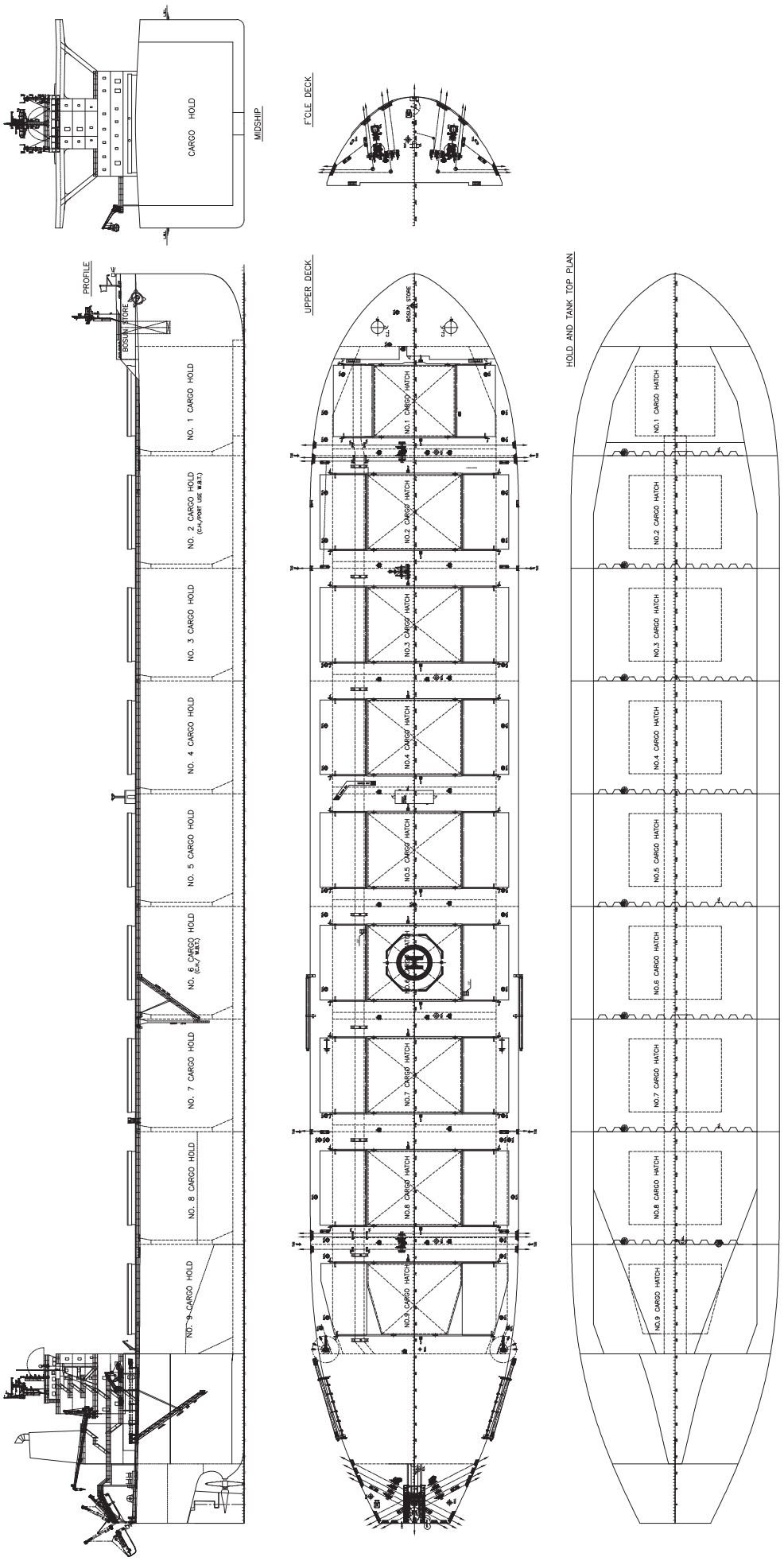
Special lifesaving equipment
Number of each and capacity: 1 x 25 persons
Make: .....Jiangsu Jiaoyan Marine Equipment Co., Ltd.
Type: .....Diesel engine, free-fall type
Hatch covers
Design: ..... MacGregor
Manufacturer: ..... CSBC
Type (upper deck/other decks): ... Upper deck
Cargo tanks
Number: 9
Product range: ..... Ore
Ballast water treatment system
Make: ..... Headway Technology Co., Ltd.
Capacity: ..... 3,900m^3/h x 2
Complement
Officers:..... 15
Crew: 10
Radars
Number: 2
Make: ..... JRC

Fire extinguishing systems
Engine room:
Make: ..... NK
Type: .....High Expansion Foam

Efficiency
Attained EEDI value: 2.20
Required EEDI value: 2.51
Energy Saving Technologies*: ..... Twisted rudder, rudder bulb, high efficient propeller, sea sword bow, rudder fin

Contract date: ..... 17 August 2017
Launch/float-out date: .....19 January 2019
Delivery date: .....20 May 2019

CHINA STEEL LIBERTY



CLIPPER EOS: LPG tanker

Shipbuilder: ....**Hyundai Mipo Dockyard Co., Ltd**
Vessel's name: ..... ***Clipper Eos***
Owner/Operator: ..... **Solvang**
Country: ..... **Norway**
Designer: ....**Hyundai Mipo Dockyard Co., Ltd**
Country: .....**Republic of Korea**
Model test establishment used: ..... **KRISO**
Flag: ..... **NIS**
IMO number: **9827205**
Total number of sister ships already completed (excluding ship presented): **3**
Total number of sister ships still on order: .....**Nil**

Built by Hyundai Mipo for Norwegian shipowner Solvang, *Clipper Eos* is the first in a series of four ECO ethylene carriers designed to meet the latest exhaust emission standards for NOx and SOx using a hybrid exhaust gas cleaning system. The owner claims the ships are the first HFO fuelled TIER III compliant ethylene carriers.

The vessel's Wärtsilä exhaust system combines a SOx scrubber with low pressure exhaust gas recirculation for NOx removal. SOx removal is achievable down to 0.1% while NOx reduction meets Tier II emissions standards. A separate SCR system using urea allows the ship to meet Tier III standards when necessary.

Clipper Eos and its sisters, which were all delivered in 2019, are the first of Solvang's vessels to be fitted with the system from new. A less efficient prototype was fitted in 2016 to an older Solvang vessel *Clipper Harald*. The system allows the ship to operate on HFO from January 2020 when the IMO global sulphur cap enters into force. The owner predicts a US$5,000 per day saving compared to operation on MGO. Fuel consumption is considered to be over 30% better than the previous generation of ethylene carriers.

The ship's propulsion system comprises a HYUNDAI-MAN B&W 6S50ME-C8.5 producing 7,100kw at 112rpm. The propeller is a 5.8m fixed pitch type with a Mewis duct to aid propulsion efficiency. Service speed is 16knots on 22tonnes of fuel per day. There is also a trio of Hyundai Himsen auxiliary engines, specified at 1,400kW at 720rpm.

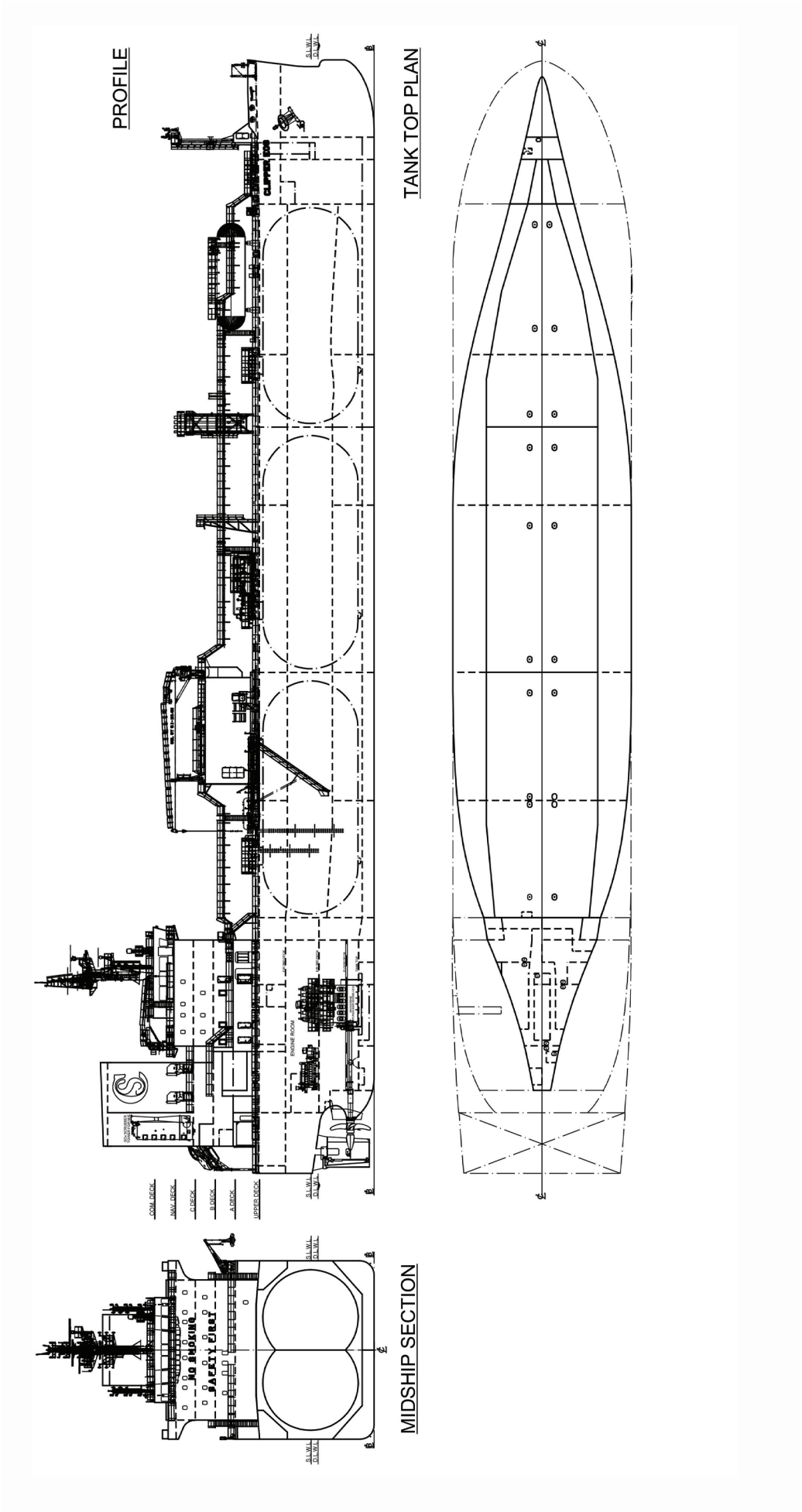
Clipper Eos has a 21,289m^3 cargo capacity. It is semi-refrigerated and features three IMO Type C independent, bi-lobe tanks (−104°C, 3.9 Bar). As well as ethylene, the ship can carry propane, ammonia and propylene among others. The vessel features six 350m^3/h capacity main cargo pumps, along with a further two 350m^3/h booster pumps.

TECHNICAL PARTICULARS

Length oa: ..... abt. 159.9 m
Length bp: 155.75m
Breadth moulded: 25.60m
Depth moulded
to upper deck: 16.40m
Draught (mld.)
scantling: 9.0m
design: 8.0m
Gross: 18,898gt
Deadweight
scantling: 18,000t
design: 14,500t
Speed, service (- % MCR output): 15.95knots
Cargo capacity
Liquid volume: ..... 21,300m^3
Bunkers (m^3)
Heavy oil: ..... 1,420m^3
Diesel oil: ..... 270m^3
Water ballast: ..... 9,500m^3
Daily fuel consumption (tonnes/day)
Main engine only: 21.4
Classification society and notations:
+1A1, tanker for liquefied gas, ship type 2G, (-104°C, 680kg/m^3, 0.39 Mpa), E0, TMON, BIS, BWM-T, Recyclable, COAT-PSPC(B), Nauticus(new building), PLUS
Propulsion
Model: .....HYUNDAI-MAN B&W 6S50ME-C8.5 (Tier II)
Manufacturer: .....HHI Engine & Machinery Division
Number: 1
Type of fuel: ..... HFO, MDO
Output of each engine: ....7,100kW x 112.7rpm
Is this a diesel-electric or hybrid?: .....No
Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer : .....Hyundai Heavy Industries
Number: 1
Fixed/Controllable pitch: .....Fixed
Diameter: 5.8m
Speed: 112.7rpm
Diesel-driven alternators
Number: 3
Engine make/type: Hyundai Heavy Industries
Type of fuel : .....HFO
Alternator make/type: ..... Hyundai Electric / HFJ7 634-10P
Output/speed of each set: 1,400kW x 720rpm x3 sets
Exhaust-gas scrubbing equipment
Manufacturer: .....Wärtsilä Moss
Type: .....Hybrid system (including LP-EGR provision)
On main engines?: 1
On auxiliary engines?: .....1 (including composite boiler)
Boilers
Number: 1
Type: ..... Composite boiler
Make: ..... Kangrim Heavy Industries
Output, each boiler: ..... Oil fired side 1,500, Exh.gas side 400kg/h
Stern appendages/special rudders: ....Mewis Duct
Deck machinery
Cargo cranes/cargo gear
Number: 1
Make: .....Oriental
Type: .....Electro-hydraulic
Performance: .....SWL 5.0t / outreach: max. 23.4m, min. 5.1m
Other cranes
Number: 1
Make: ..... DMC
Type: .....Electro-hydraulic
Tasks: ..... Engine room crane
Performance: .....SWL 2.5t / outreach: max. 10.0m, min. 2.6m
Mooring equipment
Number: 6
Make: .....Flutek
Type (electric/hydraulic/steam): ..... Hydraulic
Special lifesaving equipment
Number of each and capacity: ....1 x life boat (23P)
Make: .....Norsafe
Type: ..... Free-fall type
Cargo tanks
Number: ..... 3 (No.1~3)
Grades of cargo carried: .....2 Grades
Product range: ..Ethylene, Ethane, LPG, NH3
Stainless steel – structure/piping: ..... Piping – ASTM A312 Gr.316L or 304L
Cargo pumps
Number: 6
Type: ..... Deepwell, electric motor driven
Make: ..... Wärtsilä Svanehøj
Stainless steel: ..... AISI316 or 316L
Capacity (each): ..... 350m^3/h
Cargo control system
Make: ..... Kongsberg Maritime AS
Type: .....Computer type – Console mounted
Ballast control system
Make: .....Konsberg
Type: ..... K-Chief 600
Ballast water treatment system
Make: .....Techcross
Capacity: ..... 750m^3/h
Complement
Officers:..... 12
Crew: 11
Suez/Repair Crew: 6
Single/double/other rooms: ..... 4 / 19 / 1; Gymnasium
Navigation and other equipment
Bridge control system
Make: ..... Hyundai Heavy Industries
Is bridge fitted for one-man operation? .....No
Integrated bridge system?: ..... Yes
If yes, make: .....Furuno
Model: FMD-3300
Radars
Number: ..... S-Band Radar(1ea), X-Band Radar(1ea)
Make: .....Furuno
Model(s): ....S-Band Radar(FAR-3330S-SSD), X-Band Radar(FAR-3320)
Fire detection system
Make: .....Consilium
Type: .....Cargo / 4L
Fire extinguishing systems
Cargo holds: .....Portable fire extinguisher on deck
Make/Type: .....NK / 6kg dry powder
Engine room: .. CO_2 fire extinguishing system
Make/Type: .....Survitec / Total flooding
Cabins: .....Portable fire extinguisher on deck
Make/Type: .....NK / 6kg dry powder
Public spaces: .....Portable fire extinguisher on deck
Make/Type: .....NK / 6kg dry powder

Waste disposal plant
Incinerator
Make: ...Hyundai Marine Machinery Co.,Ltd.
Model: .....MAXI NG100SL WS
Sewage plant
Make: IL Seung Co., Ltd. .....Model: ISB-02
Efficiency
Attained EEDI value: 10.6
Required EEDI value: 11.5
Installed Fuel Meters: .....3x flow meter (volumetric type)
Energy Saving Technologies*: .....Mewis Duct

Contract date: ..... 24 March 2017
Launch/float-out date: .....21 September 2018
Delivery date: .....31 January 2019


PROFILE
TANK TOP PLAN
MIDSHIP SECTION
S.L.W.L.
D.L.W.L.
COM. DECK
NAV. DECK
C DECK
B DECK
A DECK
UPPER DECK
ENGINE ROOM
NO SMOKING
SAFETY FIRST

CMA CGM ARGENTINA: Container ship

Shipbuilder: .....**Hyundai Samho Heavy Industries Co., Ltd.**
Vessel's name: ..... ***CMA CGM Argentina***
Hull No: **S985**
Owner/Operator: .... **Eastern Pacific Shipping / CMA CGM**
Country: .....**Singapore**
Designer: .. **Hyundai Samho Heavy Industries**
Country: .....**Republic of Korea**
Model test establishment used: ..... **Hyundai Maritime Research Institute**
Flag: .....**Malta**
IMO Number: **9839909**
Total number of sister ships already completed (excluding ship presented): .....**3 off**
Total number of sister ships still on order: ..**2 off**

As its name suggests, *CMA CGM Argentina* is operated on services run by the France-based container liner major. However, the ship delivered in July by Hyundai Samho was ordered and is managed by Singapore-based Eastern Pacific Shipping, a relative newcomer to container ship operation. The vessel is one of five sister ships ordered in 2017, although that number has since been increased. Many of the ships have been committed to service with CMA CGM.

CMA CGM Argentina is a 15,072TEU NeoPanamax container ship of 365.98m length and 51m beam, optimised for use with refrigerated cargoes by way of slots for 1,000FEU reefer boxes. Container distribution fully loaded is 8,778TEU on deck and 6,294TEU under deck when homogenously loaded to 14tonnes.

The NeoPanamax is a size for container ships which is becoming increasingly popular over most of the major operators and some analysts believe it may eventually become the mainstay of the global container fleet. This is because they are easier to fill than the ultra large container ships that attract the most headlines, as well as their flexibility and greater range of ports.

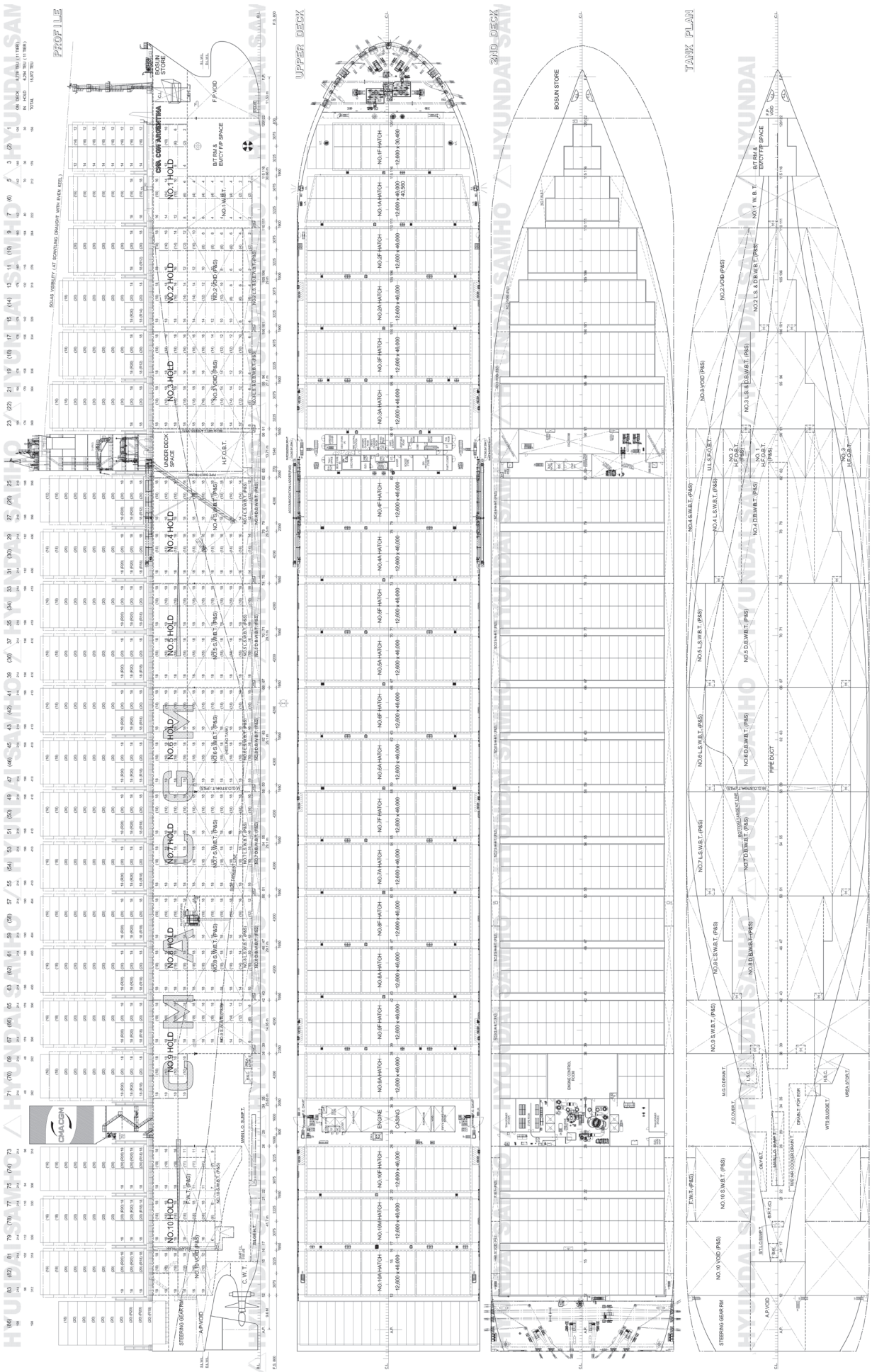
The first five vessels ordered by Eastern Pacific are powered by MAN B&W 11G90ME-C10.5 main engines running on HSFO as the ships are fitted with a Wärtsilä scrubber system. The 46,360kW main engine drives a 10m diameter fixed pitch propeller at 76rpm to give a service speed of 22knots. Efficiency of the propulsion system is enhanced by a pre-swirl duct, fin and a full spade rudder with bulb.

NOx compliance is achieved by way of an exhaust gas recirculation system and SCR. Six vessels ordered later and due for delivery from 2021 onwards are to be fitted with dual-fuel variants of the main engines. In late December 2019, it was reported that a further 11 dual-fuel engined sisters were ordered.

TECHNICAL PARTICULARS

Length oa: 365.98m
Length bp: 350m
Breadth moulded: 51m
Depth moulded
to main deck: 29.85m
to upper deck: 29.85m
Width of double skin
side: 2.5m
bottom: 2.3m
Draught
scantling: 16m
design: 14.5m
Gross: 149,314gt
Displacement: .....199,983t (at Scant.)
Lightweight: 42,907t
Deadweight
Design: 133,607t
scantling: 157,076t
Block co-efficient: ..... 0.6818 (At Scant.)
Speed, service: ..... 22knots at design draught at NCR with 15% S.M.
Bunkers (m^3)
Heavy oil: 8,087.5
Diesel oil: 1,442.6
Water ballast (m^3): 41,810.4
Daily fuel consumption (tonnes/day)
Main engine only: .... 163.6g/kWh + 5% at NCR
Classification society and notations: .....LR, +100A1,containership(SDA,FDA,FDASPR,WDA2, CM,ACS(B)),*IWS,LI,BoxMax(V,W,L),+LMC,UMS, BWTS,withdescriptivenotesShipRight(BWMP(T), IHM, SCM), CSA, GR(A)
% high-tensile steel used in construction: ...68.84 %
Main engine(s)
Design: .....Hyundai-Man B&W
Model: 11G90ME-C10.5-EGRTC
Manufacturer: .....HHI-EMD
Number: ..... 1 off
Type of fuel : ..... HFO/MDO
Output of each engine: . 46,360kW x 75.7rpm (two stroke, crosshead, turbocharged)
Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer: .....HHI-EMD
Number: ..... 1 off
Fixed/Controllable pitch: .....Fixed
Diameter: 10m
Diesel-driven alternators
Number: .....5 sets
Engine make/type: 8H32/40, 7H32/40
Type of fuel : .....HFO
Output/speed of each set: .....Abt. 4,000kW @720rpm, Abt. 3,500kW@720rpm
Alternator make/type: .....HHI-EES/Marine Design IP54 Enclosure Brushless
Output/speed of each set: .....Abt. 3,840kW @720rpm, Abt. 3,360kW@720rpm
Exhaust-gas scrubbing equipment
Manufacturer: .....Wärtsilä Moss AS
Type: ..Open-loop EGC system Q-50x5SMW
On main engines?: .....Yes
On auxiliary engines?: .....Yes
Boilers
Number: ..... 1 off
Type: ..Automatic, forced draught, heavy fuel oil burning, marine boiler
Make: .....Kangrim
Output, each boiler: .....5,000kg/h x 1set
Other cranes
Number: ..... 1 off
Make: .....Oriental Precision & Engineering Co., Ltd.
Type: ..... Electric motor driven system
Tasks: .....Monorail crane
Performance: .....12.5t x 7.0m/min
Other cranes
Number: .....2 set
Make: ..... Dongnam Marine Crane Co., Ltd.
Type: .....Electric Motor Driven System
Tasks: .....Provision Crane
Performance: .....3.0t x 10.0m/min
Mooring equipment
Number: .....12 sets
Make: .....TTS Marine GMBH
Type: .....Electric
Hatch covers
Design: ....Non-tight, Pontoon non-sequential operation type
Manufacturer: .....SMS-SME
Type: .....Upper Deck
Containers
Lengths: ..... 40ft container of 40'(L) x 8'(W) x 9'6''(H) ISO container
Heights: ..... 40ft container of 40'(L) x 8'(W) x 9'6"(H) ISO container
Cell guides: 40ft container of 40'(L) x 8'(W) x 9'6"(H) ISO container
Total TEU capacity: 15,072TEU
On deck: 8,778TEU
In holds: 6,294TEU
Homogeneously loaded to 14t:..... Yes
Reefer plugs: ..... 1,500 FEU reefer container socket on deck/hatch covers
Tiers/rows (maximum)
On deck: .....11 Tiers/22 rows
In holds: .....11 Tiers/21 rows
Ballast control system
Make: .....Emerson Process
Type: .... Hyd. operated and remotely controlled
Water ballast Treatment System
Make: ..... Hyundai Heavy Industries
Capacity: .....Filter + electrolysis unit ($2{,}000m^3/h$)
Complement
Officers: .....11 persons
Crew: .....20 persons
Bow thruster(s)
Make: .....KTE Co., Ltd.
Number: ..... 1 off
Output (each): 3,000kW
Bridge control system
Make: .....HHI-EES
Fire detection system
Make: .....Autronica
Type: ..... Analogue addressable optical smoke detector
Fire extinguishing systems
Cargo holds: ...High pressure CO_2, sea water
Make/Type: .....FAIN Co., Ltd.
Engine room:..... Water mist
Make/Type: .....NK Co., Ltd.
Radars
Number: .....2 sets
Make: ..... JRC
Model(s) : .....S-Band (JMR-9282-S), X-Band (JMR-922S-6X)
Waste disposal plant
Incinerator
Make: ....Hyundai Marine Machinery Co., Ltd.
Model: ..... MAXI 1500SL WS
Sewage plant
Make: .....Jonghap Machinery
Model: ..... Biological type
Contract date: .....28 September 2017
Launch/float-out date: ..... 22 March 2019
Delivery date: .....1 July 2019

CMA CGM ARGENTINA



DIJILAH: Crude oil tanker

Shipbuilder: ..... **Samsung Heavy Industries**
Vessel's name: ..... ***Dijilah***
Owner/Operator: ... **Al-Iraqia Shipping Services & Oil Trading (AISSOT)**
Country: ..... **UAE**
Designer: ..... **Samsung Heavy Industries**
Country: ..... **Republic of Korea**
Flag: ..... **Marshall Islands**
IMO number: **9829629**
Total number of sister ships already completed (excluding ship presented): **4**
Total number of sister ships still on order: ..... **Nil**

Originally ordered by Singapore-based BW Group, the 320,596dwt VLCC *Dijilah* debuted in January as the first newbuilding owned and operated by the 2017-formed Iraqi company Al-Iraqia Shipping Services & Oil Trading (AISSOT).

Dijilah is the first in a series of four identical sisters built by South Korean builder Samsung Heavy Industries. The other three ships – *Ninawa, Diyala* and *Kirkuk* – were delivered shortly afterwards in March, April and May respectively. BW's order for the vessels was made in May 2017, one month after the new owner to which they would be sold while still under construction was founded. The order was also notable for Samsung as it marked the first VLCCs the yard had secured in nearly a decade.

Cargo arrangements are typical for a VLCC, with five sets of port, centre and starboard tanks, making 15 in all. Three SHINCO steam cargo pumps of 5,300m^3/h capacity allow for three grade segregation of the cargo.

The ship has a vertical bow form with no bulb. Hull dimensions are a length of 330m, a beam of 60m and a moulded depth of 30.5m.

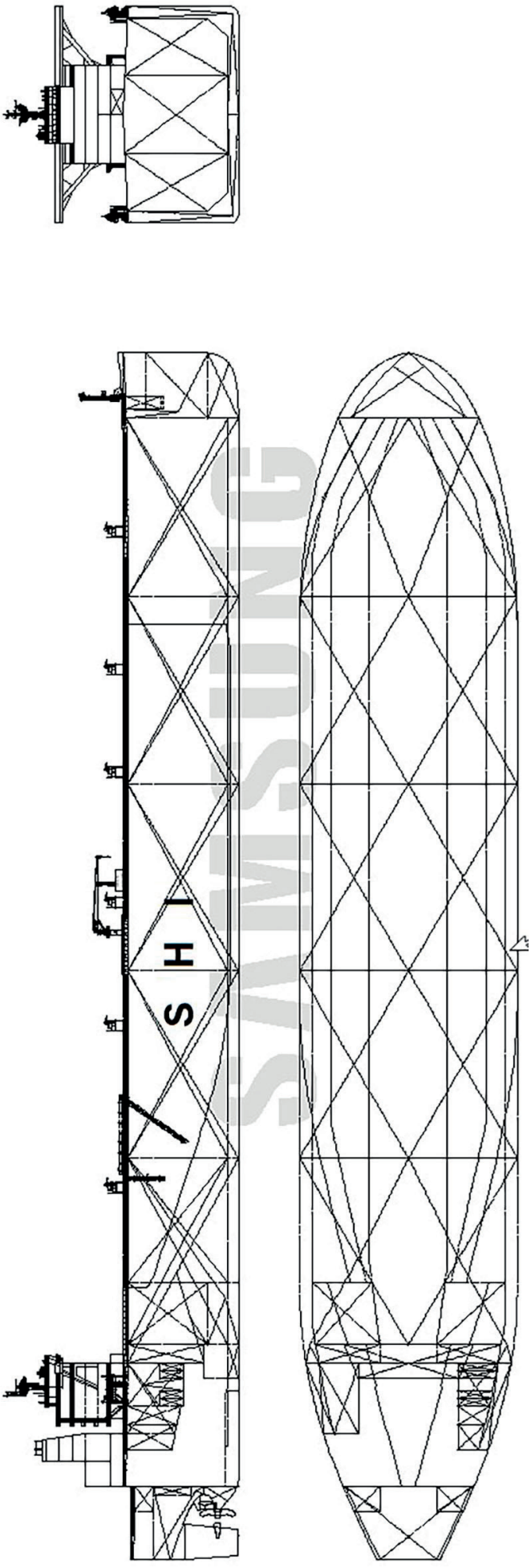
The power and propulsion system features a Doosan-built MAN B&W 7G80ME-C9 main engine with an output of 26,890kW. It is directly connected to a 10.4m diameter fixed pitch propeller turning at 72rpm. The arrangement gives the ship a service speed of 14.5knots on a fuel consumption of 70.5tonnes per day.

Dijilah is fitted with a variety of Samsung's in-house energy saving devices and systems. Included in these are a rudder bulb, SAVER Fins and a SAVER Stator. The SAVER Fins, which are attached to the hull, produces a series of strong vertical streams making inflow of the propeller more uniformly distributed. Meanwhile, the SAVER Stator improves the propeller's rotational energy efficiency. The ship also features Samsung's En-Saver performance monitoring and trim optimisation software.

TECHNICAL PARTICULARS

Length oa: ..... Approx. 333m
Length bp: 326.4m
Breadth moulded: 60.0m
Depth moulded
to upper deck: 30.5m
Width of double skin
side: 3.4m
bottom: 3.0m
Draught
scantling: 22.8m
design: 21.0m
Gross: 161,960gt
Displacement: 364,700t
Lightweight: 44,200t
Deadweight
scantling: 320,500t
design: 288,400t
Block co-efficient: .....0.788 at design draught
Speed, service: ..... 14.8knots incl. 15% power margin (65.9% DMCR)
Cargo capacity (m^3)
Liquid volume: 354,000
Bunkers (m^3)
Heavy oil: 6,700
Diesel oil: 1,100
Water ballast (m^3): 96,000
Tankers – percentage segregated ballast: ...100%
Daily fuel consumption (tonnes/day)
Main engine only: 64.6
Classification society and notations: ..... Lloyd's Register of Shipping ✠100A1, Double Hull Oil Tanker, CSR, ESP, ShipRight(ACS(B,C), CM), LI, ✠LMC, UMS, ECO(BWT, IHM, P, VECS-L) , COW(LR), *IWS(no seachest blanking device), with Descriptive Notes : ShipRight(BWMP(T), SCM, SERS)
% high-tensile steel used in construction: 75%
Propulsion
Design: ..... MAN Energy Solutions
Model: ..... MAN B&W 7G80ME-C9.5
Manufacturer: .....HSD Engine
Number: 1
Type of fuel: .....HFO or MGO
Output of each engine: 26,890kW
Is this a diesel-electric or hybrid?: .....No
Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer: ..... Samsung Heavy Industries/Silla Metal
Number: 1
Fixed/Controllable pitch: .....Fixed
Diameter: 10.4m
Speed: ..... 72rpm at DMCR
Diesel-driven alternators
Number: 3
Engine make/type: .....Hyundai Heavy Industries/7H21/32
Type of fuel: .....HFO or MGO
Alternator make/type: .....Hyundai / HFJ7 568-08P
Output/speed of each set: .....1,812.5kVA / 900rpm
Boilers
Number: 3
Type: .....Oil fired x 2sets, composite x 1set
Make: .....Kangrim
Output, each boiler: ..... 40,000kg/h x 2sets, 1,800(oil fired side)/1,500(exh. gas side) kg/h x 1set
Stern appendages/special rudders: ...Full spade rudder
Deck machinery
Cargo cranes/cargo gear
Number: 2
Make: .....Oriental Precision
Type: .....High pressure, electro-hydraulic self-contained, single jib type
Performance: .....20.0tons SWL, each
Other cranes
Number: 2
Make: .....Oriental Precision
Type: .....High pressure, electro-hydraulic self-contained, single jib type
Tasks: .....For provision / engine room equipment handling
Performance: .....1x 10.0t SWL, 1x 3.0t SWL
Mooring equipment
Number: 2x - 1 C/L + 2 M/D + 1 W/H, each, 8x – 2 M/D + 1 W/H, each
Make: .....Flutek
Type: High pressure, electro-hydraulic driven
Special lifesaving equipment
Number of each and capacity: ....2x 30 persons
Make: .....Hyundai Lifeboat (HLB)
Type: ..... Totally enclosed conventional
Cargo tanks
Number: 15
Grades of cargo carried: .....3x segregations
Product range: .....Crude oil
Coated tanks – make and type: ... PPG, Epoxy A/C according to PSPC
Cargo pumps
Number: 3
Type: ..... Centrifugal, steam turbine driven
Make: ..... SHINCO
Capacity (each): ..... 5,500m^3/h x 150m at S.G 1.025
Cargo control system
Make: ..... KSB Seil
Type: ..... Hydraulic type valve remote control
Ballast control system
Make: ..... KSB Seil
Type: ..... Hydraulic type valve remote control
Ballast water treatment system
Make: ..... Samsung Heavy Industries
Capacity: ..... 6,000m^3/h
Complement
Officers:.....14 persons
Crew: .....16 persons
Suez/Repair Crew: .....6 persons
Single/double/other rooms: .....30 cabins (single), 1 cabin (3 double)
Navigation and other equipment
Bridge control system
Make/Type: Nabtesco/M-800-V
Is bridge fitted for one-man operation? .....No
Integrated bridge system?: ..... Yes
If yes, make: .....Furuno
Model: .....FMD-3300 and etc
Radars
Number: 2
Make: .....Furuno
Model(s): .... 1 x FAR-2837S + 1 x FAR-2827
Fire detection system
Make/Type: ..... Consilium/Salwico
Fire extinguishing systems
Engine room: ..... NK / High expansion form
Cabins: ..... Fire hydrants
Public spaces: ..... Fire hydrants
Waste disposal plant
Incinerator
Make/Model: .... HMMCO/MAXI 150SL WS
Sewage plant
Make/Model: .....IL Seung/ISB-03
Efficiency
Attained EEDI value: 2.14
Required EEDI value: .....2.256 (Phase 1)
Installed Fuel Meters: Volumetric type for fuel oil
Energy Saving Technologies*: ..... SAVER Fins, Rudder bulb, SAVER Sator with Partial Duct, En-Saver
Performance Monitoring Regime:.... En-Saver of Optimum weather routing / Trim optimisation

Contract date: ..... 28 April 2017
Launch/float-out date: .....1 November 2018
Delivery date: .....17 January 2019


SHI
SAMSUNG

EAGLE BRASILIA: Crude oil tanker

Shipbuilder: ..... **Samsung Heavy Industries**
Vessel's name: ..... ***Eagle Brasilia***
Owner/Operator: ..... **AET Tankers Pte Ltd**
Country: ..... **Malaysia**
Designer: ..... **Samsung Heavy Industries**
Country: ..... **Republic of Korea**
Flag: ..... **Malaysia**
IMO number: **9795062**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: ..... **Nil**

A pair of cylindrical tanks just forward of the superstructure mark *Eagle Brasilia* as something beyond the run of the mill Aframax tankers. The tanks are there because the 118,110dwt vessel is in fact one of the tankers to be fitted with a dual-fuel engine intended to run on LNG.

Eagle Brasilia is the first of a pair of dual-fuel tankers built by Samsung for MISC subsidiary AET Tankers as part of its fleet renewal programme, which began in 2017. The ship was handed over in January one month before its sister *Eagle Bintulu*.

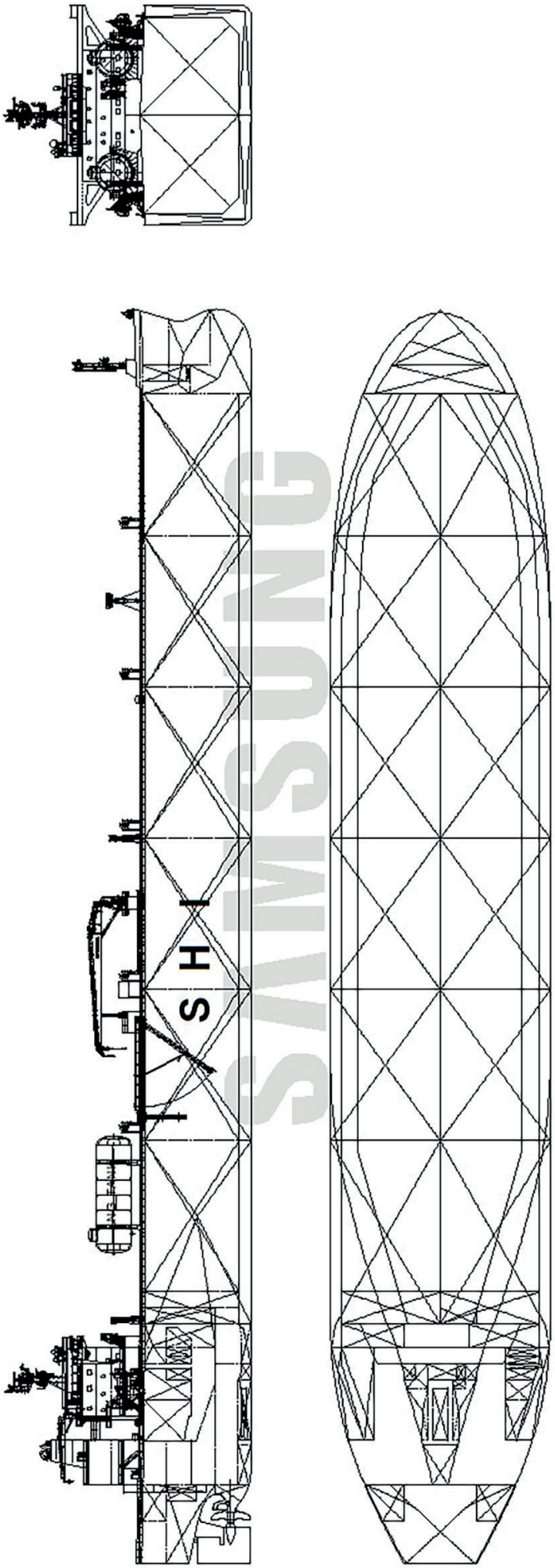
Sovcomflot beat AET in the race to become the first company with a dual-fuelled Aframax; but that doesn't detract from AET's leading role in the uptake of LNG fuelled tankers. Beyond being AET's first dual-fuel ship, *Eagle Brasilia* is also the first of any kind to feature Samsung's proprietary S-FuGaS LNG fuel system. S-FuGaS is composed of 850m^3 C-type tanks for storing extremely low temperature LNG as well as a system supplying LNG at the temperature and pressure required by the engines by vaporisation. The two tanks confer a range of 6,000nm. The supplying pressure of natural gas delivery depends on the specifications of the main engines. Each tank has two LNG feed pumps for full redundancy.

TECHNICAL PARTICULARS

Length oa: ..... Approx. 250m
Length bp: 243.0m
Breadth moulded: 43.8m
Depth moulded
to upper deck: 21.2m
Width of double skin
side: 2.35m
bottom: 2.4m
Draught
scantling: 15.1m
design: 13.6m
Gross: 62,150gt
Displacement: 112,900t
Lightweight: 20,000t
Deadweight
scantling: 132,900t
design: 118,100t
Block co-efficient: .....0.796 at design draught
Speed, service: .....14.5knots incl. 15% Power Margin (82.3% DMCR)
Cargo capacity (m^3)
Liquid volume: 129,000
Bunkers (m^3)
Heavy oil: 2,400
Diesel oil: 500
Water ballast (m^3): 40,000
Tankers – percentage segregated ballast: ...100%
Daily fuel consumption (tonnes/day)
Main engine only: 38.2
Classification society and notations: ..... ABS ✠A1 E , Oil carrier, CSR, ESP, CPS, AB-CM, TCM, ✠AMS, ✠ACCU, SPMA, GP, BWT, ENVIRO, UWILD(no seachest blanking device), GFS
% high-tensile steel used in construction: 75%
Propulsion
Design: .....WinGD
Model: 6X62DF
Manufacturer: .....HSD engine
Number: 1
Type of fuel: .....HFO, MDO or LNG
Output of each engine: ....11,200kW (DMCR)
Is this a diesel-electric or hybrid?: .....No
Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer : .....Samsung Heavy Industries/Hyundai Heavy Industries
Number: 1
Fixed/Controllable pitch: .....Fixed
Diameter: 8.0m
Speed: ..... 80.7rpm at DMCR
Diesel-driven alternators
Number: .....3 sets
Engine make/type: .....Hyundai Heavy .....Industries/ 6L20DF
Type of fuel : .....HFO, MDO or LNG
Alternator make/type: Hyundai / HFJ7 508-6P
Output/speed of each set: .....1,312.5kVA / 1,200rpm
Boilers
Number: ..... 2 x DF aux. boilers, 1 x composite boiler
Type
Aux. boilers: .. Dual fuel (HFO, MDO, LNG)
Composite boiler: Oil fired (HFO or MDO)
Make: .....Alfa Laval
Output, each boiler: .....DF aux. boiler: 25t/h
Composite boiler: .....1.2t/h (oil fired section) / 1.1t/h (exh. gas section)
Deck machinery
Cargo cranes/cargo gear
Number: 1
Make: .....SSII
Type: .....High pressure, electro-hydraulic
Performance: .....15.0t SWL
Other cranes
Number: 2
Make: .....SSII
Type: .....High pressure, electro-hydraulic
Tasks: .....For provision / engine room equipment handling
Performance: ..... 1 x 5.0t SWL, 1 x 1.0t SWL
Mooring equipment
Number: ... 2 x 1 C/L + 2 M/D + 1 W/H, each; 6 x 2 M/D + 1 W/H, each, 2 x 1 M/D
Make: .....Flutek
Type: ....High pressure, electro-hydraulic driven
Special lifesaving equipment
Number of each and capacity: ...2 x 35 persons
Make: .....Hyundai Lifeboat (HLB)
Type: ..... Totally enclosed conventional type
Cargo tanks
Number: 12
Grades of cargo carried: .....3 segregations
Product range: .....Crude oil
Coated tanks – make and type: ... Jotun, Epoxy A/C according to PSPC
Cargo pumps
Number: 3
Type: ..... Centrifugal, steam turbine driven
Make: ..... SHINCO
Capacity (each): ..... 3,000m^3/h x 130m at S.G 1.025
Cargo control system
Make: .....KSB Seil
Type: .....Hydraulic remote control system
Ballast control system
Make: .....KSB Seil
Type: .....Hydraulic type valve remote control
Ballast water treatment system
Make: .....Samsung - S&SYS
Capacity: .....4,000m^3/h
Complement
Officers:..... 16 persons
Crew: .....14 persons
Suez/Repair Crew: .....6 persons
Single/double/other rooms: .....30 cabins (single), 1 cabin (3 double)
Navigation and other equipment
Bridge control system
Make/Type: .....Kongsberg/AutoChief 600
Is bridge fitted for one-man operation? .....No
Integrated bridge system?: ..... Yes
If yes, make: ..... JRC
Model: .....JAN-9201 and etc
Radars
Number: 3
Make: ..... JRC
Model(s): ..... 1 x JMR-9282-S + 2 x JMR-9225-6X
Fire detection system
Make/Type: ..... Consilium/Salwico
Fire extinguishing systems
Engine room:
Make/Type: ..... NK / High expansion form
Cabins:: ..... - / Fire hydrants
Public spaces: ..... - / Fire hydrants
Waste disposal plant
Incinerator
Make/Model: HMMCO/ MAXI T150SL WS
Sewage plant
Make/Model: ..... Il Seung/ISB-03
Efficiency
Attained EEDI value: 2.941
Required EEDI value: .....3.752 (Phase 1)
Installed Fuel Meters: .....Ship performance monitoring system with shaft torque meter
Energy Saving Technologies*: ..... SAVER-Fins, Rudder bulb, SAVER SATOR, EN-SAVER (Smart ship solution), VFD (Main CSW pumps, LNG Fuel pumps, M/E El. Balancer)

Contract date: .....27 October 2015
Launch/float-out date: .....12 June 2018
Delivery date: .....4 January 2019

EAGLE BRASILIA



EXPRESS 4: Ro-pax

Shipbuilder: ..... **Austal Pty Ltd**
Vessel's name: ..... ***Express 4***
Owner/Operator: ..... **Molslinjen**
Country: ..... **Denmark**
Designer: ..... **Austal**
Country: ..... **Australia**
Model test establishment used: .. **Vienna Model Basin Ltd.**
Flag: ..... **Denmark**
IMO number: **9824564**
Total number of sister ships already completed (excluding ship presented): ..... **Nil**

January 2019 saw a new record set for Australian shipbuilder Austal, when it delivered the ro-pax catamaran *Express 4* to Danish ferry operator Molslinjen.

At 109m in length, *Express 4* is some 17.7m shorter than the 2005-built *Benichigua Express* – the longest vessel type Austal has designed and built. Yet at 11,345gt, the new fast ferry is more than 2,550gt larger than *Benichigua Express* and almost 1,000gt larger than the next largest Austal-built ship.

The ferry has an overall length of 109m, a waterline length of 105m, a moulded beam of 30.5m, a moulded depth of 7.6m, and a maximum draught of 3.4m.

Express 4 is based on Austal's proven catamaran platform but features a new optimised hull shape and reduced weight designed to deliver better performance and greater fuel efficiency. It is the first Austal design to feature two full car decks, which accounts for the large increase in gross tonnage over earlier vessels.

The car decks can accommodate 425 cars or 610 lane metres for trucks and 232 cars. The main vehicle deck has a clearance height of 4.6m while the mezzanine deck has a clearance of 2.1m. Maximum passenger capacity is 1,006 persons.

The vessel is fitted with four MAN Energy Solutions 20V 28/33D STC engines featuring sequential turbocharging and producing 9,100kW each at 1,000rpm. The power is transmitted through four ZF reduction gearboxes to four Wärtsilä LJX 1500 SRI waterjets. The arrangement gives a service speed of 40knots and during testing achieved a top speed of 47.8knots.

A similar vessel was ordered by Fjord Line of Norway to be built at Austal Philippines, using the same hull enhancements. In October 2019, Molslinjen contracted for an even larger 115m vessel that will have a slightly increased vehicle capacity and space for 1,610 passengers.

TECHNICAL PARTICULARS

Length oa: 109m
Length bp: 105m
Breadth moulded: 30.5m
Depth moulded: 7.60m
to main deck: 7.6m

Draught
design: 3.9m
Gross: 11,345gt
Displacement: 2,500t
Lightweight: 1,500t
Deadweight: 1,000t
Block co-efficient: 0.61
Speed, service: ..... 37knots at 75% MCR
Bunkers (m^3)
Diesel oil: ..... 598.512m^3

Classification society and notations: ....1A HSLC R1 Ferry B EO
Heel control equipment: ..... Transom trim tabs
Roll-stabilization equipment: ..... Transom trim tabs

Propulsion
Main engine(s)
Design: ..... MAN
Model: ..... 20V 20/33D STC
Manufacturer: ..... MAN
Number: 4
Type of fuel: ..... Marine diesel oil
Output of each engine: . 9,100kW@1,000rpm.
Is this a diesel-electric or hybrid?: .....No

Gearbox(es)
Make: .....ZF
Model: 60000 NR2H
Number: 4
Output speed : 470rpm

Waterjet(s)
Material: ..... Stainless steel
Designer/Manufacturer: ..... Wärtsilä LJX1500
Number: 4

Hydraulic Steering Layout: .....2 x mechanical linked jetivators
Main-engine generators
Number: 4
Make/type: .....Scania DI-09 074M
Output/speed of each set: 250kW
Stern appendages/special rudders: ..... Trim tab

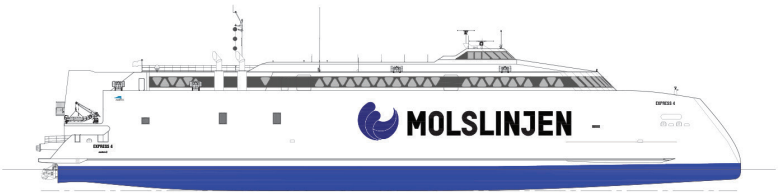
Mooring equipment
Number: 1
Make: ..... Hypac HHAW 12050
Type: ..... Hydraulic

Special lifesaving equipment: .....MES
Number of each and capacity: .....12 x 100 person SOLAS B liferafts, 4 x 22m MES slides
Make: .....LSA
Type: ..... LSA 100P SRL MK1 liferaft, 22m Mk2 slide
If MES, vertical or sloping chutes?: ... Sloping

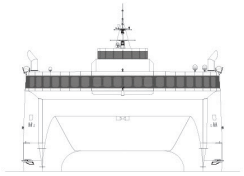
Vehicles
Number of vehicle decks: .....Two fixed
Total lane length: ..... 610m (trucks)
Total cars: 425
Complement
Officers: 3
Crew: .....22 (incl. officers)
Passengers
Total: 1,006
Navigation and other equipment
Bridge control system
Make: .....Marinelink
Type: .....Marinelink
Is bridge fitted for one-man operation? .....No
Integrated bridge system: ..... Yes
Make: .....Marinelink
Radars
Number: .....Two
Make: ..... Furuno S- Band Radar Model + FuRano X-Band
Model(s): .... FAR3230S-SSD-BB 250W Solid State + FAR3210BB
Fire detection system
Make: ..... Aquip Systems
Fire extinguishing systems
Cargo holds: ..... N/A
Engine room: .....CO_2
Make/Type: ..... Danfoss Semco
Vehicle spaces: .....Drencher
Make/Type: .....Minimax MXD
Public spaces: ..... Sprinkler
Make/Type: ..... Minimax MX-5
Efficiency
Attained EEDI value: .....Exempt from EEDI
Installed Fuel Meters: .....1 – flow meter
Energy Saving Technologies*: ..... MARINELINK-Smart
Performance Monitoring Regime: ..... High frequency data

Contract date: .....29 June 2016
Launch/float-out date: .....16 October 2018
Delivery date: .....29 January 2019

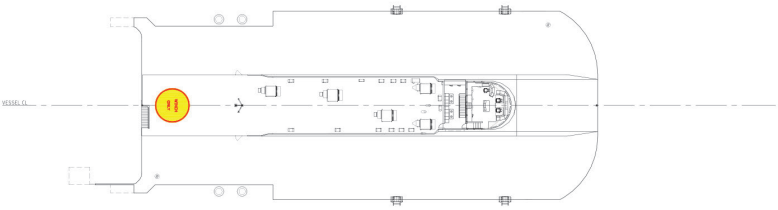
EXPRESS 4



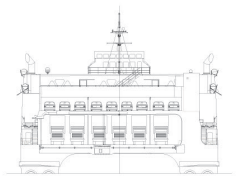
PROFILE



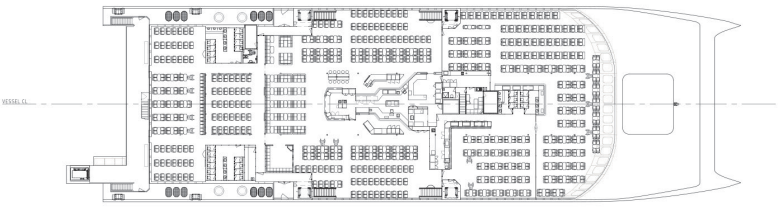
FORWARD ELEVATION



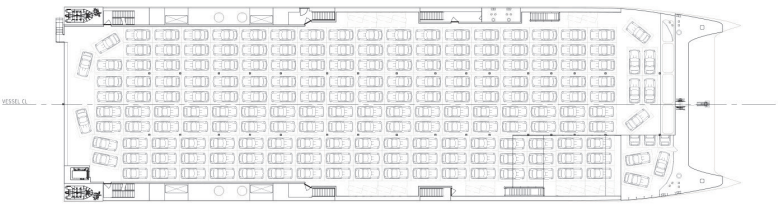
BRIDGE DECK



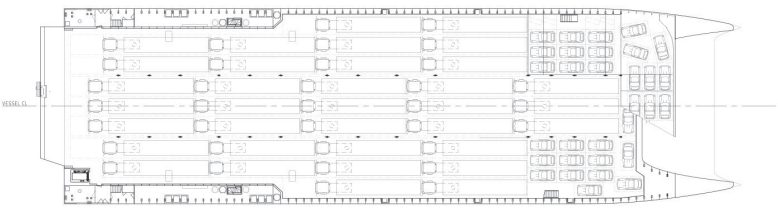
AFT ELEVATION



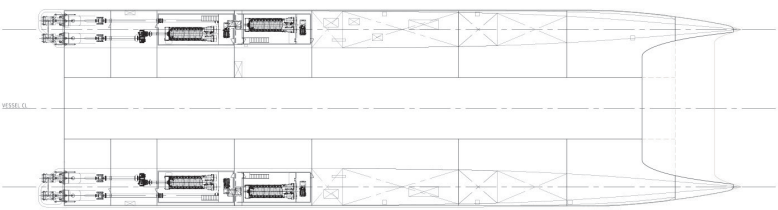
PASSENGER DECK



UPPER VEHICLE DECK



VEHICLE DECK



HULLS

GASLOG WARSAW: LNG tanker

Shipbuilder: ..... **Samsung Heavy Industries**
Vessel's name: ..... ***GasLog Warsaw***
Owner/Operator: ..... **GasLog Ltd.**
Country: ..... **Greece**
Designer: ..... **Samsung Heavy Industries**
Country: ..... **Republic of Korea**
Model test establishment used: ..... **SSMB (Samsung Ship Model Basin)**
Flag: ..... **Greece**
IMO number: **9816763**
Total number of sister ships already completed (excluding ship presented): ..... **Nil**
Total number of sister ships still on order: **4**

GasLog Warsaw was handed over by Samsung Heavy Industries to Monaco-based LNG Carrier operator GasLog at the end of July as the first in a series of 180,000m^3 ships. On its delivery it became the new flagship and largest vessel in the GasLog fleet, exceeding a slightly smaller 174,000m^3 series that had begun being delivered in 2018.

The 297m loa and 47m beam vessels have a prismatic shape covering four tanks served by a total of eight Shinko cargo pumps. *GasLog Warsaw* and its sisters were ordered in late 2016. The second vessel in the series has been named as *GasLog Windsor* and is scheduled for delivery in April 2020.

The vessels were originally to be the first fitted with the Mark V containment system developed by GTT of France. Technical problems encountered while developing the system however led to *GasLog Warsaw* being fitted instead with the Mark III Flex Plus system. Even so, the improved version of the Mark III featured some of the characteristics of the Mark V and allowed GasLog to boast that *GasLog Warsaw* was "the first vessel with a 0.07% boil off rate (compared with a more typical 0.085%) and reliquefaction providing the customer the lowest unit freight cost and maximum flexibility".

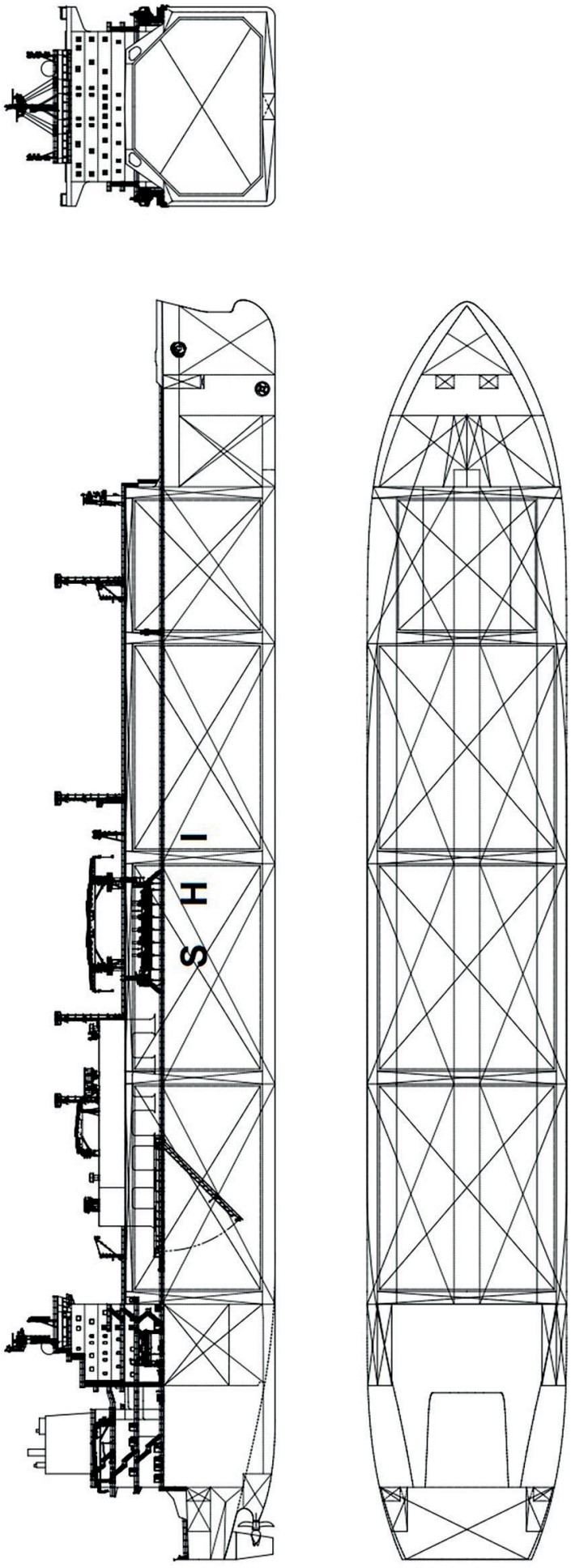
Operation on LNG means less CO_2 production, which aids the ship in attaining an EEDI rating almost 27% below that required under IMO rules.

TECHNICAL PARTICULARS

Length oa: 297m
Length bp: 290m
Breadth moulded: 47.0m
Depth moulded
  to main deck: 26.2m
  to upper deck: 26.2m
Width of double skin
  side: 2.42m
  bottom: 3.0m
Draught
  scantling: 12.5m
  design: 11.5m
Gross: 120,800gt
Deadweight
  scantling: 99,000t
  design: 86,900t
Speed, service (90% MCR output): 19.5knots
Cargo capacity (m^3)
  Liquid volume: 180,000
Bunkers (m^3)
  Heavy oil: 5,000
  Diesel oil: 900
Water ballast (m^3): 62,000
Daily fuel consumption (tonnes/day)
  Main engine only: 91.0
Classification society and notations: ..... ABS ✠A1 E, Liquefied Gas Carrier, Ship type 2G (Membrane tank, Maximum pressure 25 kPaG and Minimum Temperature -163°C, Specific Gravity 500 kg/m^3), SH, SH-DLA, SHCM, RRDA, ✠AMS, ✠APS, ✠ACCU, SFA(40), ENVIRO+, CRC, DFD, GCU, TCM, NIBS, UWILD, PMP, CPS, BWT+, R2, IHM, POT, RW, MLC-ACCOM, PORT
% high-tensile steel used in construction: .. 30%
Propulsion
  Design: ..... WinGD
  Model: 5X72DF
  Manufacturer: ..... HSD Engine
  Number: ..... 2 sets
  Type of fuel: ..... LNG, HFO or MGO
  Output of each engine: .... 12,084kW x 74.0rpm
Is this a diesel-electric or hybrid?: ..... No
Propeller(s)
  Material: ..... Ni-Al-Bronze
  Designer/Manufacturer: ..... Silla Metal Co.
  Number: ..... 2 sets
  Fixed/Controllable pitch: ..... Fixed
  Diameter: 8.4m
  Speed: 74.0rpm
Diesel-driven alternators
  Number: ..... G1 – 2 x sets, G-2 – 2 x sets
  Engine make/type: Hyundai Heavy Industries
  Type of fuel: ..... LNG, HFO or MGO
  Alternator make/type: ..... Hyundai / HSJ7 807-10P & HSJ 803-10P
  Output/speed of each set: ..... 2 x 4,562.5kVA + 2 x 3,437.5kVA / 720rpm
Boilers
  Number: ..... 2 sets
  Type: ..... oil fired
  Make: ..... Alfa Laval
  Output, each boiler: 5,000kg/h
Bow thruster(s)
  Make: ..... Kawasaki
  Number: ..... 1 set
  Output (each): 2,500kW
Deck machinery
  Cargo cranes/cargo gear
    Number: 2
    Make: ..... Oriental Precision (Korea)
    Type: ..... High pressure, electro-hydraulic self-contained, single jib type
    Performance: ..... 5.0t SWL, each
  Other cranes
    Number: 2
    Make: ..... Oriental Precision
    Type: ..... High pressure, electro-hydraulic self-contained, single jib type
    Tasks: ..... For provision / engine room equipment handling
    Performance: ..... 1 x 10.0t SWL, 1 x 5.0t SWL
Mooring equipment
  Number: ..... 2 x 1C/L + 2M/D + 1W/H, each, 5 x 2 M/D + 1 W/H, each, 2 x 3 M/D + 1 W/H
  Make: ..... TTS Marine
  Type: .... High pressure, electro-hydraulic driven self-contained type
Special lifesaving equipment
  Number of each and capacity: ... 2 x 48 persons
  Make: ..... Hyundai Lifeboat (HLB)
  Type: ..... Totally enclosed conventional type
Cargo tanks
  Number: 4
  Product range: ..... LNG
  Coated tanks: ..... Membrane
  Stainless steel – structure/piping: ..... Applied
Cargo pumps
  Number: ..... 8 sets
  Type: ..... Centrifugal, Submerged
  Make: ..... Shinko
  Capacity (each): ..... 1,750m^3/h x 160 MLC
Cargo control system
  Make: ..... KSB Seil
  Type: ..... Hydraulic type valve remote control system
Ballast control system
  Make: ..... KSB Seil
  Type: ..... Hydraulic type valve remote control system
Ballast water treatment system
  Make: ..... Samsung Heavy Industries
  Capacity: ..... 7,000m^3/h
Complement
  Officers: ..... 25 persons
  Crew: ..... 13 persons
  Suez/Repair Crew: ..... 6 persons
  Single/double/other rooms: ..... 36 cabins (single), 1 cabin (double), 1 cabin (3 double)
Navigation and other equipment
  Bridge control system
    Make/Type: ..... Kongsberg/AutoChief 600
Is bridge fitted for one-man operation? ..... Yes
Integrated bridge system?: ..... Yes
  If yes, make: ..... Furuno
  Model: ..... FMD-3300 and etc.
Radars
  Number: 2
  Make: ..... Furuno
  Model(s): FAR-2837SW, FAR-2827W
Fire detection system
  Make/Type: ..... Consilium/Salwico
Fire extinguishing systems
  Engine room: ..... NK / High expansion form
  Cabins: ..... Fire hydrants
  Public spaces: ..... Fire hydrants
Waste disposal plant
  Incinerator
    Make/Model: . HMMCO/ MAXI T150SL WS
  Sewage plant
    Make/Model: ..... IL Seung/ISB-07
Efficiency
  Attained EEDI value: ..... 6.596g-CO_2/ton-mile
  Required EEDI value: .... 8.955g-CO_2/ton-mile
Installed Fuel Meters: .... Mass flow type for fuel oil and fuel gas
Other installed monitoring tools: ..... Ship performance monitoring system with shaft torque meter
Energy Saving Technologies*: ..... VFD (Re-liquefaction plant, Main CSW pumps and etc.), LED (Inside area)

Contract date: ..... 28 September 2016
Launch/float-out date: ..... 16 October 2018

GASLOG WARSAW



HISTRIA ATLAS: Product tanker

Shipbuilder: ....**Santierul Naval Constanta S.A. (Constanta Shipyard)**
Vessel's name: ..... ***Histria Atlas***
Owner/Operator: **Histria Shipmanagement Srl**
Country: ..... **Romania**
Designer: ..... **Ship Design & Consult GmbH**
Country: ..... **Germany**
Model test establishment used: ..... **CFD optimization & Model Test by HSVA, Germany**
Flag: ..... **Liberia**
IMO number: **9800790**
Total number of sister ships already completed (excluding ship presented): ..... **Nil**
Total number of sister ships still on order: ... **3 + 3**

Constructed by Romanian builder Santierul Naval Constanta (SNC), *Histria Atlas* is the first in a series of three plus three EcoMax-class MR1 product tankers. The vessel was developed as a project by the builder, the shipowner Histria Shipmanagement and Italian classification society RINA. Histria Shipmanagement has also owned the yard since 2002.

The ship has been designed for a maximum cargo intake while still being able to operate in ports with a relatively shallow draught limitation. With a length of 179.99m, a beam of 32.26m and a draught of 11.1m, combine with a deadweight of 40,000tonnes and a liquid capacity of 46,995m^3 at 98%, the vessel falls in the middle of the MR1 size range.

The EcoMax name reflects the design philosophy to build a vessel with a lower lightship weight but high cargo capacity. The ratio of cargo to ship weight is some 10% to 20% better than typical ships of the same type and fuel consumption around 30% lower. The assigned EEDI rating of 4.7 is significantly below the required 6.23.

Histria Atlas has 10 cargo and two slop tanks and can carry seven grades. The pumping arrangements are covered by 10 500m^3/hour Framo hydraulic pumps plus two 300m^3/hour pumps for the slop tanks. This flexibility is further enhanced as the vessel can carry IMO 2 and 3 chemical cargoes as well as clean or dirty products.

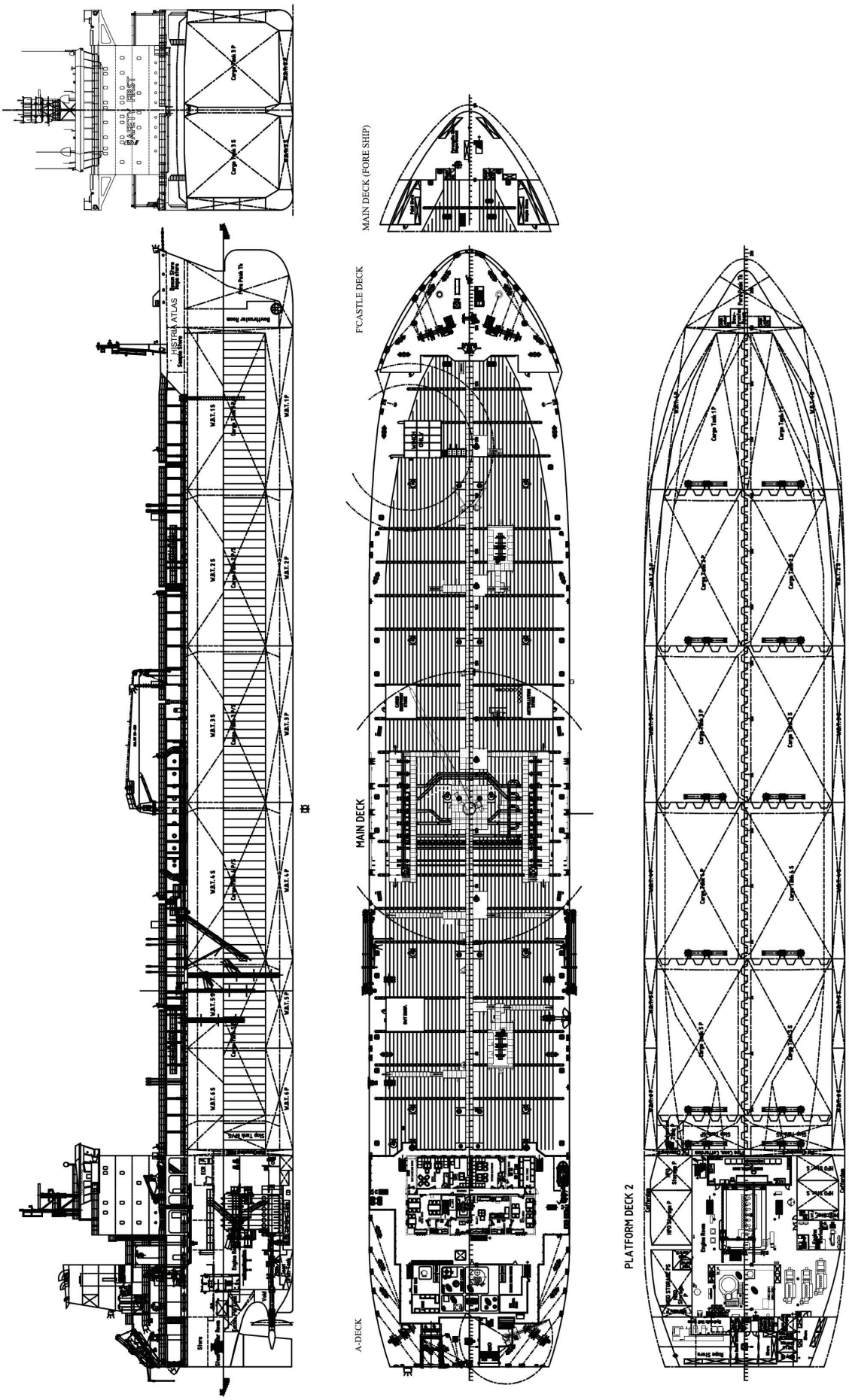
Power for *Histria Atlas* is provided by a Doosan-built MAN B&W 6S50ME-C9.5 producing 6,480kW at 89rpm. The propeller is a 6.5m fixed pitch type supplied by Wärtsilä. The arrangement allows a service speed of 14.5knots on the consumption of 20tonnes of MDO per day. As there are no plans for the vessel to trade within US ECAs, the engine only needed to meet NOx Tier II emission standards.

TECHNICAL PARTICULARS

Length oa: 180.00m
Length bp: 173.30m
Breadth moulded: 32.26m
Depth moulded
to main deck: 17.00m
Width of double skin
side: 2.00m
bottom: ..... 2.150 – 2.265m (slanted)
Draught
scantling: 11.20m
design: ..... summer draught 11.116m
Gross: 26,310gt
Displacement: 49,762t
Lightweight: 9,762t
Deadweight
scantling: 40,000t
design: ..... summer draught 40,000t
Block co-efficient: ..... approx. 0.78 at scantling draught
Speed, service (--%MCR output): .....14.00knots (88% SMCR)
Cargo capacity (m^3)
Liquid volume: 49,500
Bunkers (m^3)
Heavy oil: 1,335
Diesel oil: 410
Water ballast (m^3): 18,500
Tankers – percentage segregated ballast: ...100%
Daily fuel consumption (tonnes/day)
Main engine only: 20.0
Auxiliaries: 2.8
Classification society and notations: .....RINA C HULL MACH Oil Tanker ESP – CSR / Chemical Tanker ESP AUT-UMS; BWM-T; COAT-WBT; CARGOCONTROL; DMS; GREEN PLUS; INERTGAS-A; MLCDESIGN MON-SHAFT; PMA; SPM; SYSNEQ1; VCS
% high-tensile steel used in construction: ....70% approx.

Propulsion
Design: ..... MAN Diesel
Model: .....MAN B&W 6S50ME – C9.5 Tier II
Manufacturer: .....DOOSAN – MAN B&W
Number: 1
Type of fuel: .....HFO
Output of each engine: .....SMCR 6,480kW
Is this a diesel-electric or hybrid?: .....No
Propeller(s)
Material: .....Cu-NI-Al
Designer/Manufacturer: ..... Wärtsilä Marine Solutions
Number: 1
Fixed/Controllable pitch: .....Fixed
Diameter: 6,500mm
Speed: 90rpm
Diesel-driven alternators
Number: 3
Engine make/type: ..... Yanmar 6EY22ALW
Type of fuel: .....HFO
Alternator make/type: ..... TAYO FE 547C-8
Output/speed of each set: 900kW 900rpm
Boilers
Number: ... 1 oil fired boiler + 1 ME exhaust gas economizer
Type: ..... Vertical
Make: ..... Kangrim
Output, each boiler: ..... 12t/h 10bar +400kg/h 7 bar
Stern appendages/special rudders: ..... Spade rudder with bulb
Bow thruster(s)
Make: .....Wärtsilä Marine Solutions
Number: 1
Output (each): 850kW
Deck machinery
Cargo cranes/cargo gear
Number: .....2 cargo hose cranes
Make: .....Techflower
Type: .....Electrohydraulic
Performance: 1 x 100kN, 22m & 1 x 25kN, 7.5m
Mooring equipment
Number: 7
Make: ..... MacGregor Pusnes
Type: ..... Hydraulic
Special lifesaving equipment
Number of each and capacity: ..... 1 free-fall lifeboat, 30 persons
Make: ..... Hatecke
Type: ..... GFF 6.6 C17-T
Cargo tanks
Number: .....10 cargo + 2 slop
Grades of cargo carried: 7
Product range: .....oil products, chemical cargoes IMO type 2 and type 3
Coated tanks – make and type: .... Jotun epoxy tank coating
Stainless steel – structure/piping: .....Cargo piping AISI 316L
Cargo pumps
Number: ..... 10 + 2
Type: ..... Hydraulic
Make: .....Framo
Stainless steel: .....AISI 316L
Capacity (each): .... 10 x 500m^3/h + 2 x 200m^3/h
Cargo control system
Make: ..... Framo; Hoppe
Ballast control system
Make: ..... Framo; Hoppe
Ballast water treatment system
Make: ..... Alfa Laval PureBallast 3.1
Capacity: ..... 2 x 1,000m^3/h
Complement
Officers: 8
Crew: 15
Supernumaries/Spare: 1
Suez/Repair Crew: ..... Suez 6
Single/double/other rooms: .. Single rooms/ 6 beds Suez room
Navigation and other equipment
Bridge control system
Make: .....Wärtsilä Lingsø
Type: .....EMS 2200
Is bridge fitted for one-man operation? ..... Yes
Integrated bridge system: .....No
Radars
Number: 2
Make: ..... JRC
Model(s): .....JMR 9225 6XN, JMR 9230 SN
Fire detection system
Make: .....Salwico
Type: ..... Salwico Cargo
Fire extinguishing systems
Cargo holds; cargo tanks area: ..Water foam, low expansion
Make/Type: .....Minimax
Engine room: .....CO_2
Make/Type: .....Minimax
Waste disposal plant
Incinerator
Make: DETEGASA.....Model: IRLA 50
Waste compactor
Make: Delitek ..... Model: DT 200 MC
Sewage plant
Make: .....Detegasa
Model: .....DELTA BIO STPN 630
Efficiency
Attained EEDI value: 4.70
Required EEDI value: 6.23
Installed Fuel Meters: ..... Conventional
Other installed monitoring tools: .....Torque propulsion power monitoring
Energy Saving Technologies*: Rudder bulb, LED lighting
Performance Monitoring Regime: ..... In-house developed system / ship management system
Contract date: .....15 December 2015
Launch/float-out date: .....3 February 2019
Delivery date: .....24 April 2019

HISTRIA ATLAS



HOURAI MARU: LPG carrier

Shipbuilder: .....**Namura Shipbuilding Co., Ltd.**
Vessel's name: ..... ***Hourai Maru***
Owner/Operator: .....**Southern Pacific Holding Corporation**
Country: .....**Republic of Panama**
Designer: .....**Namura Shipbuilding Co., Ltd.**
Country: .....**Japan**
Flag: ..... **Marshall Islands**
IMO number: **9796585**
Total number of sister ships already completed (excluding ship presented): .....**Nil**
Total number of sister ships still on order: .....**Nil**

Hourai Maru is a unique vessel with no sister ships in the pipeline but it is significant in a number of ways.

On 11 March 2019, Namura Shipbuilding delivered the 38,000m^3 capacity LPG carrier from its Imari Shipyard & Works to Southern Pacific Holding. It is the very first of newly developed, medium-sized, fully refrigerated type multi-purpose LPG carrier.

Its first standout point is that it is fitted with the world's first IMO Type B independent prismatic cargo tanks. Adopted specifically for multi-purpose LPG carriers, the cargo tanks give the ship a high safety performance based on structural fatigue analysis. It also benefits from easier maintenance due to the partial secondary barrier of low temperature steel. It is arranged so that the distance between the outer shell and cargo tanks meets the requirements of the revised IGC Code.

Both the cargo tanks and reliquefaction system are designed to carry various products including commercial propane, anhydrous ammonia and vinyl chloride monomer. Two sets of deck storage tanks facilitate the conditioning of the cargo tanks.

Flexibility in meeting the 2020 sulphur cap is conferred by a fuel tank arrangement that includes a settling tank and service tank for low sulphur fuel oil, as well as a design that is scrubber ready in case the owner decides later that running on HFO is preferable.

Another significant achievement is that it is the first vessel of any type with a ClassNK certified SMARTShip system. SMARTShip is an Internet of Things (IoT) platform that enables the onboard operation of multiple systems with varying degrees of autonomy. ClassNK's certification approves the solution as a 'Computer Based System', which conforms to its rules governing a product performing 'Remote Monitoring and Diagnostics', 'Situational Awareness' and 'Decision Support Systems', both on board and ashore.

TECHNICAL PARTICULARS

Length oa: 182.97m
Breadth moulded: 29.60m
Draught
scantling: 10.40m
Gross: 25,458gt
Deadweight: 28,894t
Cargo capacity (m^3)
Liquid volume: ..... 38,543m^3
Bunkers (m^3)
Heavy oil: ..... 1,792m^3
Diesel oil: ..... 256m^3
Water ballast (m^3): ..... 11,775m^3
Classification society and notations: ..... NK NS* (LGC 2G, PSPC-WBT, NC) (PS-DA&FA/40) (IWS) (PSCM) (IHM) (EGCSR-G), MNS* (M0)
Propulsion
Design: .....MAN-B&W
Model: ..... 6G50ME-B9.5 (PL-ECT)
Manufacturer: Mitsui E&S Machinery Co., Ltd.
Number: .....1 set
Type of fuel: .....HFO (up to RMG380) / MDO (DMB) / MGO (DMA,DMZ)
Is this a diesel-electric or hybrid?: .....No

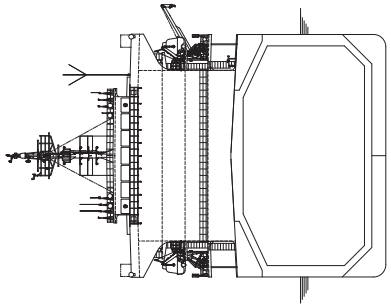
Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer: ..... Mitsubishi Heavy Industries Co., Ltd./Nakashima Propeller Co., Ltd.
Number: .....1 set
Fixed/Controllable pitch: .....Fixed
Diameter: 6,600mm
Speed: 97.0min-1
Diesel-driven alternators
Number: .....3 sets
Engine make/type: ..... Daihatsu Diesel MFG. Co., Ltd. / 6DK-20e
Type of fuel: .....HFO (up to RMG380) / MDO (DMB) / MGO (DMA,DMZ)
Alternator make/type: ..... Taiyo Electric Co., Ltd. / FE 547C-8
Output/speed of each set: .....1,075kVA (860kW) / 900min-1
Boilers
Number: .....1 set
Type: .....Vertical cylinder, smoke tube and composite type (OVS2-125/80-25)
Make: ..... Osaka Boiler MFG. Co., Ltd.
Output, each boiler: .... 1,200kg/h of 0.59MPa Saturated steam (oil fired side)
Other cranes
Number: 1
Make: .....Kyoritsu Kikai Co., Ltd.
Type: .....Hydraulic oil motor driven
Performance: 5t
Mooring equipment
Number: 8
Make: ..... Kawasaki Heavy Industries Ltd.
Type: .....Hydraulic oil motor driven
Special lifesaving equipment
Number of each and capacity: ...2 x 25 persons
Make: ..... Shigi Shipbuilding Co., Ltd.
Type: .....Totally enclosed type
Cargo tanks
Number: 3
Cargo pumps
Number: 6
Type: .....Deepwell type
Make: ..... Wärtsilä Svanehøj A/S
Capacity (each): ..... 400m^3/h
Cargo control system
Make: .....Liquid Gas Equipment Ltd.

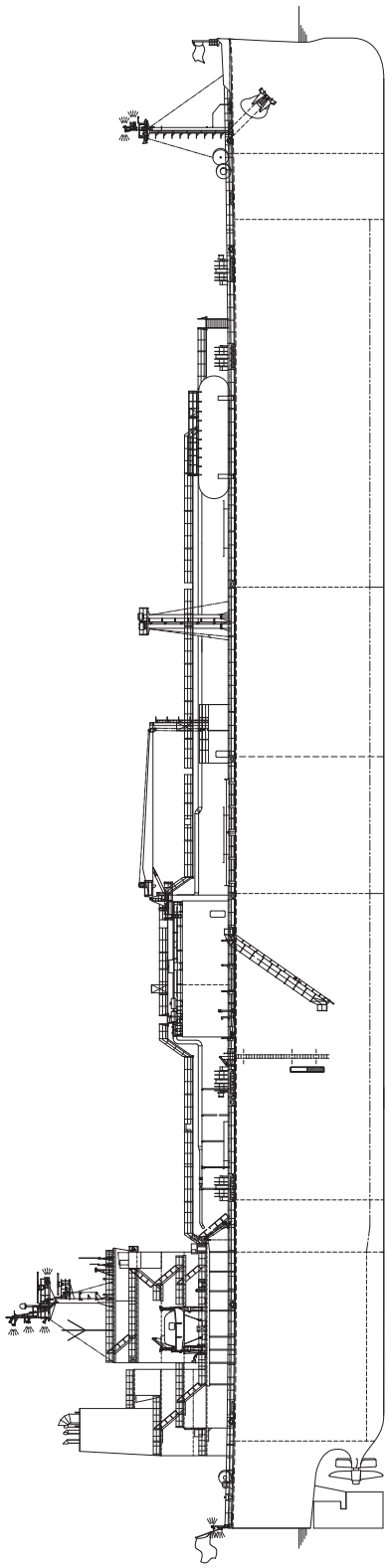
Ballast control system
Make: ..... Nakakita Seisakusho Co., Ltd.
Type: .....Hydraulic remote control system
Ballast water treatment system
Make: .....SunRui Marine Environment Engineering Co., Ltd.
Capacity: ..... 1,000m^3/h
Complement
Officers: 11
Crew: 14
Single/double/other rooms: ..... Single
Navigation and other equipment
Bridge control system
Make: ....Mitsui E&S Systems Research Inc. (for main engine)
Type: ..... BMS-2000III (for main engine)
Is bridge fitted for one-man operation? .....No
Radars
Number: 2
Make: ..... Furuno Electric co., Ltd.
Model(s): FAR-3330S-SSD, FAR-3320
Fire detection system
Make: ..... Consilium Nittan Marine Ltd.
Type: .....Addressable type
Fire extinguishing systems
Cargo holds: .....Dry chemical power type
Engine room: .....CO_2 fire extinguishing system
Cabins: .....Portable fire extinguisher
Public spaces: .....Portable fire extinguisher
Waste disposal plant
Incinerator
Make: .....Sunflame Co., Ltd.
Model: OSV-360SAI

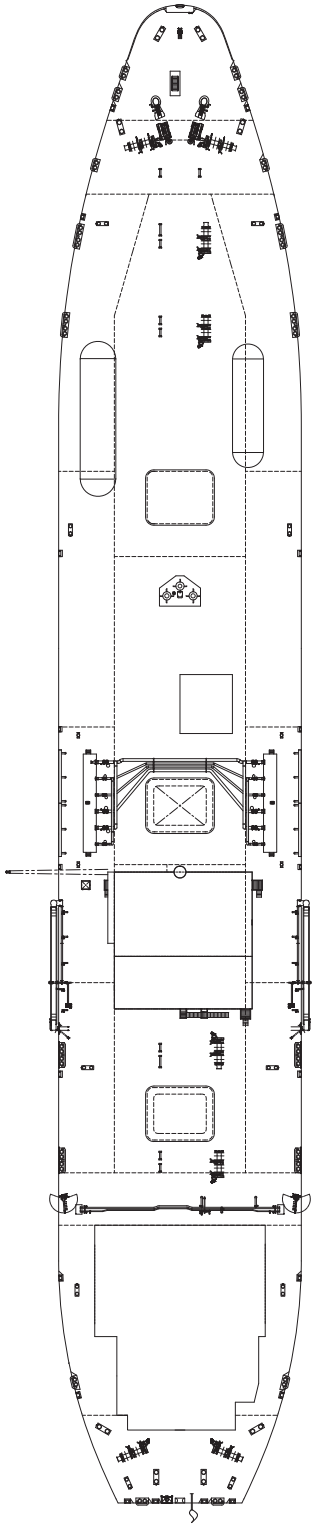
Efficiency
Installed Fuel Meters: .....1 set of main engine & generator engine F.O. consumption flow meter (volume type), 1 set of generator engine F.O. supply line flow meter (volume type), 1 set of generator engine F.O. return line flow meter (volume type), 1 set of Boiler F.O. consumption flow meter (volume type), 1 set of MDO/MGO consumption flow meter (volume type)
Other installed monitoring tools: ..... 1 set of shaft horsepower meter

Delivery date: ..... 11 March 2019

HOURAI MARU







HUNTER ATLA: Very large crude carrier

Shipbuilder: ....**Daewoo Shipbuilding & Marine Engineering Co., Ltd. (DSME)**
Vessel's name: ..... ***Hunter Atla***
Hull No: **5455**
Owner/Operator: ..... **Hunter Tanker AS**
Country: ..... **Norway**
Designer: ..... **DSME**
Country: ..... **Republic of Korea**
Model test establishment used: ..... **Korea Research Institute of Ships and Ocean Engineering (KRISO)**
Flag: ..... **Marshall Islands**
IMO number: **9851830**
Total number of sister ships already completed (excluding ship presented): **4**
Total number of sister ships still on order: **5**

Hunter Tankers took delivery of *Hunter Atla*, the first of seven identical 300,300dwt ECO design VLCC newbuilds, from Daewoo Shipbuilding & Marine Engineering in South Korea in September. Two sisters, *Hunter Saga* and *Hunter Laga*, followed at monthly intervals and the remaining four ships are due for delivery in 2020. The yard also has a separate order for a pair of the vessels from Oman Shipping company.

Justifying their ECO design label, *Hunter Atla* has been equipped with a comprehensive range of environmental protection systems. There is a Wärtsilä scrubber treating exhaust from the main, auxiliary engines and boilers for compliance with 2020 SOx rules, and an SCR system for main engine and generator engines to meet NOx Code Tier III levels.

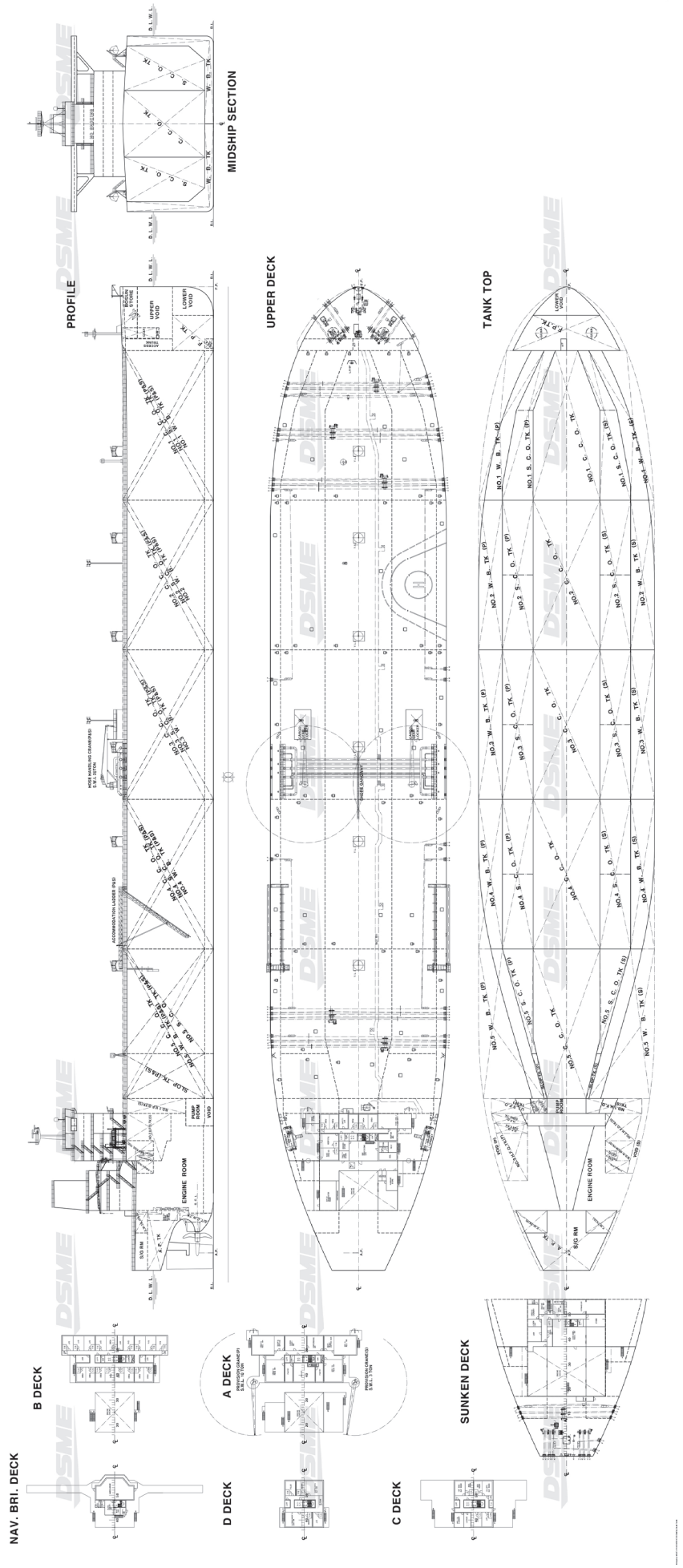
The hull dimensions are a loa of 336m, a beam of 60m and a depth of 29.5m. The hull form features DSME's streamlined DS Bow and various energy saving devices such as DSME duct, long cap and rudder bulb, all helping to reduce fuel consumption. The main engine is a derated MAN B&W 7G80ME-C9.5 model producing 24,510kW at 66.4rpm at MCR and 17,160kW at 70% MCR running at 59rpm. A 10.6m fixed pitch propeller directly coupled allows for a 12knots service speed, or a 14.8knots maximum speed consuming 59tonnes HFO daily.

DSME's Crosstie-less design has been applied to cargo tanks for preventing potential fatigue cracking of crosstie and permitting easy tank cleaning due to the simpler structure. As is typical for a VLCC, there are five tanks split into port starboard and centre for a total of 15 cargo tanks and two slop tanks. Three Shinko cargo pumps each with a capacity of 5,500m^3/h are installed.All seven vessels will be operated in the Tankers International Scrubber Pool and will trade in the spot market.

TECHNICAL PARTICULARS

Length oa: 336.0m
Length bp: 330.0m
Breadth moulded: 60.m
Depth moulded
to main deck: 29.5m
to upper deck: 29.m
Width of double skin
side: 3.m
bottom: 3.0m
Draught
scantling: 21.6m
design: 20.5m
Gross: 156,452gt
Deadweight
Design: 280,760t
scantling: 300,300t
Block co-efficient (at Scantling draft): .... Approx. 0.78
Speed, service (70%MCR output): 14.8knots
Cargo capacity (m^3)
Liquid volume: 341,870
Bunkers (m^3)
Heavy oil: 6,435
Diesel oil: 650
Water ballast (m^3): 94,032
Tankers - percentage segregated ballast: .Approx. 100% (ballast tank only)
Daily fuel consumption (tonnes/day)
Main engine only: 62.9
Classification society and notations:..... Lloyd's Register (LR) +100A1, Double Hull Oil Tanker, CSR, ESP, ShipRight (ACS(B, C), CM, FDA Plus(40,WW)), *IWS, LI, DSPM4, +LMC, IGS, EGCS(OPEN), UMS, NAV1, with the descriptive notes COW(LR), ShipRight (BWMP(T), VECS, SCM, IHM) DNV-GL: +A1, Tanker for oil, CSR, ESP, COAT-PSPC(B,C), CMON, BIS, LCS, SPM, E0, NAUT(NAV), BWM(T), VCS(2), TMON, Recyclable, CLEAN, ER(EGCS OPEN), descriptive note on "Target fatigue life of 40 years in worldwide operation basis"
% high-tensile steel used in construction: 61.5%
% aluminium used in hull/superstructure: 0%
Main engine(s)
Design: ..... MAN Energy Solutions
Model: ...MAN B&W 7G80ME-C9.5 (derated)
Manufacturer: ..... HHI
Number: 1
Type of fuel: .....HFO, ULSFO and LSMGO
Output of each engine: 24,510kW at 66.4rpm at MCR, 17,160kW at 59.0rpm at NCR (70% MCR)
Propeller(s)
Material: ..... Ni-Al-Bronze
Designer/Manufacturer: ..... Nakashima
Number: 1
Fixed/Controllable pitch: .....Fixed
Diameter: 10.6m
Speed: ..... 66.4rpm at MCR, 59rpm at NCR
Special adaptations: ..... Propeller ESCAP (manufacturer: MMG)
Diesel-driven alternators
Number: 3
Engine make/type: ..... STX-MAN/4-stroke, trunk piston, in-line
Type of fuel: .....HFO, ULSFO and LSMGO
Output/speed of each set: ..... 1,540kW at 900rpm
Alternator make/type: ..... Hyundai electric / HFJ7 634-08P
Output/speed of each set: 1,460kW / 900rpm
Exhaust-gas scrubbing equipment
Manufacturer: ..... Wärtsilä
Type: ..... Open, venturi, SW scrubbing
On main engines?: ..One(1) set for ME, GEs, aux. boilers and donkey boiler
Auxiliary Boilers
Number: 2
Type/Make: ..... Vertical/Kangrim
Output, each boiler: .....45,000kg/h, 20bar g. saturated (working pressure)
Donkey Boilers
Number: 1
Type/Make: ..... Vertical/Kangrim
Output, each boiler: .....3,000kg/h, 6bar g. saturated (working pressure)
Cargo cranes/cargo gear
Number: .....2 sets
Make: .....Oriental
Type: .... Electro-hydraulic, single jib, cylinder luffing
Performance: .....20t (SWL)
Other cranes
Number: .....2 sets
Make: .....Oriental
Type: .... Electro-hydraulic, single jib, cylinder luffing
Tasks: .....For handling provisions and engine spare parts
Performance: .....10 & 3t (SWL)
Mooring equipment
Number: .....11 sets
Make/ Type: .....Mirae Industries/Hydraulic
Cargo tanks
Number: .....5 pairs of side cargo tanks, 5 center cargo tanks, 2 slop tanks
Grades of cargo carried: .....Crude oil
Cargo pumps
Number: 3
Type: ..... Centrifugal, vertical, single stage
Make: ..... Shinko
Stainless steel: .....Impeller shaft
Capacity (each): .....5,500m^3/h x 150mTH
Cargo control system
Make: .....Emerson
Type: ..... Conventional control console type
Water ballast Treatment System
Make: .....Techcross
Capacity: .....3,000m^3/h x 2 units
Complement
Officers:..... 15
Crew:..... 15
Suez/Repair Crew: 6
Single/double/other rooms: .....31 cabins
Stern appendages/special rudders: ..... DSME duct, long cap and rudder bulb
Bridge control system
Make: .....Kongsberg
Type: .....Bridge manoeuvring system (Autochief 600)
Is bridge fitted for one-man operation? ..... Yes
Fire detection system
Make: .....Consilium
Type: .....Addressable type
Engine room: .....
Make/Type: .....NK/ high-expansion foam
Radars
Number: .....S-band, X-band radar (2 sets)
Make: .....Furuno
Model(s) ..... S-band: FAR-2338S-NXT-BB, X-band: FAR-2228-BB
Integrated bridge system?: .....No
Waste compactor
Make/Model:.....Uson/UBP-30S
Sewage plant
Make/Model:.....IL Seung/ISB-02
Efficiency
Attained EEDI value: 2.18
Required EEDI value: 2.33
Other installed monitoring tools: .....Cargo/ballast monitoring system, remote level & draft gauging system, shaft horsepower meter
Energy Saving Technologies: .....DSME Duct, Long cap, Rudder bulb

Contract date: .....2 February 2018
Launch/float-out date: ..... 1 June 2019
Delivery date: .....24 September 2019


MIDSHIP SECTION
PROFILE
UPPER DECK
TANK TOP
NAV. BRI. DECK
B DECK
A DECK
D DECK
C DECK
SUNKEN DECK
ENGINE ROOM
PUMP ROOM
S/G RM
D.L.W.L.

HYPATIA DE ALEJANDRÍA: Ro-pax

Shipbuilder: ..... **Cantiere Navale Visenini SRL**
Vessel's name: ..... ***Hypatia de Alexjandría***
Owner/Operator: ..... **Balearia Eurolineas Maritimas SA**
Country: ..... **Spain**
Designer: ..... **Cantiere Navale Visenini SRL**
Country: ..... **Italy**
Flag: ..... **Cyprus**
IMO number: **9498755**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: ..... **Nil**

Spanish ferry operator Balearia has ambitions to operate one of the cleanest ferry fleets in Europe, and as part of that plan, *Hypatia de Alejandría* has claimed the distinction of being the first LNG fuelled passenger ferry to operate in the Mediterranean.

The first of two sister ships by Italian builder Cantiere Navale Visentini – the second vessel *Marie Curie* was delivered six months later in July 2019 – *Hypatia de Alejandría* is a 28.658gt ro-pax of 186,48m in length. The vessel is powered by a pair of Wärtsilä 9L46DF main engines, each with 10,305kW output, which are connected to controllable pitch propellers through Renk reduction gearboxes. Additionally, the ro-pax is fitted with a Wärtsilä 9L20DF auxiliary as well as two Caterpillar 3516C oil-fuelled gensets. Service speed is 24knots.

The vessel has five vehicle decks and can accommodate 166 cars and 120 trucks in its 2,194 lane metres. There is capacity for 850 passengers in 123 four-person cabins and three lounges with reclining seats. Describing *Hypatia de Alejandría* as its first smart ship, Balearia designed much of the innovative equipment and services to enhance the passenger experience.

All signage onboard is digitised and if passengers prefer not to wait at reception for key allocations, access to cabins can be granted by of QR codes sent to mobile phones. Pets are allowed onboard in a kennel area which has been equipped with cameras allowing passengers to monitor them by smart phones and tablets. Passengers can access wi-fi entertainment services that include TV, films, games, e-books and magazines. This platform with a-la-carte digital content is also accessible from the smart TVs in the cabins. *Hypatia de Alejandría* has a shop, café, self-service and a-la-carte restaurant in addition to Jacuzzis on the outside deck.

The use of smart technology further extends to the operation of the vessel with a system in place for remote monitoring of the ship's engines and fuel consumption.

TECHNICAL PARTICULARS

Length oa: 186.48m
Length bp: 177.40m
Breadth moulded: 25.60m
Depth moulded
to main deck: 9.15m
to upper deck: ..... 15.00m (weather)
to other decks: ..21.00m (restaurant), 24.40m (passengers), 27.20m (bridge)
Draught
scantling: 7.10m
design: 6.75m
Gross: 28,658gt
Displacement: ..... 18,090.2t full load cond.
Lightweight: 10,371.5t
Deadweight: 7,718.7t
Block co-efficient: .....0.569 (draught = 6.75)
Speed, service (85%MCR output): ..24.65knots

Bunkers (m^3)
Heavy oil: 707.2
Diesel oil: 210.1
LNG: ..... 2 X 165m^3

Water ballast (m^3): .....5,516 (with heeling tanks = 6,244.32m^3)

Classification society and notations: .....RINA RO-RO passenger ship AUT-PORT, AUT-UMS, gas fueled

Propulsion
Model: 9L46DF
Manufacturer: ..... Wärtsilä
Number: 2
Type of fuel: .....Dual fuel – LNG/HFO/MDO
Output of each engine: 10.305kW
Is this a diesel-electric or hybrid?: .....No

Gearbox(es)
Make: .....Renk
Model: .....RSV – 1060
Number: 2
Output speed: 137.3rpm

Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer: .....Rolls-Royce
Number: .....2 (4 blades each)
Fixed/Controllable pitch: ..... Controllable
Diameter: 4.8
Speed: ..... 137 rpm

Main-engine driven alternators
Number: 2
Make/type: ..... Nidec (Leroy Somer) / LSA 52 3 S7/4P
Output/speed of each set: 1,800kW/1,800rpm
Diesel-driven alternators
Number: 2
Engine make/type: ..... Caterpillar / 3516C
Type of fuel: ..... HFO / MDO
Output/speed of each set: ..2,095kW/1,800rpm
Diesel-driven alternators
Number: 1
Engine make/type: ..... Wärtsilä / W9L20DF
Type of fuel: .....LNG / HFO / MDO
Output/speed of each set: ..1,665kW/1,200rpm

Boilers
Number: 1
Type: SM250/11,5/N/NAVY
Make: .....Cannon Bono Energia
Output, each boiler: 1,870kW
Bow thruster(s)
Make: .....Rolls-Royce
Number: 2
Output (each): 1,300kW
Mooring equipment
Number: .....2 combined mooring winch / windlass and 4 mooring winches
Make: .....Rolls-Royce
Type: .....Electric

Special lifesaving equipment (eg MES, free-fall lifeboats)
Number of each and capacity: .....2 x MES x 303 persons
Make: .....Viking
Type: .....VEMC
If MES, vertical or sloping chutes?: ... Sloping
Hatch covers
Design: .....Cover
Manufacturer: ..... MacGregor
Type (upper deck/other decks): ....Main deck
Reefer plugs: ..... 80 - PALAZZOLI (32A 11h/440-460V) + 5 plugs for e- cars
Vehicles
Number of vehicle decks (fixed/moveable): 5
Total lane length: ..... 2.194 LM
Total cars: 166
Total freight units: 120 (16m)
Doors/ramps/lifts/moveable car decks
Number of each: ..... 5 x ramps, 2 x lifts
Type: ..... Ramps (MacGregor); Lifts (Otis)
Designer: ..... Hydraulic

Cargo control system
Make: .....Janus
Ballast control system
Make: ..... Seastema
Ballast water treatment system
Make: .....Alfa Laval
Capacity: ..... 500m^3/h
Complement
Officers:..... 14
Crew: 44
Single/double/other rooms: ..... 14 / 22 / 0
Passengers
Total: 850
Number of cabins: ..... 123 (+36 for crew)

Navigation and other equipment
Is bridge fitted for one-man operation? ... Yes

Radars
Number: 2
Make: .....Sperry Marine
Model(s): ..... Radar(A) S-Band, Radar(B) X-Band, Vision Master FT PCM4

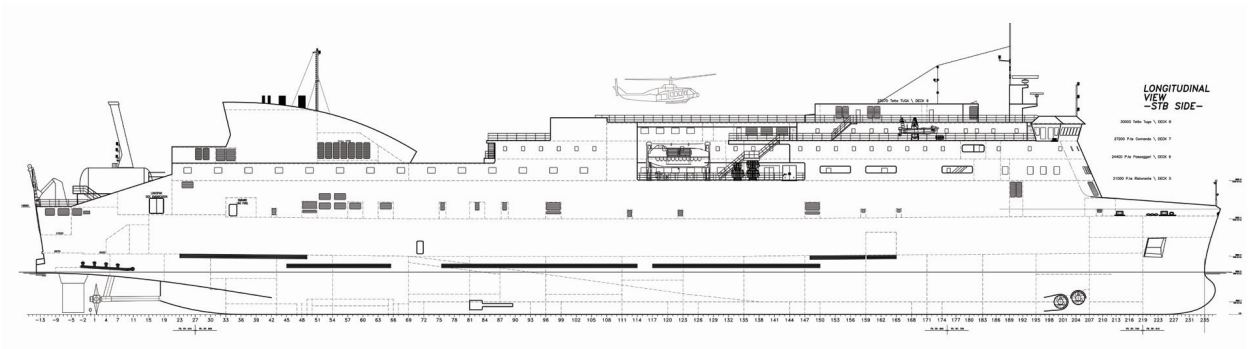
Fire detection system
Make: .....Autronica (AUTRO SAFE)
Type: .....BS – 420 M
Fire extinguishing systems
Cargo holds:..... Marioff – HIFOG / HF MT4 system
Engine room:..... Marioff – HIFOG / HF MLS-ML9
Vehicle spaces:..... Marioff – HIFOG / HF Ro-ro system
Cabins:..... Marioff – HIFOG / HF 3000
Public spaces:..... Marioff – HIFOG / HF 3000
Galley Spaces:..... Marioff – HIFOG / DUCT

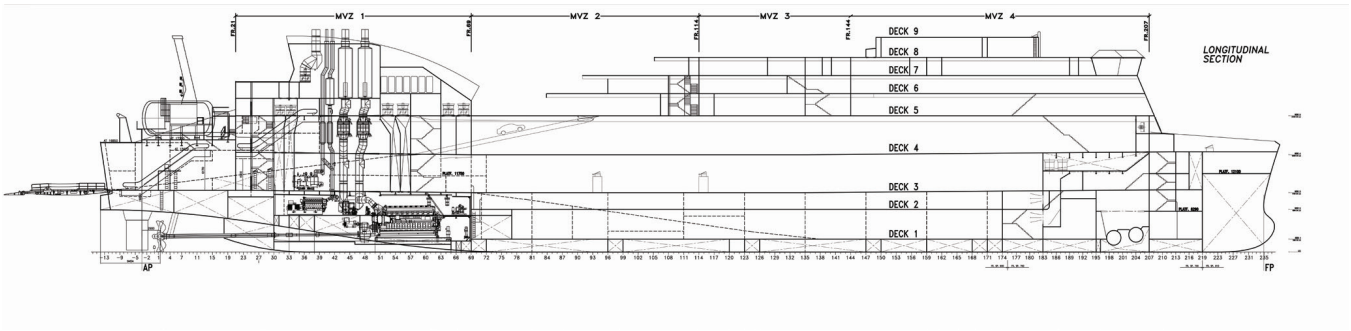
Waste disposal plant
Sewage plant
Make: ..... Evac
Model: ..... MBR 70 KN

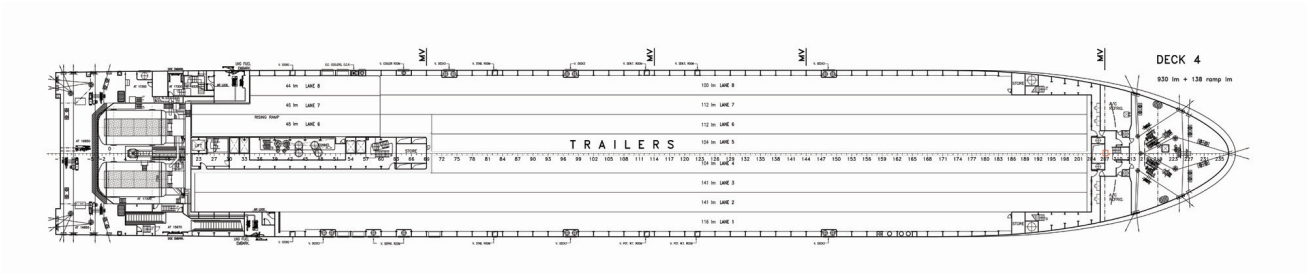
Efficiency
Installed Fuel Meters: .....VAF instruments / J5040PTZ (volume)
Energy Saving Technologies*: ..... Alternative fuel (LNG), LED lighting, special hull coating (silicone), an energy saving device for cooling water system

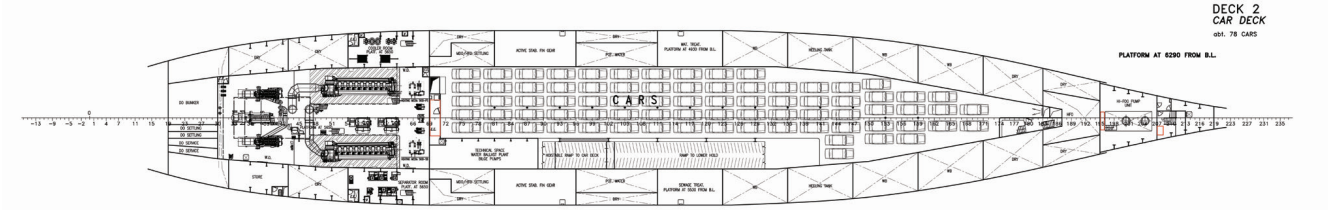
Launch/float-out date: ..... 29 March 2018
Delivery date: .....21 January 2019

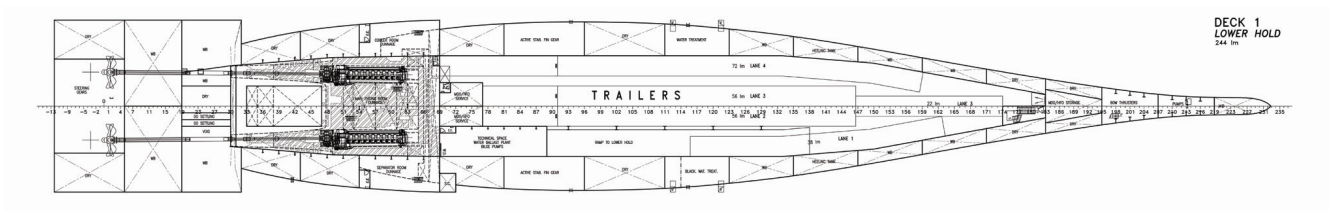
HYPATIA DE ALEJANDRÍA











JS INEOS MARLIN: LPG tanker

Shipbuilder: .....**Dalian Shipbuilding Offshore**
Vessel's name: .....***JS Ineos Marlin***
Owner/Operator: ..... **Evergas Management AS**
Country: .....**Denmark**
Designer: ..... **JHW**
Country: ..... **China**
Model test establishment used: . **HSVA Hamburg**
Flag: ..... **Malta / Valletta**
IMO number: **9799379**
Total number of sister ships already completed (excluding ship presented): .....**Nil**
Total number of sister ships still on order: **1**

Built by Dalian Shipbuilding Industry Company (DSIC), Denmark-based Evergas' 84,088m^3 very large ethane carrier *JS Ineos Marlin* is the first VLEC to be built in China. The first of a pair of sisters, the two vessels were ordered in 2017 to service a long-term contract by Ineos to carry shale-derived ethane from the US to China.

The cargo arrangements of the vessel are one of its most significant details. The ship is the first to apply the semi-refrigerated principle to a very large gas carrier. There are four tanks, three of which are 23,000m^3 Type C tri-lobe design – the largest tanks of this type in service. The tri-lobe type combines three cylinders into a single unit and allow a 20% capacity uplift compared with the bi-lobe design. The final tank is a standard cylinder type. Cargoes can be carried at temperatures down to -104˚C.

A wide range of gases can be carried including ethane, ethylene, propane, butylene, vinyl chloride monomer (VCM), isopropylamine, propane/butane mixtures, and ammonia. The ship can accommodate two different liquefied gases simultaneously. Cargo handling is catered for by Svanehoj deepwell pumps of 500m^3/h capacity. There are two pumps for each of the three large tanks.

The propulsion arrangements for the vessel feature a MAN B&W 6G60ME-C9.5 GIE dual-fuel engine. The E suffix denoting it can run on ethane, which is derived from cargo boil off when carrying ethane. The engine can run on HFO or MDO at times when ethane is not carried.

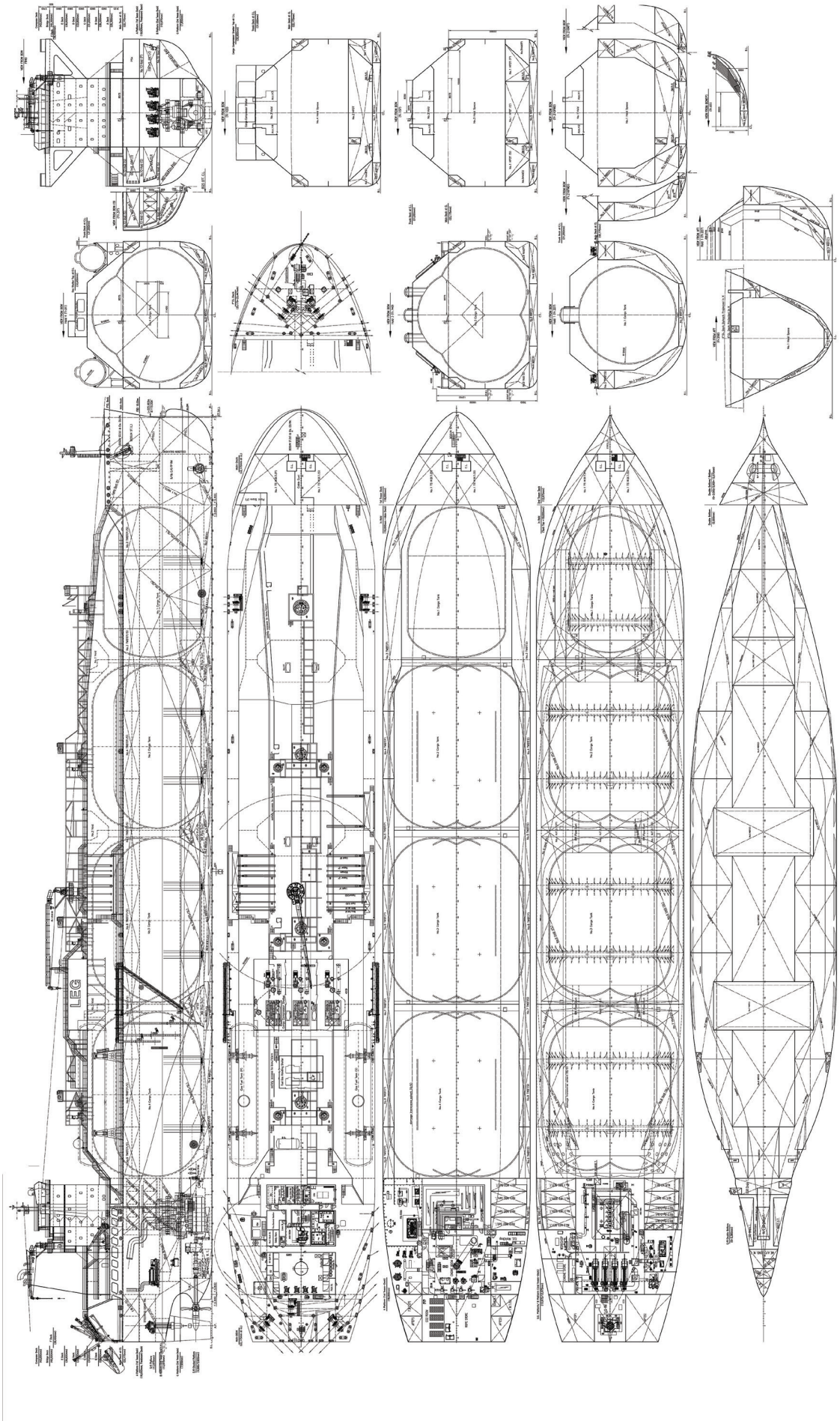
TECHNICAL PARTICULARS

Length oa: 231.57m
Length bp: 225.50m
Breadth moulded: 36.60m
Depth moulded : 22.00m
to main deck: 22,175mm
to other decks:.....Trunk Deck 30,950mm
Width of double skin : .....Double Bottom
bottom: .....2,000mm (cargo hold space)
Draught
scantling: 12.30m
design: 12.00m
Gross: 59,226gt
Displacement: 75,920t
Lightweight: 26,607.5t

Deadweight
scantling: 51,312.50t
design: 51,312.50t
Block co-efficient: 16knots
Speed, service (--%MCR output):..18.18knots at 16,080kW
Cargo capacity (m^3)
Liquid volume: ..... 84,087.7m^3 (Including gas fuel tanks)
Bunkers (m^3)
Heavy oil: 2,251.1
Diesel oil: 925.8
Ethane : 2,005.8
Water ballast (m^3): 19,272
Daily fuel consumption (tonnes/day)
Main engine only: ..... HFO: 39 / Ethane :33
Auxiliaries: ..... 10 (in port while discharge)
Classification society and notations: .....DNV GL 100 A5 Liquefied gas carrier Type-2G BWM (D2) ERS IW NAV MC AUT CM-PS EP-D GF Inert
Propulsion
Design: ..... MAN B&W
Model: .....6G60ME-C9.5-GIE-TII & TIII
Manufacturer: ..... MAN B&W
Number: 1
Type of fuel: .....HFO / MDO / Ethane
Output of each engine: 16,080kW
Is this a diesel-electric or hybrid?: .....No
Propeller(s)
Designer/Manufacturer: .... MAN Diesel Alpha propeller VBS 1810
Number: 1
Fixed/Controllable pitch: ..... Controllable
Diameter: ..... Approx 7,600mm
Speed: 97rpm
Main-engine driven alternators
Number: 1
Make/type: ..... Leroy Somer/ LSA 46.3
Output/speed of each set: 3,000kW
Diesel-driven alternators
Number: 4
Engine make/type: .....CMP-MAN 8L23/30H
Type of fuel: ..... HFO & MDO
Alternator make/type: .....Leroy Somer
Output/speed of each set: .... 900rpm x 1,300kW
Boilers
Number: 1
Type: .....Oil fired/exhaust gas
Make: ..... Kangrim
Output, each boiler: .....1,800/1,200kg/h (oil fired/exhaust gas)
Bow thruster(s)
Make: .....Brunvoll FU74LTC2000 13/49
Number: 1
Output (each): 1,400kW
Deck machinery
Cargo cranes/cargo gear
Number: 1
Make: .....Ningbo Kairong Ship Machinery
Type: .....Crane
Performance: ..... 7.5MT SWL
Other cranes
Number: 1
Make: .....Ningbo Kairong Ship Machinery
Type: .....Crane
Tasks: ..... Stores
Performance: ..... 7.5MT SWL
Mooring equipment
Number: 7
Make/Type: .....MacGregor Supply/Electric
Special lifesaving equipment
Number of each and capacity: ... 1 (22 persons)
Make: .... Jiangsu Jiaoyan Marine Equipment
Type: ..... Free-fall
Cargo tanks
Number: 4
Grades of cargo carried: .....2 simultaneously
Product range: .. Ethane, Propylene Propane, Ammonia, VCM, Butadiene, Ethylene
Stainless steel – structure/piping: ....X12 Ni 5 (5% Ni-steel)
Cargo pumps
Number: .....Tank 1 - 1 Pump / Tank 2,3,4 - 2 Pumps
Type: .....Deep well
Make: ..... Svanehoj
Capacity (each): .....500 Cub M
Cargo control system
Make: .....Oil Free Burckhardt Compressor 2K160-2F_1
Type: .....2K160-2F_1
Ballast control system
Make: ..... Allweiler
Type: ..... 2 Nos centrifugal pump
Ballast water treatment system
Make: .....HEADWAY OceanGuard
Capacity: HMT-600x2
Complement
Officers:..... 8
Crew: 14
Navigation and other equipment
Bridge control system
Make: ..... Wärtsilä SMA electronics
Type: .....NACOS Platinum
Is bridge fitted for one-man operation? ..Yes
Integrated bridge system?:..... Yes
If yes, make: ..... Wärtsilä SMA electronics
Model: .....NACOS Platinum
Radars
Number: ..... 3cm & 10cm
Make: ..... Wärtsilä SMA electronics
Model(s): ..... Multipilot Platinum
Fire detection system
Make/ Type: Consillium/M4.3
Fire extinguishing systems
Engine room: ..... Fixed CO_2
Make/Type: .....Tyco
Cabins:
Make/Type: .....Portable fire extinguishers
Public spaces:
Make/Type: .....Portable fire extinguishers
Waste disposal plant
Waste handled: ..... As per garbage management plan
Incinerator
Make: ..... TeamTec AS
Model: OG200C
Sewage plant
Make: ..... Wärtsilä
Model: .. STC02-13 with 1 Pump 1 Compressor
Efficiency
Attained EEDI value: 6.349
Required EEDI value:
Phase 0: ..... Required EEDI=7.968
Phase 1: ..... Required EEDI=7.171
Phase 2: ..... Required EEDI=6.375
Phase 3: ..... Required EEDI=5.578
Installed Fuel Meters: ..... Mass flow meter
Other installed monitoring tools: .....Loadicator, remote draught gauges
Energy Saving Technologies*: .....Twisted leading-edge rudder fitted with MAN Alpha EcoBulb Rudder Bulb, a MAN Alpha 7.6 meter Kappel CP Propeller with fairing cone. Power take out via shaft generator.
Performance Monitoring Regime: ..... COACH used for noon data and performance monitoring.

Launch/float-out date: .....16 July 2018
Delivery date: ..... 28 March 2019

JS INEOS MARLIN



KAI OLDENDORFF: Bulk carrier

Shipbuilder: .....**Jiangsu Hantong Ship HI**
Vessel's name: ..... ***Kai Oldendorff***
Owner/Operator: ..... **Oldendorff Carriers**
Country: .....**Germany**
Designer: .....**Shanghai Merchant Ship Design & Research Institute (SDARI)**
Model test establishment used: ..... **HSVA** Hamburg, ...**Germany**
Flag: .....**Liberia**
IMO number: **9834375**
Total number of sister ships already completed (excluding ship presented): **5**
Total number of sister ships still on order: **6**

Lubeck-based Oldendorff Carriers is among the most active in the purchase of newbuildings funded to a large extent by sales of older vessels. Having offloaded a sizeable part of its fleet of mixed sizes in the five years before the crash of 2008, Oldendorff has since been building at a rate that the average age across its 100-vessel plus fleet is well below five years.

Kai Oldendorff was delivered in January as the first of 12 ECO Kamsarmax ships designed by SDARI and built by Jiangsu Hantong the Chinese yard most favoured by the owner. Some of the latter ships have since been sold to other owners but may well end up chartered in by Oldendorff. When the order was first announced, Oldendorff said that at least two of the vessels will have a 1C ice-class which would be in keeping with the company's use of the Northern Sea Route. *Kai Oldendorff* is not one of the two ice-classed ships.

The vessel weighs in at 81,242dwt on a 14.51m draught. She has the typical Kamsarmax dimensions of 229m loa and 32.26m beam dictated by the West African port of Kamsar – a major loading place for bauxite. Cargo arrangements are typical for a Kamsarmax ship with seven holds and hatches.

Power comes from a fuel-efficient Hyundai-MAN B&W 6S60ME-C8.5 main engine rated at 9,932kW at 90rpm. The propeller is a 6.95m diameter optimised FPP from Nakashima. Service speed is 14.3knots at 75% MCR. *Kai Oldedorff* is required to have an EEDI rating of maximum 3.94 and comes in below this at 3.72. The ship was delivered without a scrubber, but one is scheduled to be fitted during 2020.

TECHNICAL PARTICULARS

Length oa: 228.28m
Length bp: 225.5m
Breadth moulded: 32.27m
Depth moulded: 20.02m
Draught
scantling: 14.51m
design: 12.20m
Gross: 44,029gt
Lightweight: 13,984t
Deadweight: 81,242t
scantling: 70,000t
design: 82,000t
Speed, service (75%MCR output): 14.3knots
Cargo capacity (m^3) 96,82
Bunkers (m^3)
Heavy oil: 2,100
Diesel oil: 593
Water ballast (m^3): 21,906

Classification society: .....Lloyd's Register

Propulsion
Design: ..... MAN B&W
Model: 6S0ME-C85Tier 2
Manufacturer: ..... Hyundai
Number: .....
Type of fuel: .....HFO
Output of each engine: 99,34kW
Is this a diesel-electric or hybrid?: .....No
Propeller(s)
Material: .....CV3 Ni-Al-Bronze
Designer/Manufacturer: ....Nakashima, Japan
Number: 1
Fixed/Controllable pitch: .....Fixed
Diameter:..... 6,950mm
Speed: 92.2rpm
Diesel-driven alternators
Number: 3
Engine make/type: ..... Yanmar, Japan 6EY18ALW
Type of fuel: .....HFO/MOD/MGO
Alternator make/type: ...Taiyo Electric, Japan
Output/speed of each set: 600kW, 900rpm

Exhaust-gas scrubbing equipment
Manufacturer: .....Yarra
On main engines?: ..... Yes
On auxiliary engines?: ..... Yes
Boilers
Number: 1
Type: .....Composite Boiler/ CMB-VS
Make: .....Saacke, Germany
Output, each boiler: .....1,600kg/n (oil fired) 690kg/n (exhaust gas)
Mooring equipment
Number: 6
Make: .....TTS
Type (electric/hydraulic/steam): ..... Hydraulic

Special lifesaving equipment
Number of each and capacity: 1x 30pax
If MES, vertical or sloping chutes?: ... Sloping

Hatch covers
Design: .....TTS
Manufacturer: ..... Jiangsu New Hantong Ship Heavy Ind. Co Ltd.
Type (upper deck/other decks): .. Side-rolling
Ballast water treatment system
Make: .....Erma First Esk Engineering Solution SA.
Capacity: .....34,733.8m^3 1,200m^3/h

Complement
Officers:..... 11
Crew: 13
Supernumaries/Spare: 1

Navigation and other equipment
Bridge control system
Make: ..... Nabtesco
Type: M-800-V
Is bridge fitted for one-man operation? .....No
Integrated bridge system: .....No
Radars
Number: 2
Make: ..... Furuno
Model(s): FAR-2827, FAR-2837-5

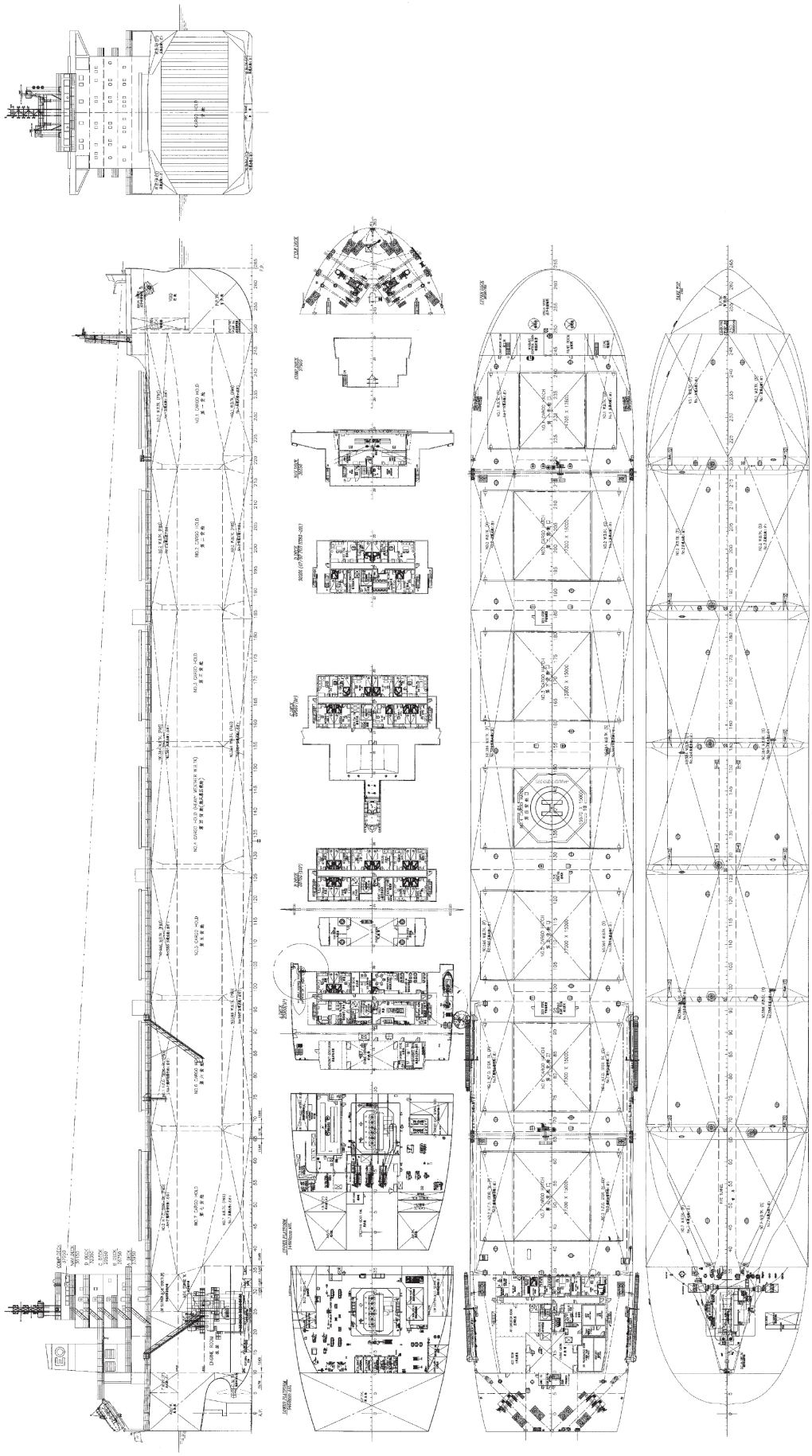
Fire detection system
Make: .....Consilium
Type: ..... Salwico Cargo
Fire extinguishing systems
Cargo holds: .....High Pressure CO_2
Make/Type: ..... NK
Engine room: .....High Pressure CO_2
Make/Type: ..... NK

Waste disposal plant
Incinerator
Make: ..... Teamtec
Model: 06200CS
Sewage plant
Make: .....Hansun
Model: ST-300

Efficiency
Attained EEDI value: 3.72
Required EEDI value: 3.94

Installed Fuel Meters: ..... Mass flow
Other installed monitoring tools: ..... Shaft power meter, draught gages
Performance Monitoring Regime: ..... BMT-High frequency data

Contract date: .....30 June 2015
Launch/float-out date: .....23 October 2018
Delivery date: .....31 January 2019



KMTC TOKYO: Feeder container ship

Shipbuilder: ...**Hyundai Mipo Dockyard Co., Ltd.**
Vessel's name: ..... ***KMTC Tokyo***
Owner/Operator: .....**Mitsui & Co., Ltd.**
Country: .....**Japan**
Designer: ...**Hyundai Mipo Dockyard Co., Ltd.**
Country: .....**Republic of Korea**
Model test establishment used: .....**FORCE Technology**
Flag: .....**Panama**
IMO number: **9848871**
Total number of sister ships already completed (excluding ship presented): **7**
Total number of sister ships still on order: **4**

KMTC Tokyo, which entered service in February, is the first ship of the new 1,800TEU feeder container ship design developed by Hyundai Mipo Dockyard under a project begun in 2016. The Con-Green project involved a partnership with MAN, DNV GL and others, to develop efficient and environmentally friendly feeder ships of varying sizes. The 1,800TEU design was not among the first proposed but the principals of the project team have been applied to this type.

Japanese owner Nissen Kaiun has ordered 12 of the type for charter to Korea Marine Transport Co (KMTC), which has also ordered more vessels of the same type for its own account. Orders by other owners mean that there are now more than 30 of the type in service or on order. Including *KMTC Tokyo*, six vessels were delivered to KMTC and a further seven vessels to other owners and operators in 2019.

KMTC Tokyo and its sisters feature a hull form with bulbous bow, transom stern, flush deck with forecastle and raised quarter deck, and an open water type stern frame. The ships dimensions are 172m loa, 27.43m beam and 9.8m draught. Nominal capacity is 1,809TEU of which 558 are under deck and 1,251 on deck.

The under deck arrangement allows for five tiers of containers including two tiers of 1.14m high boxes in nine rows athwartships, and seven tiers in 11 rows on deck. There are also 279 reefer points in total in holds 2 and 3, and on deck.

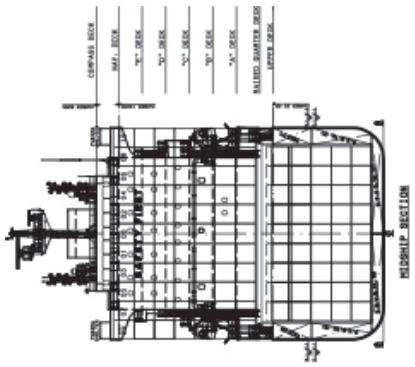
KMTC Tokyo is powered by a Hyundai-MAN B&W 6S60ME-C10.5 main engine capable of 11,960kW at 98.5rpm MCR and 10,764kW at 95rpm service rating allowing a speed of 18.5knots. The single FPP is a 6.6m diameter type. The attained EEDI value is 16 which is considerably below the 20.9 required value, proving that the aims of the Con-Green project have been achieved.

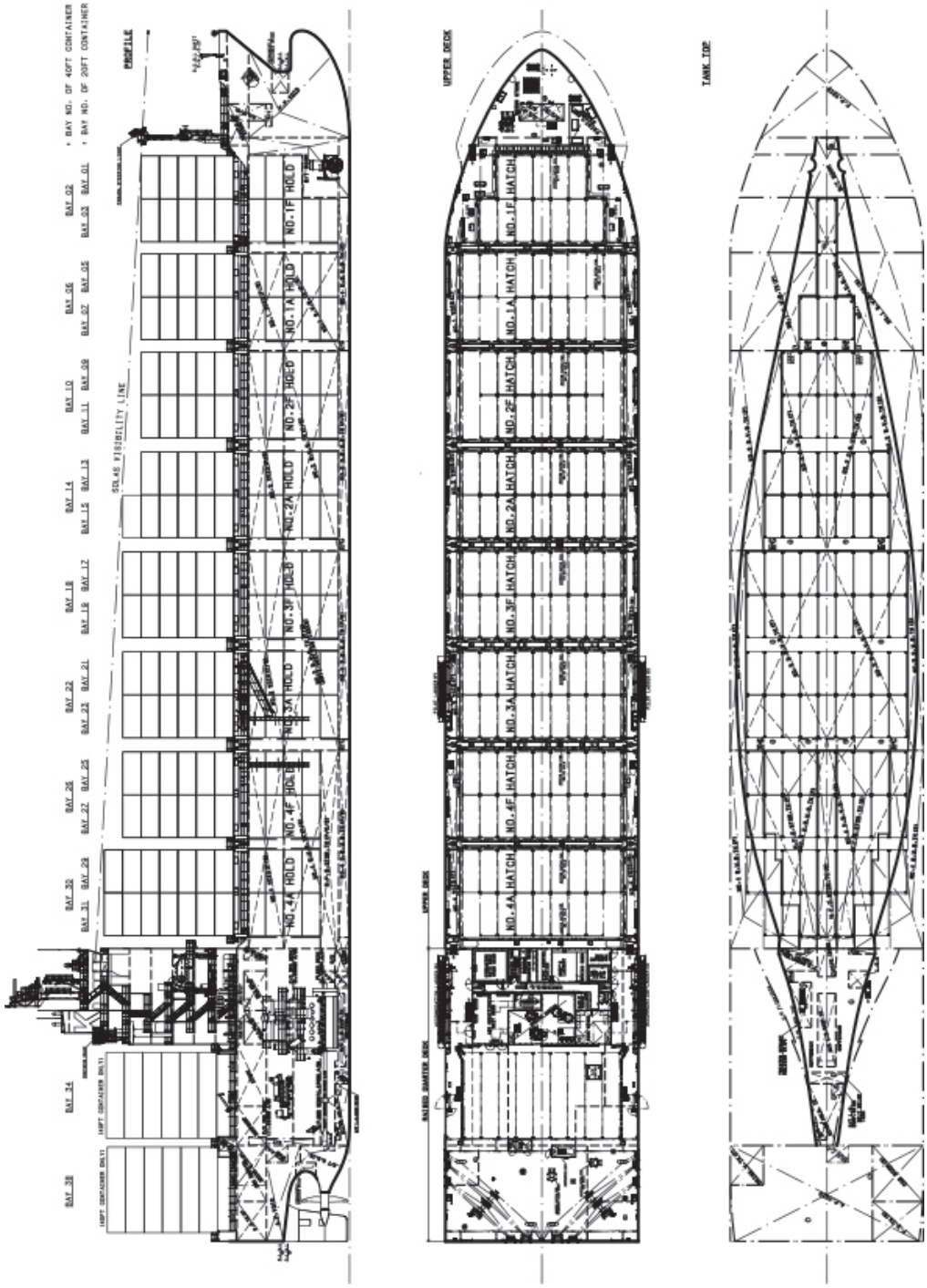
TECHNICAL PARTICULARS

Length oa:..... 172.07m
Length bp:..... 163.55m
Breadth moulded: 27.4m
Depth moulded: 14.3m
to main deck:..... 14.3m
to upper deck: 14.3m
to other decks:..... 16m (raised quarter deck)
Width of double skin
side: 2.17m
bottom: 1.55m
Draught
scantling: 9.75m
design: 8.75m
Gross: 17,853gt
Deadweight:
scantling: 22,444t
design: 18,576t
Speed, service (78.2%MCR output): abt. 19.9knots
Bunkers (m^3)
Heavy oil: 1,140
Diesel oil: 150
Water ballast (m^3): 6,790
Daily fuel consumption (tonnes/day)
Main engine only: 43.4
Classification society and notations: .....NK, NS*(CNC, EQ C DG, PSPC-WBT, NC)(PS-DA-CNC)(IWS) (PSCM)(IHM)(CSSA)(SDCL)(EA) MNS*M0
% high-tensile steel used in construction: 53.9
Heel control equipment: .....Anti-heeling pump system (in No.3 hold)
Propulsion
Design: .....Hyundai-MAN B&W 6S60ME-C10.5(Tier II)
Model: KAA006660
Manufacturer: .....Hyundai Heavy Industries Co., Ltd.
Number: 1
Type of fuel: .....HFO & MDO
Output of each engine: .... MCR –11,960kW x 98.5rpm / NCR – 10,764kW x 95.1rpm
Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer : .....Hyundai Mipo Dockyard/Hyundai Heavy Industries
Number: 1
Fixed/Controllable pitch: .....Fixed
Diameter: 6.6m
Boilers
Number: 1
Type: .....Vertical, cylindrical type
Make: ..... Kangrim Heavy Industries
Output, each boiler: 1,500/1,100kg/h
Stern appendages/special rudders: ..... Becker rudder
Bow thruster(s)
Make: ..... KTE
Number: .....1 Set
Output (each): .....1,000kW / AC 3,300V / 3Ø / 60Hz
Mooring equipment
Number: 4
Make: .....Flutek
Type: .....Elec-Hyd.
Special lifesaving equipment
Number of each and capacity: .....25 persons each
Make: .....Oriental
Type: ..... Gravity type
Hatch covers
Design: ..... MacGregor
Manufacturer : ..... MacGregor
Type (upper deck/other decks) : ..... Pontoon (lift away)
Containers
Lengths: 6,058m
Heights: 2,591mm
Total TEU capacity: 1,809TEU
On deck: 1,251TEU
In holds: 558TEU
Homogeneously loaded to 14tonnes: 1,250TEU
Tiers/rows (maximum)
On deck: ..... 7 / 11
In holds: ..... 5 / 9
Ballast water treatment system
Make: ..... Miura
Capacity: ..... 300m^3/h
Complement
Officers:..... 10
Crew:..... 11
Suez/Repair Crew:..... 6
Single/double/other rooms: 21/0/1
Navigation and other equipment
Bridge control system
Make: ..... HHI
Integrated bridge system?: .....No
Radars
Number: .....2 sets
Make: ..... JRC
Model(s) : .....JMR-9230-S (S-Band) & JMR-9225-6X (X-Band)
Fire detection system
Make: ..... Autronica
Type: ..... Autroprime fire alarm system
Fire extinguishing systems
Cargo holds: ..... High pressure CO_2 system with smoke detection system / sea water
Make/Type: ..... NK/CO_2 (High pressure CO_2 sys.)
Engine room: ..... High pressure CO_2 system / sea water / portable / fixed local fire extinguishers
Make/Type: .....NK/CO_2 (high pressure CO_2 sys.). NK/dry powder, foam, CO_2 (fire extinguishers)
Cabins: .....Portable fire extinguishers
Make/Type: .....NK/dry powder, foam, CO_2
Public spaces: .....Portable extinguishers
Make/Type: .....NK/dry powder, foam, CO_2
Efficiency
Attained EEDI value: 16.0
Required EEDI value: 20.9
Energy Saving Technologies*: .....Becker rudder

Contract date: .....28 December 2017
Launch/float-out date: .....7 December 2019
Delivery date: .....28 February 2019

KMTC TOKYO





LACHIN: River/sea tanker

Shipbuilder: ..... **Baku Shipyard LLC**
Vessel's name: ..... ***Lachin***
Owner/Operator: ..... **Azerbaijan Caspian Shipping CJSC**
Country: ..... **Azerbaijan Republic**
Designer: ..... **Marine Enginerring Bureau**
Country: ..... **Ukraine**
Flag: ..... **Azerbaijan Republic**
IMO number: **9821469**
Total number of sister ships already completed (excluding ship presented): **3**
Total number of sister ships still on order: ..... **nil**

Lachin is a river/sea tanker that marks a milestone for its owner, builder and the small country of Azerbaijan. The vessel is of the RST12C design, developed by Odessa Marine Engineering Bureau and based on an earlier RST12 type. It is the first of four ships being built for Azerbaijan Caspian Sea Shipping by Baku Shipyard, which was inaugurated in 2013. It will also be the first tanker ever built by the yard and indeed in the country itself.

Lachin will be able to trade in the Caspian Sea, which is bordered by Iran, Russia and Kazakhstan, but will also be able to use the Volga Don river and canal system, giving access to much of inland Russia and beyond using the Volga-Balt canals to the Baltic. Whereas many ships with a Volga-Don max dimension carry only 4,000-5,000tonnes, the design of *Lachin* allows for a maximum 5,600tonnes.

The ship has a 7,875tonne deadweight at Caspian draught of 4.5m, which is more than the other new RST27 design's 7,072dwt. The vessel is designed for crude oil and oil products with density of up to 1.015t/m^3, including gasoline, without restriction on the flash point, ensuring the carriage of goods with a temperature of 50°C, as well as chemicals such as methyl alcohol, ethylene glycol and urea/ammonium nitrate.

There are six cargo tanks with a combined capacity of 9,190m^3 on the vessel and a pumping arrangement that allows for two grades to be carried simultaneously. Propulsion of the twin skeg ship is provided by a pair of Wärtsilä 6L20 medium speed engines, each producing 1,200kW and driving a Wärtsilä WST-14 steerable thruster unit which was specifically developed for river/sea vessels to give a speed of 10knots.

TECHNICAL PARTICULARS

Length oa: 141.00m
Length bp: 137.08m
Breadth moulded: 16.90m
Depth moulded
to main deck: 6.00m
Width of double skin
side: 1.85m
bottom: 1.20m

Draught
scantling: ..... 4.54m (at sea)
design: ..... 3.60m (in the river)
Gross: 5,371gt
Displacement: 10,414t
Lightweight: 2,539t
Deadweight
scantling: 7,875t
design: 5,447t

Block co-efficient (please state relevant draught): .....0.940 (at draught 4.54m)
Speed, service (85%MCR output): 10.5knots
Cargo capacity (m^3)
Liquid volume: 9,190
Bunkers (m^3)
Heavy oil: 374
Diesel oil: 60
Water ballast (m^3): 4,417
Tankers – percentage segregated ballast: 100%
Daily fuel consumption (tonnes/day)
Main engine only: 7.5
Auxiliaries: 0.5

Classification society and notations: .....Russian Maritime Register of Shipping (RS) KM (★) Ice1 R2-RSN(4,5) AUT1-ICS VCS ECO-S OMBO Oil tanker (ESP)
% high-tensile steel used in construction: .. 80% approx. (hull – 100 %)
Roll-stabilisation equipment: .....Bilge keels

Propulsion
Main engine(s)
Design: .....Diesel engine
Model: 6L20
Manufacturer: ..... Wärtsilä
Number: 2
Type of fuel: .....HFO
Output of each engine: 1,200kW
Is this a diesel-electric or hybrid?: .....No
Gearbox(es)
Output speed: 1,000rpm
Propeller(s)
Material: GS-CuAl10Fe5Ni5-C
Designer/Manufacturer: .....Rudder-propeller/ Wärtsilä WST-14 FP
Number: 2
Fixed/Controllable pitch: .....Fixed
Diameter: 2,000mm
Speed: 283rpm
Special adaptations: ..... In nozzles
Diesel-driven alternators
Number: 3
Engine make/type: Scania / DI13 075M 04-12
Type of fuel: .....MDO
Alternator make/type: .....Leroy-Somer / LSAM 47/2L9
Output/speed of each set: ..376kW/1,500rpm

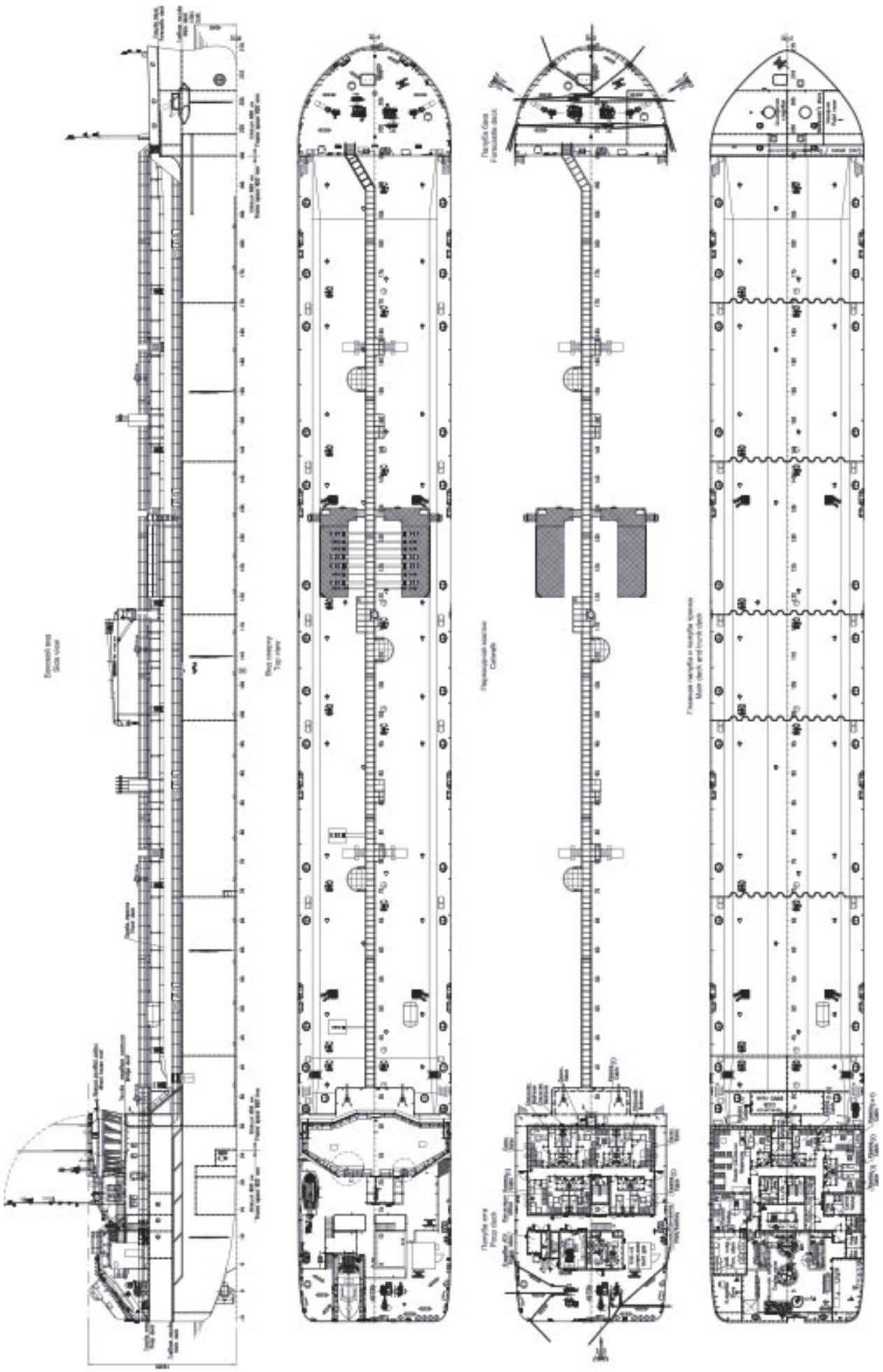
Boilers
Number: 2
Type: ..... OS-TCi
Make: .....Aalborg
Output, each boiler: 2.5t/h 0.7MPa
Bow thruster(s)
Make: .....Schöttel / STT170FP
Number: 1
Output (each): 120kW
Other cranes
Number: 1
Make: .....Gürdesan
Type: .....GD-HK 50/12
Tasks: ..... For cargo hoses
Performance: .....SWL 5.0t / 12m
Mooring equipment
Number: .....2 bow anchor-mooring winches, 1 stern anchor-mooring winch
Make: .....Gürdesan
Type: .....Electric

Special lifesaving equipment
Number of each and capacity: ....1 x 16 pers.
Make: .....Gürdesan
Type: ..... Free-fall lifeboat G-FFF2-FP

Cargo tanks
Number: ..... 6 cargo tanks + 2 slop tanks
Grades of cargo carried: .....2 sort of cargo density from 0.7 up to 1.015t/m^3
Product range: ..... Crude oil, petroleum products and chemicals without restrictions of temperature of flash-point
Coated tanks – make and type of coating:..... Epoxy coated
Stainless steel – structure/piping: ..... Heating system pipes
Cargo pumps
Number: .....6 cargo + 1 slop
Type: . electric deepwell DL125D/150 (cargo) and DL-100/150 (slop)
Make: .....Wärtsilä Svanehoj A/S
Stainless steel: .....AISI 316L
Capacity (each): .....200m^3/h (cargo) and 80m^3/h (slop)
Cargo control system
Make: ..... Valcom
Type: .....TSS/Control
Ballast control system
Make: ..... Valcom
Type: .....TSS/Control
Ballast water treatment system
Make: ..... Wärtsilä
Capacity: ..... 850m^3/h
Complement
Officers:..... 6
Crew: 6
Supernumaries/Spare: 2
Single/double/other rooms: ..12 (2 with spare berth) / pilot)
Navigation and other equipment
Bridge control system
Make: ..... Valcom
Is bridge fitted for one-man operation? ..... Yes Transas TSS/bridge alarm
Integrated bridge system?:..... Yes
If yes, make: ..... Valcom
Radars
Number: 2
Make: .....Furuno
Model(s): .....FAR-2127 (X-Band)
Fire detection system
Make: .....Consilium Marine AB
Type: .....Salwico CS4000
Fire extinguishing systems
Cargo tanks: ..... Foam
Make/Type: .....Foam, Wilhelmsen
Engine room:
Make/Type: ..... Aerosol, Kaskad
Waste disposal plant
Sewage plant
Make: .....Jowa
Model: ..... STP 2010-25

Efficiency
Attained EEDI value: 14.81
Required EEDI value: 14.93

Contract date: .....18 November 2016
Launch/float-out date: .....21 February 2019
Delivery date: .....13 December 2019



LAUREL INE: Ro-ro

Shipbuilder: **Hyundai Mipo Dockyard Co., Ltd**
Vessel's name: ..... ***Laureline***
Owner/Operator: ..... **CLdN Cobelfret**
Country: ..... **Luxembourg**
Designer: .... **Hyundai Mipo Dockyard Co., Ltd**
Country: ..... **Republic of Korea**
Model test establishment used: ..... **KRISO**
Flag: ..... **Malta**
IMO number: **9823352**
Total number of sister ships already completed (excluding ship presented): **3**
Total number of sister ships still on order: ..... **Nil**

In late 2015, Belgian shipowner Cobelfret announced a plan to modernise its freight ferry fleet which at that time comprised vessels with a maximum of 4,000 lane metres. Among the 12 planned ships were a series of four 5,400 lane metre vessels booked with South Koreas Hyundai Mipo yard.

Delivered in January, *Laureline* was the first of the four and was joined by sisters *Ysaline, Sixtine* and *Hermine* in April, July and August respectively. The vessels are operated by Cobelfret-associated Compagnie Luxembourgeoise de Navigation (CLdN). They are 216.5m in length, have a beam of 32.26m and a depth of 27.3m to the weather deck.

The 50,443gt vessels will serve on various services in Europe connecting ports in Belgium, Netherlands, UK, Ireland, Portugal and Spain. They have seven cargo decks including two hoistable decks and a single stern ramp. The vessel is suitable for carrying cars, trucks, trailers, mafi roll trailers with double stacked containers and cassettes with double stacked containers.

Laureline has a Hyundai-built MAN B&W 7S50ME-C9.5 main engine rated at 10,800kW and 114rpm. The engine is directly connected to a Kongsberg (ex Rolls-Royce) controllable pitch Promas propeller designed to reduce cavitation and aid manoeuvrability, which is also served by forward and aft tunnel thrusters. The arrangement allows a service speed of 18knots.

As well as expanding its fleet with the 2015 orders, the owner also wished to modernise and make operations more environmentally friendly. Therefore, the four 5,400 lane metre sister vessels were designed to be gas ready on delivery. In July, the owner returned to Hyundai Mipo ordering two more similar ships. They will be equipped with LNG fuel systems and able to burn LNG on delivery in the dual-fuel versions of the same main engine.

TECHNICAL PARTICULARS

Length oa: ..... abt. 216.5m
Length bp: 204.00m
Breadth moulded: 32.26m
Depth moulded
  to main deck: 12.20m
  to upper deck: 27.30m
Draught (mld.)
  scantling: 8.2m
  design: 7.4m
Gross: 50,443gt
Deadweight
  scantling: 20,600t
  design: 16,100t
Block co-efficient: ..... 0.6276 (Design Draught)
Speed, service (-%MCR output): 17.60knots
Bunkers (m^3)
  Heavy oil: 1,970
  Diesel oil: 340
Water ballast (m^3): 12,900
Daily fuel consumption (tonnes/day) (only for reference)
  Main engine only: 34.5
  Auxiliaries: 11.1
Classification society and notations: ..... DNV-GL +1A, RO/RO ship, CONTAINER, E0, DG(P), NAUT(AW),CLEAN,BIS,TMON(oillubricated),gas ready(D,S,MEc), LCS
Heel control equipment: ..... Anti-heeling pump
Propulsion
  Design: ..... Hyundai-MAN B&W
  Model: ..... Hyundai-MAN B&W 7S50ME-C9.5(Tier II)
  Manufacturer: ..... HHI Engine & Machinery Division
  Number: 1
  Type of fuel: ..... HFO, MDO
Output of each engine: ..... MCR-10,800kW x 114.0rpm
Is this a diesel-electric or hybrid?: ..... No
Propeller(s)
  Material: ..... Ni-Al-Bronze
  Designer/Manufacturer : ..... Rolls-Royce
  Number: 1
  Fixed/Controllable pitch: ..... Controllable
Diameter: 6.2m
  Speed: 114rpm
  Special adaptations: ..... Promas rudder
Diesel-driven alternators
  Number: 4
  Engine make/type: ..... HHI-EMD/ 8H25/33(3 sets) , 5H21/32(1 set)
  Type of fuel: ..... HFO, MDO
GENERATOR ENGINE: ..... 8H25/33 (2,400kW @ 900rpm, 3 sets) , 5H21/32 (960kW @ 900rpm, 1 set)
Boilers
  Number: ..... 1 set of thermal oil heater
  Type: ..... Pressure atomizing type
  Make: ..... Alfa-laval
  Output, each boiler: 1,100kW
Stern appendages/special rudders: ..... 1 set of Promas rudder
Bow thruster(s)
  Make: ..... Kawasaki
  Number: 2
  Output (each): 2,000kW
Stern thruster(s)
  Make: ..... Kawasaki
  Number: 2
  Output (each): 1,500kW
Deck machinery
  Other cranes
    Number: 1
    Make: ..... Oriental
    Type: ..... Normal head type
    Tasks: ..... Engine room crane
    Performance: ..... 4t x 5.63m
Mooring equipment
  Number: 6
  Make: ..... Rolls-Royce
  Type: ... Electro-hydraulic high pressure type.

Special lifesaving equipment
  Number of each and capacity: 1xlifeboat(40P)
  Make: ..... Norsafe
  Type: ..... Free-fall Type
  If MES, vertical or sloping chutes?: ... Sloping

Vehicles
  Number of vehicle decks (fixed/moveable): . 5/2
  Total lane length: 5,051m
  Total cars: .... 316 trailers, 1,100 private cars
Doors/ramps/lifts/moveable car decks
  Number of each: ..... 1 x stern ramp/door, 2 x movable ramps
  Type: ..... Moveable ramp
  Designer: ..... TTS
Ballast control system
  Make: ..... DESMI
  Type: ..... Electric motor driven
Ballast water treatment system
  Make: ..... Techcross
  Capacity: ..... 1,000m^3/h

Complement
  Officers: 12
  Crew: 16
  Suez/Repair Crew: 6
  Single/double/other rooms: ..... 12 (drivers)

Navigation and other equipment
  Bridge control system
    Make: ..... Hyundai Electric
    Type: ..... Floor mounting and self standing
    Is bridge fitted for one-man operation? .. Yes
Integrated bridge system?: ..... Yes
  If yes, make: ..... Konsberg
  Model: K-Chief 600 Alarm Monitoring System

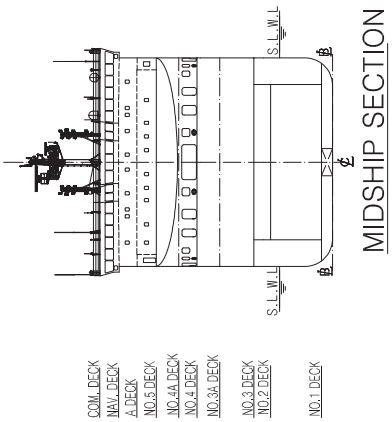
Radars
  Number: 2
  Make: ..... JRC
  Model(s) : JMR-9230-S, JMR-9225-6X

Fire detection system
  Make: ..... Consilium Marine
  Type: ..... Salwico Cargo
Fire extinguishing systems
  Engine room: ..... Low pressure CO_2 system, portable fire extinguisher, fixed local fire extinguisher
    Make/Type: ..... Danfoss Semco / CO_2
  Vehicle spaces: ... Low pressure CO_2 system, Portable fire extinguisher
    Make/Type: ..... Danfos Semco / CO_2
  Cabins: ..... Portable fire extinguisher
  Public spaces: ..... Portable fire extinguisher

Waste disposal plant
  Incinerator
    Make: ..... HMMCO
    Model: ..... MAXI NG50SL WS
  Sewage plant
    Make: ..... RWO Veolia
    Model: ..... CS-BIO 2

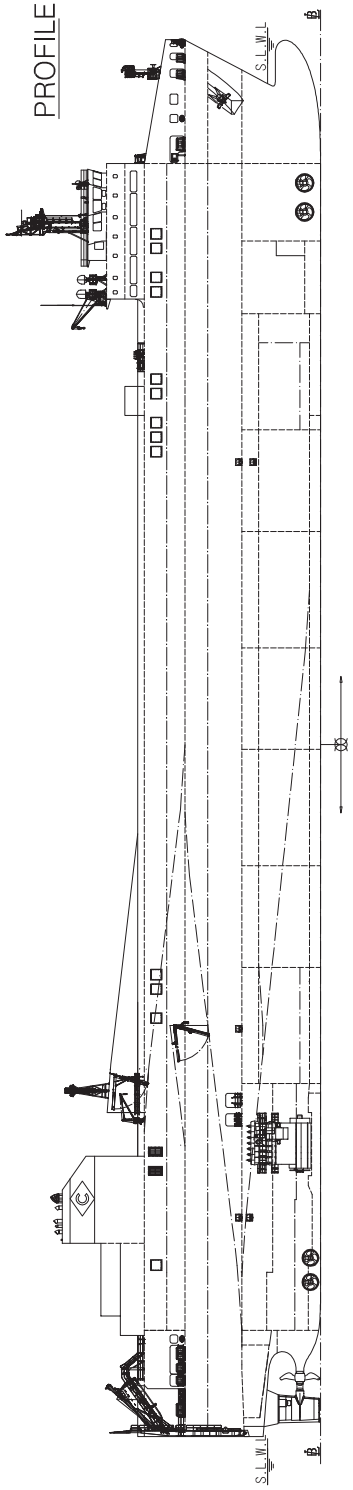
Efficiency
  Attained EEDI value: ..... 8.00 (-15.6%)
  Required EEDI value: 9.48
Installed Fuel Meters: ..... Mass type flow meter, 3 sets for M/E & G/E, 1 set for T.O. heater
Energy Saving Technologies*: ... Promas rudder

Contract date: ..... 3 February 2017
Launch/float-out date: ..... 31 August 2018
Delivery date: ..... 4 January 2019



MIDSHIP SECTION

PROFILE



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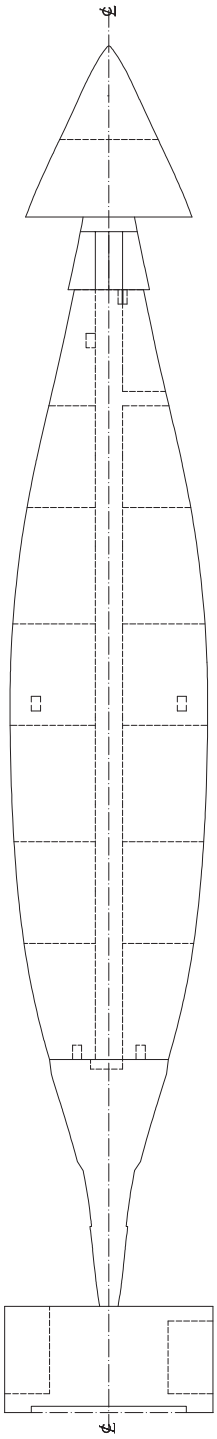


MARAN GAS ANDROS: LNG carrier

Shipbuilder: ....**Daewoo Shipbuilding & Marine Engineering (DSME)**
Vessel's name: ..... ***Maran Gas Andros***
Hull No: **H2467**
Owner/Operator: .....**Maran Gas Maritime Inc.**
Country: .....**Greece**
Designer: .....**DSME**
Country: .....**Republic of Korea**
Model test establishment used: ....**KRISO, SSPA**
Flag: .....**Greece**
IMO number: **9810379**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: **4**

Unlike most of the vessels in this edition of Significant Ships, the LNG carrier *Maran Gas Andros* is not the first in a new series of ships. However, its place is justified because it incorporates a new feature not just for the series but for all ships of its type.

The vessel is a 173,608m^3 LNG carrier built by DSME and it is the very first LNG carrier ever built to feature an air lubrication system (ALS) aimed at reducing friction through the water and thus cutting fuel consumption by an estimated 5%. It has been reported that the shipowner was so pleased with the fuel savings performance of the vessel that all 13 subsequent LNG carriers being built at DSME will feature the same system. *Woodside Rees Withers*, the first vessel in the series, was delivered two months earlier and does not feature the ALS.

The vessel has hull dimensions of 294.9m loa, 46.4m beam and 12.5m draught. Cargo arrangements are a four tank GTT-NO96 membrane containment system with full reliquefaction.

A twin engine, twin propeller propulsion system comprises of two Hyundai-built MAN B&W 5G70ME-C9.5-GI high pressure dual-fuel engines. Each one producing 12,590kW at 69rpm and driving an 8.3m FPP for a service speed of 19.5knots. Auxiliary engines are four Wärtsilä 34DF engines; two each of the six and eight-cylinder models. As a dual-fuel ship, no special arrangements are necessary to meet the IMO 2020 sulphur cap.

Maran Gas Maritime was an early entrant to the LNG sector when commencing operations in 2003. It has a policy of adopting high safety and comfort standards in its new vessels and a department to oversee newbuilds, allowing late changes to specifications such as the inclusion of the ALS.

TECHNICAL PARTICULARS

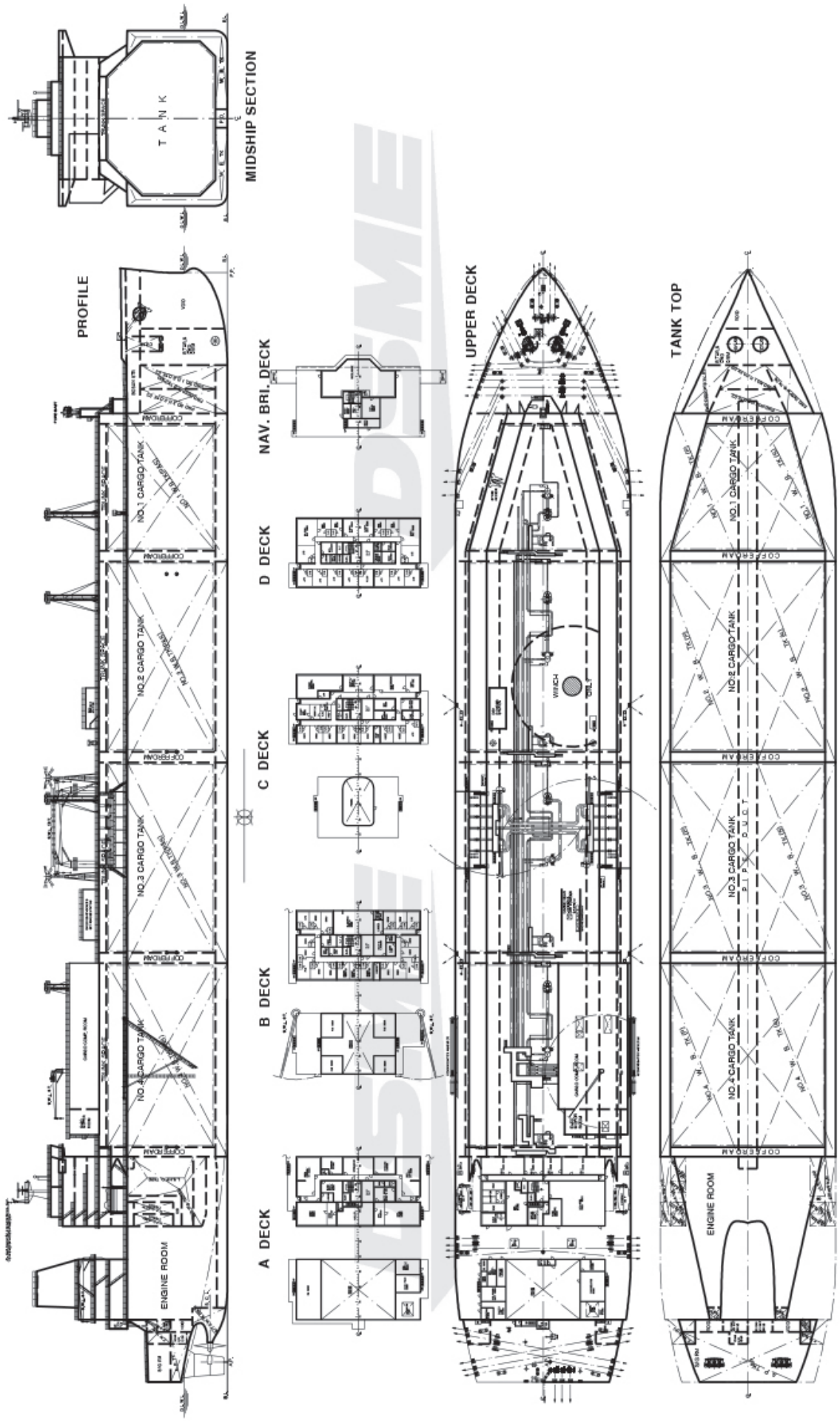
Length oa: 294.9m
Length bp: 288.5m
Breadth moulded: 46.4m
Depth moulded
to main deck: 26.5m
Width of double skin
side: 2.711m
bottom: 3.2m
Draught
scantling: 12.5m
design: 11.5m
Gross: 113,793gt
Deadweight
Design: 82,996t
scantling: 94,637t
Block co-efficient: .approx. 0.76 at scantling draught
Speed, service (85% MCR output): ..19.42knots
Cargo capacity (m^3)
Refrigerated cargo: 173,608
Bunkers (m^3)
Heavy oil: 5,264
Diesel oil: 610
Water ballast (m^3): 60,431
Daily fuel consumption (tonnes/day)
Main engine only: ..... 82.0 (oil) / 67.1 (gas)
Classification society and notations: ..... Lloyd's Register +100A1, Liquefied Gas Tanker, Ship Type 2G, Methane(LNG) in Membrane tanks, Maximum Vapour Pressure 0.35 bar, Minimum Cargo temperature -163°C, ShipRight(SDA, FDA Plus(40, WW), CM, AC S(B)), *IWS, LI, ECO(TOC), +LMC, UMS, NAV1, IBS, LFPF(GC,NG), PSMR; Descriptive notes: "ShipRight(BWMP(T), IHM, SERS, MPMS(CM), SCM)"
% high-tensile steel used in construction: 7.7%
Main engine(s)
Design: ..... MAN B&W
Model: 5G70ME-C9.5-GI
Manufacturer: ..Hyundai Heavy Industries Co
Number: 2
Type of fuel: .....HFO, MDO, LSMGO and Fuel Gas
Output of each engine: .....12,590kW x 69.1rpm (MCR)
Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer: ..... Daewoo Shipbuilding & Marine Engineering Co., Ltd. / Nakashima Propeller Co., Ltd
Number: 2
Fixed/Controllable pitch: .....Fixed
Diameter: 8.3m
Speed: 19.5knots
Diesel-driven alternators
Number: 4
Engine make/type: .....Wärtsilä / 34DF, 4-stroke, trunk piston, in-line, dual fuel
Type of fuel: .....HFO, MDO, LSMGO and Fuel Gas
Output/speed of each set: .. 3,670kW/720rpm & 2,750kW/720rpm
Alternator make/type: .....Hyundai Electric / synchronous type
Boilers
Number: 2
Type: .....Vertical, water tube
Make: .....Alfa Laval
Output, each boiler: .....6,500kg/h x 6.0bar g. saturated
Cargo cranes/cargo gear
Number: 2
Make: .....Oriental
Type: ..... Hydraulic
Performance: .....SWL 10t
Other cranes
Number: 2
Make: .....Oriental
Type: ..... Hydraulic
Tasks: .....Provision and engine spare part handling
Performance: .....SWL 8t
Mooring equipment
Number: 9
Make: .....Fukushima
Type: ..... Hydraulic
Special lifesaving equipment (eg MES, free-fall lifeboats)
Number of each and capacity: 2
Make: ..... Hyundai
Type: .....Conventional gravity launching type
Cargo pumps
Number: .....8 in total
Type: .....Centrifugal, vertical, submerged, single stage, integrated electric motor
Make: ..... Shinko
Capacity (each): ..... 1,800m^3/h
Cargo control system
Make: .....Kongsberg
Type: ....Integrated Automation System (IAS)
Ballast control system
Make: .....Kongsberg
Type: ....Integrated Automation System (IAS)
Water ballast Treatment System
Make: .....NK (Ozonation)
Capacity: ..... 3,200m^3/h
Complement
Officers: 20
Crew: 19
Suez/Repair Crew: .....6 Suez crew / 6 shore worker
Single/double/other rooms: .....Single rooms / 2 beds in one room for shore worker / 6 beds in one room for Suez crew
Bow thruster(s)
Make: .....Kawasaki
Number: 1
Output (each): 2,500kW
Bridge control system
Make: .....Kongsberg
Type: .....Bridge manoeuvring system
Is bridge fitted for one-man operation? ..... Yes
Fire detection system
Make: .....Consilium
Type: ..... Addressable
Fire extinguishing systems
Engine room:
Make/Type: .....Kashiwa/high expansion foam system
Radars
Number: 3
Make: ..... JRC
Model(s): JMR-9225-7X3/JMR-9225-6X/JMR-9282-S
Integrated bridge system?: .....No

Waste disposal plant
Incinerator
Make: ..... Teamtec
Model: GS1000CRSX
Waste compactor
Make: .....Metos
Model: ..... IP 500
Sewage plant
Make: .....Jonghap
Model: AEROB-25N

Efficiency
Attained EEDI value: ..... 5.515 (ALS off)/ 5.5051 (ALS on)
Required EEDI value: 8.881
Other installed monitoring tools: .....Cargo/ ballast control & monitoring system, remote level & draft gauging system, trim & list indication, shaft horsepower metre
Energy Saving Technologies: ..... DSME air lubrication system (ALS), full spade rudder with bulb

Contract date: .....8 June 2016
Delivery date: .....14 June 2019

MARAN GAS ANDROS



MARI COUVA: Methanol tanker

Shipbuilder: ... **Hyundai Mipo Dockyard Co.Ltd**
Vessel's name: ..... ***Mari Couva***
Owner/Operator: ..... **Marinvest AB/Waterfront Shipping**
Country: ..... **Sweden**
Designer: ... **Hyundai Mipo Dockyard Co., Ltd.**
Country: ..... **South Korea**
Model test establishment used: . **Korea Research Institute of Ships and Research Engineering (KRISO)**
Flag: ..... **Norway (NIS)**
IMO number: **9848584**
Total number of sister ships already completed (excluding ship presented): **3**
Total number of sister ships still on order: ..... **Nil**

Built by Hyundai Mipo, *Mari Couva* was delivered in August and is the first of four second generation chemical/product tankers intended for carrying methanol for Canada-based Methanex subsidiary Waterfront Shipping. *Mari Couva* and *Mari Kokako* (September 2019) are owned in a joint venture between WFS and Marinvest; *Takaroa Sun* (August 2019) is owned by NYK and *Creole Sun* (September 2019) is owned in a joint venture between IINO and Mitsui.

The ships are based on a Hyundai Mipo standard design 49,000dwt tanker with hull dimensions of 183.06m length, 32.2m beam and 13.32m draught. They have 18 cargo tanks and two slop tanks that may be used for methanol fuel storage. Cargo pumps are from Framo and run at 600m^3/h for cargo tanks and 300m^3/h for the slop tanks. They are fitted with a methanol fuel supply room on the upper deck.

Waterfront already operated seven similar methanol-fuelled ships delivered in 2016/17 which differ from the *Mari Couva* and sisters in that they are fitted with an earlier generation of engines. The new vessels feature the MAN B&W 6G50ME-C9.5-LGIM-HPSCR and not the B9 version. The main differences between the two engine types involve fuel lines and injectors.

Using methanol as fuel allows the ships to meet the IMO 2020 sulphur rules as it contains no sulphur to begin with. *Mari Couva* is fitted with a high-pressure SCR system to meet NOx Tier III rules, but the ship may be retrofitted with a new system as the newer engine is capable of running on methanol with up to 40% water added. This increases the combustible hydrogen and lowers operating temperature reducing NOx formation to the point where SCR is not needed. The SCR system will need to be retained only for running on oil fuels.

As methanol has a lower carbon content, its use as a fuel means that the EEDI rating is 4.21 which is significantly below the required value of 5.6.

TECHNICAL PARTICULARS

Length oa: 183m
Length bp:..... 175.15m
Breadth moulded: 32.2m
Depth moulded
to main deck: 19.1m
to upper deck: 19.1m
Width of double skin
side: 2.0m
bottom: 2.15m
Draught
scantling: 13.3m
design: 11.0m
Gross: 29,900gt
Deadweight
scantling: 49,700t
design: 37,500t
Speed, service (76.6%MCR output): 14.5knots
Cargo capacity (m^3)
Liquid volume: ..... 53,300m^3
Bunkers (m^3)
Heavy oil: ..... 2,600m^3
Diesel oil: ..... 200m^3
Water ballast (m^3): ..... 22,400m^3
Daily fuel consumption (tonnes/day)
Main engine only: 20.8

Classification society and notations:..... DNV GL, +1A, tanker for oil products and chemicals, ESP, CSR, IMO Ship Type2, E0, TMON, ETC, CLEAN, VCS(2), LFL FUELLED, BWM(T), LCS.....
Note 1. ETC notation to be applied for cargo tanks except slop tanks and residual oil tank.
% high-tensile steel used in construction: ... 57%

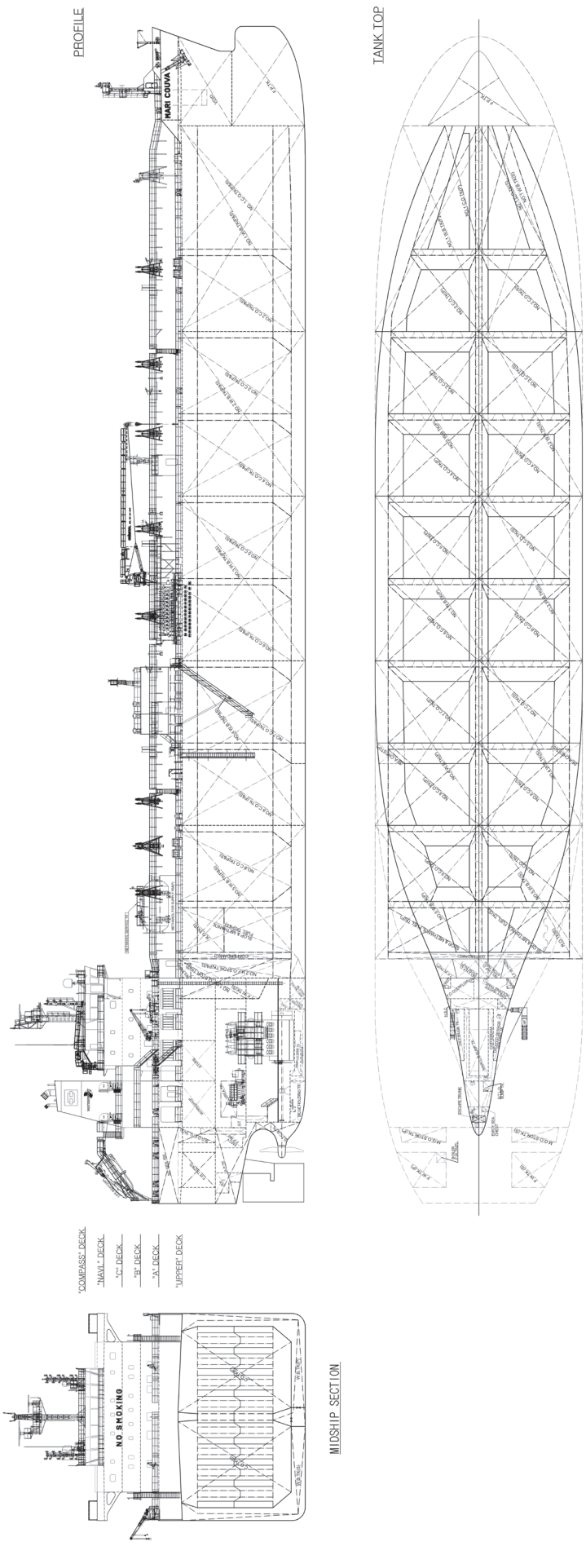
Propulsion
Design: .....Hyundai - MAN B&W
Model: ... B&W 6G50ME-C9.5-LGIM-HPSCR
Manufacturer: ..... HHI Engine & Machinery Division
Number: 1
Type of fuel: .....HFO & methanol
Output of each engine: ... 7,180kW x 86.9rpm (M.C.R), 5,499kW x 49.5rpm (N.C.R)
Is this a diesel-electric or hybrid?: .....No

Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer : ..... Hyundai Heavy Industries Co., Ltd.
Number: 1
Fixed/Controllable pitch: .....Fixed
Diameter: 6.8m
Speed: ..... 86.9 rpm
Boilers
Number: 2
Type: .....Aux. boiler & Composite boiler
Make: .....Alfa Laval
Output, each boiler: .....20,000kg/h(Aux. boiler), 2,000kg/h & 300kg/h (Oli fired & Exh.gas)
Deck machinery
Cargo cranes/cargo gear
Number: 1
Make: .....Oriental
Type: .....Electro-hydraulic
Performance: .....SWL 4t / Outreach : Max. 24m, Min. 6.4m
Other cranes
Number: 1
Make: .....Oriental
Type: .....Electro-hydraulic
Tasks: ..... Provision and machinery parts handling in engine room
Performance: .....SWL 4t / Outreach: Max. 10m, Min. 2.7m
Mooring equipment
Number: 6
Make: ..... Kongsberg Maritime Finland
Type: ..... Hydraulic
Special lifesaving equipment
Number of each and capacity: ..... 1 / 30P
Make: ..... Viking Norsafe
Type: ..... Free-fall type

Cargo tanks
Number: ..... 18 Cargo + 2 Slop
Grades of cargo carried: .... Petroleum products / chemical cargoes (ship type 2) / methanol
Product range: ...Petroleum products / chemical cargoes (ship type 2) / methanol
Coated tanks: .....Chokwang Jotun Paint / Tankguard Zinc
Stainless steel – structure/piping: .....Mild steel / SUS316L
Cargo pumps
Number: .....18 cargo tanks / 2 slop tank / 1 residual tank
Type: .....Hydraulic driven submerged pump
Make: .....Framo
Stainless steel: AISI316L:
Capacity (each): ..... 600m^3/h cargo / 300m^3/h slop / 75m^3/h residual
Cargo control system
Make: .....Framo
Type: ..... Piano type
Ballast control system
Make: .....Framo
Type: ..... Piano type
Ballast water treatment system
Make: .....Alfa Laval
Capacity: .....1,500m^3/h for W.B.TK / 300m^3/h for A.P.TK
Complement
Officers:..... 12
Crew: ..... 16+6 (Suez crew)
Supernumaries/Spare: 1
Suez/Repair Crew: 6
Single/double/other rooms: ..... 28 rooms
Navigation and other equipment
Bridge control system
Make: .....KMK
Type: .....AutoChief 600
Is bridge fitted for one-man operation? .....No
Integrated bridge system?: .....No

Radars
Number: .....2 sets
Make: .....Furuno
Model(s) : FAR-3330S-SSD, FAR-3320
Fire detection system
Make: ..... Consilum
Type: ..... Salwico Cargo
Fire extinguishing systems
Cargo holds:
Make/Type: ..... NK /dry powder system
Engine room:
Make/Type: .....NK / CO_2
Cabins:
Make/Type: ... NK / Portable fire extinguisher
Public spaces:
Make/Type: ... NK / Portable fire extinguisher
Efficiency
Attained EEDI value: 4.21
Required EEDI value: 5.60

Contract date: .....20 December 2017
Launch/float-out date: .....3 May 2019
Delivery date: ..... 16 August 2019


PROFILE
MARI COUVA
TANK TOP
"COMPASS" DECK
"NAVI." DECK
"C" DECK
"B" DECK
"A" DECK
"UPPER" DECK
NO SMOKING
MIDSHIP SECTION

MATER: Wood chip carrier

Shipbuilder: ..... **Chengxi Shipyard Co, Ltd**
Vessel's name: ..... ***Mater***
Owner/Operator: .... **Mater Shipping Ltd/ Royal Marine Holdings**
Country: ..... **China**
Designer: ..... **SDARI**
Country: ..... **China**
Model test establishment used: .... **Shanghai Ship and Shipping Research Institute (SSSRI)**
Flag: ..... **Liberia**
IMO number: **9841184**
Total number of sister ships already completed (excluding ship presented): **4**

Mater is one of the specialist bulk carriers designed for transport of wood chips for paper production. She is the first in an eight-ship series to be operated by Qingdao-based Royal Marine Holdings and was built by Chengxi Shipyard, which is constructing four of the class with the remainder being built by Beihai Shipyard. Woodchip carrier construction and operation have previously been monopolised by Japan, but *Mater* is the first of the type to be built in China. It was designed by SDARI.

The vessel was delivered in June and has been followed by five sister vessels in 2019 with one more due for delivery in January 2020 and the final ship in March 2020.

The 210m loa, 37.05m beam and 23.5m depth vessel has a deadweight of 64,532tonnes but as with all vessels of this type which are designed to carry low density cargoes, the hold capacity is the most important factor. For *Mater* this is 130,943m^3 or 4.622 million cubic feet which equates to approximately 1.65 times that of a comparable deadweight conventional bulker.

In order to accommodate as much cargo as possible the hopper tanks found in most bulk carriers of this size are absent and the holds are box shaped. In addition, the vessel is longer, wider and deeper than a typical Ultramax of similar deadweight. *Mater* has six holds and end folding hatches. The hull shape makes for a lower draught and thus a smaller propeller.

Mater's propulsion system comprises a MAN B&W 6G50ME-C9.5 two stroke engine coupled to a 6.95m propeller. Power output is 8,300kW and service speed 14.5knots. The attained EEDI of 3.64 is below the required 4.4 level. To meet the IMO 2020 sulphur requirements, the ship is fitted with a Saacke scrubber which serves the main and three auxiliary engines.

TECHNICAL PARTICULARS

Length oa: 210.00m
Length bp: 206.50m

Breadth moulded: 37.00m
Depth moulded: 23.50m
to main deck: 20.8m
to upper deck: 24.3m
Width of double skin bottom: 1.9m

Draught
scantling: 11.95m
design: 10.00m
Gross: 52,906gt

Displacement: 78,031.7t
Lightweight: 13,500.29t

Deadweight
scantling: 64,531.4t
design: 50,345.4t

Block co-efficient: ..... 0.832(scantling)

Speed, service (82%MCR output): ... 14.38knots

Cargo capacity (m^3)
Bale: 13,0943.1

Bunkers (m^3)
Heavy oil: 2,243.6
Diesel oil: 422.3

Water ballast (m^3): 16,026.4

Daily fuel consumption (tonnes/day)
Main engine only: 30.3
Auxiliaries: 3.5

Classification society and notations: ..... NK NS* (BC-XII, PSPC-WBT, NC), (IHM), (IWS), (EA), (PSCM), (NOx-III(SCR)), MNS* (M0)

% high-tensile steel used in construction: 70%

Propulsion
Main engine(s)
Design: ..... MAN
Model: ..... MAN 6G50ME-C9.5 TIII
Manufacturer: ..... MAN
Number: 1
Type of fuel: ..... HFO
Output of each engine: 8,300kW
Is this a diesel-electric or hybrid?: ..... No

Propeller(s)
Material: ..... Ni-Al-Bronze
Number: 1
Fixed/Controllable pitch: ..... Fixed
Diameter: 6.95m
Speed: 75.8r/min

Exhaust-gas scrubbing equipment
Manufacturer: ..... SAACKE
Type: ..... 85%SMCR ME + 3x75%AEs

Boilers
Number: 1
Type: LYF1.5/295-0.6
Make: ..... Greens Shazhou
Output, each boiler: 1,500kg/h

Stern appendages/special rudders: ..... A semi-balanced rudder with rudder horn

Other cranes
Number: 1
Make: ..... CSSC Luzhou
Type: ..... Monorail
Tasks: ..... Provision, spare
Performance: ..... 4t x 3m (outreach from max. breadth of ship)

Mooring equipment
Number: 4
Make: ..... Kawasaki WuHan
Type: ..... Hydraulic

Special lifesaving equipment
Number of each and capacity: ..... 25 persons
Make: ..... JiangYinShi BeiHai
Type: ..... Free-fall lifeboat

Hatch covers
Design: ..... TTS-Huahai
Manufacturer: ..... Chengxi Shipyard Co.,Ltd
Type (upper deck/other decks): .... Hydraulically operated folding type for weather

Ballast water treatment system
Make: ..... SunRui
Capacity: ..... 1,600m^3/h

Complement
Officers: 13
Crew: 12
Suez/Repair Crew: 6
Single/double/other rooms: 25/0/1

Navigation and other equipment
Bridge control system
Make: ..... Lushun Nav. Ele. App. Co., Ltd Dalian

Is bridge fitted for one-man operation?: ..... No

Radars
Number: 2
Make: ..... Furuno
Model(s): ..... FAR-2827 and FAR-2837S

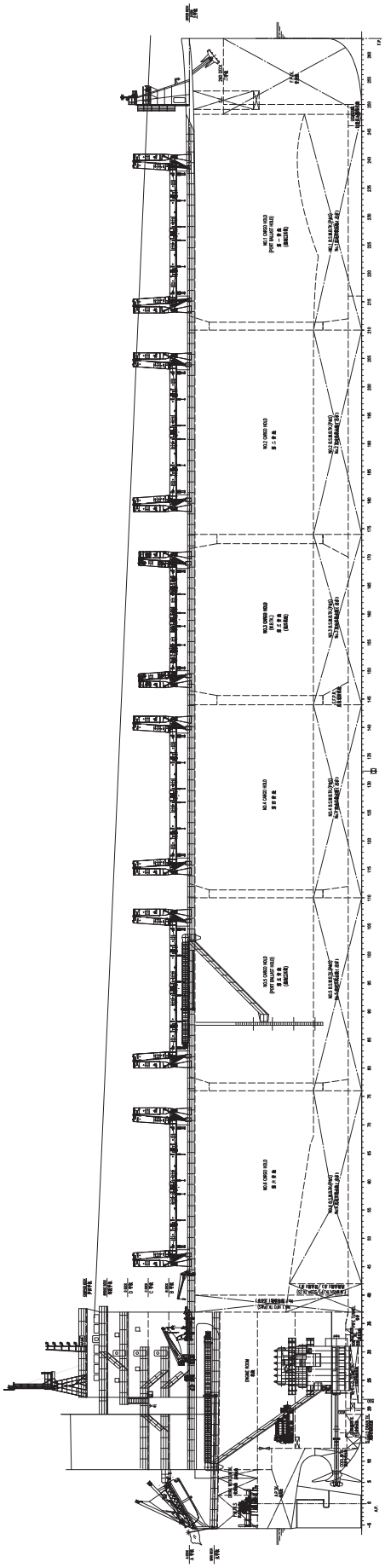
Fire detection system
Make: ..... Consilium

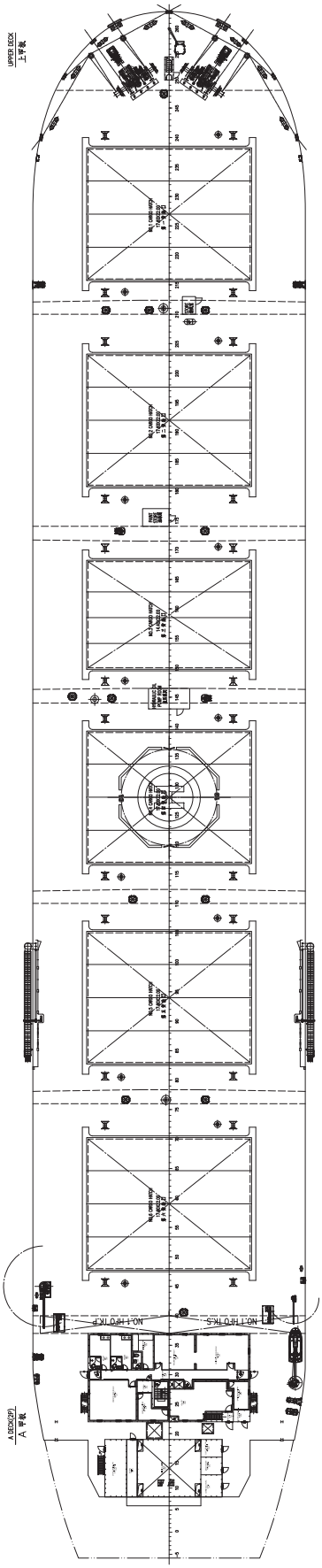
Fire extinguishing systems
Cargo holds:
Make/Type: ..... NK
Engine room:
Make/Type: ..... NK

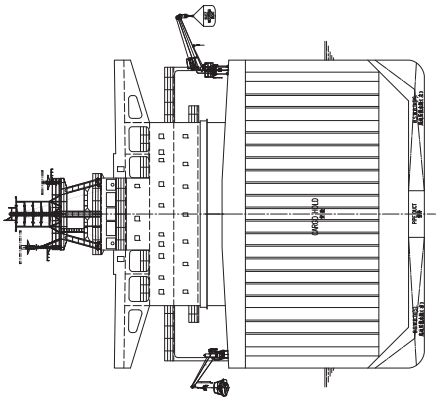
Efficiency
Attained EEDI value: 3.64
Required EEDI value: 4.40

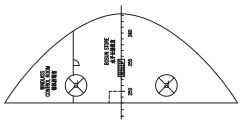
Energy Saving Technologies*: ..... HVAF

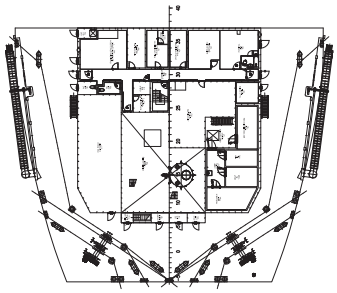
Contract date: ..... 26 July 2017
Launch/float-out date: ..... 28 January 2019
Delivery date: ..... 14 June 2019

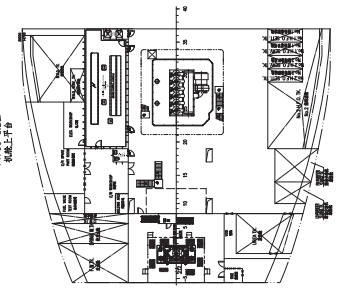


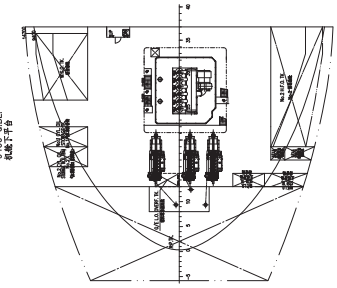

UPPER DECK
上甲板
A DECK(2P)
A 甲板
NO.1 HOLD
NO.1 HOLD


CARGO HOLD
FRONT
REAR


2nd DECK
二甲板


MAIN DECK
主甲板


E/R UPPER PLATFORM
14700 ü BL
机舱上平台


E/R LOWER PLATFORM
9400 ü BL
机舱下平台

MATTERHORN EXPLORER: Very large gas carrier

Shipbuilder: ..... **Hyundai Samho Heavy Industries Co., Ltd.**
Vessel's name: ..... ***Matterhorn Explorer***
Hull No: **S977**
Owner/Operator: ..... **CCB Financial Leasing Co., Ltd / Trafigura**
Country: ..... **China/Switzerland**
Designer: ... **Hyundai Samho Heavy Industries Co., Ltd.**
Country: ..... **Republic of Korea**
Model test establishment used: ..... **Hyundai Maritime Research Institute**
Flag: ..... **Singapore**
IMO number: **9847425**
Total number of sister ships already completed (excluding ship presented): **3**
Total number of sister ships still on order: ..... **nil**

Ordered in late 2017, the VLGC *Matterhorn Explorer* was handed over to commodity and energy trader Trafigura in May 2019 by Hyundai Samho Heavy Industries, as the first of a four-ship series. The quartet which includes *Eiger Explorer*, *Weisshorn Explorer* and *Dom Explorer* delivered in June, August and September respectively, are the second series of ships built to the same design but the first ordered by Trafigura in conjunction with Asian partners.

The order for the vessels came at the end of what was generally acknowledged as a difficult year in LPG trading, when the combination of new ship arrivals and a shortage of product halved average spot market rates. On the positive side for owners, newbuild prices in the sector were very attractive but rising.

Matterhorn Explorer's hull dimensions are designed around the old Panamax restrictions and are 229.98m length, 32.25m beam and 12.02m draught. The ship is fully refrigerated and has four tanks with a capacity of 80,000m^3. It also has two deck storage tanks to hold the chemicals used for conditioning the cargo tanks. Cargo is pumped out by eight Svanehoj vertical deepwell pumps of 600m^3/h capacity.

Trafigura had decided before ordering the vessels that the 2020 sulphur rules would be met by installation of a scrubber that would serve the main engine, auxiliaries and boiler. The scrubber is an Alfa Laval PureSox open-loop hybrid ready model with multiple inlets.

The main engine is a MAN B&W ultra-long stroke type 6G60ME-C9.5 with an output of 13,500kW which with the 7.2m propeller and Hi-Fin cap fin and a rudder bulb, allows for an efficient propulsion system and a maximum speed of 16.5knots and a service speed of 13.5knots.

Compliance with NOx Tier III levels is achieved using a high pressure selective catalytic reduction system.

TECHNICAL PARTICULARS

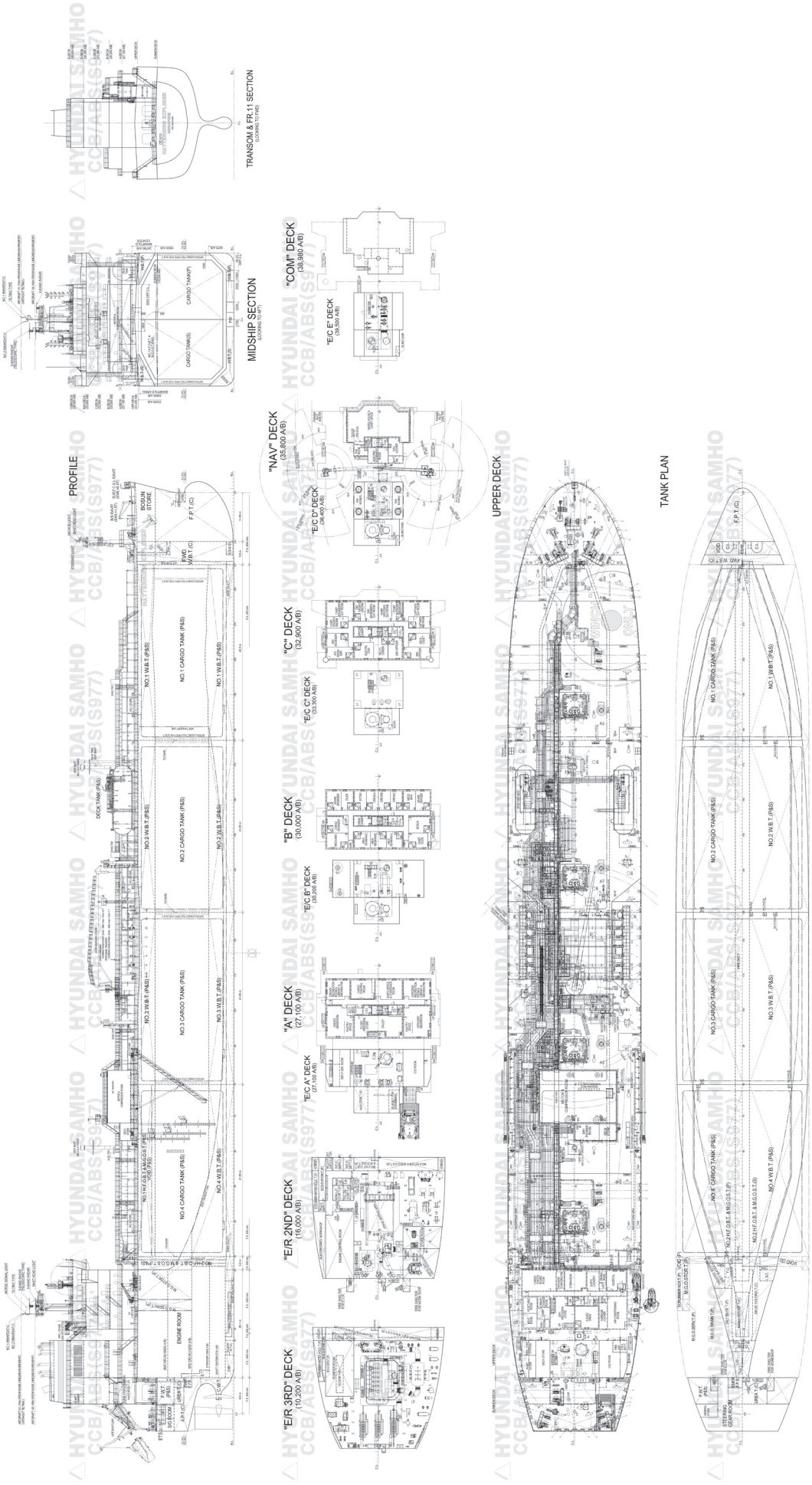
Length oa: 229.98m
Length bp: 223m
Breadth moulded: 32.25m
Depth moulded
to upper deck: 23.2m
Width of double skin
side: 1.68m
bottom: 1.85m
Draught
scantling: 12.1m
design: 11.6m
Gross: 46,668gt
Displacement: ..... 69,699 (at scant)
Lightweight: 19,186t
Deadweight
Design: 47,248t
scantling: 50,513t
Block co-efficient: ..... 0.7788 (at scant)
Speed, service (-- %MCR output): .. 16.8knots at design draught
Cargo capacity (m^3)
Refrigerated cargo: 80,000
Bunkers (m^3)
Heavy oil: 2,388.2
Diesel oil: 274.2
Water ballast (m^3): 17,398
Daily fuel consumption (tonnes/day)
Main engine only: .....171.14g/kW·h (MCR)

Classification society and notations: ..... ABS +A1, (E), Liquefied Gas Carrier with independent tanks, +AMS, +ACCU, SM, SHCM, FL(20), IMM, BWT, TCM, CPS, UWILD, RW, EGC-SCR, EGC-SOx, CRC, SP, SC-PL+
% high-tensile steel used in construction:.. 81.77%
Main engine(s)
Design: .....Hyundai-B&W
Model: 6G60ME-C9.5
Manufacturer: .....Hyundai Heavy Industries Co., Ltd.
Number: ..... 1 off
Type of fuel : .....HFO
Output of each engine: 13,500kW
Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer: ..... Hyundai Heavy Industries Co., Ltd.
Number: ..... 1 off
Fixed/Controllable pitch: .....Fixed
Diameter: 7,200mm
Diesel-driven alternators
Number: ..... 3 off
Engine make/type: ..... Hyundai Heavy Industries Co., Ltd.
Type of fuel: .....HFO
Output/speed of each set: ...1,400kW / 900rpm
Alternator make/type: ..... Hyundai Electric & Energy Systems Co., Ltd / HFC7 636-08P / 568-8P
Output/speed of each set: .....2,125KVA & 1,625KVA / 900rpm
Exhaust-gas scrubbing equipment
Manufacturer: .....Alfa Laval
Type: .....PureSox ECA open-loop hybrid prepared U-type system
On main engines?: ..... Yes
On auxiliary engines?: ..... Yes
Boilers
Number: ..... 1 off
Type: ..... OS-TCi
Make: .....Alfa Laval
Output, each boiler: 4,300kg/h
Cargo cranes/cargo gear
Number: ..... 2 off
Make: ..... Dongnam Marine Crane Co., Ltd.
Type: ..... Electro-Hydraulic type
Performance: .....SWL 10t
Other cranes
Number: ..... 2 off
Make: ..... Dongnam Marine Crane Co., Ltd.
Type: .....Electro-hydraulic type
Tasks: .....Provision crane
Performance: .....SWL 5t, 2t
Mooring equipment
Number: ..... 8 off
Make: .....Flutek, Ltd
Type: ..... Hydraulic
Special lifesaving equipment (eg MES, free-fall lifeboats)
Number of each and capacity: .....1 off / 28 persons
Make: ..... Jiangyinshi Beihai LSA Co., Ltd.
Type: .....Free-fall lifeboat
Cargo tanks
Number: ..... 8 off
Grades of cargo carried: .....Liquefied gas
Product range: ..... Butane (all isomers), Butane-propane mixture, Commercial propane, Propane, Propylene
Cargo pumps
Number: ..... 8 off
Type: ..... Vertical deepwell
Make: .....Wärtsilä Svanchoj A/S
Capacity (each): ..... 600m^3/h
Cargo control system
Make: ..... Kongsberg Maritime AS
Type: PC-001
Ballast control system
Make: ..... KSB
Type: ..... Hydraulic and remote control
Water ballast Treatment System
Make: ..... ERMA First ESk Engineering Solutions
Capacity: ..... 800m^3/h
Complement
Officers: .....13 persons
Crew: .....13 persons
Bridge control system
Make: .....KTE Co., Ltd.
Type: ..... Console
Is bridge fitted for one-man operation? ..... Yes

Fire detection system
Make: .....Consilium Marine AB
Type: ..... Unit of control panel
Fire extinguishing systems
Cargo holds: .....Dry powder
Make/Type: .....Fain Co., Ltd / Chemical
Engine room: .....CO_2
Make/Type: ..Fain Co., Ltd / high pressure
Cabins: .....Water spray system
Radars
Number: ..... 2 off
Make: .....Furuno Electric Co., Ltd.
Model(s) : FAR-3xxO

Waste disposal plant
Incinerator
Make: .....Hyundai Marine Machinery Co., Ltd.
Model: .....MAXI NG50SL WS
Sewage plant
Make: ..... IL Seung Co., Ltd
Model: ISB-02
Contract date: .....22 December 2017
Launch/float-out date: .....29 October 2018
Delivery date: .....15 May 2019

MATTERHORN EXPLORER



MSC GÜLSÜN: Container ship

Shipbuilder: ..... **Samsung Heavy Industries**
Vessel's name: ..... ***MSC Gülsün***
Owner/Operator: ..... **Mediterranean Shipping Company (MSC)**
Country: ..... **Switzerland**
Flag: ..... **Panama**
IMO number: **9839430**
Total number of sister ships already completed (excluding ship presented): **3**
Total number of sister ships still on order: **7**

The title of the world's largest container ship is a somewhat transient honour. Nevertheless, when delivered by Samsung Heavy Industries in July, it was accorded to the 23,756TEU *MSC Gülsün*. At 399.9m in length and a beam of 61.5m, it is the first of a new class of 11 vessels to be added in 2019-2020 to the MSC fleet. Construction of the other 10 ships is split equally between Samsung and Daewoo.

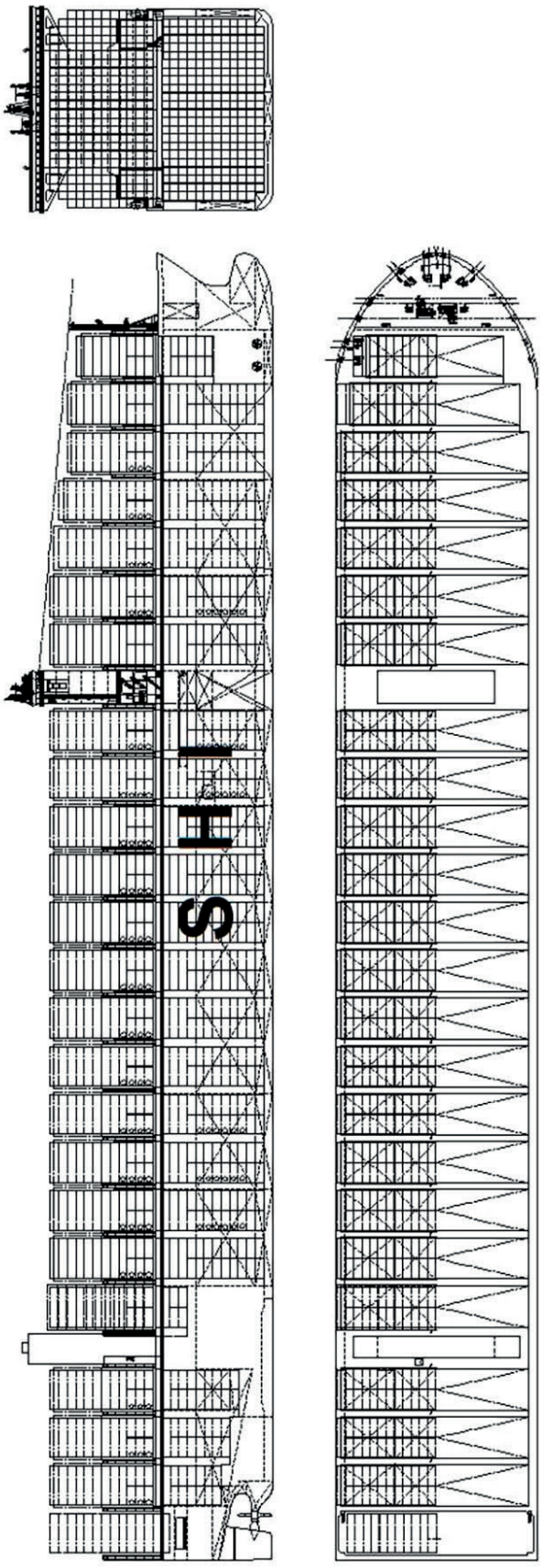
The nominal 23,756TEU capacity is divided as 13,968TEU on deck and 9,788TEU below. To mitigate the risk of fire *MSC Gülsün* is equipped with a dual-tower fire-fighting system with high-capacity pumps.

This new class has been designed with a wide range of efficiency, stability and safety considerations and was intended to meet the EEDI Phase 3 standard ahead of time. Features include a bow designed to enhance energy efficiency by reducing hull resistance.

The Hyundai-built MAN B&W 11G95ME-C9.5 engine is capable of conversion to LNG if considered necessary. The 66,650kW engine is directly connected to a 10.4m fixed pitch propeller. Typical of ultra large container ships, the engine room is located aft and the accommodation and navigation bridge in a midship position for line of sight requirements.

TECHNICAL PARTICULARS

Length oa: 399.903m
Length bp: 383.0m
Breadth moulded: 61.5m
Depth moulded: 33.2m
  to main deck: ..... 23.412m (2nd deck)
  to upper deck: ..... 33.2m (upper deck)
  to other decks: ..... 29.884m (Aft partial deck)
Width of double skin
  side: 2.61m
  bottom: 2.7m
Draught
  scantling: 16.5m
  design: 14.5m
Gross: approx.233,500gt
Displacement: ..... 292,360t at Ts
Lightweight: 64,350t
Deadweight
  scantling: 228,600t
  design: 186,800t
Block co-efficient: ..... 0.734 at Ts
Speed, service: . 23.2knots (90% DMCR output)
Cargo capacity (m^3): 23,756TEU
Bunkers (m^3)
  Heavy oil: 13,900
  Diesel oil: 900
Water ballast (m^3): 61,000
Daily fuel consumption (tonnes/day)
  Main engine only: 240.9
  Auxiliaries: 60.2
Classification society and notations: ..... DNV GL +1A, Container ship, RSD, E0, BIS, DG(P), NAUT(OC), TMON, BWM(E(s), T), Clean, LCS, WIB, Gas Ready(D, MEc), RSCS, ECA(Sox-A), Shore power, HLP, Recycle, ER(EGCS Hybrid)
% high-tensile steel used in construction: .. 85%
Propulsion
  Design: ..... MAN Energy Solutions
  Model: ..... MAN B&W 11G95ME-C9.5
  Manufacturer: ..... Hyundai Heavy Industries
  Number: 1
  Type of fuel: ..... HFO or MGO
  Output of each engine: . 66,650kW x 80.0rpm
Is this a diesel-electric or hybrid?: ..... No
Propeller(s)
  Material: ..... Ni-Al-Bronze
  Designer/Manufacturer: ..... Samsung HI/MMG
  Number: 1
  Fixed/Controllable pitch: ..... Fixed
  Diameter: 10.4m
  Speed: 80.0rpm
Diesel-driven alternators
  Number: 5
  Engine make/type: ..... STX-MAN / 9L32/40 x 3 sets, 6L32/40 x 2 sets
  Type of fuel: ..... HFO or MGO
  Alternator make/type: ..... Hyundai / HFJ9 913-10P & HSJ9 803-10P
  Output/speed of each set: ..... 3 x 5,375kVA + 2 x 3,500kVA / 720rpm
Exhaust-gas scrubbing equipment
  Manufacturer/Type: ..... Yara/In-line
  On main engines: ..... Applied
  On auxiliary engines: ..... Applied
Boilers
  Number: 1
  Type/ Make: ..... Oil fired/Kangrim
  Output, each boiler: 5,000kg/h
Stern appendages/rudders: .... Full spade rudder
Bow thruster(s)
  Make: ..... Kawasaki
  Number: 2
  Output (each): ..... 3,000kW, each
Other cranes
  Number: 3
  Make: ..... Oriental Precision
  Type: ..... 2 x high pressure, electro-hydraulic self-contained, single jib type, 1 x electric motor driven, monorail type
  Tasks: ..... For provision / engine room equipment handling
Performance: ..... 2 x 4.0t SWL; 1 x 13.5t SWL
Mooring equipment
  Number: ..... 1 x 1 C/L + 1 M/D, 1 x 1 C/L + 1 M/D + 1 W/H, 10 x 1 M/D + 1 W/H, each, 6 x 1 M/D
  Make/Type: ..... Kongsberg/Electric
Special lifesaving equipment
  Number of each and capacity: 2 x 32 persons
  Make: ..... Hyundai Lifeboat
  Type: ..... Totally enclosed
Hatch covers
  Design: ..... Welded steel open construction
  Manufacturer: ..... MacGregor
  Type: ..... Steel pontoon type with non-sequential opening/closing
Containers
  Lengths: ..... 6,058 (ISO-1CC) / 12,192 (ISO-1AA, High cube, 45ft)
  Heights: .. 2,591 (ISO-1AA, ISO-1CC) / 2,896 (High cube, 45ft)
  Total TEU capacity: 23,756TEU
  On deck: 13,968TEU
  In holds: 9,788TEU
Homogeneously loaded to 14t:
  ..... 15,020TEU at Ts
  Reefer plugs: ..... 2,024 UNIT (1,496 UNIT on deck / 528 UNIT in hold)
Tiers/rows (maximum)
  On deck/In holds: 13/12
Ballast control system
  Make/Type: ..... Pleiger/Electro-hydraulic
Ballast water treatment system
  Make: ..... Panasia
  Capacity: ..... 1,200m^3/h x 2 sets
Complement
Officers: ..... 15 persons
  Crew: ..... 14 persons
  Suez/Repair Crew: ..... 6 persons
  Single/double/other rooms: ..... 29 cabins (single), 1 cabin (3 double)
Navigation and other equipment
  Bridge control system
    Make/Type: ..... Kongsberg/AutoChief 600
    Is bridge fitted for one-man operation? .. Yes
Integrated bridge system: ..... Yes
  If yes, make: ..... Furuno
  Model: ..... FMD-3300 and etc.
Radars
  Number: 3
  Make: ..... Furuno
  Model(s): ..... 1 x FAR-3330S + 2 x FAR-3320
Fire detection system
  Make/ Type: ..... Consilium/Salwico
Fire extinguishing systems
  Cargo holds:
    Make/Type: ..... FAIN / CO_2 system
  Engine room:
    Make/Type: ..... FAIN / CO_2 system
  Cabins: ..... - / Fire hydrants
  Public spaces: ..... - / Fire hydrants
Waste disposal plant
  Incinerator
    Make/Model: .. HMMCO/Maxi NG25SL WS
  Sewage plant
    Make/Model: ..... IL Seung/ ISB-03
Efficiency
  Attained EEDI value: 7.494 g-CO_2 / tonne-mile
  Required EEDI value: ..... 13.132 g-CO_2 tonne-mile
Installed Fuel Meters: ..... Mass flow
Other installed monitoring tools: ..... Performance monitoring system with shaft torque meter
Energy Saving Technologies*: ..... SAVER Fin, SAVER Gap protector, SARB, Variable speed control for main cooling sea water pump and engine room supply fan, Intelliman Ship (Smart ship solution), VFD
Performance Monitoring Regime: ..... Noon reporting in Intelliman Ship
Launch/float-out date: ..... 09 March 2019
Delivery date: ..... 4 July 2019



MSC JOSSELINE: Container ship

Shipbuilder: ..... **Hyundai Heavy industries**
Vessel's name: ..... ***MSC Josseline***
Hull No: **3024**
Owner/Operator: ..... **Zodiac Maritime / MSC**
Country: ..... **United Kingdom**
Designer: ..... **Hyundai Heavy Industries**
Country: ..... **Republic of Korea**
Model test establishment used: ..... **Hyundai Maritime Research Institute**
Flag: ..... **Liberia**
IMO number: **9842061**
Total number of sister ships already completed (excluding ship presented): **4**
Total number of sister ships still on order: ..... **nil**

Delivered as the first of five Neo-Panamax box ships in May, *MSC Josseline* was built by Hyundai Heavy and is owned by Zodiac Maritime. As the name suggests, the vessel is operated as part of the MSC containership fleet.

The four sister vessels – *MSC Jewel, MSC Faith, MSC Aliya* and *MSC Kanoko*, were all delivered and in service with MSC by the end of November. At the time they were ordered in April 2018, all five vessels were reported as being owned by Zodiac but only *MSC Josseline* and *MSC Jewel* are included in the company's fleet list of owned vessels.

MSC Josseline's dimensions were built for the new Panama Canal locks and are 366m loa and 48.2m beam with a draught of 16m. Nominal cargo capacity is 14,336TEU, of which 6,078 are in the holds and 8,258 on deck. At a homogenous weight of 14tonnes, capacity is 9,500TEU. A maximum tier height of 11 boxes is listed for both under and on deck and there is a maximum number of rows at 19 under deck and 17 on deck. There is capacity for 1,000TEU of refrigerated cargo.

The ship's propulsion system features a WinGD 10X92 main engine producing 46,422kW at 76rpm driving a single 10m diameter fixed pitch propeller. The engine has a low pressure SCR system serving main and auxiliaries in order to meet NOx Tier III levels. Although MSC has been an enthusiastic supporter of scrubber technology, this ship is not equipped with one, but it has been built as LNG ready with a possible conversion of the main engine to dual-fuel configuration later.

Energy saving devices including a rudder bulb and Becker Twisted fin are included. A USCG Alfa Laval ballast treatment system is also fitted.

TECHNICAL PARTICULARS

Length oa: Max.366.00m
Length bp: 347.00m
Breadth moulded: 48.20m
Depth moulded
to main deck: 29.85m
Draught
scantling: 16.0m
design: 14.5m
Gross: 140,976gt
Displacement: 190,897t
Deadweight
scantling: 150,893t
Speed, service (-- %MCR output): 22.00knots
Cargo capacity (m^3)
Bale: abt.14,330TEU
Refrigerated cargo: 1,000TEU
Bunkers (m^3)
Heavy oil: ..... abt. 7,400m^3
Diesel oil: ..... abt. 1,300m^3
Water ballast (m^3): ..... abt. 37,000m^3
Classification society and notations: ..... LR: +100A1, Container Ship, ShipRight(SDA, FDA plus(25, WW),WDA2, CM, FDA SPR, ACS(B)), *IWS, LI, +LMC, UMS,ShipRight(BWMP(T), IHM, SCM), BoxMax(V, W), GR(A),CCSA, EDD(7.5 years), NAV1, BWTS
Main engine(s)
Model: ..... WinGD 10X92 – B
Manufacturer: ..... Hyundai - WinGD
Number: 1
Type of fuel : ..... HFO / ULSFO or MGO
Output of each engine: . 46,422kW x 75.7rpm
Propeller(s)
Material: ..... Ni-Al-Bronze
Designer/Manufacturer: ..... Hyundai
Number: 1
Fixed/Controllable pitch: ..... Fixed
Diameter: 10.0m
Diesel-driven alternators
Number: 4
Engine make/type: . Hyundai HiMSEN 7H32/40
Type of fuel: ..... HFO / ULSFO or MGO
Output/speed of each set: 3,354kW x 720rpm
Alternator make/type: ..... Hyundai HiMSEN 7H32/40
Output/speed of each set: ... 3,220kW x 720rpm
Boilers
Number: 1
Type: ..... Automatic, forced draught
Make: ..... Kangrim Insulation Co., Ltd.
Output, each boiler: 8,000kg/h
Other cranes
Number: 2
Make: ..... Oriental Precision Co., Ltd.
Type: ..... Electro-hydraulic type
Tasks: ..... Provision handling crane
Performance: ..... 4t SWL
Mooring equipment
Number: ..... 2 windlass, 9 mooring winch
Make: ..... Mirae Industry Co., Ltd.
Type: ..... Electro-hydraulic type
Special lifesaving equipment
Number of each and capacity: 2x 28 persons each
Make: ..... HLB (Hyundai Lifeboat)
Type: ..... Conventional
Hatch covers
Design: ..... 20ft(90t), 40ft(180t), 20/40ft(230t)
Manufacturer: ..... SMS-SME Marine Systme
Type (upper deck/other decks): ..... Pontoon, non-sequential operation
Containers
Lengths(mm): ..... 6,058(20ft) / 12,192 (40ft) / 13,716(45ft)
Heights(mm): ..... 2,591(20ft) / 2,591 or 2,896(40ft) / 2,896(45ft)
Total TEU capacity:
On deck: ..... abt. 8,200
In holds: ..... abt. 6,100
Homogeneously loaded to 14t: ..... abt. 9,500
Tiers/rows (maximum)
On deck: 11/19
In holds: 11/17
Ballast control system
Make: ..... Shin Shin Machinery Co., Ltd.
Type: ..... Hydraulic
Water ballast Treatment System
Make: ..... Alfa Laval
Capacity: ..... 1,000m^3 / 2 sets
Complement
Officers: 11
Crew: 17
Bow thruster(s)
Make: ..... KTE – Nakashima Co., Ltd.
Number: 2
Output (each): 1,800kW
Bridge control system
Make: ..... Kongsberg
Type: AutoChief-600
Is bridge fitted for one-man operation? ..... Yes
Fire detection system
Make: ..... Consilium-Iljin
Type: ..... Addressable
Fire extinguishing systems
Cargo holds: ..... H.P. CO_2
Make/Type: ..... NK
Engine room: ..... H.P. CO_2
Make/Type: ..... NK
Radars
Number: ... 2 (1 for S-band and 1 for X-band)
Make: ..... Furuno Electric
Model(s): ..... FAR-2338SNXT for S-band / FAR-2328 for X-band
Integrated bridge system: ..... Yes
If yes, make: ..... Furuno
Model: FMD-3300
Efficiency
Attained EEDI value: 6.73
Required EEDI value: 8.76
Installed Fuel Meters: ..... F.O: positive displacement type / Gas: the maker's standard

Other installed monitoring tools:
M/E Shaft Power Meter:
- M/E shaft power, torque and revolution

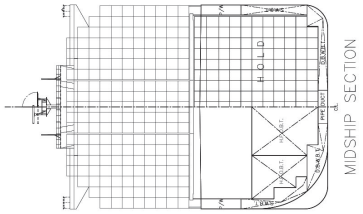
Loading Computer:
- Trim/draught monitoring
- Dead weight calculation
- Intact stability calculation
- Shear force and bending moment calculation
- Damage stability calculation
- Optimum trim calculation
- Dynamic/static damage stability calculation
- Propulsion immersion calculation

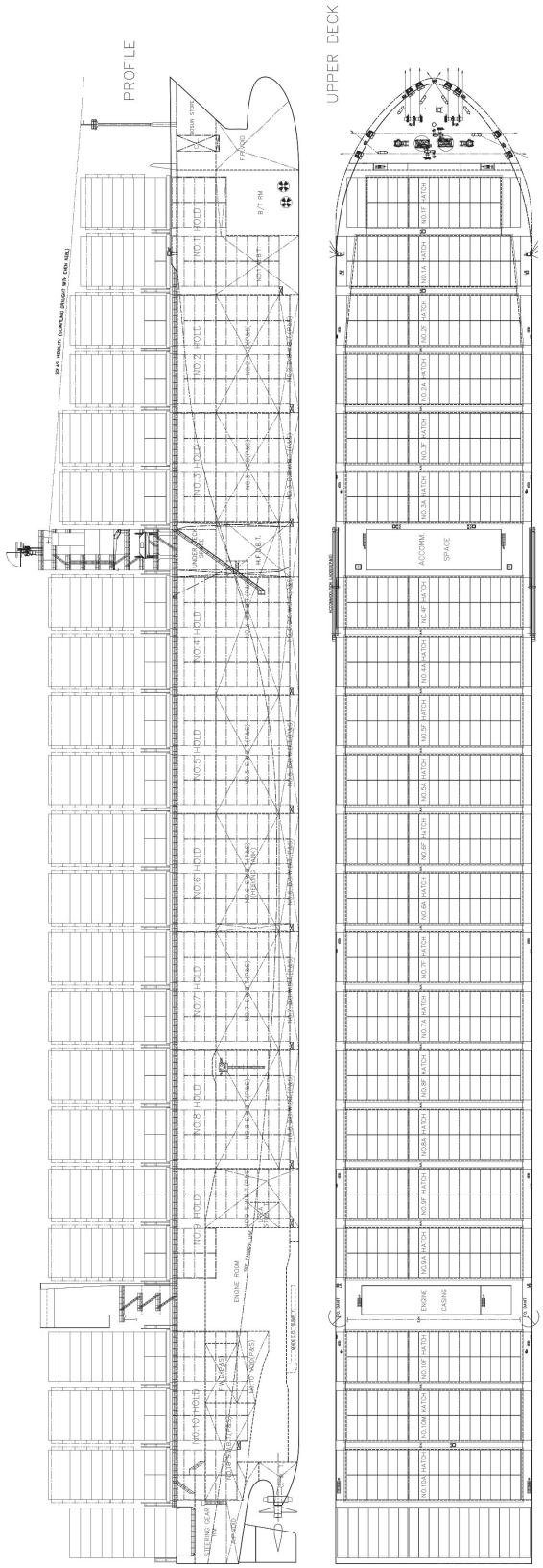
Integrated Automation System:
- Data display (trend, log and mimic)
- Alarm display (pressure, temperature, level and others)
- Self check function
- Alarm extension
- Remote control for E/R machinery
- Remote control for cargo system

Energy Saving Technologies*: .. Hi-Fin, Hi-rudder with bulb, dual fuel (fuel oil and gas)
Performance Monitoring Regime:
Hyundai-ISS (Integrated Smart Ship Solution):
- Voyage monitoring
- Route optimization (weather routing)
- Trim optimization
- Fuel/energy flow monitoring
- Analysis (speed performance / weather
- Effect / hull fouling status)
- Report (Noon / departure / arrival / voyage / MRV / IMO SEEM)

Contract date: ..... 20 October 2017
Launch/float-out date: ..... 8 March 2019
Delivery date: ..... 1 June 2019

MSC JOSSELINE





NAVIS-1: River/sea dry cargo ship

Shipbuilder: .....**JCS Okskaya Sudoverf**
Vessel's name: ***Navis-1***
Owner/Operator: .....**State Transport Leasing Company** .....**PJSC**
Country: .....**Russia**
Designer: .....**Marine Engineering Bureau**
Country: .....**Ukraine**
Flag: .....**Russian Federation**
IMO number: **9868730**
Total number of sister ships already completed (excluding ship presented): **7**
Total number of sister ships still on order: .....**Nil**

Navis-1 is the first of a new generation of river/sea dry cargo ships designed for use in the river and canal systems of Russia and its neighbouring countries, as well as for short sea operation.

Navis-1 is the first of the RSD32M type designed by Marine Engineering Bureau of Ukraine and built by Okskaya Sudoverf at Navashino on the Oka River. The design is a development of the RSD32 type and is intended to replace veteran vessels of the Sormovskiy and Volgo-Balt series that are familiar in much of Northern Europe.

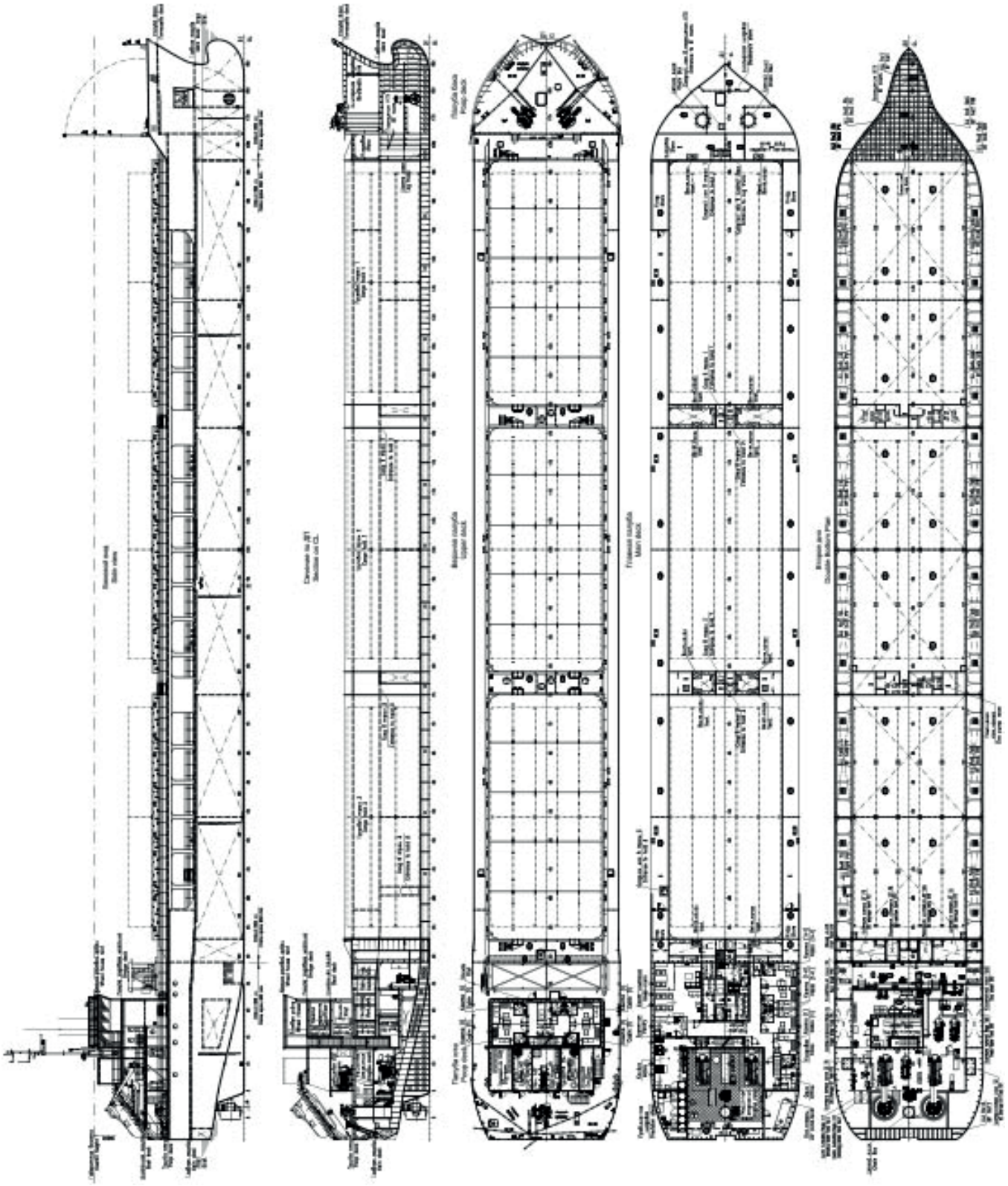
Designed as multipurpose ships, *Navis-1* and its seven sisters that were ordered in late 2017 have hull dimensions of 123.2m loa, beam of 16.75m and a maximum 4.745m draught. Its deadweight in rivers on a 3.6m draught is 3,883tonnes. In the Caspian and Azov Seas, the draught is 4.2m and deadweight 5,157tonnes and in open seas, its deadweight is 6,221tonnes on the maximum draught.

The designer refers to the type as an Azov 5000, referring to its ability to transport batches of 5,000tonnes of grain from Azov and Caspian Sea ports. The ship has three box holds with a combined capacity of 8,804m^3 and three large hatches. It can carry most general and bulk cargoes, including containers with 180TEU in the holds and 60TEU on deck.

Vessels of this type need to be highly manoeuvrable and for *Navis-1* this is achieved using a combination of twin engines and propulsion equipment. The two main engines are medium-speed Yanmar 6EY22AW models, each producing 1,100kW at 1,000rpm and connected through gearboxes to a pair of fully azimuthing Schottel SRP 340FP rudder propellers. This arrangement gives a 10knots service speed. Manoeuvring is further aided by a Schottel STT170FP bow thruster.

TECHNICAL PARTICULARS

Length oa: 123.17m
Length bp: 116.82m
Breadth moulded: 16.50m
Depth moulded
to main deck: 5.50m
Width of double skin
side: 1.90m
bottom: 1.00m
Draught
scantling: ..... 4.745m (at sea)
design: ..... 3.60m (in the river)
Gross: 4,982gt
Displacement: 8,594t
Lightweight: 2,266t
Deadweight
scantling: 6,328t
design: 3,940t
Block co-efficient: .....0.887 (at draught 4.745m)
Speed, service (75%MCR output): 11.1knots
Cargo capacity (m^3)
Bale: 8,805
Grain: 8,805
Bunkers (m^3)
Diesel oil: 300
Water ballast (m^3): 2,420
Classification society and notations: .....Russian Maritime Register of Shipping (RS) KM (★)Ice1 R2 AUT1-ICS BWM(T) CONT(deck, cargo holds Nos.1,2,3) DG(bulk, pack)
% high-tensile steel used in construction: ... 80% approx. (hull – 100 %)
Roll-stabilisation equipment: .....Bilge keels
Propulsion
Main engine(s)
Design: .....Diesel engine
Model: 6EY22AW
Manufacturer: .....Yanmar
Number: 2
Type of fuel: .....MDO
Output of each engine: 1,100kW
Is this a diesel-electric or hybrid?: .....No
Gearbox(es)
Output speed: 900rpm
Propeller(s)
Material: GS-CuAl10Fe5Ni5-C
Designer/Manufacturer: .....Rudder-propeller/ Schöttel SRP 340FP
Number: 2
Fixed/Controllable pitch: .....Fixed
Diameter: 2,000mm
Speed: 283rpm
Special adaptations: ..... In nozzles
Diesel-driven alternators
Number: 3
Engine make/type: .....Volvo Penta / D9 MG KC (D9A2A)
Type of fuel: .....MDO
Alternator make/type: .. Stamford / HCM534C-1
Output/speed of each set: ...160kW / 1,500rpm
Bow thruster(s)
Make: .....Schöttel / STT170FP
Number: 1
Output (each): 120kW
Other cranes
Number: 1
Make: .....Gürdesan
Type: .....Gantry crane
Tasks: .....For hatch covers of cargo holds
Mooring equipment
Number: .....2 bow anchor-mooring winches, 1 stern anchor-mooring winch
Make: .....Gürdesan
Type: .....Electric
Special lifesaving equipment
Number of each and capacity: ....1 x 16 pers.
Make: .....China
Type: ..... Free-fall lifeboat YZ49FC
Hatch covers
Design: .....Marine Engineering Bureau
Manufacturer: .....JCS "Okskaya Sudoverf"
Type (upper deck/other decks): ...Of lift-away type with gantry crane
Containers
Lengths: .....20'/40'
Heights: .....9.5'
Total TEU capacity: 240
On deck: 60
In holds: 180
Homogeneously loaded to 14tonnes: 240
Tiers/rows (maximum)
On deck: ..... 12 / 1
In holds: ..... 12 / 3
Ballast control system
Make: ..... Valcom
Type: .....TSS/Control
Ballast water treatment system
Make: ..... Alfa Laval / PureBallast 3.1 500 Compact Flex
Capacity: ..... 500m^3/h
Complement
Officers:..... 5
Crew: 6
Supernumaries/Spare: 3
Single/double/other rooms: .....11 (3 with spare berth) / pilot
Navigation and other equipment
Bridge control system
Is bridge fitted for one-man operation? .....No
Integrated bridge system:.....No
Radars
Number: 2
Make: ..... Furuno
Model(s): .....FAR-2127 (X-Band)
Fire detection system
Make: ..... MRS Electronics (fire alarm), Safetec (smoke detection system for cargo holds)
Type: PS-220-5A, SDS-48
Fire extinguishing systems
Cargo holds: .....CO_2
Engine room: .....CO_2
Efficiency
Attained EEDI value: 15.7
Required EEDI value: 15.8
Contract date: .....30 November 2017
Launch/float-out date: 22 May/12 December 2018
Delivery date: .....29 May 2019



NISSOS RHENIA: Very large crude carrier

Shipbuilder: ..... **Hyundai Heavy Industries**
Vessel's name: ..... ***Nissos Rhenia***
Hull No: **3012**
Owner/Operator: ..... **Kyklades**
Country: ..... **Greece**
Designer: ..... **Hyundai Heavy Industries**
Country: ..... **Republic of Korea**
Model test establishment used: ..... **Hyundai Maritime Research Institute (HMRI)**
Flag: ..... **Marshall Island**
IMO number: **9845685**
Total number of sister ships already completed (excluding ship presented): **7**
Total number of sister ships still on order: ..... **nil**

First in a series of what was initially four ships, *Nissos Rhenia* is a 319,000dwt VLCC constructed by Hyundai Heavy Industries in Ulsan and managed by Kyklades Maritime Corporation. The series was later extended to eight ships and a further three vessels of the same type have been constructed for a different owner. Of the eight vessels operated by Kyklades, seven were delivered in 2019 and the last in January 2020. The ship is owned by Okeanis Eco Tankers (OET).

The vessel's dimensions are a loa of 333m, a beam of 60m and a draught of 22.6m. *Nissos Rhenia* has 15 cargo tanks – five centre tanks and five pairs of side tanks – and two slop tanks. There are three cargo pumps each capable of 5,000m^3/h and the ship is fitted with two 3,000m^3/h Sunrui ballast water treatment systems.

Nissos Rhenia and its sisters are all fitted with seven cylinder Hyundai-built WinGD X82-B engines with a power rating of 33,250kW at 84rpm, although it will normally be run at 66rpm with a 24,500kW output. The engine drives a 10.4m diameter fixed pitch propeller for a service speed of 11.2knots and a consumption of 83tonnes HFO per day. Its maximum speed is 14knots.

OET's strategy is to operate eco vessels that are scrubber equipped for meeting IMO 2020 rules. *Nissos Rhenia* has been claimed to be the first eco-friendly VLCC with both SCR and a scrubber installed at the newbuilding stage. The SCR system needed to meet IMO Tier III is a high pressure type on the main engine, while the three Himsen auxiliaries have a low pressure system.

The scrubber fitted to the vessel is an Alfa Laval PureSox open loop type with multi inlet to treat exhaust from the main engine, auxiliaries and the boiler.

TECHNICAL PARTICULARS

Length oa: 332.995m
Length bp: 327.0m
Breadth moulded: 60.0m
Depth moulded
to main deck: 30.4m

Width of double skin
side: 3.0m
bottom: 2.9m
Draught
scantling: 22.6m
design: 21.0m

Gross: 160,457gt
Deadweight
design: 290,353t
scantling: 318,953t

Speed, service (-- %MCR output): ..14.4knots at scantling draught (72.2%)

Cargo capacity (m^3)
Liquid volume: ..... abt. 355,800m^3
Bunkers (m^3)
Heavy oil: ..... abt. 4,600m^3
Diesel oil: ..... abt. 800m^3
Water ballast (m^3): ..... abt. 90,900m^3

Daily fuel consumption (tonnes/day)
Main engine only: ... 65.2MT/day (tier II mode without scrubber operation)

Classification society and notations:..... DNV GL, +1A,tankerforoil,ESP,CSR,CMON,BIS,BWM(T), BWM(E(s)),VCS(2B),COAT-PSPC(B,C),LCS,E0,TMON, SPM, BMON, Clean, Recyclable.

Main engine(s)
Design: ..... Hyundai-WínGD
Model: 7X82-B
Manufacturer: .....Hyundai Heavy Industries (engine & machinery division)
Number: 1
Type of fuel : .....HFO, ULSFO or MGO
Output of each engine: ..... 33,250kW x 84

Propeller(s)
Material: ..... Ni-Al-Bronze
Designer/Manufacturer: ..... Hyundai Heavy Industries (engine & machinery division)
Number: 1
Fixed/Controllable pitch: .....Fixed
Diameter: 10.4m

Diesel-driven alternators
Number: 3
Engine make/type: .....Hyundai, HiMSEN 8H21/32
Type of fuel : .....HFO, ULSFO or MGO
Output/speed of each set: ..1,760kW x 900rpm
Alternator make/type: .....Hyundai, HiMSEN 8H21/32
Output/speed of each set: ... 1,670kW x 900rpm

Exhaust-gas scrubbing equipment
Manufacturer: .....Alfa Laval
Type: ..... Multi-inlet, S.W. wet cleaning, open loop type, Utype
On main engines?: ..... Applied
On auxiliary engines?: ..... Applied
Boilers
Number: 2
Type: ..Automatic, forced draught, heavy fuel oil burning, marine boiler
Output, each boiler: 4,000kg/h

Cargo cranes/cargo gear : Hose handling crane
Number: 2
Type: .....Electro-hydraulic type
Performance: .....20t SWL
Other cranes
Number: 2
Type: .....Electro-hydraulic type
Tasks: .....Provision Handling Crane
Performance: .....SWL 10t (Port)/ 3t (Stbd)

Mooring equipment
Number: ..... 2 windlass, 11 mooring winch
Type: .....Electro-hydraulic type
Special lifesaving equipment
Number of each and capacity: .....2 lifeboat, 40 person each
Cargo tanks
Number: ...5 center cargo oil tanks, 5 pairs of side cargo oil tanks, one(1) pair of slop tanks
Grades of cargo carried: .....Crude oil having flash points at or below 60°C
Cargo pumps
Number: 3
Type: .....Vertical, centrifugal, single stage
Capacity (each): ..... 5,000m^3/h
Cargo control system
Type: .....Control console of piano type

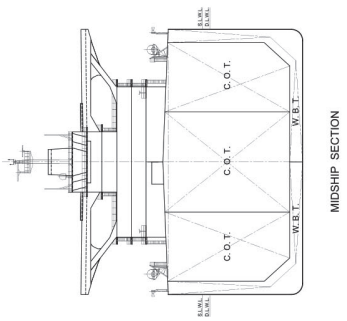
Ballast control system
Type: .....Control console of piano type
Water ballast Treatment System
Make: .....Sunrui
Capacity: ..... 2x 3,000m^3/h

Complement
Officers: 19
Crew: 12
Suez/Repair Crew: 6
Bridge control system
Make: ..... Nabtesco
Type: M-800-V
Is bridge fitted for one-man operation? .....No

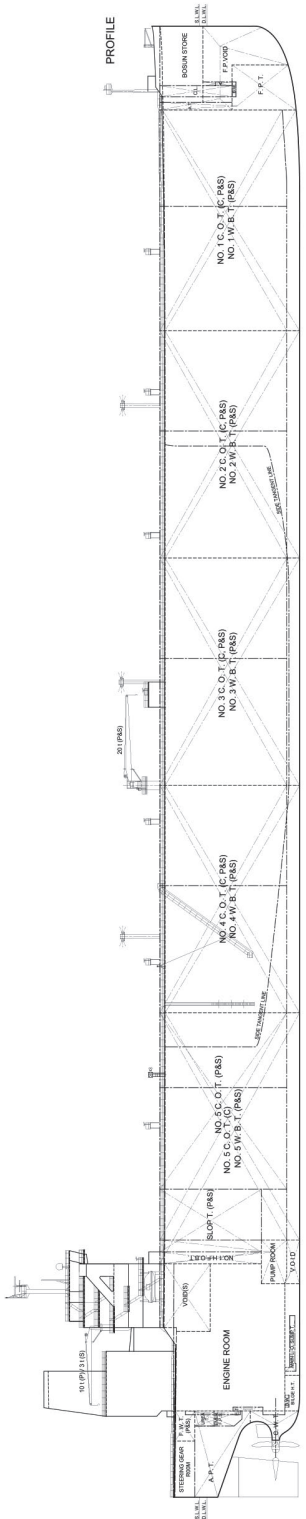
Fire detection system
Make: .....Consilium
Type: .....Salwico
Fire extinguishing systems
Cargo holds:
Make/Type: ..... Foam, Sea water
Engine room:
Make/Type: .....CO_2, Sea water
Cabins:
Make/Type: ..... Sea water
Public spaces:
Make/Type: ..... Sea water
Radars
Number: ..... 2 sets (X-band radar x 1set, S-band radar x 1set)
Make: ..... Furuno
Model(s) : FAR-3320, FAR3330S-SSD
Integrated bridge system: ..... Yes
If yes, make: ..... Furuno
Model: FMD-3300
Waste disposal plant
Waste handled: ...Incinerator & sewage plant

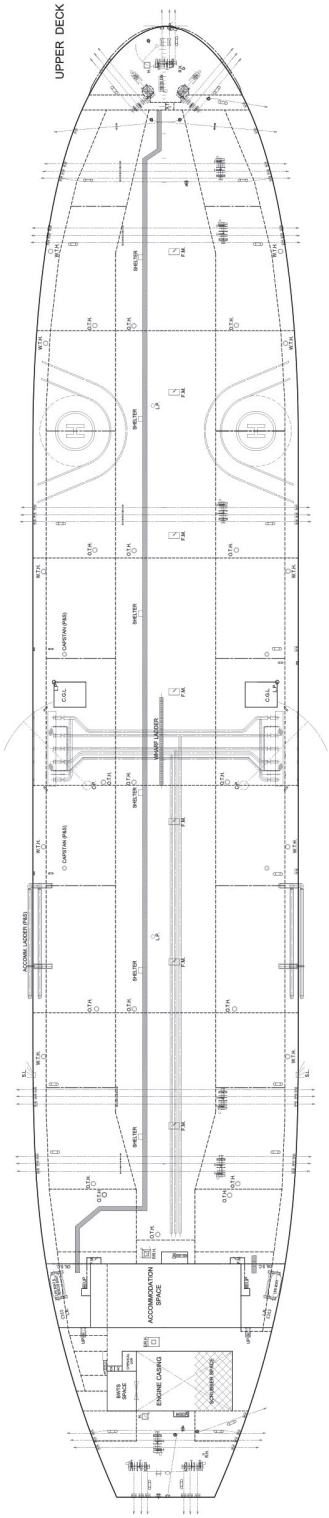
Contract date: .....8 December 2017
Launch/float-out date: .....28 February 2019
Delivery date: .....4 May 2019

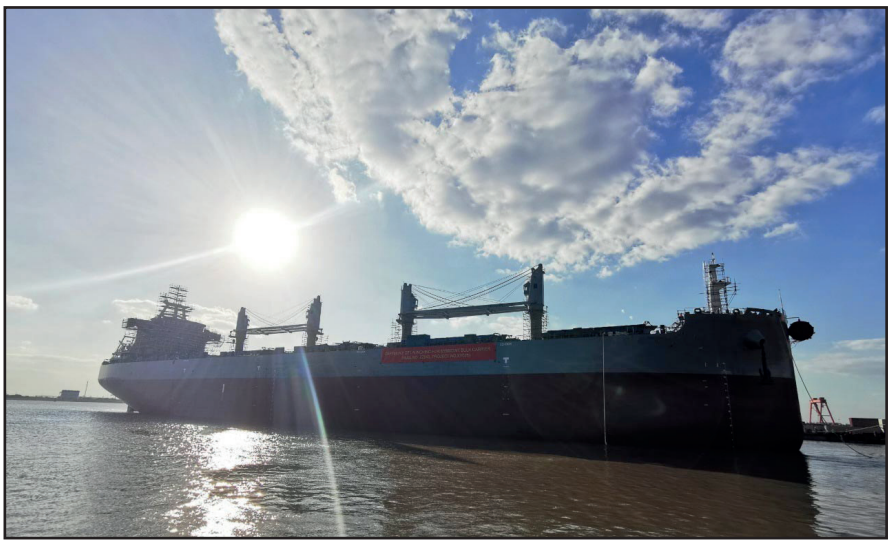
NISSOS RHENIA



MIDSHIP SECTION







NORD YUCATAN: Bulk carrier

Shipbuilder: **Nantong Xiangyu Shipbuilding & Offshore Engineering Co., Ltd.**
Vessel's name: ..... ***Nord Yucatan***
Owner/Operator: ....**Nisshin Shipping Co., Ltd.**
Country: ..... **Japan**
Designer: .**Shanghai Merchant Ship Design & Research Institute**
Country: ..... **China**
Model test establishment used: .....**China Ship Scientific Research Centre (CSSRC)**
Flag: ..... **Philippines**
IMO number: **9856232**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: **13**

Nord Yucatan is a New Dolphin 63500 Ultramax bulk carrier developed by SDARI and based on the Green Dolphin 64 type first unveiled in 2012.

The 63,500dwt vessel was built by Nantong Xiangyi Shipbuilding for the Japan-based operator Nisshin Shipping and delivered in October. The owner initially placed an order for nine of the type but has since returned and booked several more. A small number of vessels of the same type are on order at other Chinese yards for different owners.

Hull dimensions are 199.9m length, 32.2m beam and a 13.5m draught. The vessel is a typical Ultramax with five cargo holds and five pairs of water ballast tanks, each arranged as a double bottom tank connected to a top side wing tank. The No.3 cargo hold may be used for a water ballast tank during heavy weather ballast voyages.

Four energy efficient, fully electric deck cranes with variable frequency drive that are of 30tonnes and 28m outreach are fitted. The mooring systems and windlass are also electrically driven and, like many of the electric systems on the ship, have frequency converters for reduced energy requirements. The lighting is low energy LED type.

The hull form of the parent design has been modified for efficiency and, with the updated common structural rules applying, the ship has been built lighter. These modifications along with a new low wind resistance superstructure help the vessel to attain an EEDI rating of 3.51, more than 20% below that required.

The power and propulsion system comprises an STX-built MAN B&W 6G50ME-C9.5 main engine of 7,300kW output at 88rpm directly coupled to a 6.9m fixed pitch propeller. This arrangement allows a 13.55knots service speed on 22.6tonnes daily fuel oil consumption – around 5tonnes below the Green Dolphin 64 type.

TECHNICAL PARTICULARS

Length oa: 199.90m
Length bp: 196.50m
Breadth moulded: 32.26m
Depth moulded: 18.90m
to main deck: 18.90m
to upper deck: 18.90m
Draught
scantling: 13.5m
design: 13.5m
Gross: 35906gt
Displacement: 75,276.6t
Lightweight: 11,689.2t
Deadweight
scantling: 63,587.4t
design: 63,587.4t
Block co-efficient: ...0.8561 at scantling draught
Speed, service (78%MCR output): ...13.55knots
Cargo capacity (m^3)
Bale: 72,775.1
Grain: 78,325.7
Bunkers (m^3)
Heavy oil: 1,601.2
Diesel oil: 441.3
Water ballast (m^3): 17,504.6
Daily fuel consumption (tonnes/day) (LCV=42,700Kj/kg)
Main engine only: 22.6
Auxiliaries: 3.1
Classification society and notations:.....BV BV I + HULL MACH Bulk Carrier CPS(WBT) CSR BC-A(holdsNo.2&4maybeempty) ESPGRAB[20] UnrestrictedNavigationINWATERSURVEYLI-HGS2 +AUT-UMSMON-SHAFTCLEANSHIPBWTBWE GREENPASSPORT
% high-tensile steel used in construction: .. 80%
Propulsion
Main engine(s)
Design: ..... MAN
Model: 6G50ME-C9.5
Manufacturer: STX Heavy Industries Co., Ltd.
Number: 1
Type of fuel: ..... HFO and MGO
Output of each engine: .... 7,300kW x 88r/min
Is this a diesel-electric or hybrid?: .....No
Propeller(s)
Material: ..... Ni-Al-Bronze
Designer/Manufacturer : ..... Shanghai Marine Propeller Design Co., Ltd.
Number: 1
Fixed/Controllable pitch: .....Fixed
Diameter: 6.9m
Speed: 5,484.67mm
Diesel-driven alternators
Number: 3
Engine make/type: ..... Yanmar Co., Ltd. / 6EY18ALW
Type of fuel : ..... HFO and MGO
Alternator make/type: .... Taiyo Electric Co., Ltd.
Output/speed of each set : ...640kW/ 900rpm
Boilers
Number: 1
Type: GK-2545S2-1500/410-90
Make: ..... Miura Co., Ltd.
Output, each boiler: ..... Exhaust Gas Side 410+90X2kg/h and Oil-fired side 1,500kg/h
Stern appendages/special rudders: ..... Semi balanced type rudder
Deck machinery
Cargo cranes/cargo gear
Number: 4
Make: ...Jiangsu Masada Heavy Industries Co., Ltd
Type: ..Electro-hydraulic single deck crane
Performance: ..... 30t x 28m, working radius min. 4.5m
Other cranes
Number: 1
Make: Wuxi Haidelong Marine Equip. Co., Ltd.
Type: ..... Electric-hydraulic operate
Tasks: ..... Auxiliary crane
Performance: ..... 4t x 11.5m
Mooring equipment
Number: ..... 2 combined windlass /mooring winch and 2 mooring winch
Make: .....Jiangsu Masada Heavy Industries Co., Ltd
Type: ..... Electric-hydraulic

Special lifesaving equipment
Number of each and capacity: .....25 persons
Make: ..... Jiang Yin Shi Beihai LSA Co., Ltd.
Type: ..... Free-fall lifeboat
If MES, vertical or sloping chutes?: ...Lifeboat davit system (sloping shute)
Hatch covers
Design: ..... MacGregor
Manufacturer : ..... MacGregor
Type: ..... Folding electric hydraulic type hatch cover on the upper deck

Ballast water treatment system
Make: ..... Techcross
Capacity: ..... 1,800m^3/h
Complement
Officers:..... 13
Crew: 12
Suez/Repair Crew: 6
Single/double/other rooms: 25

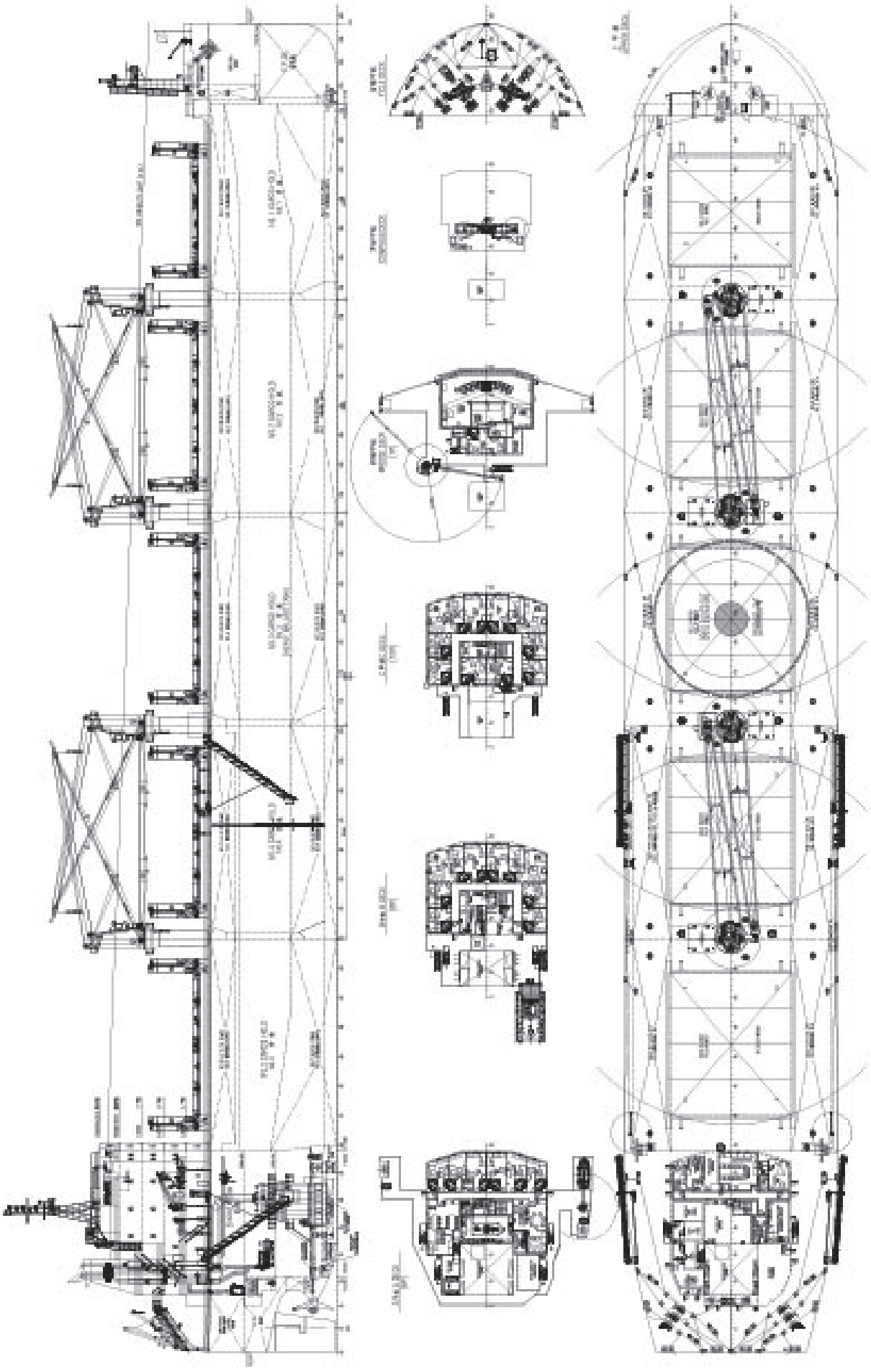
Navigation and other equipment
Bridge control system
Make: ..... Yokogawa
Type: PT900A-P-Y2A-2S
Is bridge fitted for one-man operation? .....No
Integrated bridge system: .....No

Radars
Number: .....3 sets
Make: ..... Furuno
Model(s): XN-24CF, SN-36CF, XN-20CF

Fire detection system
Make: ..... Bright Sky
Type: ..... JB-QBC
Fire extinguishing systems
Cargo holds: ..... CO_2 + Water
Engine room: ..... CO_2 + Water
Cabins: ..... Water
Public spaces: ..... Water
Waste disposal plant
Incinerator
Make: ..... Hansun (Shanghai) Marine Technology Co., Ltd
Model: HSINC-50
Sewage plant
Make: ..... CSSC Nanjing Luzhou Machine Co., Ltd
Model: STD3
Efficiency
Attained EEDI value: 3.51
Required EEDI value: 4.43
Energy Saving Technologies*: ..... HVAF, LED lighting

Contract date: ..... 8 March 2015
Launch/float-out date: .....15 September 2015
Delivery date: .....21 October 2019

NORD YUCATAN



OLEANDER: Con-ro

Shipbuilder: .....**Jiangsu New Yangzi Shipbuilding Co., Ltd**
Vessel's name: .....***Oleander***
Owner/Operator: .....**Bermuda Container Line**
Country: ..... **United States**
Designer: .**Shanghai Merchant Ship Design & Research Institute (SDARI), CSSC**
Country: ..... **China**
Model test establishment used: .**Shanghai Ship & Shipping Research Institute (SSSRI)**
Flag: ..... **Marshall Islands**
IMO number: **9827334**
Total number of sister ships already completed (excluding ship presented): ..... **nil**
Total number of sister ships still on order: ..... **nil**

Oleander is the first of a new design of con-ro by SDARI for Bermuda Container Line. The ship replaces a veteran 1990 built con-ro of the same name and was delivered by Jiangsu New Yangzi Shipbuilders in January 2019. At 120m in length and with a 20m beam, the ship is not large, but its role is to connect the island of Bermuda with New York and beyond via transhipment. Despite its relatively small size, the ship has considerably more cargo capacity than its predecessor.

The ship can carry a total of 456TEU in four holds and on hatch covers. In addition, 113 small cars can be carried on three car decks at aft part of the ship from a stern quarter ramp. Fourteen 48ft trailers and other block ro-ro cargoes can be carried on the heavy load deck and No.3 and No.4 hatch covers through a garage door in the ro-ro hold. The two forward holds are mechanically ventilated for carrying dangerous goods.

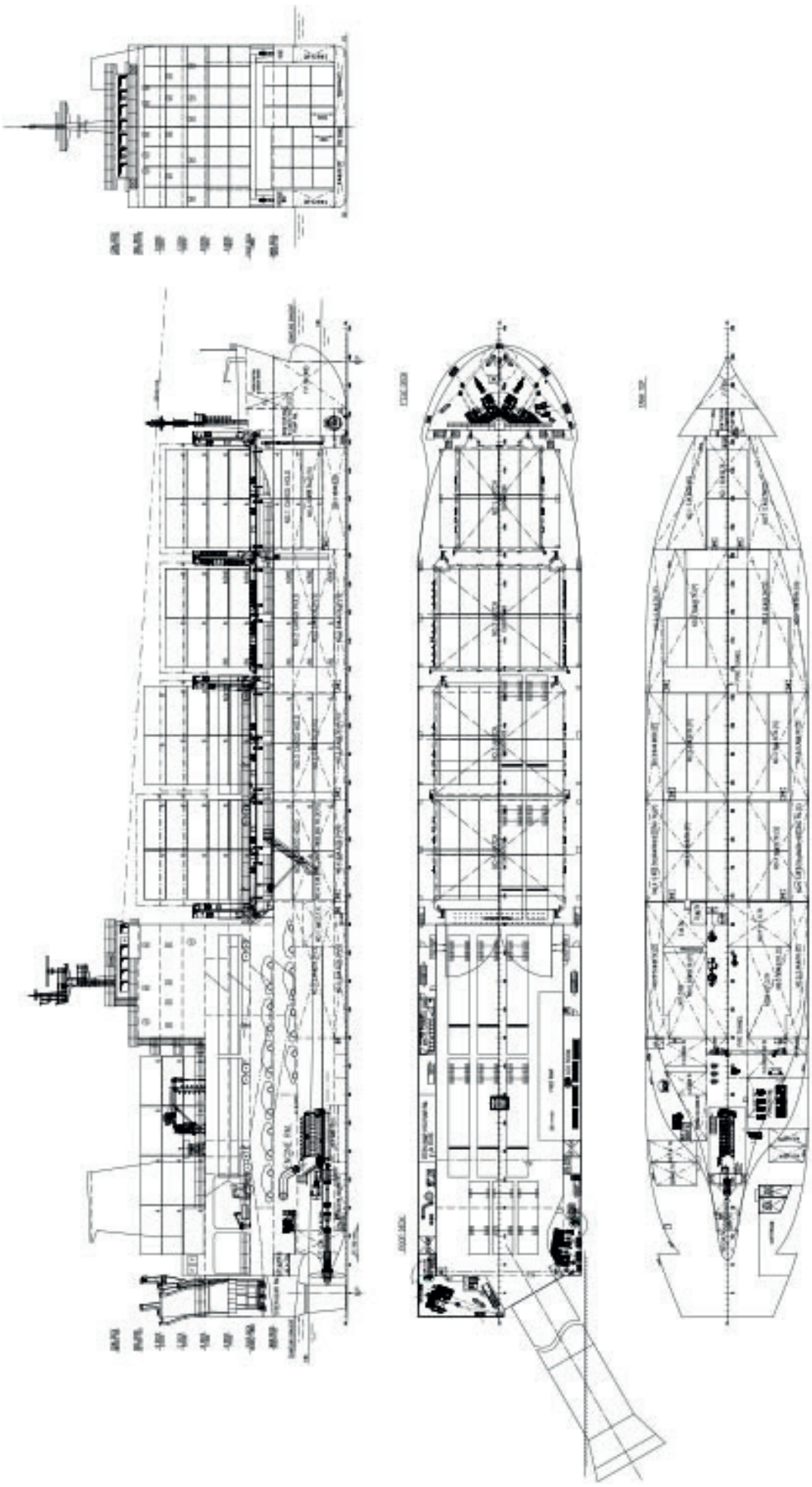
Oleander is powered by a MaK nine cylinder M32E medium speed main engine. The service speed is more than 14.0knots at CSR with 15% sea margin and with PTO at design draught 6.3m. The engine is fitted with a low pressure SCR system for NOx control, which is needed as the vessel will be operating mostly in the North American ECA zones where Tier III levels have been in force for some time. Space provision has been made for containerised LNG tanks in anticipation of a possible conversion to LNG.

TECHNICAL PARTICULARS

Length oa: 120.0m
Length bp: 115.0m
Breadth moulded: 20.0m
Depth moulded: 9.0m
  to main deck: 9.0m
  to B deck: 17.45m
  to other decks: 11.88m
Width of double skin
  side: 2.15m
  bottom: 1.5m
Draught
  scantling: 6.5m
  design: 6.3m
Gross: 8,313gt
Deadweight
  scantling: 6,884t
  design:..... 6,474t
Speed, service:... 14.0knots (85%MCR 15%sea margin, with PTO)
Bunkers (m^3)
  Heavy oil: 472
  Diesel oil: 235
Water ballast (m^3): 3,532
Daily fuel consumption (tonnes/day)
  Main engine only: 17.8
  Auxiliaries: 2.19
Classification society and notations: .....DNV GL
% high-tensile steel used in construction: .. 80%
Heel control equipment: .. Ballast tanks with pump
Roll-stabilisation equipment: .....Bilge keels
Propulsion
Main engine(s)
  Design: .....MaK
  Model: 9M32E
  Manufacturer: .....Caterpillar
  Number: 1
  Type of fuel: ..... HFO/MDO
  Output of each engine: 4,950kW
  Is this a diesel-electric or hybrid?:.....No
Gearbox(es)
  Make: .....Renk
  Model: RSV-900
  Number: 1
  Output speed:..... 137.5rpm for propeller and 1,803.6rpm for shaft generator
Propeller(s)
  Material: ..... Cu-Ni-Al Bronze
  Designer/Manufacturer: .....MaK
  Number: 1
  Fixed/Controllable pitch: ..... Controllable
  Diameter:..... 4,500mm
  Speed:..... 137rpm
Main-engine driven alternators
  Number: 1
  Make/type: .....AEM SE 400 LL4
  Output/speed of each set: ..1,000kW/1,800rpm
Diesel-driven alternators
  Number: 3
  Engine make/type: .....Linderberg DI16 091M
  Type of fuel : .....MDO
  Alternator make/type: ..... Emerson LSA 47.2
  Output/speed of each set: 450kW
Exhaust-gas scrubbing equipment
  Manufacturer: .....Heatmaster
  Type: .....HTX 5-54-1451-SF
  On main engines?: .....On main engine
  On auxiliary engines?: .....None
Boilers
  Number: 1
  Type: .....HTF 500H
  Make: .....Heatmaster
  Output, each boiler: 475kW
Bow thruster(s)
  Make: ..... Kawasaki, Wuhan, China
  Number: 1
  Output (each): 600kW
Other cranes
  Number: 1
  Make: .....Masada, Jiangsu ,China
  Type: ..... Hydraulic slewing crane
  Tasks: .....Provision crane
  Performance: .....3t x 6m
Mooring equipment
  Number: 5
  Make: .....SEC
  Type: .....Electric
Special lifesaving equipment
  Number of each and capacity: 1x 26 persons
  Make: .....Norsafe
  Type: .....Free-fall lifeboat
Hatch covers
  Design: .....TTS-Huahai
  Manufacturer: ..... Shipyard
  Type (upper deck/other decks): Folding type, hydraulic operated
Containers
  Lengths: 20ft,40ft,45ft
  Heights: .....8'6'',9'6''
Cell guides: .....4 holds below main deck
Total TEU capacity: 456
  On deck: 332
  In holds:..... 124
Homogeneously loaded to 14tonnes: 284
Reefer plugs: 72
Tiers/rows (maximum)
  On deck:..... 5/8
  In holds:..... 3/6
Vehicles
  Number of vehicle decks: .....3x fixed
  Total cars: ..... 113(4,700mm x 1,800mm)
Doors/ramps/lifts/moveable car decks
  Number of each: ..1 access door for vehicles, 1 stern quarter ramp
  Type: .....hydraulic
  Designer: .....TTS-Huahai
Ballast control system
  Make: .....Emerson
  Type: .....HPU 100 FAP
Ballast water treatment system
  Make: .....Alfa Laval
  Capacity: ..... 250m^3/h
Complement
  Officers:..... 8
  Crew:..... 8
  Single/double/other rooms: ..... 4 suites, 12 single room
Navigation and other equipment
  Bridge control system
    Make: .....Caterpillar
    Type: MPC800M
  Is bridge fitted for one-man operation? .....No
  Integrated bridge system: .....No
Radars
  Number: 2
  Make: .....Furuno
  Model(s): FAR-2827/ FAR-2837S
Fire detection system
  Make: .....Consilium
  Type: ..... Salwico Cargo
Fire extinguishing systems
  Cargo holds:
    Make/Type: .....High pressure CO_2, NK
  Engine room:
    Make/Type: .....High pressure CO_2, NK
  Vehicle spaces:
    Make/Type:.....High pressure CO_2, NK
  Cabins: .....Portable
  Public spaces: .....Portable
Waste disposal plant
  Waste shredder/crusher:
    Make: .....Samjoo Eng
    Model: 510A-MC
  Sewage plant
    Make: Wärtsilä ..... Model: STC01-13
Efficiency
  Attained EEDI value: ..... 13.2 g-CO2/t mile
  Required EEDI value: ..... 16.38 g-CO2/t mile
Other installed monitoring tools: ..... ADCP
Energy Saving Technologies*: .. LNG fuel ready

Contract date: .....24 November 2016
Launch/float-out date: .....30 July 2018
Delivery date: .....January 2019

OLEANDER



ORANGE STREAM: Reefer

Shipbuilder: ..**Guangxin Shipbuilding & Heavy Industries Co., Ltd.**
Vessel's name: .....***Orange Stream***
Owner/Operator:.....**Seatrade**
Country: .....**Netherlands**
Designer: .....**Seatrade/GSHI/GSD**
Country: .....**Netherlands/China/Norway**
Model test establishment used: .....**Maritime Research Institute Netherlands (MARIN)**
Flag: .....**Netherlands Antilles**
IMO number: **9795983**
Total number of sister ships already completed (excluding ship presented): **3**
Total number of sister ships still on order: ..... **nil**

Orange Spirit, the first in a four ship series of new reefer vessels, was delivered in December 2018 but too late to appear in last year's Significant Ships. With three sisters; *Orange Sea, Orange Stream* and *Orange Strait* being delivered in January, March, and April respectively, this class deserves its place in this issue.

The 7,738dwt vessels were built at Guangxin Shipbuilding & Heavy Industry to a design by Groot Ship Design in the Netherlands. They have been designed secifically for the transport of frozen fish and cooled citrus fruits, with the former being loaded at sea in ship-to-ship operations.

The ships each have two different hold refrigeration systems, one using ammonia and the other brine. The four cargo holds with a total 323,318ft^3 capacity are fully equipped with aluminium gratings and the cooler rooms are no longer situated in the cargo holds, allowing cooler defrost operations to be separated from the cargo.

In addition, there are 52 reefer points for containers on deck although the ship can accommodate 65 2.89m FEU reefer boxes on deck. Cargo handling is done by four sets of derricks with a SWL of 7tonnes which can be operated in union purchase mode. There is battery operated trolley system, which operates on either side of the main deck for transferring cargo to the holds.

A Yichang-built MAN B&W 5S35ME-B9.5 main engine of 3,325kW at SMCR driving a 4.6m propeller give the ships a 14.5knots service speed.

TECHNICAL PARTICULARS

Length oa: 115.1m
Length bp: 109.5m
Breadth moulded: 18.0m
Depth moulded
to main deck: 10.3m
Width of double skin
bottom: 1.25m
Draught
scantling: 7.83m
design: 6.3m
Gross: 6,088gt
Deadweight
scantling: ..... 7,738 at 7.83m
Block co-efficient (please state relevant draught): 0.79
Speed, service (--%MCR output): .....at NCR: 14.3knots
Cargo capacity (m^3)
Refrigerated storage: 323,318cbft
Bunkers (m^3)
Heavy oil: 757
Diesel oil: 96
Water ballast (m^3): 1,071
Daily fuel consumption (tonnes/day)
Main engine only: 13.2
Auxiliaries: .....2 to 10t/day

Classification society: .....Bureau Veritas
Class Notation: .....BV + HULL + MACH, + AUT-UMS, + SYS-NEQ-1,+ REF-Cargo, + REFCONT (E), Refrigerated cargo ship - equipped for the carriage of containers. Unrestricted navigation, MON-SHAFT, GREEN PASSPORT, BWT, CLEANSHIP, SEEMP, INWATERSURVEY, ICE

Propulsion
Main engine(s)
Design: ..... MAN
Model: .....MAN B&W 5S35ME-B9.5
Manufacturer: .....Yichang Marine Diesel Engine Co., Ltd
Number: YB648
Type of fuel: .....HFO/MDO/MGO
Output of each engine: ..... 3.325kW at SMCR
Is this a diesel-electric or hybrid?:.....No

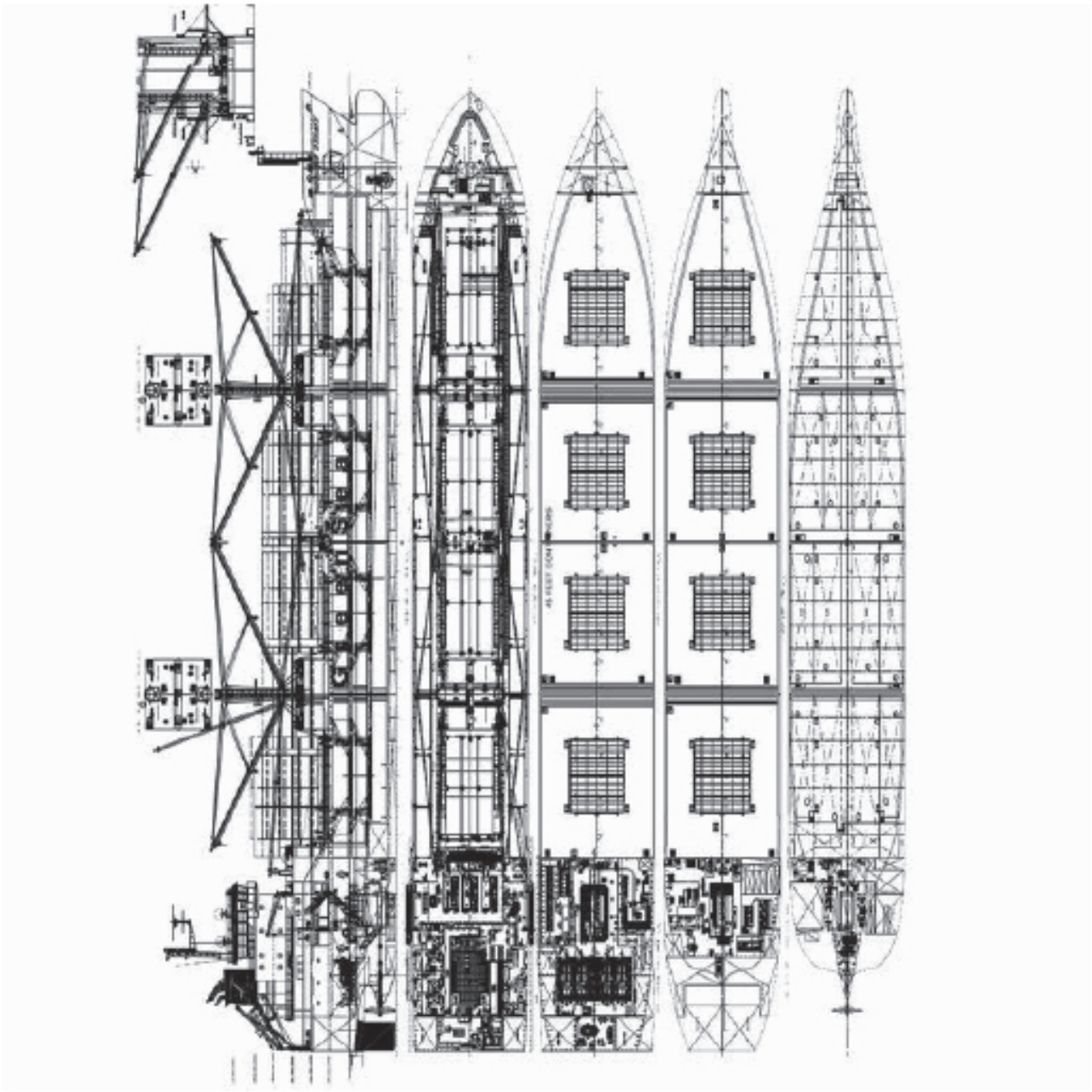
Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer: ..... Wärtsilä-CME Zhenjiang Propeller Co., Ltd.
Fixed/Controllable pitch: .....Fixed
Diameter: 4.6m
Speed: .....127rpm (MCR)
Special adaptations: .....Propeller Boss Cap Fins (PBCF)

Diesel-driven alternators
Number: 4
Engine make/type: Yanmar/6EY22LW
Type of fuel: .....HFO/MDO/MGO
Alternator make/type: .....Hyundai HFJ7
Output/speed of each set: .....837.5kVA at 720rpm

Boilers
Number: .....2 - thermal oil heater and economiser
Type: ..... HTF 800V and HTX5-26-1588-DF
Make: .....Heatmaster
Output, each boiler: .....800kW and 275kW
Stern appendages/special rudders: ..... Propeller Boss Cap Fins and asymmetric rudder blade
Bow thruster(s)
Make: .....Kawasaki
Number: 1
Output (each): 111kN

Deck machinery
Cargo cranes/cargo gear
Number: 4
Make: ..... DH Marine
Type: ..... Derricks
Performance: . SWL 7mt, 18m hoist speed 32m/min
Other cranes: .....ER crane, bunker station cranes, provision crane
Mooring equipment
Number: 6
Make: .....MacGregor/Hatlapa
Type: .....Electric
Special lifesaving equipment
Number of each and capacity: .....1x free-fall lifeboat (26 Persons)
Make: ..... Fassmer-Marland Ltd.
Type: CFL-C66E
Hatch covers
Design: .....TTS
Manufacturer: .....TTS
Type (upper deck/other decks): ....Single pull
Containers
Lengths: .....TEU, FEU, 45ft
Heights: ..... 8'6" and 9'6"
Total FEU capacity: ..... 65 9'6" FEU
On deck: ..... 65 9'6" FEU
In holds: 0
Reefer plugs: 52
Tiers/rows (maximum)
On deck: 52
In holds: 0
Hold refrigeration system: .....Primary-Ammonia (NH3), Secondary-Brine (CaCl2)
Ballast water treatment system
Make: .....Alfa Laval
Capacity: .....250m^3/hour
Complement
Officers:..... 7
Crew: 7
Supernumaries/Spare: 2
Suez/Repair Crew: 6
Single/double/other rooms: .....All officers/ crew single rooms
Navigation and other equipment
Bridge control system
Make: ..... Wärtsilä-SAM
Type: ..... Platinum
Is bridge fitted for one-man operation? ... Yes
Integrated bridge system: ..... Yes
If yes, make: ..... Wärtsilä-SAM
Model: ..... Platinum
Radars
Number: 2
Make: ..... Wärtsilä-SAM
Model(s): .X-Band GR3050, S-Band GR3051
Fire detection system
Make: .....Consilium
Type: ..... Optical smoke detector system
Fire extinguishing systems
Cargo holds:
Make/Type: ..... CO_2 system, TYCO
Engine room:
Make/Type: ..... CO_2 system, TYCO
Waste disposal plant
Waste compactor
Make: ..... Delitek
Model: DT-200MCP
Sewage plant
Make: ..... DVZ
Model: ..... DVZ-EPS-20 BIOMASTER
Efficiency
Attained EEDI value: .. 15.1 gCO_2/ tonne-mile
Required EEDI value: .. 23.5 gCO_2/tonne-mile
Installed Fuel Meters: ..... Volume
Other installed monitoring tools: .....Torque, two independent performance monitoring systemss onboard version, trim, draughts
Energy Saving Technologies*: ..... Hullform optimisation (multiple draughts and speeds), propeller design with boss cap and twisted rudder, weather routing software, optimum speed advise for ETA, trim/draft optimisation, silicone-based antifouling coating, LED navigation lights, VFD for main pumps,
Performance Monitoring Regime: .. high frequency data and noon reporting, performance monitoring systems ashore
Contract date: .....19 October 2015
Launch/float-out date: .....2 July 2018
Delivery date: ..... 19 March 2019

ORANGE STREAM



PRISM AGILITY: LNG carrier

Shipbuilder: ..... **Hyundai Heavy Industries**
Vessel's name: ..... ***Prism Agility***
Hull No: **2937**
Owner/Operator: ..... **SK Shipping**
Country: ..... **Republic of Korea**
Designer: ..... **Hyundai Heavy Industries**
Country: ..... **Republic of Korea**
Model test establishment used: ..... **Hyundai Maritime Research Institute (HMRI)**
Flag: ..... **Panama**
IMO number: **9810549**
Total number of sister ships already completed (excluding ship presented): **2**
Total number of sister ships still on order: **1**

Prism Agility is the first of shipbuilder Hyundai Heavy Industries' 180k class LNG carriers to be completed. The 299m long and 48m wide vessel was delivered to South Korean owner and operator SK Shipping in May and is intended for transporting shale gas from the US to South Korea beginning in 2020. SK Shipping is part of a group which is also a privately owned energy supplier in Korea.

SK Shipping has taken delivery of two of the type and has another on order. In addition to these three vessels, a further three have been contracted by Knutsen and two others by Dynacom. The order from SK E&S for the carriers was made in 2016, which was a noticeably poor period for LNG carrier orders with only seven new ships being placed that year.

Currently, almost 30 Korean flag LNG carriers are carrying LNG imported by Korea Gas Corporation (KOGAS). At the time of the vessel's delivery, SK E&S said that its LNG fleet, which includes *Prism Agility* and its sister *Prism Brilliance*, are the first in Korea to transport LNG imported directly by a private company.

The 180,000m^3 gas capacity of the vessel is higher than most of the large LNG carriers in operation and the ship's dimensions allow it to transit the new Panama locks. The cargo containment system is a GTT Mark III Flex type comprising four tanks and cargo handling is by two Shinko pumps per tank.

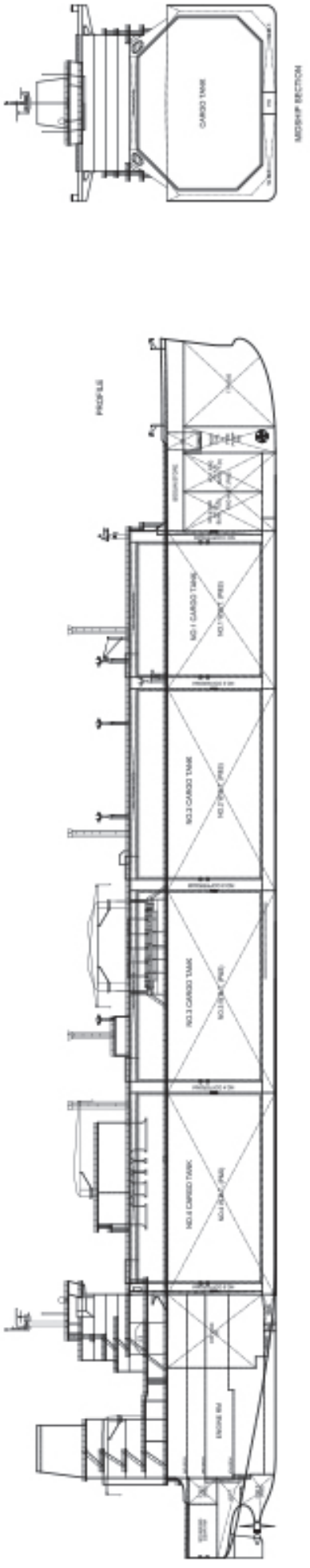
As with many large LNG carriers, the ship has a twin skeg design and is powered by a pair of WinGD 5X72DF engines producing 12,959kW at 72rpm. The twin 8.7m fixed pitch propellers allow for a service speed of 19.5knots. Auxiliary engines are Himsen 35DF types – two each of the eight and six cylinder variants.

TECHNICAL PARTICULARS

Length oa:..... 298.97m
Length bp:..... 293.6m
Breadth moulded: 48m
Depth moulded
to main deck: 26.4m
to upper deck: 26.4m
to other decks: .....35.5m to trunk deck
Width of double skin
side:..... 2.677m
bottom: 3.2m
Draught
scantling: 12.5m
design:..... 11.5m
Deadweight
design: 97,494t
scantling: 85,660t
Speed, service (-- %MCR output):.....19.5knots
Cargo capacity (m^3)
Liquid volume: 180,000
Bunkers (m^3)
Heavy oil: 4,390
Diesel oil: 1,160
Water ballast (m^3): 67,990
Daily fuel consumption (tonnes/day)
Main engine only: 91.2
Auxiliaries: 6.7
Classification society and notations: ..... <KR> +KRS1 – Liquefied Gas Carrier, 2G 3M(R)/0.35 bar, -163ºC, 0.5SG(IGC), SeaTrust(DSA1, FSA2, HCM), IWS, ERS, PSPC, IHM, CLEAN1, CHA, LI, EEAS-SCR, +KRM1 – UMA, STCM, PMS, NBS2, EEAS-SCR, DFDE, GCU, IGS, BWT <ABS>: ..... +A1(E), Liquefied Gas Carrier, Ship Type, 2G, Methane (LNG) in membrane tanks, maximum vapour pressure 0.35bar g, minimum cargo temperature minus 163°C, Specific Gravity 0.5 kg/m^3, RW, SHCM, SH, FL(40), +AMS, +ACCU, ENVIRO, IHM, BWT, CPS, UWILD, POT, RRDA, TCM, CRC, NIBS, DFD, GCU, PMP, PORT, EGC-SCR
Main engine(s)
Design: ..... WinGD
Model: 5X72DF
Manufacturer: .....Hyundai Heavy Industries (engine & machinery division)
Number: 2
Type of fuel : ..... HFO or MDO or Gas
Output of each engine: 12,949kW
Propeller(s)
Material: ..... Ni-Al-Bronze
Designer/Manufacturer: ..... Hyundai Heavy Industries (engine & machinery division)
Number: 2
Fixed/Controllable pitch: .....Fixed
Diameter: 8.7m
Speed: 71.5rpm
Special adaptations: ..... Hyundai end-plated cap fin
Diesel-driven alternators
Number: ..... 4 (8H35DF x 2 sets + 6H35DF x 2 sets)
Engine make/type: .....Hyundai HiMSEN 8H35DF, 6H35DF
Type of fuel : ..... HFO or MDO or Gas
Output/speed of each set: 3,840kW (8H35DF), 2,880kW (6H35DF)
Alternator make/type: ...Hyundai/HSJ9 809-10P x 2sets, HSJ9 805-10P x 2sets
Output/speed of each set: .....4,600kVA x 2sets, 3,450kVA
Boilers
Number: 2
Type: .....Oil-fired marine boiler
Make: .....Alfa Laval
Output, each boiler: 7,500kg/h
Cargo cranes/cargo gear: . Hose handling crane
Number: 2
Make: .....Oriental Precision
Type: .....Electro-hydraulic type
Performance: .....5t SWL
Other cranes
Number: 2
Make: .....Oriental Precision
Type: .....Electro-hydraulic type
Tasks: .....Provision crane
Performance: ..... SWL 10t (Port)/ 10t (Stbd)
Mooring equipment
Number: ..... 2 windlass, 8 mooring winch
Make: .....Flutek
Type: .....Electric type
Special lifesaving equipment
Number of each and capacity: ..2x 50 person each
Make: .....HLB (Hyundai Lifeboat)
Type: ..... Conventional
Cargo tanks
Number: 4
Cargo pumps
Number: .....8 sets (2 sets per tank)
Type: .....Vertical centrifugal, submerged
Make: ..... Shinko
Stainless steel: ..... N/A (Pump casing: AL alloy casting, impeller: AL alloy casting, shaft: 9% nickel steel)
Capacity (each): .....1,750m^3 at 165mlc
Cargo control system
Make: .....Yokogawa
Type: .....Centum VP
Ballast control system
Make: .....Yokogawa
Type: .....Centum VP
Water ballast Treatment System
Make: ..... Hi-ballast
Capacity: ..... 6,000m^3/h
Complement
Officers: 23
Crew: 17
Suez/Repair Crew: ...1 cabin for 6 Suez crew
Bow thruster(s)
Make: .....Kawasaki
Number: 1
Output (each): 2,500kW
Bridge control system
Make: ..... Nabtesco
Type: M-800-V
Is bridge fitted for one-man operation? ..... Yes

Fire detection system
Make: .....Consilium
Type: .....Salwico
Fire extinguishing systems
Cargo tank deck:
Make/Type: .....NK / Dry powder system
Engine room:
Make/Type: .....NK / High expansion foam
Cabins:
Make/Type: .....ILJIN / Sea water spray
Other space
Make/Type: .....Fain / Loose fire fighting
Radars
Number: 3sets (X-band radar x 2sets, S-band radar x 1set)
Make: ..... JRC
Model(s) : ..... JRM-9282-S, JRM-9225-6X x 2sets
Integrated bridge system: ..... Yes
If yes, make: ..... JRC
Model: JAN-9201
Waste disposal plant
Incinerator
Make: ..... HMMCO
Model: ..... MAXI NG 100SL WS
Sewage plant
Make: .....Jonghap
Model: ..... AEROB-25N(A)
Contract date: .....27 May 2016
Launch/float-out date: .....22 June 2018
Delivery date: .....10 May 2019

PRISM AGILITY



SAGA DAWN: LNG carrier

Shipbuilder: **China Merchants Heavy Industry Co. Ltd, Jiangsu**
Vessel's name: ..... ***Saga Dawn***
Owner/Operator: .**Saga LNG Shipping Pte. Ltd**
Country: .....**Singapore**
Designer: ..... **LNT Marine Pte. Ltd. in corporation with FKAB**
Country: .....**Singapore / Norway**
Flag:.....**Singapore**
IMO number: **9769855**
Total number of sister ships already completed (excluding ship presented): .....**Nil**

Saga Dawn is a significant ship on a number of levels. The 45,000m^3 LNG carrier is the first (and currently the only) vessel in Singapore-based operator Saga LNG's fleet, it is the first ship to feature the innovative LNT A-BOX gas containment system and the first ever LNG carrier built at the Haimen yard of China Merchants Heavy Industry. Saga LNG has ambitions to build a mixed fleet of LNG related vessels.

The ship was designed by Sweden's FKAB in conjunction with LNT Marine, the developer of the unique containment system. The LNT A-BOX system consists of a self-supporting prismatic IMO independent type A tank that is placed in an insulated cargo hold with a full secondary barrier. The tanks can be prefabricated and merely lifted into the hold of the vessel. The system is intended to allow new yards to enter the LNG carrier construction segment and simplify the construction of smaller sized vessels.

The vessel has dimensions of 195.3m in length and 30m beam with a draught of 10.3m. Its deadweight is 31,711tonnes. The ship features several systems from Wärtsilä including the main and auxiliary engines as well as the cargo and fuel handling plants. *Saga Dawn*'s cargo section is divided into three tanks of 0.6t/m^3 design density with 0.4 bar maximum allowable relief valve setting.

The main engine is a single 12V50DF engine, rated at 11,700kW and running at 514rpm. Transmission is through a reduction gearbox to a controllable pitch propeller. Service speed is 16.5knots. There are two Wärtsilä L20DF type auxiliary engines: a six-cylinder variant and an eight-cylinder model. Between them they produce 2,500kW. The main engine features a 1,200kW permanent magnet shaft generator supplied by The Switch, which can act in reverse as a take home device.

TECHNICAL PARTICULARS

Length oa: 195,3m
Length bp: 184,8m
Breadth moulded: 30,0m
Depth moulded
to main deck: 20,0m
Width of double skin
side: 1.5m
bottom: 1.7m
Draught
scantling: 10.3m
design: 9.0m
Gross: 32,158gt
Displacement: 45,958t
Lightweight: 14,246t
Deadweight: 31,711t
Block co-efficient ..... : 0.785 at 10.3m
Speed, service (--%MCR output): 16.5knots
Cargo capacity: ..... 46,200m^3 (100% LNG)
Bunkers (m^3) Dual Fuel
Diesel oil: ..... 2,785m^3
Water ballast (m^3): ..... 11,257m^3
Daily fuel consumption (tonnes/day)
Main engine only: ..... 32 (LNG at full speed)

Classification society and notations: ..... ABS +A1 Liquefied Gas Carrier with Independent tanks, SH-DLA, SFA(25),SH,SHCM,+AMS, +ACCU, NIBS, DFD, GCU, ENVIRO+, GP,POT,RRDA,BWT, TCM, UWILD.
Heel control equipment: .....No
Roll-stabilisation equipment: .....No
Propulsion
Design: ..... Dual fuel
Model: W12V50DF
Manufacturer: ..... Wärtsilä
Number: 1
Type of fuel: .....LNG and MDO
Output of each engine: .11,700kW at 514rpm
Is this a diesel-electric or hybrid?: .....No

Gearbox(es)
Make: ..... Wärtsilä
Model: SCV132-SD70
Number: 1
Output speed: 105rpm
Propeller(s)
Material: .....Cu-Ni-Al
Designer/Manufacturer: ..... Wärtsilä 4E1540
Number: 1
Fixed/Controllable pitch: ..... Controllable
Diameter: 6.5m
Speed: 16.5knots

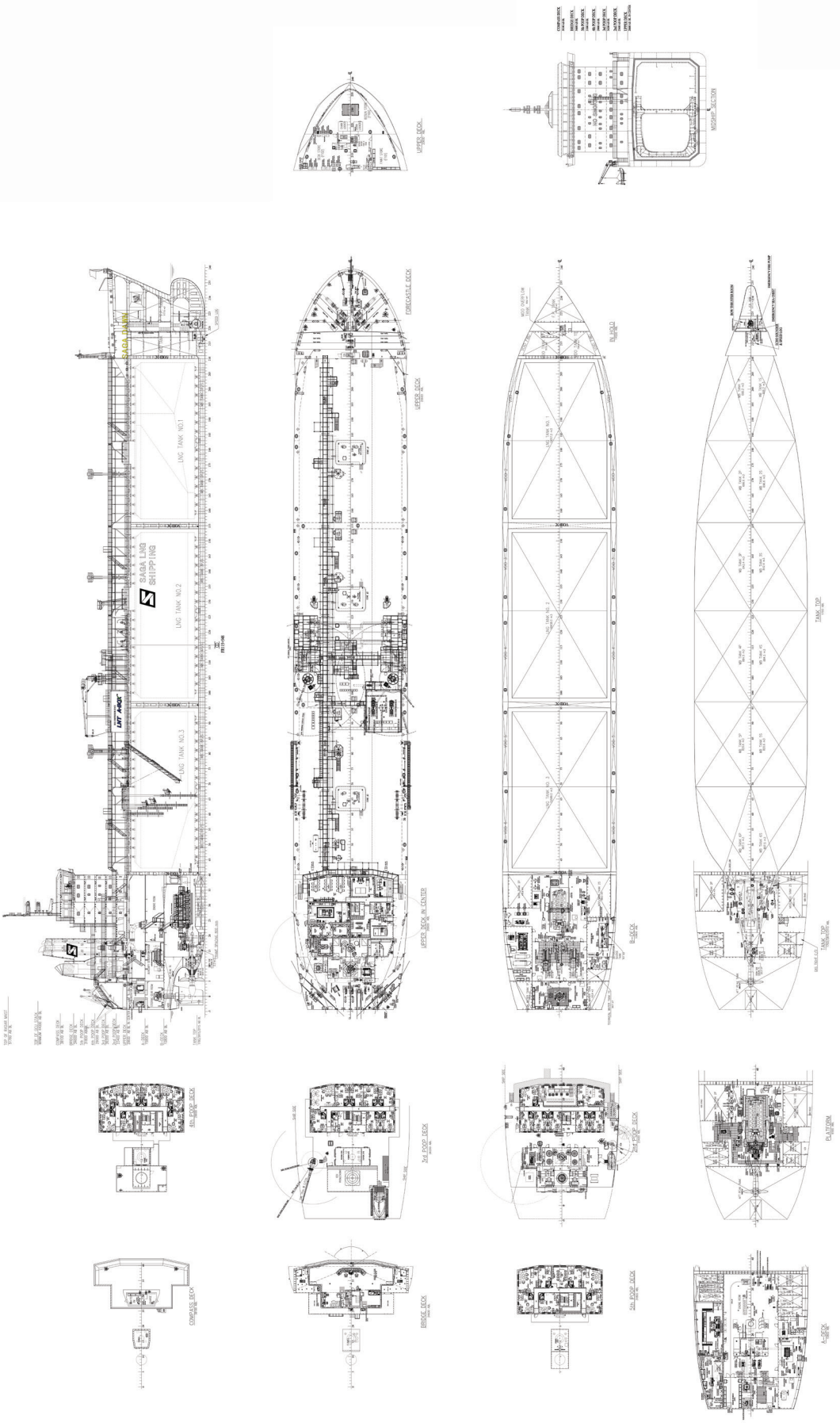
Main-engine driven alternators
Number: 1
Make/type: .....The Switch, PMM0500H shaft generator (take me home device)
Output/speed of each set: 1,200kW
Diesel-driven alternators
Number: 2
Engine make/type: .....Wärtsilä 8L20DF and 6L20DF
Type of fuel (eg, HFO or MDO): ..... Dual fuel
Alternator make/type: ..... Wärtsilä
Output/speed of each set: ..... 1,480kW+ 1,110kW
Boilers
Number: 1
Type: .....Thermal oil
Make: .....Alfa Laval
Output, each boiler: 1,000kW
Stern appendages/special rudders: ..... Wärtsilä, Becker type rudder
Bow thruster(s)
Make: .....Wärtsilä – FT225M
Number: 1
Output (each): 1,200kW/891rpm
Other cranes
Number: ..... 2 manifold cranes
Make: .....Shanghai Hengyuan Marine Equipment
Type: .....5T15M Hydraulic Slewing Crane
Mooring equipment
Number: .....2 comb. anchor-double drum, 4 double drum mooring winches, 1 triple drum winch
Make: ..... MacGregor
Type: .....Electric
Special lifesaving equipment
Number of each and capacity: ..... 1 free-fall, 25 persons
Make: .....Jiangyin Neptune
Type: NPT67FF
Cargo tanks
Number: ..... 3, independent type A, LNT A-Box design.
Grades of cargo carried: .....LNG
Product range: .....LNG and ethane
Stainless steel – structure/piping: ....All tanks and cargo handling pipes are stainless steel.
Cargo pumps
Number: 6
Type: .....Deepwell
Make: ..... Svanhoy
Stainless steel: ..... Yes
Capacity (each): ..... 535m^3/h
Cargo control system
Make: ..... Kongsberg Maritime
Type: ..... K-Chief 700
Ballast control system
Make: ..... Kongsberg Maritime
Type: ..... K-Chief 700
Ballast water treatment system
Make: ....Qingdao Headway Technology Co., Ocean Guard BWT
Capacity: .....800m^3/h at 2,5bar
Complement
Officers:..... 10
Crew: 12
Navigation and other equipment
Bridge control system
Make: ..... Kongsberg Maritime AS
Type: .....K-Bridge BAM
Integrated bridge system: ..... Yes

Radars
Number: 2
Make: .....Kongsberg
Model(s): ..... S-band and X-band
Fire detection system
Make: ..... Autronica
Type: ..... AutroSafe 4
Fire extinguishing systems
Cargo deck: ..... Water spray and dry powder
Make/Type: .....Unitor
Engine room: .....High expansion foam and local water mist for dedicated rooms.
Make/Type: .....Unitor
Public spaces: ..... Fire water, CO_2 for galley

Waste disposal plant
Incinerator
Make: .....Hansun Marine Incinerator
Model: HSINC-50
Waste shredder/crusher
Make: .....Emerson Electric Co.
Model: 100-2
Sewage plant
Make: ..... Hansun Sewage Treatment Plant
Model: ST-20U
Efficiency
Attained EEDI value: 7.88
Required EEDI value: 14.91
Other installed monitoring tools: .... Speed, shaft power, propeller RPM trim, draughts can all be monitored

Contract date: .....26 October 2015
Launch/float-out date: .....30 November 2017
Delivery date: .....November 2019

SAGA DAWN


SAGA DAWN
SAGA LNG SHIPPING
LNG TANK NO.1
LNG TANK NO.2
LNG TANK NO.3
LIFT 400T
FORECASTLE DECK
UPPER DECK
UPPER DECK IN CENTER
MAIN DECK
TANK TOP
4th FLOOR DECK
3rd FLOOR DECK
2nd FLOOR DECK
1st FLOOR DECK
COMPASS DECK
BRIDGE DECK
A-DECK
B-DECK
MIDSHIP SECTION

SAMNØY: Hybrid double-ended ferry

Shipbuilder: ..... **Tersa Tersanecilik AS**
Vessel's name: ..... ***Samnøy***
Owner/Operator: ..... **Torghatten Nord AS**
Country: ..... **Norway**
Designer: ..... **Multi Maritime AS**
Country: ..... **Norway**
Flag: ..... **Norway**
IMO number: **9825817**
Total number of sister ships already completed (excluding ship presented): **4**
Total number of sister ships still on order: ..... **nil**

As the first of five hybrid double-ended ferries, *Samnøy* and its sister *Huftarøy* were delivered simultaneously to their owner Norwegian ferry operator Torghatten Nord in February, after a voyage from their construction yard at Tersan shipyards in Turkey. A third vessel – *Faerøy* – was delivered from the same yard a month later. Two further vessels *Flatøy* and *Lysøy*, delivered in March and June respectively, were constructed in Norway by Vard Braila.

The fleet of five ferries are to a MM125FD LNG design, are 134m long, 20.7m in beam and can accommodate 180 passenger cars, 18 trailers and 550 passengers. They will be used on the Halhjem-Sandvikvåg route and in outward appearance they are similar to many other double-ended ferries that operate in Norway.

During their voyage from Turkey, the first two ships had the distinction of being the first vessels bunkered with LNG at the Spanish port of Ferrol.

The hybrid propulsion system of each of the vessels incorporates a trio of medium-speed Rolls-Royce Bergen C26:33 L9PG engines of 2,430kW each and a 1,000kWh battery pack from Corvus. The Rolls-Royce engines are of the pure gas type and are not dual-fuel. Two of the engines are located in the forward engine room and one at the aft engine room. The battery room is located just aft of the forward engine room. The batteries can be charged from the engines or alternatively using a fast charging shore supply from hydroelectricity.

Propulsion is provided by two Schottel azimuthing thrusters, one forward and one aft. The thrusters have controllable pitch propellers and run at 224rpm. Previously it was usual to use thrusters to maintain the vessel's position at piers, but for these vessels this not necessary as a vacuum mooring system is installed at all piers served.

TECHNICAL PARTICULARS

Length oa: 134m
Breadth moulded: 20,7m
Depth moulded:
to main deck: 7,15m
Draught
scantling: 5,00m
Speed, service (--%MCR output): 17,5knots
Cargo capacity: .....180 cars + 18 trailers
Bunkers (m^3)
LNG: ..... 175m^3
Diesel oil: ..... 8m^3

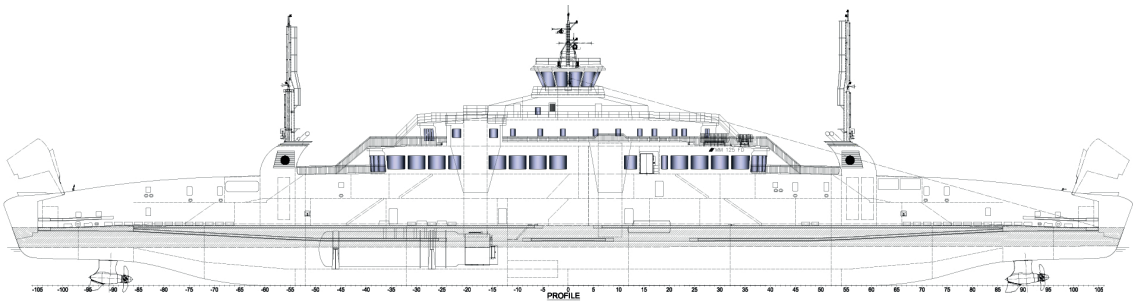
Classification society and notations: .....DNV +1A1, CAR FERRY B, GAS FUELLED, E0, R3 (nor) Battery (propulsion)
% high-tensile steel used in construction: .. 30%
Propulsion
Design: .....Bergen Engines
Model: C26:33L9P
Manufacturer: ... Bergen Engines (Rolls-Royce)
Number: 3
Type of fuel: ..... Pure LNG
Output of each engine: 2,430kW
Is this a diesel-electric or hybrid?: ..... LNG Hybrid
Gearbox(es) : ..... Gearless azimuth thruster
Propeller(s)
Material: GS-CuAl10Fe5Ni5-C
Designer/Manufacturer: ..... Schottel
Number: 2
Fixed/Controllable pitch:..... Controllable
Diameter:..... 3,100mm
Speed:..... 224rpm
Main-engine driven alternators
Number: 2
Make/type: .....Scania DI16 90M
Output/speed of each set: 1,800rpm
Boilers
Number: 1
Type: .....Electric type
Make: ..... Pyro AS
Output, each boiler: 300kW
Stern appendages/special rudders: ..... Steering propeller (Schottel)

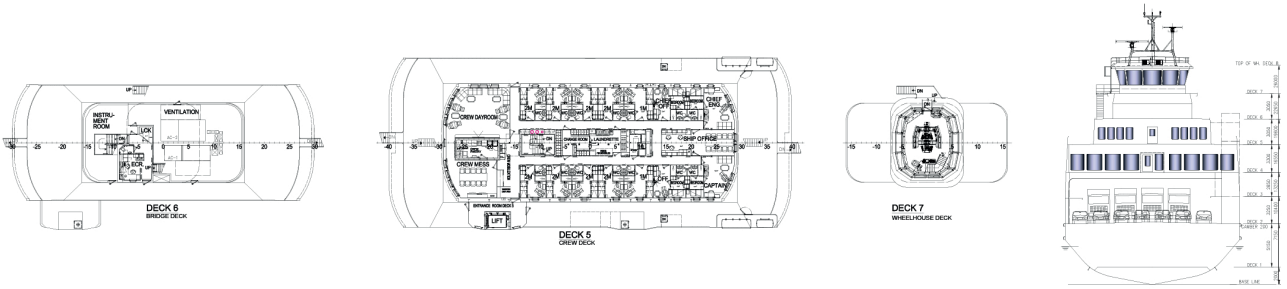
Mooring equipment
Number: 3
Make: .....Adria Vinch
Type (electric/hydraulic/steam): ..... Electric
Special lifesaving equipment
Number of each and capacity: ..... 550 person
Make: ..... Survitec
Type: .....MES
If MES, vertical or sloping chutes?: ... Vertical
Vehicles
Number of vehicle decks (fixed/moveable): ...2
Total cars: .....180 cars + 18 trailers
Doors/ramps/lifts/moveable car decks
Type: .....Bow visor
Designer: .....Multimaritime
Complement
Officers:..... 4
Crew: 16
Passengers
Total: 550
Navigation and other equipment
Bridge control system
Make: .....Furuno
Integrated bridge system: .....No

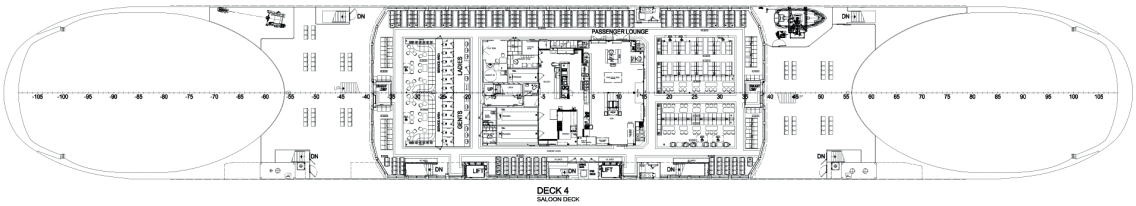
Radars
Number: 2
Make: .....Furuno
Fire detection system
Make: .....Consilium

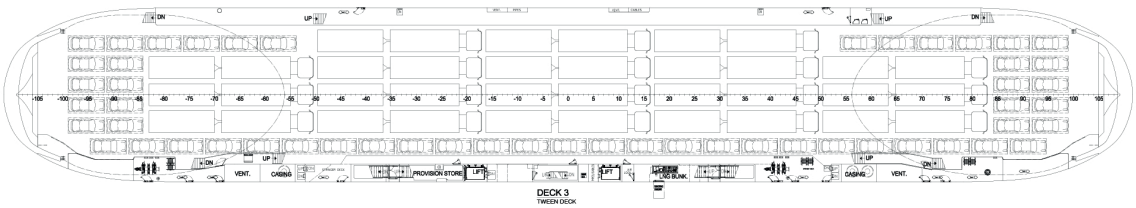
Fire extinguishing systems
Engine room:..... Survitec
Make/Type: .....Fog system
Vehicle spaces: ..... Survitec
Make/Type: .....Fog system
Cabins: ..... Survitec
Make/Type: .....Fog system
Public spaces: ..... Survitec
Make/Type: .....Fog system

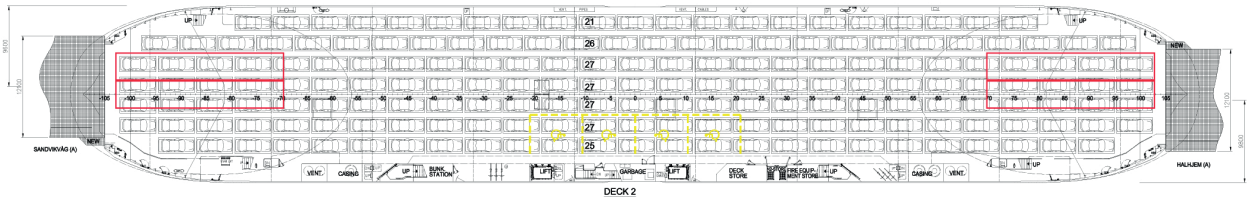
Efficiency
Energy Saving Technologies*: .....Full LED lighting, waste heat recovery, low friction hull paint,VFDs for electric motors, battery installation
Contract date:.....4 January 2017
Launch/float-out date:..... 16 April 2018
Delivery date: .....13 February 2019

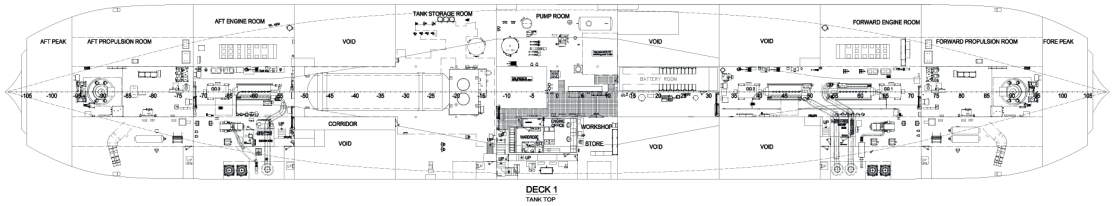

PROFILE


DECK 6
BRIDGE DECK
DECK 5
CREW DECK
DECK 7
WHEELHOUSE DECK


DECK 4
SALOON DECK


DECK 3
TWEEN DECK


DECK 2
MAIN DECK


DECK 1
TANK TOP

SEA GUAIBA: Very large ore carrier

Shipbuilder: ..... **Jiangsu New Times Shipbuilding Company, Ltd.**
Vessel's name: ..... ***Sea Guaiba***
Owner/Operator: .. **POS Maritime JC S.A. / Pan Ocean Shipping**
Country: ..... **Republic of Korea**
Designer: . **Shanghai Merchant Ship Design & Research Institute (SDARI)**
Country: ..... **China**
Model test establishment used: ..... **SINTEF**
Flag: ..... **Panama**
IMO number: **9844069**
Total number of sister ships already completed (excluding ship presented): ..... **nil**
Total number of sister ships still on order: **5**

In response to continued demand from China for iron ore from Brazil, mining giant Vale has contracted for a large number of 325,000dwt ore carriers in recent years, to be operated under time charter. Smaller than the shipper's 400,000dwt Valemax types but more flexible as to ports, these vessels have been dubbed Guaibamax as they are the largest ships that can be accommodated at the Guaiba Island ore terminal in Sepetiba Bay.

The ships have been ordered by several owners and from many different builders in China and South Korea. *Sea Guaiba*, designed by SDARI, is the first of six ships ordered in January 2018 by South Korean shipowner Pan Ocean Shipping at China's New Times Shipbuilding. The vessel was delivered in November. Four further vessels are due in 2020 and the sixth in 2021. New Times is also building two sister ships for SK Shipping. The contract for the Pan Ocean ships was New Times Shipbuilding's first ever VLOC order.

The vessel is 339.9m in length with a 62m beam and draught of 21.4m. There are seven cargo holds and a space forward of the engine room for later installation of an LNG fuel system. It was reported at the time that Vale signed the COA with various owners that the ships should be both scrubber fitted and LNG ready.

The main engine is a MAN B&W 7G80ME-C9.5 rated at 21,000kW at 58rpm, directly connected to a 10.8m fixed pitch propeller. This arrangement allows a speed of 14.8knots. Its attained EEDI is 1.81 which is below the 2.04 required under IMO rules.

TECHNICAL PARTICULARS

Length oa: 339.90m
Length bp: 333.10m
Breadth moulded: 62.00m
Depth moulded
to main deck: 29.50m
Width of double skin
side: 12.46m
bottom: 4.20m

Draught
scantling: 21.40m
Gross: 173,504gt
Displacement: 371,066.7t
Lightweight: 46,761.0t
Deadweight
scantling: 324,305.7t

Block co-efficient (please state relevant draught): ..... 0.8178 at 21.4m
Speed, service: ..... 14.83knots 85% MCR with 15% sea margin
Cargo capacity (m^3)
Bale: ..... 198,120m^3

Bunkers (m^3)
Heavy oil: ..... 7,060m^3
Diesel oil: ..... 590m^3
LNG tank: ..... 11,683m^3
Water ballast (m^3): ..... 214,850m^3

Daily fuel consumption (tonnes/day)
Main engine only: ..... Only fuel oil consumption 66.9t; only gas consumption 54.5t + 3.0t (pilot oil)

Classification society and notations: ..... KR + KRS 1 - Ore Carrier, 'ESP', GRAB [30], SeaTrust(DSA1, FSA3, HCM), IWS, ERS, IHM, CLEAN1, PSPC, BLU, LNG Ready I(SR, ME-C, AE-C, B-C), HMS1 LG, LI. +PSPC, BLU, LNG Ready I(SR, ME-C, AE-C, B-C), HMS1 LG, LI.

% high-tensile steel used in construction: ... 90%

Propulsion
Design: ..... MAN B&W
Model: ..... 7G80ME-C9.5-TII Low Load EGB
Manufacturer:
Number: 1
Type of fuel: ..... HFO MDO MGO
Output of each engine: .... SMCR 21,000kW x 58rpm
Is this a diesel-electric or hybrid?: ..... No
Propeller(s)
Material: ..... Ni-Al-Bronze Cu3
Designer/Manufacturer: ..... SDARI
Number: 1
Fixed/Controllable pitch: ..... Fixed
Diameter: 10.8m
Speed: 8,389.9mm
Diesel-driven alternators
Number: 3
Engine make/type: ..... Yanmar Co., Ltd. / 8EY26LW
Type of fuel: ..... HFO MDO MGO
Alternator make/type: ..... Taiyo Electric Co., Ltd
Output/speed of each set: .. 1,600kW x 720rpm
Number: ..... 1-Auxiliary boiler / 1-Exhaust gas boiler
Type: ..... Water tube, PA0601R20 / smoke tube, EA45013
Make: ..... Kangrim Heavy Industry Co., Ltd.
Output, each boiler: ..... 8,000kg/h / 2,600kg/h
Number: ..... 1-Auxiliary boiler / 1-Exhaust gas boiler
Boilers
Number: ..... 1-Auxiliary boiler / 1-Exhaust gas boiler
Type: ..... Water tube, PA0601R20 / smoke tube, EA45013
Make: ..... Kangrim Heavy Industry Co., Ltd.
Output, each boiler: ..... 8,000kg/h / 2,600kg/h

Stern appendages/special rudders: ..... Semi-balanced rudder
Other cranes
Number: 2
Tasks: ..... Spare hoisting crane
Mooring equipment
Number: 12
Make: ..... Flutek
Type: ..... Hydraulic

Special lifesaving equipment
Number of each and capacity: . One set, 28P
Make: ..... Jiangyinshi Beihai LSA.,Ltd
Type: ..... Free-fall lifeboats

Hatch covers
Design: ..... TTS
Manufacturer: ..... TTS
Type (upper deck/other decks): ..... Side roll one piece upper deck
Ballast control system
Make: ..... Emerson
Ballast water treatment system
Make: ..... SunRui Marine Environment Engineering Co.,Ltd
Capacity: ..... 3,000m³/h.

Complement
Officers: 11
Crew: 13
Supernumaries/Spare: 4
Passengers
Total: 28
Number of cabins: 28
Percentage/number outboard: 0

Navigation and other equipment
Bridge control system
Make: ..... JRC
Is bridge fitted for one-man operation? ..... Yes
Integrated bridge system: ..... No

Radars
Number: 2
Make: ..... JRC
Model(s): NDC-1590

Fire detection system
Make: ..... Consilium
Type: ..... Salwico Cargo
Fire extinguishing systems
Cargo holds: ..... Sea water hydrant
Engine room: ..... High expansion foam / local water mist / sea water hydrant
Make/Type: ..... Johnson Controls International
Cabins: ..... Sea water hydrant
Public spaces: ..... Sea water hydrant

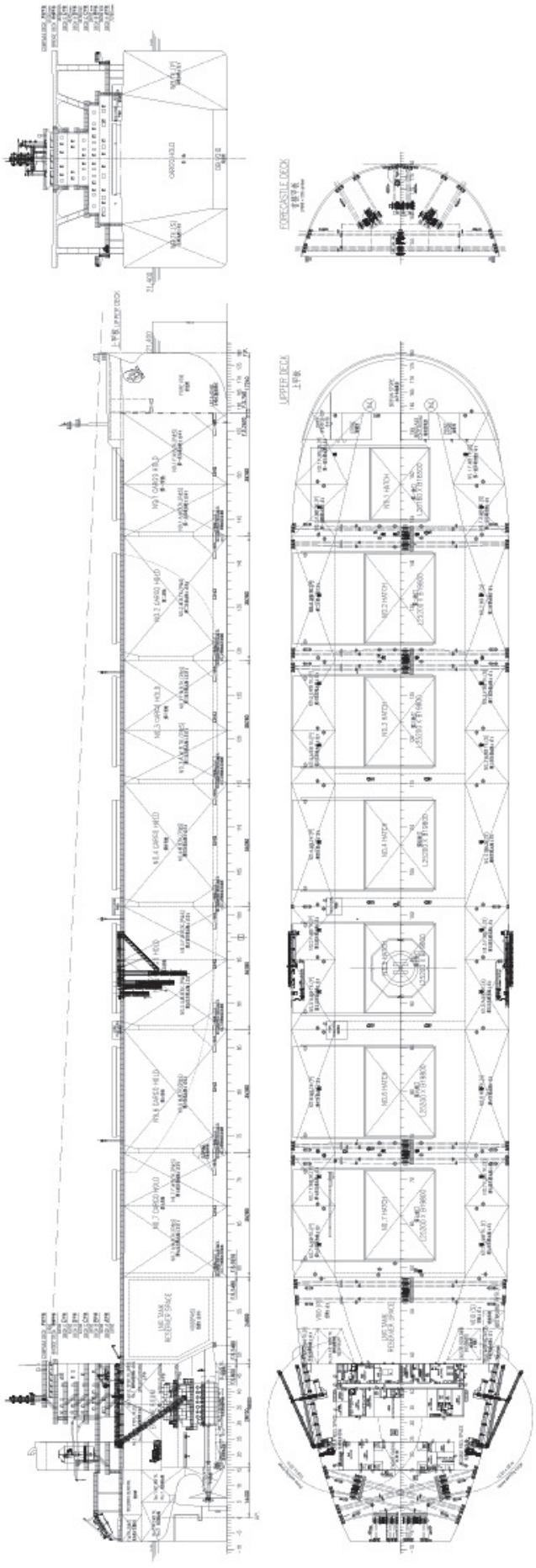
Waste disposal plant
Incinerator
Make: ..... Nanjing Luzhou (Teamtec)
Model: ..... GS 500CS
Sewage plant
Make: ..... IL Seung Co.,Ltd

Efficiency
Attained EEDI value: 1.81
Required EEDI value: 2.04

Installed Fuel Meters: ..... Volume
Energy Saving Technologies*: ..... Pri-swirl duct CMEC-tech

Contract date: ..... 22 January 2018
Launch/float-out date: ..... 4 March 2019
Delivery date: ..... 12 November 2019

SEA GUAIBA



SEATRADE GREEN: Reefer container ship

Shipbuilder: ..... **Yangfan Group Co., Ltd**
Vessel's name: ..... ***Seatrade Green***
Owner/Operator: ..... **Seatrade**
Country: ..... **Netherlands**
Designer: ..... **Seatrade / Yangfan / SDARI**
Country: ..... **Netherlands / China**
Model test establishment used: ..... **HSVA**
Flag: ..... **Liberia**
IMO number: **9810915**
Total number of sister ships already completed (excluding ship presented): ..... **Nil**
Total number of sister ships still on order: ..... **Nil**

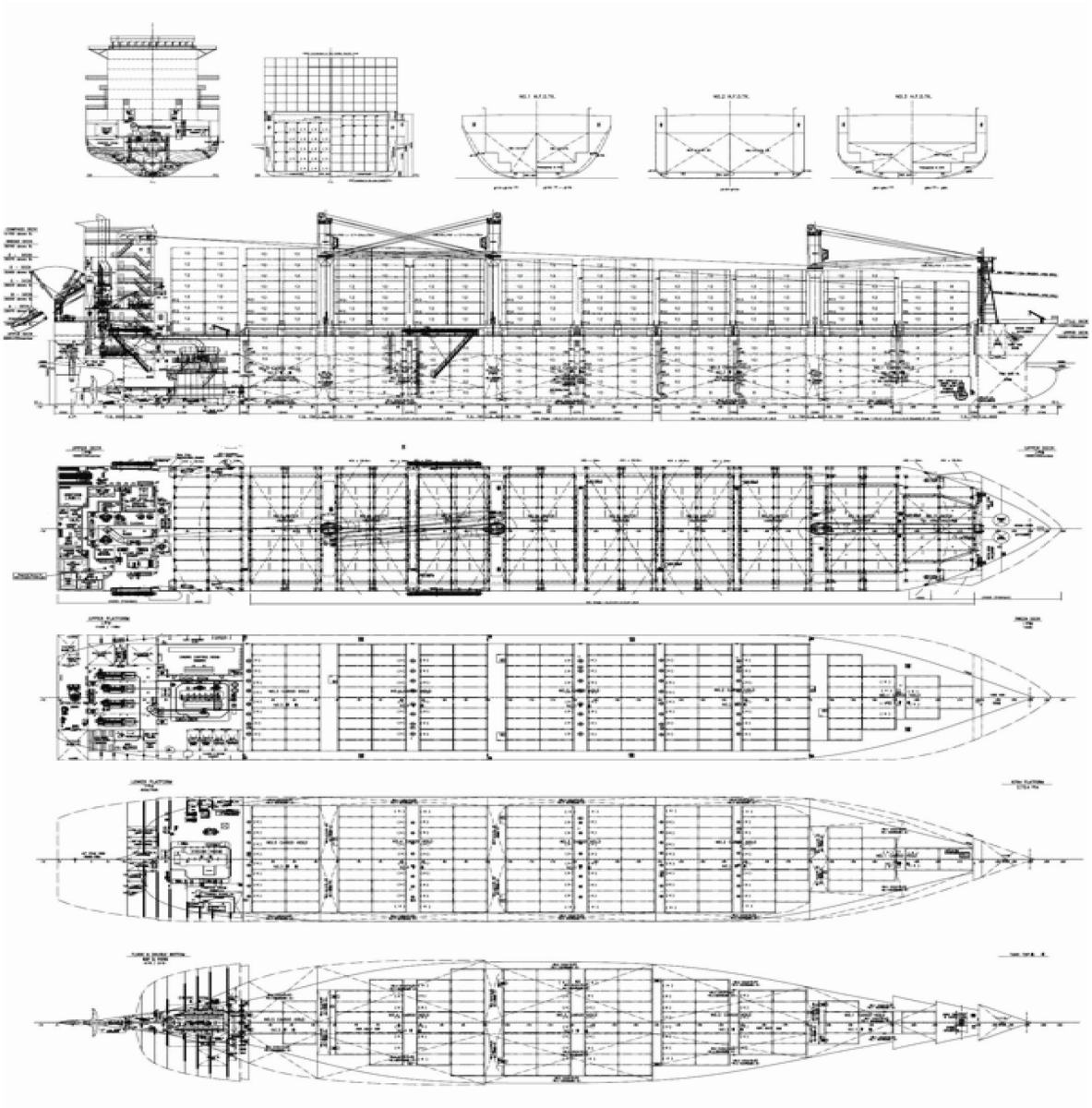
Delivered by China's Yangfang shipyard to Dutch reefer specialist Seatrade in January, *Seatrade Green* is the fifth ship in the owner's Colour Class but has several design departures from the earlier ships. The Colour Class ships are built to the SDARI 2200 Feeder container ship design but specially adapted to trade as full reefer vessels, the first four being delivered in 2016-17. *Seatrade Green* has been modified based on experience gained with those vessels. The hull dimensions remain the same but the forward hull shape optimised above the waterline to decrease air resistance and improve performance in waves.

The ship has a nominal container capacity of 2,266TEU split 1,378TEU under deck and 888TEU on deck. Since reefer boxes are usually 40ft long, it is normal to speak in terms of FEUs. The overall capacity of *Seatrade Green* is similar to the earlier four ships, but the number of reefer plugs has increased from 674 to 776.

Removing the heat produced by the refrigeration units is done by way of a water-cooling system for the reefer containers located inside the cargo holds. The sea and freshwater pumps in this system are frequency controlled to permit energy usage to be matched to actual number of reefer boxes. The main switch board is prepared for future high voltage shore connection transformers and for a portable control atmosphere/nitrogen generator unit.

TECHNICAL PARTICULARS

Length oa: 185.0m
Length bp: 176.0m
Breadth moulded: 30.0m
Depth moulded
to main deck: 16.5m
Width of double skin
side: 2.10m
bottom: 1.58m
Draught
scantling: 10.0m
design: 9.0m
Gross: 24,876gt
Displacement:
scantling: ..... 26,573 at 10.0m
Block co-efficient: ..... 0.69 at 10.0m draught
Speed, service: ..... at CSR: 18.9knots
Cargo capacity (m^3) NT: 8,935
Bunkers (m^3)
Heavy oil: 1,742
Diesel oil: 369
Water ballast (m^3): 11,067
Daily fuel consumption (tonnes/day)
Main engine only: 49.9
Auxiliaries: .....3 to 27 t/day
Classification society and notations:
Classification society: .....Bureau Veritas
Class Notation: .....BV + HULL + MACH, Container Ship, Unrestricted navigation, + AUT-UMS, MON-SHAFT, INWATERSURVEY, BWT, SYS-NEQ-1, LI-HG, CLEANSHIP, CPS(WBT)
% aluminium used in hull/superstructure: ..None
Heel control equipment: ..... Yes
Propulsion
Main engine(s)
Design: ..... MAN
Model: ..... MAN B&W 6G60ME-C9.2
Manufacturer: ..... STX
Number: SB6G60-14519
Type of fuel: .....HFO/MDO/MGO
Output of each engine: ...13.100kW at SMCR
Is this a diesel-electric or hybrid?: .....No
Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer: .....Dalian Huarui HI
Number: 1
Fixed/Controllable pitch: .....Fixed
Diameter: 6.7m
Speed: .....97rpm (MCR)
Diesel-driven alternators
Number: 4
Engine make/type: .....Yanmar 6EY26LW
Type of fuel: .....HFO/MDO/MGO
Alternator make/type: .....Hyundai HFJ7
Outputof each set: .....2,150kVA at 720rpm
Boilers
Type: ... Composite Marine Boiler CMB-VS 1.8 + 0.61/7 and Exhaust Gas Marine Economiser EME-VST 0.7/7
Make: .....SAACKE
Stern appendages/special rudders: .....Propeller hub cap in combination with rudder bulb
Bow thruster(s)
Make: .....Kawasaki
Number: 1
Output (each): 174kN
Deck machinery
Cargo cranes/cargo gear
Number: 3
Make: .....TTS
Type: KS-45t-30m
Performance: .....SWL 45mt, 30m
Other cranes: .....ER crane, bunker station crane, provision and spares monorail
Type: .....Monorail
Tasks: .....For ER
Mooring equipment
Number: 6
Make: .....MacGregor/Hatlapa
Type: ..... Hydraulic
Special lifesaving equipment
Number and capacity: 1x free-fall, 25 persons
Make: ..... Fassmer-Marland Ltd.
Type: CFL-C66E
Hatch covers
Design: ..... MacGregor
Manufacturer: ..... Yangfan Group Co., Ltd
Type (upper deck/other decks): .....Lift-away
Containers
Lengths: .....TEU, FEU
Heights: ..... 8'6" and 9'6"
Cell guides: .....Yes
Total TEU capacity: 2,266TEU
On deck: 888TEU
In holds: 1,378TEU
Homogeneously loaded to 14tonnes: .1,576TEU
Homo 24t (747 9'6"FEU reefer containers + 4TEU reefer containers)
Reefer plugs: 776
Tiers/rows (maximum)
Hold refrigeration system: ..... Water cooling reefer container system for 312 positions.
Ballast water treatment system
Make: .....BSKY
Capacity: .....350m^3/hour
Complement
Officers: 9
Crew: 14
Supernumaries/Spare: 2
Suez/Repair Crew: .....6 persons
Single/double/other rooms: ..... Single rooms
Navigation and other equipment
Bridge control system
Make: ..... Wärtsilä-SAM
Type: ..... Platinum
Is bridge fitted for one-man operation? ..... Yes
Integrated bridge system: ..... Yes
Make: ..... Wärtsilä-SAM
Model: ..... Platinum
Radars
Number: 2
Make: ..... Wärtsilä-SAM
Model(s): .X-Band GR3050, S-Band GR3051
Fire detection system
Make: .....Consilium
Type: ..... Optical smoke detector system
Fire extinguishing systems
Cargo holds: .....CO_2
Make/Type: .....Tyco
Engine room: .....CO_2
Make/Type: .....Tyco
Cabins: .....Fire extinguishers
Public spaces: .....Fire extinguishers
Waste disposal plant
Incinerator
Waste compactor
Make: ..... Delitek
Model: DT-200MCP
Sewage plant
Make: ..... DVZ
Model: ..... DVZ-SKA-30 Biomaster - Plus
Efficiency
Attained EEDI value: ..... 15.9 g CO_2/tonne-mile
Required EEDI value: ... 20.2 g CO_2/tonne-mile
Installed Fuel Meters: ..... Volume
Other installed monitoring tools: ..... Torque, two independent performance monitoring systems - onboard version, trim, draughts
Energy Saving Technologies*: ..... Hull form optimisation (multiple draughts and speeds), exhaust gas economisers on auxiliary engines, weather routing, optimum speed advise for ETA, trim/draught optimisation, water cooling system for reefer containers, LED navigation lights, VFD for main pumps.
Performance Monitoring Regime: ..... High frequency data and noon reporting, performance monitoring systems operating ashore
Contract date: .....15 July 2015
Launch/float-out date: .....12 November 2017
Delivery date: .....15 January 2019



SITC CEBU: Container vessel

Shipbuilder: ..... **Jiangsu New Yangzi Shipbuilding Co., Ltd.**
Vessel's name: ..... ***SITC Cebu***
Owner/Operator: ..... **SITC Shipowning Group Company Ltd**
Country: ..... **China**
Designer: . **Shanghai Merchant Ship Design & Research Institute (SDARI)**
Country: ..... **China**
Model test establishment used: ...**HSVA Hamburg**
Flag: ..... **Hong Kong**
IMO number: **9845726**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: **5**

SITC Cebu is a 2,400TEU container vessel which has been tailor-made for Hong Kong-based, Intra Asian operator SITC International. The vessel was delivered in October 2019 and is the first in a seven ship series designed by SDARI and constructed by Jiangsu New Yangzi Shipbuilding. The second ship in the series – *SITC Batangas* – entered service in November and the third is due for completion in Q1 2020.

The ships is 188.8m in length with a beam of 32.26m. Its hull form features a vertical bow without bulb, which ensures better seakeeping performance and reduces speed loss in rough seas. The efficient propeller and full spade type twisted leading edge rudder with bulb are further design features that make the hull, main engine, propeller and rudder harmonised and optimised to achieve maximum energy efficiency. While regulations call for an EEDI rating of 19.1, the vessel has been assigned a rating well below that of just 12.7 some 17% below Phase III requirements.

SITC Cebu was designed to be suitable for carrying various sizes of dry cargo containers, reefer containers and dangerous cargo containers. Its capacity is nominally 2,433TEU, of which 960 are in holds and 1,473 on deck. At a homogenous 10tonnes, the ship can almost meet the full capacity. At the industry standard 14tonnes homogenous, the ratio exceeds 80% to make 2,076TEU. There are 300 points for reefer containers.

The main engine is a Doosan-built MAN B&W 7S60ME10.5, which produces 13,700kW at 97rpm and allows a service speed of 19knots on a consumption of 33tonnes fuel oil daily. The ship is not fitted with a scrubber so will need to run on compliant 0.5% sulphur fuel.

A Qingdao Headway Technology ballast treatment system with a capacity of 500m^3/h allows compliance with the IMO Ballast Convention requirements.

TECHNICAL PARTICULARS

Length oa: 188.80m
Length bp: 185.4m
Breadth moulded: 32.2m
Depth moulded
to main deck: 17.1m
Width of double skin
side: 2.0m
bottom: 1.65m
Draught
scantling: 11.5m
design: 9.5m
Gross: 26,771gt
Displacement: 45,950t
Lightweight: 10,600t
Deadweight:
scantling: 353,502t
Block co-efficient (please state relevant draught): 0.646
Speed, service: ..... 19.46knots at 85% SMCR
Cargo capacity (m^3)
Bale: 48,300
Bunkers (m^3)
Heavy oil: 1,250
Diesel oil: 200
Water ballast (m^3): 11,000
Daily fuel consumption (tonnes/day)
Main engine only: 44.5

Classification society and notations: ..... DNV GL +1A Container Ship, COAT-PSPC(B), LCS, BIS, E0, Clean, BWM(T), TMON (Oil lubricated), Recyclable, DG(P), RSCS
% high-tensile steel used in construction: 50%
Heel control equipment: ..... Anti-heeling pump
Propulsion
Design: ..... MAN
Model: .....MAN B&W 7S60ME-C10.5,
Manufacturer: .....Doosan
Number: 1
Type of fuel: .....HFO
Output of each engine: .. 13,700kW x 97r/min
Is this a diesel-electric or hybrid?: .....No
Propeller(s)
Material: ..... Ni-Al-Bronze Cu3
Designer/Manufacturer: ..... Shanghai Merchant Ship Design & Research Institute (SDARI)
Number: 1
Fixed/Controllable pitch: .....Fixed
Diameter: 7.4m
Speed: 97r/min
Diesel-driven alternators
Number: 3
Engine make/type: 2 sets 6EY22ALW& 1 set 6EY26ALW
Type of fuel: .....HFO
Output/speed of each set: 1,370kW

Boilers
Number: 1
Type: PC17000001
Make: .....Kangrim
Output, each boiler:.....1,800 x 1,300kg/hr
Stern appendages/special rudders: ...Full-spade twisted leading edge rudder and rudder bulb
Bow thruster(s)
Make: ..... Kawasaki-KWJ
Number: 1
Output (each): 1,100kW
Other cranes
Number: 1
Make: .....Shanghai Hengyuan Marine Equipment Co.,Ltd.
Type: .....Electric motor driven monorail type
Tasks: .....Provision and engine parts handing crane
Performance: .....4t SWL

Mooring equipment
Number: 5
Make: .....Yoowon Industries Ltd.
Type: .....hydraulic

Special lifesaving equipment (eg MES, free-fall lifeboats)
Number of each and capacity: .....Lifeboat x2
Make: ..... Jiangyinshi Beihai LSA Co.,Ltd.
Type: ..... Gravity luffing arm type

Hatch covers
Design: .....TTS HuaHai
Type (upper deck/other decks): .....Pontoon
Containers
Total TEU capacity: 2,433
On deck: 1,473
In holds: 960

Homogeneously loaded to 14t: 2,076
Reefer plugs: 300
Tiers/rows (maximum)
On deck: 13
In holds: 11
Hold refrigeration system: .....Air cooling
Cargo tanks
Number: 5
Grades of cargo carried: Class 1.1-1.6, 1.4S, 2, 3, 4, 5.1, 5.2, 6.1, 8 and 9
Ballast water treatment system
Make: ..... Qingdao Headway Technology Co., Ltd.
Capacity: ..... 500m^3/h
Complement
Officers: 13
Crew: 12
Suez/Repair Crew: 6
Navigation and other equipment
Bridge control system
Make: .....Keiki
Type: PR-8000
Is bridge fitted for one-man operation? .....No

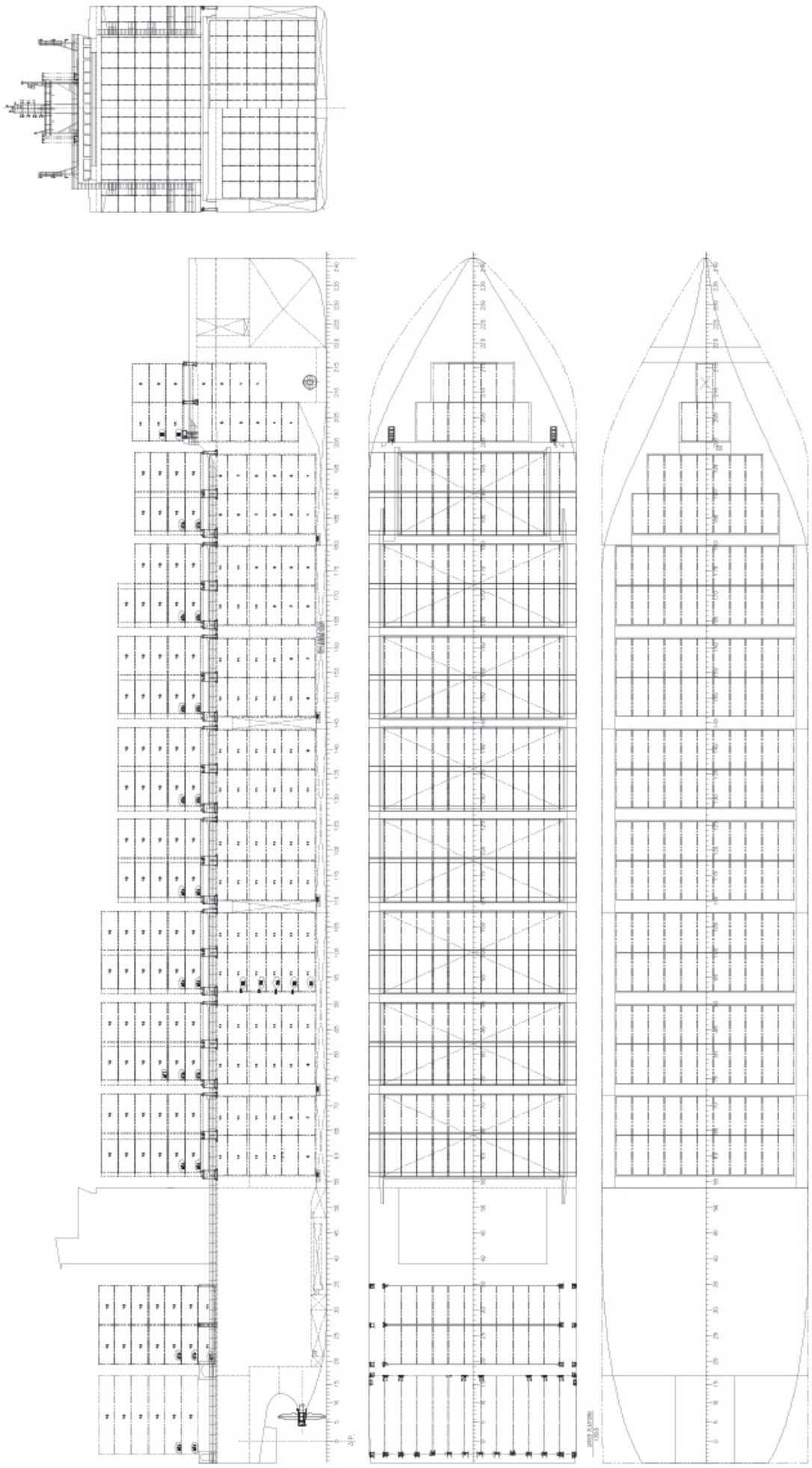
Radars
Number: .....2 sets
Make: .....Furuno
Model(s): XN-24CF, SN-36CF

Fire detection system
Make: .....Tyco
Type: T2000CV
Fire extinguishing systems
Cargo holds: .....CO_2
Make/Type: .....NK Co., Ltd
Engine room: .....CO_2
Make/Type: .....NK Co., Ltd

Efficiency
Attained EEDI value: 12.07
Required EEDI value: 19.10
Installed Fuel Meters: .. Mass flow meter for fuel oil system
Other installed monitoring tools: ....Shaft torque, remote sounding
Energy Saving Technologies*: .....Full-spade twisted leading edge rudder and rudder bulb

Delivery date:.....October 2019

SITC CEBU



SPIRIT OF DISCOVERY: Cruise ship

Shipbuilder: .....**Meyer Werft GmbH**
Vessel's name: .....***Spirit of Discovery***
Owner/Operator: .....**Saga Cruises**
Country: .....**United Kingdom**
Designer: .....**Meyer Werft GmbH**
Country: .....**Germany**
Model test establishment used: .....**Maritime Research Institute Netherlands (MARIN)**
Flag: .....**United Kingdom**
IMO number: **9802683**
Total number of sister ships already completed (excluding ship presented): .....**Nil**
Total number of sister ships still on order: **1**

Built by Meyer Werft in Papenburg, Germany, *Spirit of Discovery* was delivered in May as the first of two sisters and as Saga Cruises new flagship.

The 58,119gt vessel, which can accommodate 999 passengers in 540 cabins, was the only cruise ship built for the British market in 2019. It is described by its owner as featuring the design cues, cuisine and levels of service expected in the world's finest boutique hotels. All cabins are outside and have their own balconies.

Spirit of Discovery has been designed as an expedition cruise ship and has a Finnish-Swedish ice class IC to allow operation in higher latitudes. Its cruise programme for 2020 includes voyages to Greenland, marking a return of this type of cruise after a 10-year absence.

In the spirit of environmentalism, the ship has several energy saving features allowing it to achieve an EEDI rating of 10.158 against a required value of 15.871. The measures include extensive use of variable frequency drives, waste heat recovery and LED lighting, among others. To meet the 2020 SOx rules, the vessel is fitted with a Yara scrubber that will clean the exhaust from the four MAN 32/44 9L engines.

As with most cruise vessels, the power and propulsion system is a diesel-electric arrangement and the combined 21,600kW from the engines covers all power requirements. The propulsors are a pair of 6,500kw Siemens SISHIP eSiPODs of the single propeller type. Siemens also provided the four alternators for the vessel.

TECHNICAL PARTICULARS

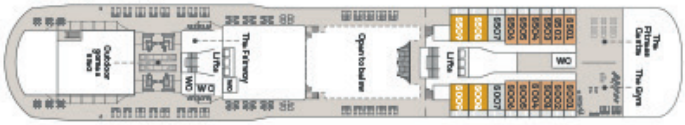
Length oa: 236.71m
Length bp: 210.5m
Breadth moulded: 31.2m
Depth moulded
to main deck: 10.4m
to upper deck: 13.30m
Draught
scantling: 7.6m
design: 7.3m
Gross: 58,119gt
Displacement: 32,850t
Lightweight: 24,978.7t
Block co-efficient: ..... 0.632 @7.3m draught
Speed, service: . 19knots = 3 engines at approx. 80%MCR
Bunkers (m^3)
Heavy oil: 1,482
Diesel oil: 517
Water ballast (m^3): 1,529
Daily fuel consumption (tonnes/day)
Main engines only: .... 38 (calculated average for season)
Classification society and notations: ..... DNV *1A1, passenger ship; LCS-DC, BIS; BWM-T; RPS; NAUT-AW(without certificate); ECO; CLEAN-DESIGN (without certificate)
% high-tensile steel used in construction: 100%
Heel control equipment: .....2 axial flow pumps 500m^3/hr and two pairs heeling tanks 218.76 & 202.6t
Roll-stabilisation equipment: .....1 pair fins SKF S700 16m^2
Propulsion
Main engine(s)
Design: ..... 4 stroke tier III compliant
Model: 32/44 9L
Manufacturer: ..... MAN
Number: 4
Type of fuel: .....HFO & MDO
Output of each engine: 5,400kW
Is this a diesel-electric or hybrid?: .....Diesel electric
Azimuthing pods
Make: ..... Siemens
Model: .....SISHIP eSiPOD 10M
Number: 2
Maximum speed: 117rpm
Output power 6,500kW
Propeller(s)
Material: ..... Cu3 Bronze
Designer/Manufacturer: .....Mecklenburger Metallguss GmbH
Number: 2
Fixed/Controllable pitch: .... Fixed monobloc 5 bladed inward turning over top
Diameter: 5m
Speed: ..... 117rpm at rated speed ahead
Special adaptations: .....DNV GL ice class 1C-free flow design, anti-singing edges applied
Main-engine driven alternators
Number: 4
Make/type: ..... Siemens
Output/speed of each set: 720rpm 5,844kVA, 5,260kWe, 5,400kWm
Exhaust-gas scrubbing equipment
Manufacturer: .....Yara
Type: .....Hybrid
On main engines: ..... Yes
Boilers
Number: 2
Type: ..... Aalborg CHB
Make: .....Alfa Laval
Output, each boiler: 7t/h
Bow thruster(s)
Make: ..... Brunvoll
Number: 2
Output (each): 2,200kW
Mooring equipment
Number: ..... 6 mooring winches (3 on aft mooring deck, 3 on fwd mooring deck)
Make: ..... Rolls-Royce (Kongsberg)
Type: .....Electric (frequency converter type)
Special lifesaving equipment
Number of each and capacity: .....2 marine evacuation system (max 450 pers. Per MES; each MES consisting of 1 x 150 p + 1 x 50 p. life rafts + 2 spare liferafts of 150 p + 2 spare liferafts of 50 p.)
Make: .....Brude / Survitec
Type: ..... Brude MES
If MES, vertical or sloping chutes?: ... Vertical

Ballast water treatment system
Make: ..... Alfa Laval pureballast 3.1 compact
Capacity: ..... 135m^3/h
Complement
Officers: 75
Crew: 468
Supernumaries/Spare: 6
Single/double/other rooms: .....64: 233: 5 (shared facilities)
Passengers
Total: ..... 1,054 max (999 normal)
Number of cabins: 540
Percentage/number outboard: ...100% balcony
Navigation and other equipment
Bridge control system
Make: .....Kongsberg
Type: .....K-Master / K-Bridge
Is bridge fitted for one-man operation? .....No
Integrated bridge system: ..... Yes
If yes, make: .....Kongsberg
Radars
Number: 4
Make: .....Kongsberg
Model(s): ..... 1 x S-band (30kW), 3 x X-band (25kW) ; 1 wave radar
Fire detection system
Make: .....Consilium
Type: .....Salwico
Fire extinguishing systems
Engine room(s):
Make/Type: .....Marioff hifog water mist (total flooding and local protection) & Minimax CO_2 (secondary)
Cabins:
Make/Type: ..... Marioff hifog water mist
Public spaces:
Make/Type: ..... Marioff hifog water mist
Waste disposal plant
Waste handled: .....Black water, accommodation grey, laundry grey, galley grey; food waste; cardboard; plastics; galley oil (partially recycled reminder incinerated), tins, glass (fully recycled) dewatered biowaste; medical waste; sludge oil; oily rags (incinerated)
Incinerator
Make: .....Michalis GmbH & Co .KG
Model: 1,200kW
Sewage plant
Make: ..... Wärtsilä
Model: .....Type III MBR 10 Murkowski and helcom compliant
Efficiency
Attained EEDI value: 10.158
Required EEDI value: 15.871
Installed Fuel Meters: ..... All fuel consuming devices with exception of emergency generator are fitted with Coriolis mass flow meters.
Other installed monitoring tools: .....trim, roll and heel are continuously monitored and recorded against propulsion power consumption.
Energy Saving Technologies*: ..... Waste heat recovery, thermally circulated exhaust gas economisers; VFDs on pumps and fans, RO plant to maximize available waste heat use, oil-free multi compressor HVAC chillers, cascade-cooled deep freeze compressors using CO_2 as refrigerant, LED lighting, silicon-coated vertical sides; fat bottom with hard coat
Performance Monitoring Regime: .....Steam and electrical consumption recorders on all main consumers e.g. galley, laundry & HVAC via the automation system

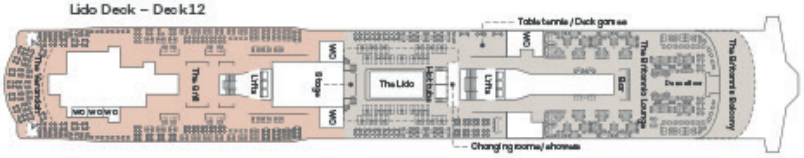
Contract date: .....21 December 2015
Launch/float-out date: .....10 May 2019
Delivery date: .....20 June 2019

Observation Deck – Deck 14

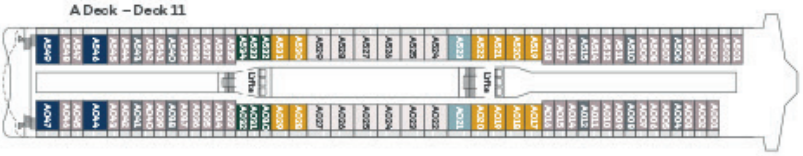
Sun Deck – Deck 13



Lido Deck – Deck 12



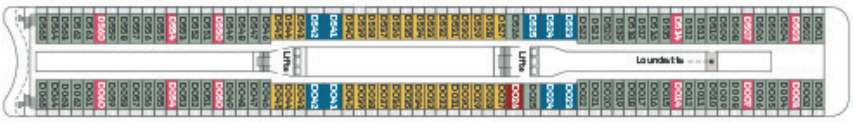
A Deck – Deck 11



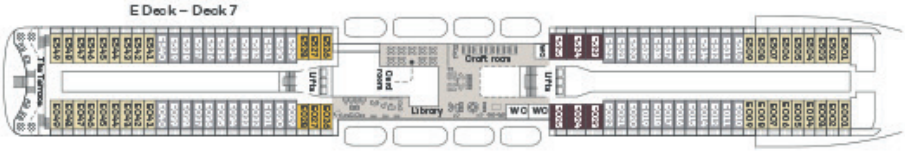
B Deck – Deck 10

C Deck – Deck 9

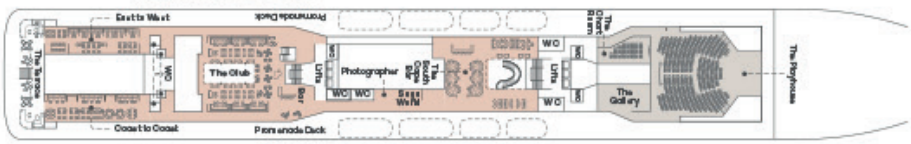
D Deck – Deck 8



E Deck – Deck 7



Promenade Deck – Deck 6



Main Deck – Deck 5

TASMANIAN ACHIEVER II: Ro-ro

Shipbuilder: ..... **NanJing JinLing Shipyard Co., Ltd.**
Vessel's name: ..... ***Tasmanian Achiever II***
Owner/Operator: ..... **Toll Transport Pty Ltd**
Country: ..... **Australia**
Designer: ..... **Sea Highways & NAOS**
Country: ..... **UK & Italy**
Model test establishment used: ..... **HSVA**
Flag: ..... **Australia**
IMO number: **9812468**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: ..... **Nil**

One of a pair of 15,631dwt freight ro-ros, *Tasmanian Achiever II* was completed by the builder Jinling Shipyard at the end of 2018 but entered into service with its owner Toll Transport in early March 2019 when infrastructure upgrades were completed in their ports. The sister, *Victorian Reliance II*, followed soon after. The vessels were designed by Sea Highways Ltd and NAOS Design of Trieste and their construction gave Jinling a re-entry to a familiar market sector which they now lead.

On its delivery, *Tasmanian Achiever II* became the largest commercial vessel under the Australian flag and is also the largest short-sea ro-ro ship in operation in the southern hemisphere. The two ships operate a daily overnight service across the Bass Strait between Melbourne on the Australian mainland and Burnie in Tasmania. Their introduction has increased capacity on the route by 40%.

The ship is tailor made for the trade which requires a high percentage of reefer units. 360 plugs are provided, the largest on any shortsea ro-ro ship. 100t capacity rolltrailers with 4TEU are block stowed in the 7.5m high maindeck, loaded via the 24m wide stern door/ramp. An advanced firefighting system has been specified based on Survitec's X-flow medium pressure water mist system covering the engine rooms, cargo decks and accommodation fully complying with IMO MSC 1/Circ 1430.

The vessels have been designed for future fuel flexibility with a Gas Ready (GR-A) notation. The two main engines are MAN B&W 9S40ME-B9.5 units each with an output of 10,215kW and each driving a 5m diameter controllable pitch propeller at 146rpm. Each shaftline is fitted with a 1,700kW We-Tech permanent magnet shaft generator. A pair of Yara in-line hybrid scrubbers takes care of SOx emissions using MgO rather than NaOH. *Tasmanian Achiever II* is fully EEDI compliant at its 20.5knot service speed (at 90% MCR and 15% sea margin).

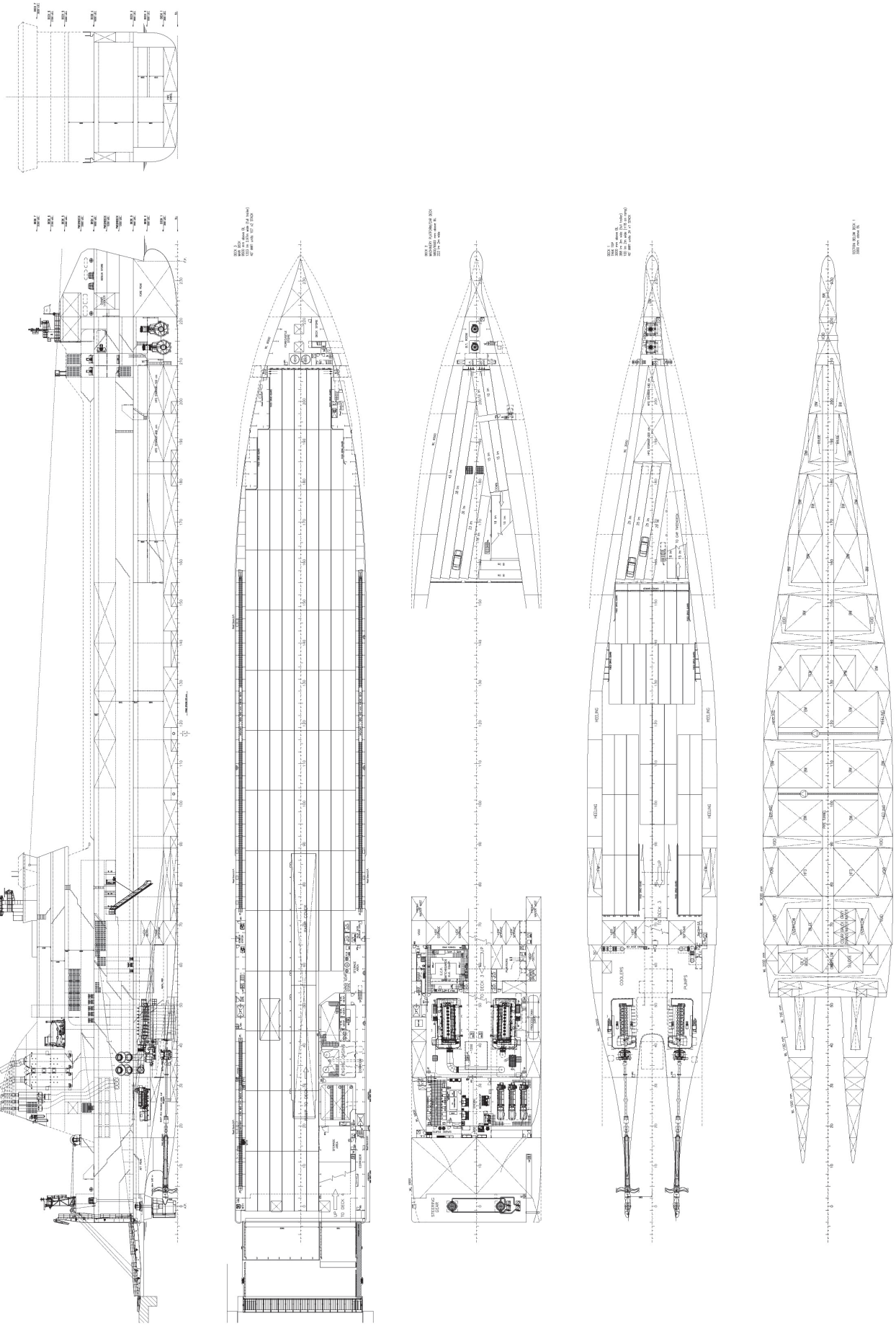
TECHNICAL PARTICULARS

Length oa:..... 210m
Length bp:..... 204.5m
Breadth moulded:.....28m
Depth moulded: 18m
to main deck:..... 9.5m
to upper deck:.....18m
Draught
Max summer:.....7.3m
design:.....6.5m
GT:.....28,709
Deadweight: 15,631.34t
Speed, service:..... 90%MCR output 20.5knots
Bunkers (m^3)
Heavy oil: 1,243.5
Diesel oil:.....68.9
Water ballast (m^3): 8,853.8
Daily fuel consumption (tonnes/day)
Main engine only: 71.4tonnes/day
Auxiliaries: .....without (Normally shaft generators are used)

Classification society and notations: .....LR +100A1, Roll on Roll off Cargo Ship, Ship-Right (SDA, CM, ACS(B)),LI, *IWS, +LMC, UMS, NAV1, IBS, ICC,CAC2 with descriptive notes: ShipRight (BWMP(T)), SCM), GR(A), EDD
Propulsion
Design:..... MAN Energy Solutions
Model: 9S40ME-B9.5
Manufacturer:.....Hyundai Heavy Industries
Number: 2
Type of fuel: .....HFO & MGO
Output of each engine:..... 10,215kW
Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer: .....Kongsberg Maritime AB (Rolls-Royce)
Number: 2
Fixed/Controllable pitch:..... Controllable
Diameter:..... 5,000mm
Speed:..... 146rpm

Main-engine driven alternators
Number: 2
Make/type:..WE-TECH/PMM1780-115-1000M
Output/speed of each set:... 1,780kW/146rpm
Diesel-driven alternators
Number: 3
Engine make/type: ..... MAN 9L21/31
Type of fuel: .....HFO&MGO
Alternator make:..... ABB
Output/speed of each set: ...1,881kW/1,000rpm
Exhaust-gas scrubbing equipment
Manufacturer:.. YARA Marine Technologies AB
Type: .....GTM-R
Boilers
Number: .....2 sets of economiser & 1 set of thermal oil heater
Make: .....Alfa Laval Technologies Co., Ltd
Output, each boiler:.....500kW/1,000kW
Bow thruster(s)
Make: .....Rolls-Royce
Number: 2
Output (each): 2,000kW
Rudders
Make: .....2 x Rolls-Royce high lift with flaps and Promas bulb
Other cranes
Number: 2
Make: ..... Jiangsu Masada Heavy Industry Co.,Ltd
Type: .....hydraulic crane
Tasks:.....lifting provision
Performance:.....3t-7m/3t-14m
Mooring equipment
Number: 7
Make: .....Rolls-Royce
Type: .....electric
Lifesaving equipment
Number of each and capacity:.....2 x 34-person davit-launched lifeboats
Make: ..... Hatecke
Type: GSL5.5C
Vehicles
Number of vehicle decks:..... 3
Total lane length:..... 2,994 or 3,553 (Mafi rolltrailers) and 320m for cars/vehicles
Total freight units (on rolltrailers):..... 714TEU
Doors/ramps/lifts/moveable car decks
Number of each:..... 1 stern ramp
Type: .....electric operation
Ramps:.....Fixed ramp from maindeck to upperdeck / Fixed ramp from maindeck to tanktop
Designer: ..... MacGregor
Ballast water treatment system
Make: .....Alfa Laval Technologies Co., Ltd
Capacity: ..... 1,000m^3/h
Complement
Officers:..... 14
Crew:..... 10
Drivers:..... 12
Navigation and other equipment
Bridge control system
Make: .....Kongsberg
Type:..... K-Bridge
Is bridge fitted for one-man operation?..... Yes
Integrated bridge system:..... Yes
If yes, make:.....Kongsberg
Model: ..... K-Bridge
Radars
Number: 4
Make: .....Kongsberg
Model(s): 703038/703093/703041
Fire detection system
Make/Type: ..... Consilium / Salwico Cargo Efficiency
Installed Fuel Meters:..... mass flow
Other installed monitoring tools:.. shaft torque and power measuring system; propulsion shaft-line static and dynamic measurement system.
Launch/float-out date:..... 17 March 2018
Delivery date:.....25 October 2018

TASMANIAN ACHIEVER II



SIGNIFICANT SMALL SHIPS OF 2020

A sister publication to *Significant Ships*

The twenty third edition of our annual *Significant Small Ships* series, *Significant Small Ships of 2020*, will be published in February 2021. As in previous editions we shall be including up to 30 of the most innovative and interesting commercial ship designs (up to 100m in length) delivered in 2020.

The Editor invites shipbuilders, designers and owners to submit details of vessels for possible inclusion in *Significant Small Ships of 2020*. Presentation will follow on the established two-page format, with a colour photograph, descriptive text and tabular details (including major equipment suppliers) on the first page, followed by a full page of technical general arrangement plans. Potential entries should include a short technical description (500 words) of the proposed vessel, highlighting its special features and delivery date.

All entries should be addressed to:

Martin Conway, Editor, Significant Small Ships of 2020,
8-9 Northumberland Street, London WC2N 5DA, UK.
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TURQUOISE P: FSRU/LNG carrier

Shipbuilder: .....**Hyundai Heavy Industries Co., Ltd.**
Vessel's name: .....***Turquoise P***
Hull No: **2945**
Owner/Operator: ..... **Pardus**
Country: .....**Ireland**
Designer: **Hyundai Heavy Industries Co., Ltd.**
Country: .....**Republic of Korea**
Model test establishment used: ..... **Hyundai Maritime Research Institute (HMRI)**
Flag: .....**Panama**
IMO number: **9823883**
Total number of sister ships already completed (excluding ship presented): .....**Nil**
Total number of sister ships still on order: .....**Nil**

Turquoise P is a 170,000m^3 class FSRU owned by Turkish interests through Ireland-based Pardus Energy. The vessel is the latest in a series of vessels built to a standard Hyundai Heavy Industries design. Eight of the type have been built of which five are operated by Höegh. *Turquoise P* is the first vessel for its current owners. Some months before its completion, a management agreement for the ship was signed with Singapore-based Wilhelmsen Ship Management Malaysia.

While FSRUs are capable of being used for LNG transport, their purpose is to provide readily available import facilities without the need for building shoreside terminals. After delivery, *Turquoise P* headed to Aliaga to replace Turkey's very first FSRU, where it arrived in early July at the ETKİ LNG Terminal.

The vessel is 294m in length and has a 46m beam. The cargo containment system is a four tank GTT Mk III membrane type able to store 170,000m^3. Regasification is handled by the ship's Hyundai HI-Regas (Hyundai Integrated ReGASification) system, which uses ethylene glycol as intermediate heating medium with lower corrosion/safety problems than using direct seawater.

The Hi-Regas system was first launched in September 2018 and the system on *Turquoise P* is one of the first in service. It will enable the vessel to pump 28m^3 million gas per day into the local supply.

Power for *Turquoise P* is provided by four Wärtsilä 50DF engines. Two of these are six cylinder models and the other pair are eight cylinder units. For transit purposes, the ship is propelled by a single fixed pitch propeller through gearboxes and can achieve a speed of 18knots. However, in floating storage and regasification mode propulsion is not a consideration. The Hyundai EMD ballast treatment system will likewise not be used, except on occasions when the vessel is either being used for cargo transport or heading for drydocking.

TECHNICAL PARTICULARS

Length oa: 294.28m
Length bp: 282.00m
Breadth moulded: 46.00m
Depth moulded
to main deck: 26.00m
to upper deck: 26.00m
to other decks: .....33.00m (trunk deck), 20.375m (aft.mooring deck)
Width of double skin
side: 2.657m
bottom: 3.20m
Draught
scantling: 12.50m
design: 11.30m
Gross: 109,777gt
Deadweight
design: 80,124t
scantling: 93,715t
Speed, service (-- %MCR output): ....18.05knots (MPP 20,600kW with S.M.20%)
Cargo capacity (m^3)
Liquid volume: 170,044
Bunkers (m^3)
Diesel oil: 5,306
Water ballast (m^3): 59,109
Tankers - percentage segregated ballast: ...89.3%
Daily fuel consumption (tonnes/day)
Main engine only: 110.9
Classification society and notations: .....BV, I, +HULL, +MACH, Unrestricted navigation, Liquefied Gas Carrier(Ship type 2G, Membrane tank, Maximum pressure 70 kPaG, Minimum temperature -163°C and Specific gravity 500 kg/m^3), ESA, +VeriSTAR HULL FTA 40 years. +AUT-UMS,INWATERSURVEY,MONSHAFT,CPS(WBT),RV, BWT, CLEANSHIP, GREEN PASSPORT, IATP.

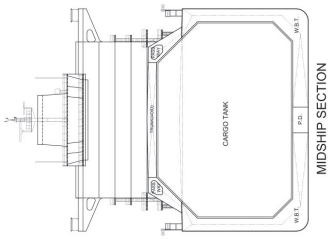
Main engine(s)
Design: ..... Dual fuel diesel electric
Model: 8L50DF, 6L50DF
Manufacturer: .....Wärtsilä-Hyundai
Number: 8L50DF x 2 sets + 6L50DF x 2 sets
Type of fuel: .....M.G.O. / gas
Output of each engine: ... 7,800kW (8L50DF), 5,850kW (6L50DF)
Gearbox(es)
Make: .....Renk
Model: NDSH-3800
Number: 1
Output speed: 76.8rpm
Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer: ..... Hyundai Heavy Industries (engine & machinery division)
Number: 1
Fixed/Controllable pitch: .....Fixed
Diameter: 8.6m
Speed: 76.8rpm
Alternator make/type: GE/HAJ7 213-14P, GE/HAJ7 183-14P
Output/speed of each set: .....8,900kVA/514rpm x 2sets, 6,671kVA/514rpm x 2sets
Boilers
Number: 1
Type: .....Oil-fired marine boiler
Make: .....Alfa Laval
Output, each boiler: 7,500kg/h
Cargo cranes/cargo gear: . Hose handling crane
Number: 1
Make: .....Oriental Precision
Type: .....Electro-hydraulic type
Performance: .....10t SWL
Other cranes
Number: 2
Make: .....Oriental Precision
Type: .....Electro-hydraulic type
Tasks: .....Provision crane
Performance: .....SWL 5t (Port)/ 5t (Stbd)
Mooring equipment
Number: ..... 2 windlass, 8 mooring winch
Make: .....Flutek
Type: .....Electric type
Special lifesaving equipment
Number of each and capacity: .....1, 40 person each
Make: .....Viking Norsafe
Type: ..... Free-fall type

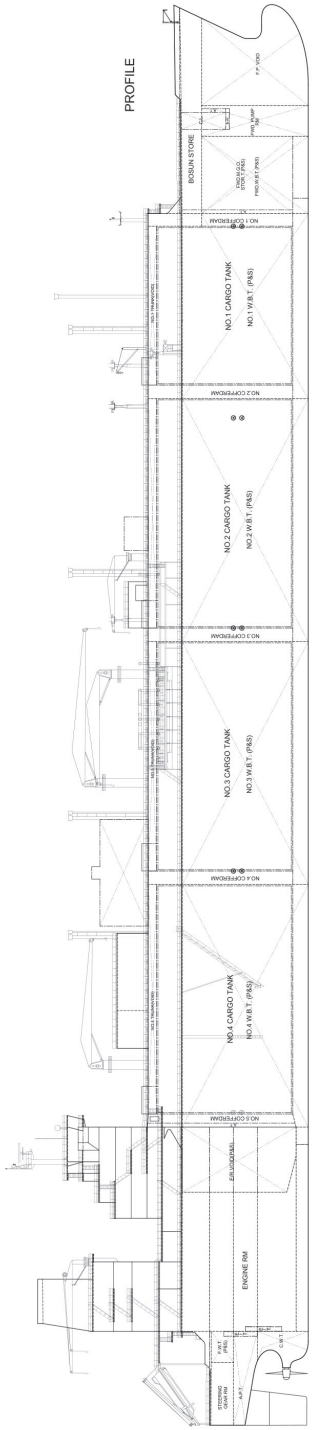
Cargo tanks
Number: 4
Cargo pumps
Number: 8
Type: .....Submerged cryogenic centrifugal
Make: ..... Shinko
Stainless steel: .....Ball bearing only (pump casing, impeller, etc.: aluminium alloy)
Capacity (each): ..... 1,000m^3/h
Cargo control system
Make: .....Kongsberg
Type: ..... K-Chief 700

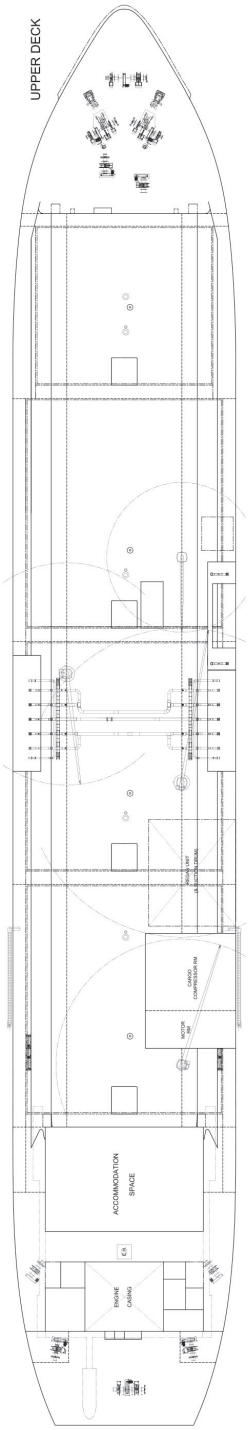
Ballast control system
Make: .....Kongsberg
Type: ..... K-Chief 700
Water ballast Treatment System
Make: .....HHI-EMD
Capacity: ..... Electrolysis
Complement
Officers: 21
Crew: 16
Suez/Repair Crew: ...1 cabin for 6 Suez crew
Bridge control system
Make: ..... GE
Is bridge fitted for one-man operation? .....No

Fire detection system
Make: .....Consilium
Type: .....Salwico
Fire extinguishing systems
Cargo holds:
Make/Type: .....Fain / dry chemical power / Tanktech / seawater spray Fain / high pressure CO_2
Engine room:
Make/Type: ..... Fain / high pressure CO_2 / Tanktech / seawater spray
Cabins:
Make/Type: ..... Tanktech / seawater spray
Public spaces:
Make/Type: ..... Tanktech / seawater spray

Radars
Number: .....2sets(X-band radar x 1set, S-band radar x 1set)
Make: .....Furuno
Model(s) : FAR-3320, FAR3330S-SSD
Integrated bridge system: ..... Yes
If yes, make: .....Furuno
Model: FMD-3300
Waste disposal plant
Sewage plant
Make: .....Jonghap
Model: ..... AEROB - 55N(A)
Contract date: .....24 January 2017
Launch/float-out date: .....15 June 2018
Delivery date: ..... 29 March 2019


MIDSHIP SECTION
CARGO TANK
W.B.T.
P.D.
W.B.T.


PROFILE
BOSUN STORE
NO.1 CARGO TANK
NO.1 W.B.T. (P&S)
NO.2 CARGO TANK
NO.2 W.B.T. (P&S)
NO.3 CARGO TANK
NO.3 W.B.T. (P&S)
NO.4 CARGO TANK
NO.4 W.B.T. (P&S)
ENGINE RM


UPPER DECK
ACCOMMODATION SPACE
ENGINE CASING

VIVIT DUBHE: LPG carrier

Shipbuilder: ..... **Hyundai Heavy Industries**
Vessel's name: ..... ***Vivit Dubhe***
Hull No: **2984**
Owner/Operator: ..... **Vitol**
Country: ..... **Netherlands**
Designer: ..... **Hyundai Heavy Industries**
Country: ..... **Republic of Korea**
Flag: ..... **Liberia**
IMO number: **9835173**
Total number of sister ships already completed (excluding ship presented): **2**
Total number of sister ships still on order: **7**

Vivit Dubhe has acquired several firsts since being ordered by the global energy and commodity trader Vitol in July 2017.

Vitol's order of the LPG carrier and potentially seven more of the same type at Hyundai Heavy Industries, after selling off several tankers, marked the company's entry into the gas carrier sector. *Vivit Dubhe*, an 84,200m^3 VLGC, was the first of two sisters and was delivered in March, one month before the second vessel *Vivit Fornax*. The ship is a fully refrigerated type with three cargo tanks.

Hyundai has also built two slightly smaller 80,000m^3 vessels for Vitol. All four vessels mentioned are under technical management of Latvian Shipping Company (LSC) of Riga, which Vitol has had a stake in since 2007. The vessel is the first VLGC in LSC's managed fleet.

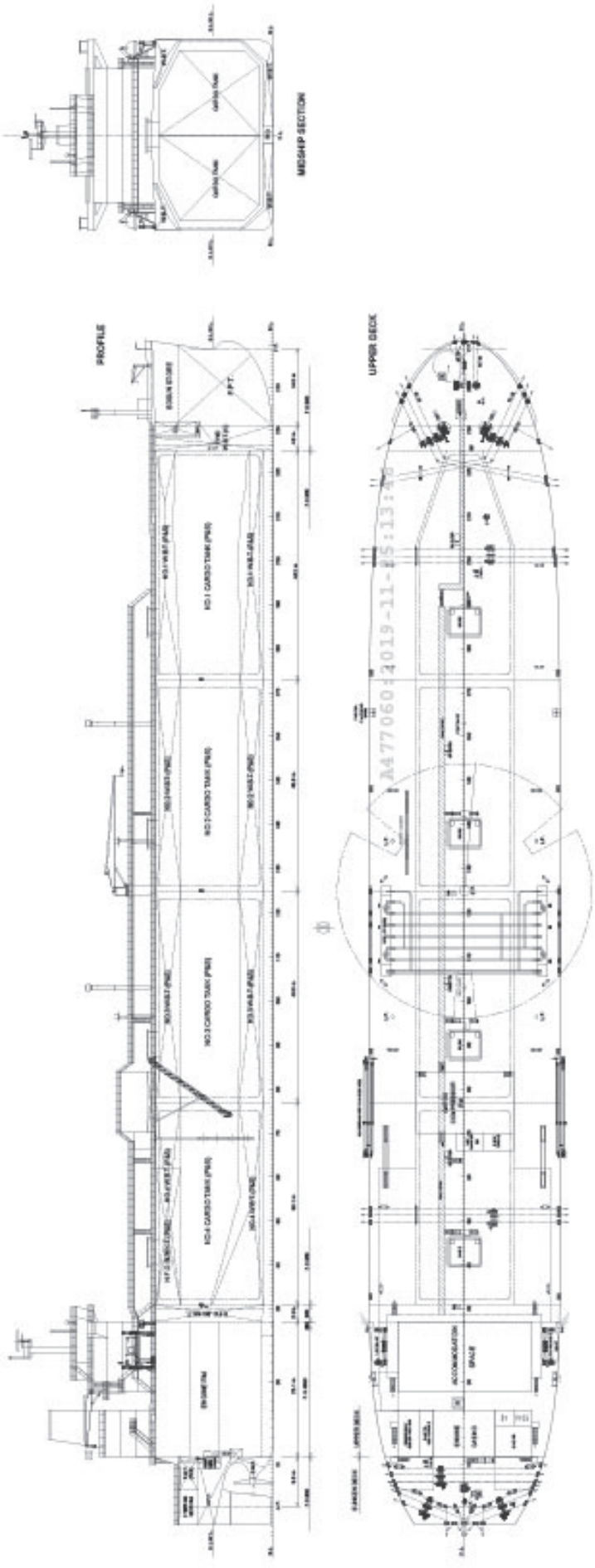
The 228m vessel is powered by a MAN B&W 6G60ME-C9.5 main engine, fitted with a high pressure selective catalytic reduction system to meet the NOx III requirements. It has a service speed of 14knots. For compliance with the 2020 global sulphur cap, the owner has opted to install a scrubber. The chosen model is a multi-inlet Wärtsilä open-loop type that cleans the exhaust from the main engine, three Himsen auxiliary engines and the ship's boiler. Hyundai claims the vessel is the world's first eco-friendly 84.2k Class LPG Carrier with SCR and SOx scrubber installed together.

Vivit Dubhe has another first to its name, being the first vessel built with Hyundai's Integrated Smart Ship Solution. This is a performance management system that uses real time data from the vessel's engines, weather data and other sensors to optimise speed and trim. The data can be used directly on the ship and is also transmitted ashore where it can be monitored and advice offered to the ship if problems occur.

TECHNICAL PARTICULARS

Length oa: 228.48m
Length bp: 222.60m
Breadth moulded: 36.6m
Depth moulded
to main deck: 22.55m
to upper deck: 22.55m
Width of double skin
bottom: 1,850mm
Draught
scantling: 11.9m
design: 11.4m
Gross: 49,552gt
Deadweight
design: 50,877t
scantling: 54,406t
Speed, service (-- %MCR output): 16.8knots (85%)
Cargo capacity (m^3)
Liquid volume: ..... abt. 84,000m^3
Bunkers (m^3)
Heavy oil: abt. ..... 3,000m^3
Diesel oil: abt. ..... 250m^3
Water ballast (m^3): ..... abt. 20,500m^3
Daily fuel consumption (tonnes/day)
Main engine only: 40.9
Classification society and notations: ..... Lloyd's Register, +100A1, Liquefied Gas Carrier, Ship type 2G, Butane, Butane/Propanemixture, Propane, Propylene in independent Tank Type A, Maximum SpecificGravity 0.61, Maximum Vapour Pressure 0.275bar(0.4bar in harbor),Minimum Temperature Minus 50°C, ShipRight(ACS(B), SDA, FDA, CM),*IWS, LI SPM4, +LMC, UMS, BWTS, +Lloyd's RMC(LG), ECO(BIO, EEDI-1, BWT) with the descriptive notes ShipRight(BWMP(T), SCM), ETA.
Main engine(s)
Design: ..... Hyundai-MAN B&W
Model: 6G60ME-C9.5-HPSCR
Manufacturer: ..... Hyundai Heavy Industries (engine & machinery division)
Number: 1
Type of fuel: ..... HFO, ULSFO or MGO
Output of each engine: .... 12,541kW x 90rpm
Propeller(s)
Material: ..... Ni-Al-Bronze
Designer/Manufacturer: ..... Hyundai Heavy Industries (engine & machinery division)
Number: 1
Fixed/Controllable pitch: ..... Fixed
Diameter: 7.4m
Speed: 90rpm
Special adaptations: ..... Hyundai end-plated cap fin
Diesel-driven alternators
Number: 3
Engine make/type: ..... Hyundai, HiMSEN 8H21/32
Type of fuel: ..... HFO, ULSFO or MGO
Output/speed of each set: 1,280kW x 720rpm
Alternator make/type: .. Hyundai/HFC7 568-10P
Output/speed of each set: ..1,500kVA x 720rpm
Exhaust-gas scrubbing equipment
Manufacturer: ..... Wärtsilä
Type: ..... U-type, multi-inlet, open-loop type
On main engines?: ..... Applied
On auxiliary engines?: ..... Applied
Boilers
Number: 1
Type: ..... Oil-fired marine boiler
Make: ..... Kangrim
Output, each boiler: 3,000kg/h
Cargo cranes/cargo gear: . Hose handling crane
Number: 1
Make: ..... Sangsangin Industry
Type: ..... Electro-hydraulic type
Performance: ..... 7.5t SWL
Other cranes
Number: 2
Make: ..... Sangsangin Industry
Type: ..... Electro-hydraulic type
Tasks: ..... Provision crane
Performance: ..... SWL 4t (Port)/ 2t (Stbd)
Mooring equipment
Number: ..... 2 windlass, 6 mooring winch
Make: ..... Flutek
Type: ..... Electro-hydraulic type
Special lifesaving equipment
Number of each and capacity: ..2x 28 person
Make: ..... HLB (Hyundai Lifeboat)
Type: ..... Conventional
Cargo tanks
Number: 4EA
Grades of cargo carried: 2
Product range: ..... Pure Propane, Mixture of Propane and Butane in any proportion, Commercial Butane (normal and isobutane mixed in any proportion), Propylene, Commercial Propane (maximum 5.0 mole % ethane in the liquid phase)
Stainless steel – structure/piping: ... Stainless steel piping
Cargo pumps
Number: 8
Type: ..... Vertical deepwell
Make: ..... Svanehoj
Stainless steel: ... Intermediate pipe / impeller etc. to be of stainless steel
Capacity (each): ..... 600m^3/h
Cargo control system
Make: ..... Kongsberg
Type: ..... K-Chief 600
Ballast control system
Make: ..... Kongsberg
Type: ..... K-Chief 600
Water ballast Treatment System
Make: ..... ERMA First
Capacity: ..... 2sets of 800m^3/h
Complement
Officers: 14
Crew: 14
Bridge control system
Make: ..... Kongsberg
Type: ..... AutoChief 600
Is bridge fitted for one-man operation? ..... No
Fire detection system
Make: ..... Autronica
Type: ..... Autroprime
Fire extinguishing systems
Engine room: ..... H.P CO_2, sea water
Make/Type: ..... Fain
Cabins: ..... Sea water, portable extinguisher
Make/Type: ..... Fain
Public spaces: ..... Sea water, portable extinguisher
Make/Type: ..... Fain
Radars
Number: .2sets (X-band radar x 1set, S-band radar x 1set)
Make: ..... JRC
Model(s): JRM-9282-S, JRM-9225-6X
Integrated bridge system: ..... Yes
If yes, make: ..... JRC
Model: JAN-9201
Waste disposal plant
Incinerator
Make: ..... Hyundai-Atlas
Model: ..... MAXI T50SL WS
Waste compactor
Sewage plant
Make: ..... IL Seung
Model: ISB-02
Contract date: ..... 25 July 2017
Launch/float-out date: ..... 14 December 2018
Delivery date: ..... 20 March 2019

VIVIT DUBHE



ZHONG GU NAN HAI: Container ship

Shipbuilder: ..... **Nanjing Jinling Shipyard Co., Ltd.**
Vessel's name: ..... ***Zhong Gu Nan Hai***
Owner/Operator: ... **Zhong Gu Shipping Group**
Country: ..... **China**
Designer: . **Shanghai Merchant Ship Design & Research Institute (SDARI), CSSC**
Country: ..... **China**
Model test establishment used: ..... **China Ship Scientific Research Centre (CSSRC)**
Flag: ..... **China**
IMO number: **9842310**
Total number of sister ships already completed (excluding ship presented): **3**
Total number of sister ships still on order: **2**

Zhong Gu Nan Hai, delivered to Chinese logistic specialist Zhonggu Shipping in June, is the lead vessel of a six ship series of new generation Bangkok Max feeder container vessels designed by SDARI for construction by Jinling shipyard. Four of the ships were in service in 2019 with the last two scheduled for delivery in early 2020.

There is competition by builders and designers to achieve the highest capacity for Bangkok Max ships by both TEU capacity and deadweight. The designers of the vessel claim the deadweight of 24,123tonnes for *Zhong Gu Nan Hai* is the highest yet achieved for vessels with a loa of 172m at a draught of 8.2m.

Cargo capacity is a nominal 1,912TEU but at 14tonnes homogenous this drops to 1,300TEU. Over length 45ft containers can be carried on the hatch covers from the third tier. The cargo hold can accommodate three tiers of 2.89m and two tiers of 2.59m containers. 230 sets of reefer plugs are installed on deck and in holds. Hazardous goods can be loaded in No.1 and No.2 cargo holds.

The design aims at energy saving with an optimised hull form based on operational profile. The notable feature is the application of Erect Invisibility Bulb-Bow named 'S-BOW' developed by SDARI. This gives a more efficient performance at various trims and drafts than a traditional bulbous bow. A boss cap fin is featured on the propeller.

Power is provided by a single two-stroke WinGD 6RT-flex58T-E of 12,900kW output at 105rpm. Service speed at 90MCR is 18.9knots. Although not fitted at delivery, the ship is designed as 'scrubber ready' and has a notation to that effect from China Classification Society (CSS). It is also planned to fit a cold ironing system in future for use when in port.

TECHNICAL PARTICULARS

Length oa: 171.95m
Length bp: 168.70m
Breadth moulded: 27.50m
Depth moulded
to main deck: 14.30m
Width of double skin
side: 2.4m
bottom: 1.6m

Draught
scantling: 9.5m
design: 8.5m
Gross: 18,490gt
Deadweight
scantling: 24,100t
design: 20,100t
Speed, service (90%MCR output with 15% SM): 18.9knots
Bunkers (m^3)
Heavy oil: ..... 1,150m^3
Diesel oil: ..... 400m^3
Water ballast (m^3): ..... 8,500m^3
Daily fuel consumption (tonnes/day)
Main engine only: 45.4
Auxiliaries: 3.82

Classification society and notations: ..... CCS ★CSA Container Ship; ERS ;PSPC(B); SOLAS II-2 Reg19; Loading computer(S,I);CLC(V); In-Water Survey; FTP; AFS; BWMP; Green Ship I; ★CSM AUT-0; OMBO; EGC Ready (H); CMS; SCM; Clean; EEDI(II+); GPR; BWMS
% high-tensile steel used in construction: 45%
Heel control equipment:.. Anti-heeling pump with capacity 350m^3/h

Propulsion
Main engine(s)
Design: ..... WinGD
Model: ..... 6RT-flex58T-E Tier II
Manufacturer: ..... QMD
Number: 1
Type of fuel: ..... HFO/MGO
Output of each engine: 14,100kW
Is this a diesel-electric or hybrid?: ..... Yes
Propeller(s)
Material: ..... Ni-Al-Bronze
Designer/Manufacturer: SDARI /Tongzhou, Zhenjiang, China
Number: 1
Fixed/Controllable pitch: ..... Fixed
Diameter: 6.64m
Speed: 101rpm
Special adaptations: ..... Fan cap
Diesel-driven alternators
Number: 3
Engine make/type: .. Anqing CSSC Diesel Engine Co.,Ltd / 6DE-23
Alternator make/type: . CSIEM/1FC6 568-8
Output/speed of each set: .....1,270kW x 900r/min
Boilers
Number: 1
Type: LYF1.8/220-0.7
Make: ..... Greens Shazhou, China
Output, each boiler: 1,800kg/h
Stern appendages/special rudders:..... Flap type rudder
Bow thruster(s)
Make: ..... Kawasaki, Wuhan, China
Number: 1
Output (each): 1,000kW

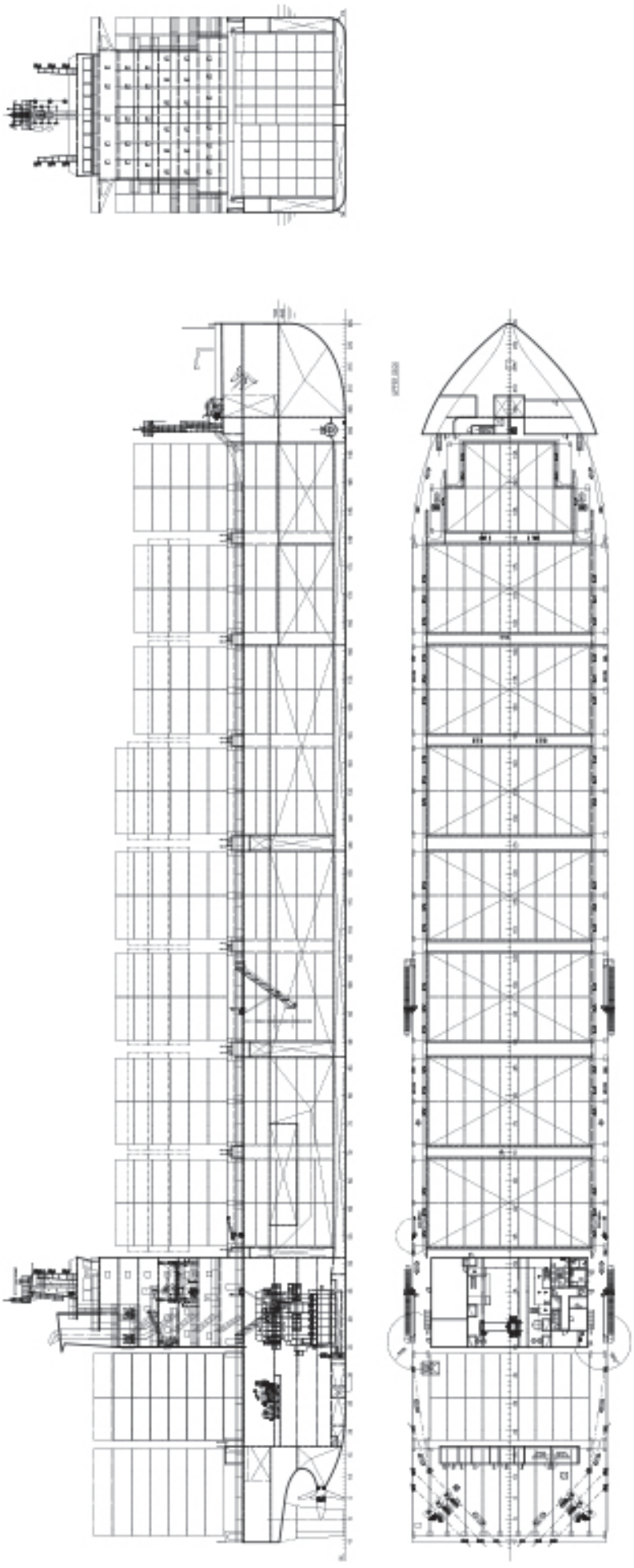
Other cranes
Number: 2
Make: ..... Ningbo Kairong, China
Type: ..... Electric
Tasks:..... Provision crane
Performance: ..... SWL 4t x R 4.2m

Mooring equipment
Number: ..... Fore 2 and aft 2
Make: ..... Masada, Jiangsu, China
Type: ..... Hydraulic
Special lifesaving equipment (eg MES, free-fall lifeboats)
Number of each and capacity: 2x 24P
Make: ..... Luzhou Zhenjiang Marine Auxiliary Machinery Co.,Ltd, CSSC
Type: ..... Gravity luffing arm type davit
Hatch covers
Design: ..... TTS-Hua Hai
Manufacturer: ..... Jinling Shipyard
Type: ..... Upper deck, lifting-away type
Containers
Lengths: ..... 20' / 40' / 45'
Heights: ..... 8'6" / 9'6"
Cell guides: ..... All cargo holds
Total TEU capacity: 1,912TEU
On deck: 1,286TEU
In holds: 626TEU
Homogeneously loaded to 14tonnes: ... 1,300TEU
Reefer plugs: 230FEU
Tiers/rows (maximum)
On deck: 8/11
In holds: 5/9
Ballast control system
Make: ..... Rongde, China
Type: ..... EHS
Ballast water treatment system
Make: .... Ahead Ocean Technology (DaLian) Co.,Ltd, China
Capacity: ..... 350m^3/h

Complement
Officers:..... 10
Crew: 14
Suez/Repair Crew: 6
Single/double/other rooms: 24

Navigation and other equipment
Bridge control system
Make: ..... Shanghai Ship & Shipping Research Institute, China
Type: ..... OMBO, CCS class
Is bridge fitted for one-man operation? .... Yes
Integrated bridge system: ..... No
Radars
Number: 2
Make: ..... Furuno
Model(s): FAR-2827/FAR-2837S
Fire detection system
Make: ..... Consilium
Type: ..... Salwico Cargo
Fire extinguishing systems
Cargo holds:..... CO_2
Make/Type: .... Wuhan Modern Changjiang Machinery Co.,Ltd/ high pressure type
Engine room: ..... CO_2/fixed local application firefighting system
Make/Type: ..... Wuhan Modern Changjiang Machinery Co.,Ltd / Rongde (high pressure type/RDFF)
Cabins: ..... Seawater fire
Make/Type: ... DESMI/ NSL125-215C/D02-P
Public spaces: ..... Seawater fire
Make/Type: DESMI/ NSL125-215C/D02-P
Waste disposal plant
Incinerator
Make: Hansun..... Model: HSINC-50A
Sewage plant
Make: ..... Chongqing Taiko Kangda Environmental Protection Technology Co.,Ltd
Model: SBHC-25
Efficiency
Attained EEDI value:..... 17.011
Required EEDI value: ..... 18.337 (Phase II)
Installed Fuel Meters: ..... Volumetric flow, 50-400m^3/h
Energy Saving Technologies*: ..... Fan cap designed by SDARI
Contract date: ..... November 2017
Launch/float-out date: ..... March 2019
Delivery date: ..... July 2019

ZHONG GU NAN HAI



ZHONG HUA FU XING: Ro-pax cruise ferry

Shipbuilder: .....**Shandong Huanghai Shipbuilding Co., Ltd.**
Vessel's name: ..... ***Zhong Hua Fu Xing***
Owner/Operator: .....**Bohai Ferry Co., Ltd.**
Country: ..... **China**
Designer: .**Shanghai Merchant Ship Design & Research Institute (SDARI)**
Country: ..... **China**
Model test establishment used: .**Shanghai Ship & Shipping Research Institute (SSSRI)**
Flag: ..... **China**
IMO number: **9849875**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: .....**Nil**

Bohai Ferry, China's largest ro-pax operator and first cruise ship operator having bought *Costa Voyager* in 2014, took delivery of the 44,403gt *Zhong Hua Fu Xing* in November from Shandong Huanghai Shipbuilding. The ship, which was designed by SDARI, is a 1,689 passenger/3,070 lane metre ro-pax cruise ferry. Not only is the ship the first luxury cruise ferry in China, it can also boast the highest deadweight and greatest capacity for both passengers and vehicles of Chinese ro-paxes. Its blue and white hull painted to resemble a whale is a distinctive feature.

The vessel's principal particulars are an overall length of 212m, beam of 28.60m, design draught of 6.35m and service speed 18.8knots. Three vehicle holds are arranged from Deck No.1 to No.7 through the vessel allowing for cars and freight. Three ramps, one at the bow, one at the stern and a stern quarter ramp on the vessels starboard side, allow for rapid loading and discharging of vehicles.

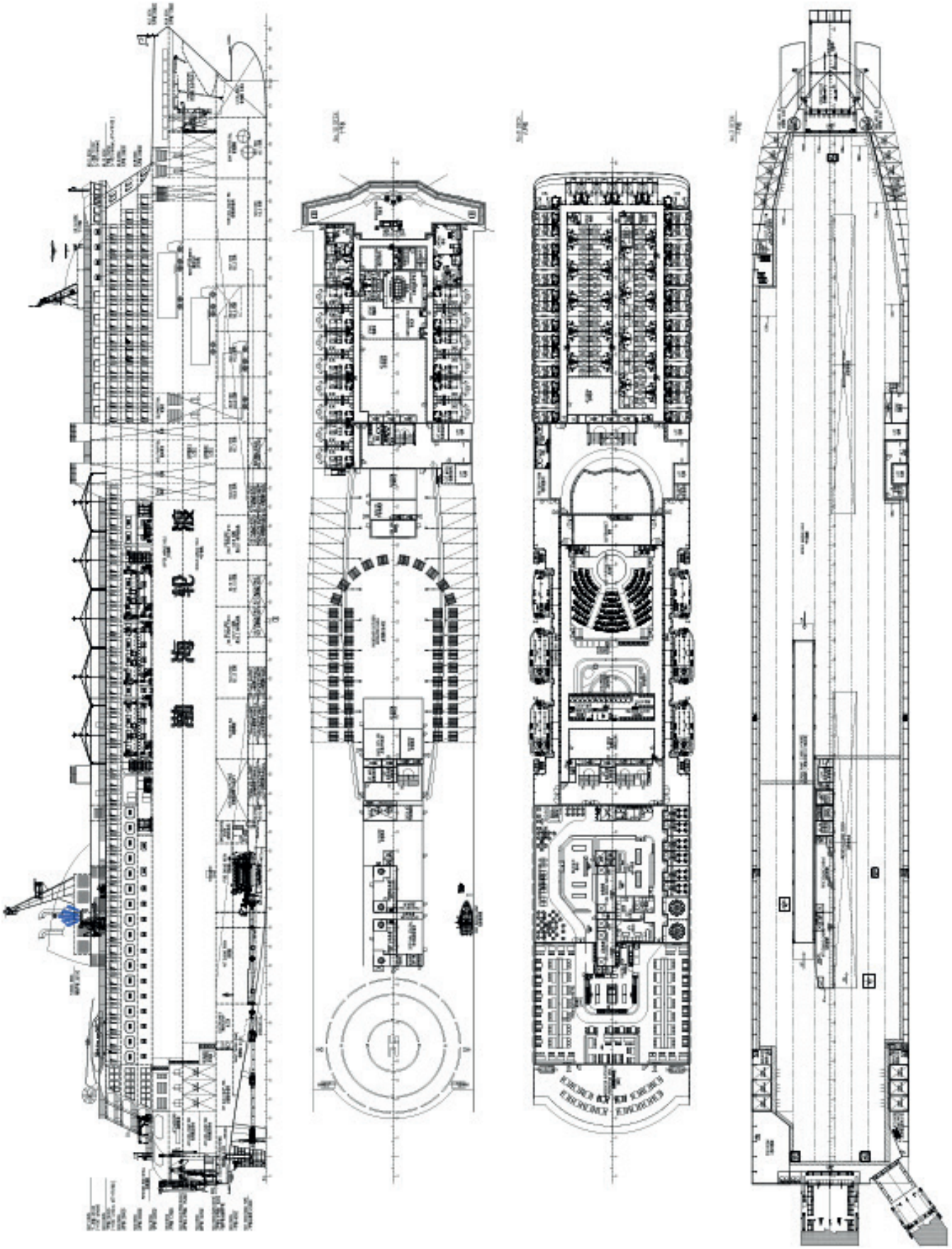
There are 461 passenger cabins, which are said to be of high standard with a more luxurious interior design and entertainment features than are found on most domestic ferries. The automatic management of cabin HVAC services, low noise and vibration levels due to an optimised hull form and high insulation levels, have allowed the vessel to be assigned a comfort notation by China Classification Society.

Zhong Hua Fu Xing has a twin propulsion mechanical system, with each featuring a MAN 14V32/40 medium-speed engine producing 7,000kW of power at 750rpm. Each engine is connected to a dedicated Reintjes reduction gearbox and drives one of the ship's twin controllable pitch 4.8m diameter propellers at 106rpm. The long tailshafts are supported by V-brackets outside of the hull. Twin twisted flap rudders are fitted. This arrangement confers redundancy and allows a service speed of 18knots.

TECHNICAL PARTICULARS

Length oa: 212.00m
Length bp: 197.00m
Breadth moulded: 28.60m
Depth moulded
to main deck: 9.20m
to upper deck: 15.30m
Draught
scantling: 6.50m
design: 6.35m
Gross: 44,403gt
Displacement:
design:..... 24,344t
scantling:..... 25,094t
Lightweight: 15,738t
Deadweight
scantling: 9,356t
design: 8,606t
Block co-efficient: .....0.6630 (scantling)/ 0.6584(design)
Speed, service (90%MCR output):.....18.8knots
Bunkers (m^3)
Heavy oil: 728.48
Diesel oil: 181.08
Water ballast (m^3): 3,035.14
Daily fuel consumption (tonnes/day)
Main engine only:..... 58.74
Auxiliaries: 3.41
Classification society and notations: .....CCS ★CSA RO/RO Passenger Ship, Ice Class B; Clean; AFS;GPR; AMPS; COMF(NOISE 3);COMF(VIB,3) ★CSM MCC SCM PMS
% high-tensile steel used in construction: 58%
Heel control equipment: .....Anti-heeling tank
Roll-stabilisation equipment: ..... Fin stabilizer
Propulsion
Main engine(s)
Design :..... Four-stroke engine, Diesel-mechanic drive, turning counter-clockwise
Model: .....MAN 14V 32/40
Manufacturer: ..... MAN
Number: 2
Type of fuel: .....HFO&MDO
Output of each engine: ..7,000kW/750rpm
Is this a diesel-electric or hybrid?: .....No
Gearbox(es)
Make: ..... Reintjes
Model: .....SVA 1180 PDR
Number: 2
Output speed: 750:106.3
Propeller(s)
Material: .....Ni-Al-Bronze
Designer/Manufacturer: ..... MAN
Number: 2
Fixed/Controllable pitch: ..... Controllable
Diameter:..... 4,800mm
Speed:..... 106.6rpm
Main-engine driven alternators
Number: 2
Make/type: ..... KFS /AB-HW4-1800
Output/speed of each set: ...1,880kW/1,500rpm
Diesel-driven alternators
Number: 4
Engine make/type: Wärtsilä/4L20
Type of fuel: .....HFO & MDO
Alternator make/type: ..... Wärtsilä /TEC6 502-6SB43
Output/speed of each set: ...800kW/1,000rpm
Exhaust-gas Boiler:
Manufacturer: ..... GSz
Type: GFL160-0.6
On main engines?: ..... Yes
On auxiliary engines?:.....No
Oil-fired Boilers
Number: 1
Type: LSK3-0.6
Make: ..... GSz
Output, each boiler:.....3,000kg/h
Stern appendages/special rudders: .....Twisted ap rudder
Bow thruster(s)
Make: ..... Kawasaki-KWJ
Number: 2
Output (each): 1,000kW
Other cranes
Number: 2
Make: .....Jiangyin Senhai
Type: .....Hydraulic telescopic type
Tasks: .....Provision crane
Performance: .....2t x 7m
Mooring equipment
Number: 7
Make: .....Rolls-Royce
Type: ..... Hydraulic
Special lifesaving equipment
Number of each and capacity: ....MES 500P x2, lifeboats 120P x4, 90P x2
Make: .....MES: Shanghai Youlong Rubber Products Co.,Ltd. / lifeboat: Jiangyinshi Beihai LSA Co.,Ltd.
Type: .....Gravity-hydraulic type lifeboat
If MES, vertical or sloping chutes?:.... Vertical
Vehicles
Number of vehicle decks: ..... 3 (fixed)
Total lane length: 3,070m
Doors/ramps/lifts/moveable car decks
Number of each: 3/ 3/ 0/ 0
Type: ..... Electric-hydraulic driven
Designer: ..... SMS-SME Pte. Ltd.
Ballast control system
Make: .....Sealantern Electronics Co., Ltd.
Type: ..... Pneumatic
Ballast water treatment system
Make: .....Sealantern Electronics Co., Ltd.
Complement
Officers:..... 11
Crew:..... 78
Supernumaries/Spare: 6
Passengers
Total: 1,689
Number of cabins: 461
Navigation and other equipment
Bridge control system
Make: .....SaierNico
Is bridge fitted for one-man operation? .....No
Integrated bridge system: .....No
Radars
Number: 3
Make: .....Furuno
Model(s): FAR-2837SW, FAR-2827W, FAR-2827
Fire detection system
Make: ..... Apollo
Type: ..... Syncro ASM
Fire extinguishing systems
Engine room:
Make/Type: .....Shanghai Sure-safe Fire Equipment Co., Ltd. / CO_2
Vehicle spaces:
Make/Type: .....Shanghai Sure-safe Fire Equipment Co., Ltd./CO_2; Shanghai Sure-safe Fire Equipment Co., Ltd./deluge system
Cabins:
Make/Type: .....Shanghai Sure-safe Fire Equipment Co., Ltd./water sprinkler system
Public spaces:
Make/Type: .....Shanghai Sure-safe Fire Equipment Co., Ltd./water sprinkler system
Waste disposal plant
Sewage plant
Make: .....Jiangsu Nanji
Model: ..... WCMBR-400(U)
Contract date:.....16 January 2018
Launch/float-out date: .....8 June 2019
Delivery date: .....4 November 2019

ZHONG HUA FU XING



ZHONG YUAN HAI YUN KAI TUO: Multipurpose cargo ship

Shipbuilder: ..... **COSCO Shipping Heavy Industries (Dalian) Co., Ltd.**
Vessel's name: . ***Zhong Yuan Hai Yun Kai Tuo***
Owner/Operator: ..... **COSCO Shipping Specialised Carriers Co., Ltd.**
Country: ..... **China**
Designer: . **Shanghai Merchant Ship Design & Research Institute (SDARI)**
Country: ..... **China**
Model test establishment used: ..... **China Ship Scientific Research Centre (CSSRC)**
Flag: ..... **China**
IMO number: **9837640**
Total number of sister ships already completed (excluding ship presented): **3**
Total number of sister ships still on order: **16**

Zhong Yuan Hai Yun Kai Tuo is the first in a series of 20 vessels for COSCO Shipping Specialized Carriers. The vessel was built by COSCO Heavy Industries Dalian and completed in late December 2018. The naming ceremony was held after sea trials on 11 January 2019.

The ship is a 62,000dwt multipurpose open hatch vessel and is the largest shiptype in the owner's fleet. *Zhong Yuan Hai Yun Kai Tuo* and its sisters have been contracted as part of the owner's expansion into the specialised woodpulp trade. The order for the ship and the second in the series was made after COSCO signed a five-year COA with Brazil's pulp and paper company, Suzano Papel e Celulose, in March 2017. A total of 300,000tonnes of paper pulp are expected to be transported annually.

Zhong Yuan Hai Yun Kai Tuo is 201.8m long, 32.26m wide and is of double side skin construction. She has six holds. Holds 1 and 6 are smaller but the other four are large box-shaped holds (27.03 x 27.26m) making them suitable for many other cargoes including grain, steel timber and project cargo. The vessel is strengthened for heavy cargoes and is grab fitted. Its open hatch design makes for a total grain capacity of 72,462m^3.

There is room for 473TEU on deck and the ship could also be used for carrying long cargoes such as wind turbine blades. There are four 75tonne cranes. The two cranes between hatches 3 and 4 share a pedestal and can be operated in tandem to lift 150tonnes at a radius of 26m.

The main engine is a MAN B&W 5G60ME-C9 of 8,304kW output. The direct mechanical drive to the single propeller allows for a service speed of 13.5knots.

TECHNICAL PARTICULARS

Length oa: 201.8m
Length bp: 198.3m
Breadth moulded: 32.26m
Depth moulded
to main deck: 19.3m
to upper deck: 19.3m
Width of double skin
side: 2.5m
Draught
scantling: 13.3m
design: 12.5m
Gross: 40,250gt
Deadweight
scantling: 62,041t
design: 57,000t
Speed, service: ..... 13.9knots at scantling draught (74%CMCR)
Cargo capacity (m^3)
Grain: ..... 72,462m^3

Bunkers (m^3)
Heavy oil: ..... 2,352m^3
Diesel oil: ..... 233m^3
Tankers – percentage segregated ballast: ..... 22,498m^3
Daily fuel consumption (tonnes/day)
Main engine only: 22.9t/d
Auxiliaries: 2.0t/d

Classification society and notations: ..... CCS ★CSA, General Dry Cargo Ship, Double Side Skin, Equipped with container securing arrangements, Strengthened for heavy cargoes, Grab*(20), ERS, PSPC(B), Loading Computer(S,I,D,G), In-Water Survey, PMS ★CSM, AUT-0, SCM, GRP, Green Ship I, EEDI(II+), FTP, BWMP, BWMS, EAL, NEC(III)

Propulsion
Main engine(s)
Model: ..... MAN 5G60ME-C9.5
Manufacturer: ..... Dalian Marine Diesel Co., Ltd.
Number: 1
Type of fuel: ..... HFO, ULSFO, MGO
Output of each engine: 8,304kW
Is this a diesel-electric or hybrid?: ..... No
Propeller(s)
Material: ..... Ni-Al-Bronze
Designer/Manufacturer ..... Shanghai Marine Propeller Design Co., Ltd.
Number: 1
Fixed/Controllable pitch: ..... Fixed
Diesel-driven alternators
Number: 3
Engine make/type: ..... Anqing CSSC Diesel Engine Co., Ltd / 6DK-20e
Type of fuel: ..... HFO, ULSFO, MGO
Output/speed of each set: 900kW/900rpm

Boilers
Number: 1
Type: ..... Composite boiler
Make: ..... SAACKE
Output, each boiler: 2,000kg/h, 300kg/h, 190kg/h
Stern appendages/special rudders: Semi-balanced type rudder
Deck machinery
Cargo cranes/cargo gear
Number: ..... Fore (4)
Make: ..... TTS NMF
Type: ..... 2 single cargo cranes and 1 twin cargo crane
Performance: ... 75t/60t x 5m-26m/4m-30m
Other cranes
Number: 1
Make: ..... Shanghai Hengyuan Marine Equipment Co., Ltd.
Type: ..... Electro operated monorail provision crane
Tasks: ..... Hoist provision
Performance: ..... 4t with outreach about 4m beyond the max.beam of the ship
Mooring equipment
Number: ..... 2 sets of combined windlass/mooring winches and 2 mooring winches
Make: ..... SEC
Type: ..... Electric-hydraulic

Special lifesaving equipment
Number of each and capacity: ... 1x, 26 persons
Make: ..... Jiangyin Neptune Marine Appliance Co., Ltd.
Type: ..... Free-fall lifeboat
If MES, vertical or sloping chutes?: ... Lifeboat davit system (sloping chute)
Hatch covers
Design: ..... TTS
Manufacturer ..... TTS
Type: ..... Folding electric hydraulic type hatch cover (cargo hold hatch cover 1&6) and piggy-back type hatch covers (cargo hold hatch cover 2-5) on the upper deck

Containers
On deck: 473
In holds: 0
Tiers/rows (maximum)
On deck: 4
In holds: 0

Ballast water treatment system
Make: ..... COSCO (WeiHai) Shipbuilding Marine Technology Co., Ltd.
Capacity: ..... 2x 600m^3/h

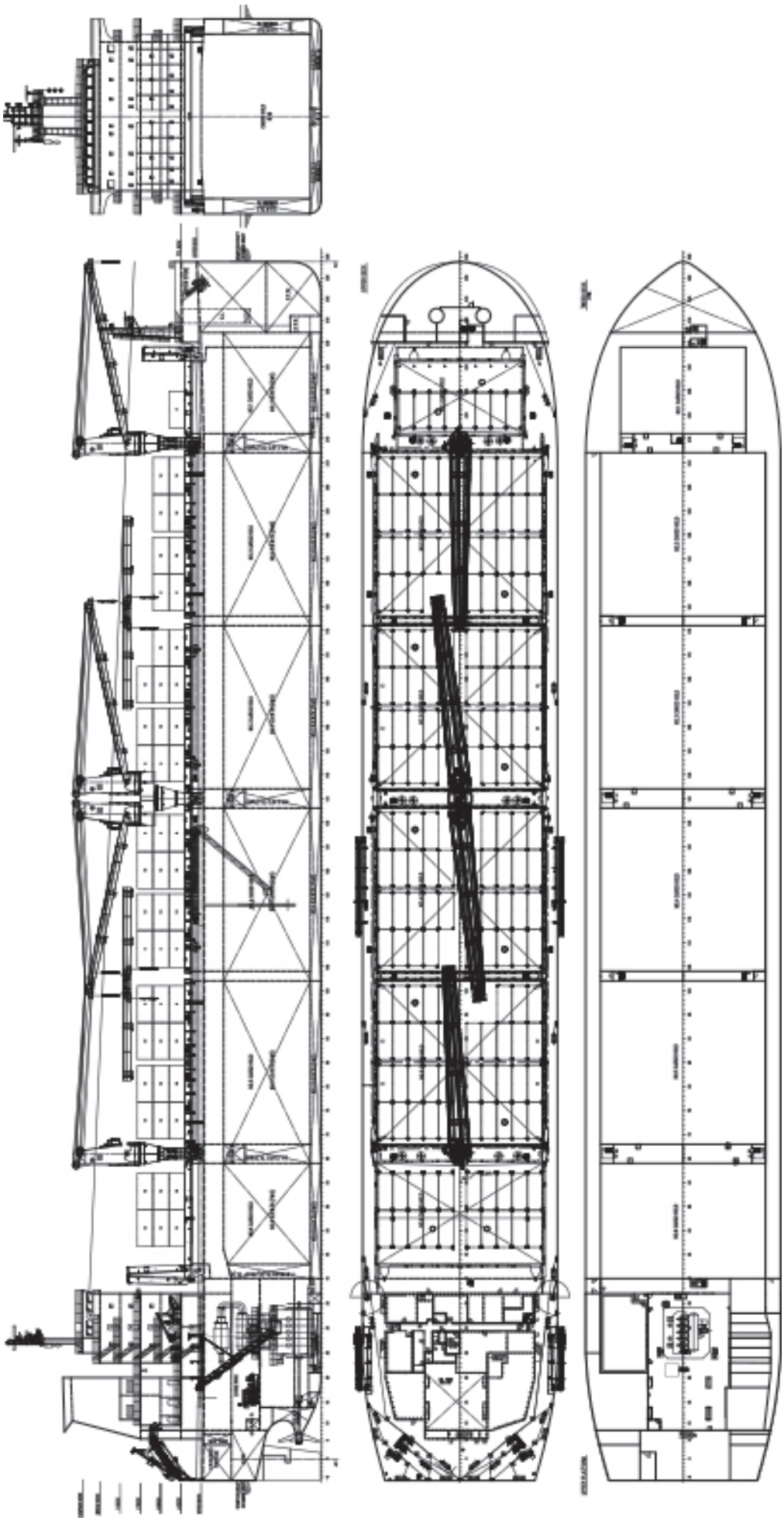
Complement
Officers: 13
Crew: 13
Suez/Repair Crew: 6
Single/double/other rooms: .. 26 single rooms

Navigation and other equipment
Bridge control system
Make: ..... Furuno, TKC
Type: ..... Furuno, TKC
Is bridge fitted for one-man operation? ..... No
Integrated bridge system: ..... No

Radars
Number: 3
Make: ..... Furuno
Model(s): FAR-2127BB/FAR-2827/FAR-2837S
Fire detection system
Make: ..... Wuxi Lantian
Type: FHMC501
Fire extinguishing systems
Cargo holds:
Make/Type: .... JiuJiang / CO_2 fixed system
Engine room:
Make/Type: .... JiuJiang / CO_2 fixed system
Waste disposal plant
Sewage plant
Make: ..... HanSun
Efficiency
Attained EEDI value: 3.8128
Required EEDI value: 8.9194
Installed Fuel Meters: .... Mass flow, 27-28t/d HFO
Energy Saving Technologies*: ..... HVAF

Contract date: ..... October 2017
Launch/float-out date: ..... 20 September 2018
Delivery date: ..... April 2019

ZHONG YUAN HAI YUN KAI TUO



SIGNIFICANT SHIPS OF 2020

A publication of The Royal Institution of Naval Architects

The 31st edition of our annual Significant Ships series, *Significant Ships of 2020*, will be published in February 2021. As in previous editions we shall be including up to 50 of the most innovative and interesting commercial ship designs (of mostly 100m length and above) which will be delivered during the forthcoming year.

The Editor invites shipbuilders, designers and owners to submit details of vessels for possible inclusion in *Significant Ships of 2020*. Presentation will follow on the established two-page format, with a colour photograph, descriptive text and tabular details (including major equipment suppliers) on the first page, followed by a full page of technical general arrangement plans. Initial potential entries should comprise a short technical description (100 words) of the proposed vessel highlighting the special features and the delivery date.

All entries should be addressed to:

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Tel: +44 (0) 20 7235 4622 Fax: +44 (0) 20 7245 6959 Email: editorial@rina.org.uk

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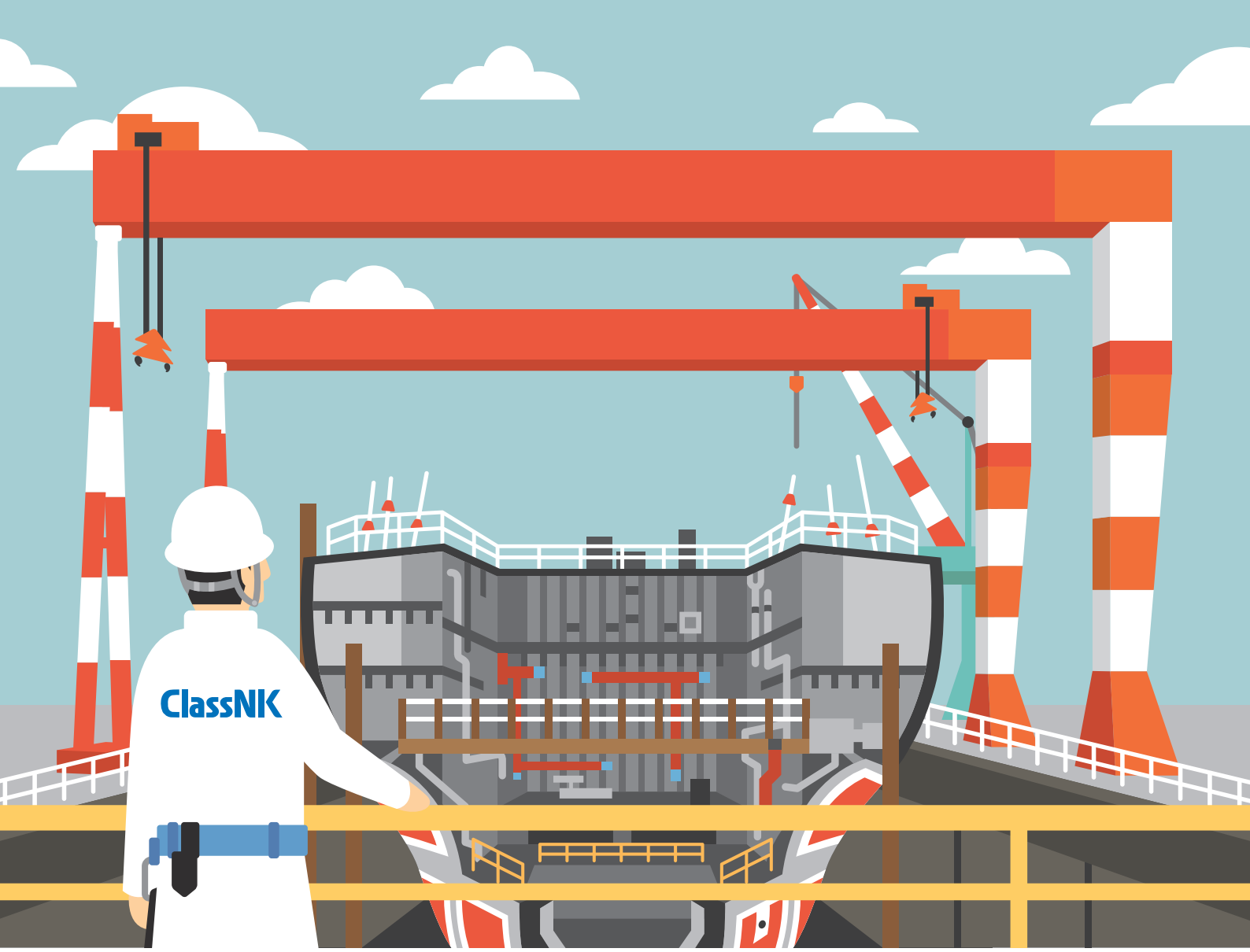

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