SIGNIFICANT SHIPS OF 2021

A PUBLICATION OF THE ROYAL INSTITUTION OF NAVAL ARCHITECTS www.rina.org.uk/sigships


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SIGNIFICANT SHIPS OF 2021

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SIGNIFICANT SHIPS OF 2021

Welcome to the 2021 edition of RINA's *Significant Ships*. As customary the following is a selection of some of the most significant ships over 100m in length delivered during 2021. 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.

Selecting which ships to include is an interesting task which begins almost as soon as the previous edition is completed. Following the announcements of new orders and deliveries throughout the year is but part as then the choices need to be made and information gathered. As the year progresses the time for doing this becomes shorter and some early choices inevitably fall behind as construction is delayed for all manner of reasons.

By the same token, ships which are completed early may have been overlooked. To overcome that the selection of 2021 also includes a handful of vessels that debuted in the closing weeks of 2020. One such is *HL Eco*, significant because it is the world's first dual-fuel Newcastlemax bulker.

As with 2020, the Covid pandemic has affected the construction rate at several shipyards and once again launching and delivery ceremonies have been curtailed and face masks and social distancing have been the hallmarks of the publicity material that has been released.

It should also not be forgotten that shipping is in a very definite state of transition to becoming a cleaner and more sustainable industry. However, as much as pioneering shipowners may wish to be showcasing vessels that satisfy the demand for zero emission shipping, it must be understood that technology often advances at a slower pace than owners' ambitions. As an example, whilst a small ferry with a fuel cell was launched in 2021, expectations for the use of such technology in larger ships has moved further and further into the future since research began in the first years of the 21st century.

Today the focus is more on hybrid ships and preparation for future alternative fuels that are expected to become available with the very near future. LNG-fuelled vessels have now become a feature in every sector of ship type and this year's crop of significant ships contains a number of such vessels.

There are fewer scrubber equipped vessels in the 2021 selection of significant ships but maybe that was to be expected as the technology is primarily a means of meeting the 2020 SOx regulation that has now passed its deadline. Even so, the rapid rise in energy prices from late 2021 and looking set to continue throughout 2022 may well see a revival of interest as bunker costs continue to soar for low sulphur fuels including LNG which is now at least five times more expensive than it was a year ago.

For the second year running, offshore vessels are notable by their absence. However, to counteract that there are two rail ferries – *Azerbaijan* and *Cherokee*. This is a particularly rare ship type in recent years so for two to be delivered in the same year is a remarkable fact in itself.

Also included is inland tanker *Blue Marjan* – the first of the so-called Parsifal type. Almost 40 of this class of LNG-fuelled tankers with their shallow draught design allowing operation even when Europe's main river arteries are affected by droughts are now in service or under construction. Another unusual ship type is represented in the following pages by *Calypso*, a purpose built transloader to shuttle cargoes of coal from bulk carriers to a new power station in North Vietnam.

Several recent editions of significant ships have featured first deliveries of new container ship designs. There may be fewer boxships in this edition but *HMM Nuri* is of interest having the highest cargo capacity for any boxship that can pass through the Panama Canal thus allowing worldwide trading with only port dimensions dictating access. *Dole Maya* is also included representing the niche reefer box sector.

There are three cruise ships among the selection with *MSC Seashore* and *Silver Dawn* appearing for the traditional cruise market and *Le Commandant Charcot* representing the new and rapidly expanding expedition cruise sector. The latter's ice-breaking capability was called upon during one cruise when the ship went to the assistance of the research vessel *Sir David Attenborough* attempting to deliver stores to a scientific expedition.

Ferries of all types feature quite strongly in this edition of significant ships but that is not unexpected as the sector appears to have taken over from offshore as a testing ground for new technologies. Among the ships from Europe are the Baleria-owned *Eleanor Roosevelt* claimed as the first fast ferry powered by gas-fuelled reciprocating engines, and *Havila Capella*, the first of four ships for new Norwegian operator Havila Kystruten.

There are also several ferries from Asia where a new generation of vessels is being built to replace older and less efficient vessels. In many cases the ferry sector is being supported by governments keen to shift freight off road.

Malcolm Latartche
Associate Editor, March 2021

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.

ALTERA WAVE – Shuttle tanker

Shipbuilder:...**Samsung Heavy Industries Co. Ltd**
Vessel's name: .....***Altera Wave***
Owner/Operator: .....**Altera Infrastructure**
Country: .....**UK**
Designer: .....**Samsung Heavy Industries**
Country: .....**Republic of Korea**
Model test establishment used: .... **Samsung Ship Model Basin**
Flag: .....**NIS**
IMO number: **9863558**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: **Nil**

Delivered in January 2021 by Samsung to Altera (previously Teekay Offshore), *Altera Wave* has taken the shuttle carrier type to a new level of technical sophistication.

Altera Wave is the first of two Aframax DP2-class shuttle tankers that have a diesel-electric propulsion system which features no less than four power sources. The system is similar to that of the Suezmax *Aurora Spirit* built a year earlier. The main engines are a quartet of Wärtsilä 8L34DFs in a genset configuration that each delivers 3,690kWe at 720rpm. The engines are intended to run mainly on LNG but can use MDO as a back-up. That said, the MDO option is designed to be the least favoured with the secondary choice for power being the ship's ability to also make use of recovered and liquefied volatile organic compounds(VOCs) from the cargo injected into the LNG fuel.

The VOC collection system is also from Wärtsilä and as well as providing what is effectively free energy for the ship, also helps it to meet strict VOC emission reduction in Norwegian waters from where the vessel will load most of its cargo. As a DP shuttle tanker, power requirements can vary massively during loading and here the vessel is aided by the twin 1,808kWh battery energy storage system that can provide instantaneous power when needed.

In addition, the vessel is equipped with a redundant electrical propulsion driving two CPP propellers, complemented by one tunnel and three azimuth thrusters for dynamic positioning operations.

TECHNICAL PARTICULARS

Length oa: .....Approx. 245 m
Length bp: .....233 m
Breadth moulded: 43.8m
Depth moulded
to main deck: 22.4m
to upper deck: 22.4m
Width of double skin
side: 2.5m
bottom: 2.5m

Draught
scantling: 15.0m
design: 14.2m
Displacement: 128,000t
Lightweight: 24,500t
Deadweight
scantling: 103,500t
design: 96,500t
Speed, service (--%MCR output): 14.5knots
Incl. 15% power margin (90% of MPP)
Cargo capacity (m^3)
Liquid volume: 113,570
Bunkers (m^3)
LNG: 2,000
Diesel oil: 2,700
Water ballast (m^3): 40,000
Tankers – percentage segregated ballast:...100%
Daily fuel consumption: .....61.1tonnes 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(T), Clean(Design), NAUT(AW), Bow loading, VCS(2) 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, x)*, Battery Power, Recyclable, SPM(except for 4.2.2 regarding the distance of fairlead), HMON(A1,B,C1,G4), BMON, LCS, HELDK-SH(CAA-N), Gas fuelled

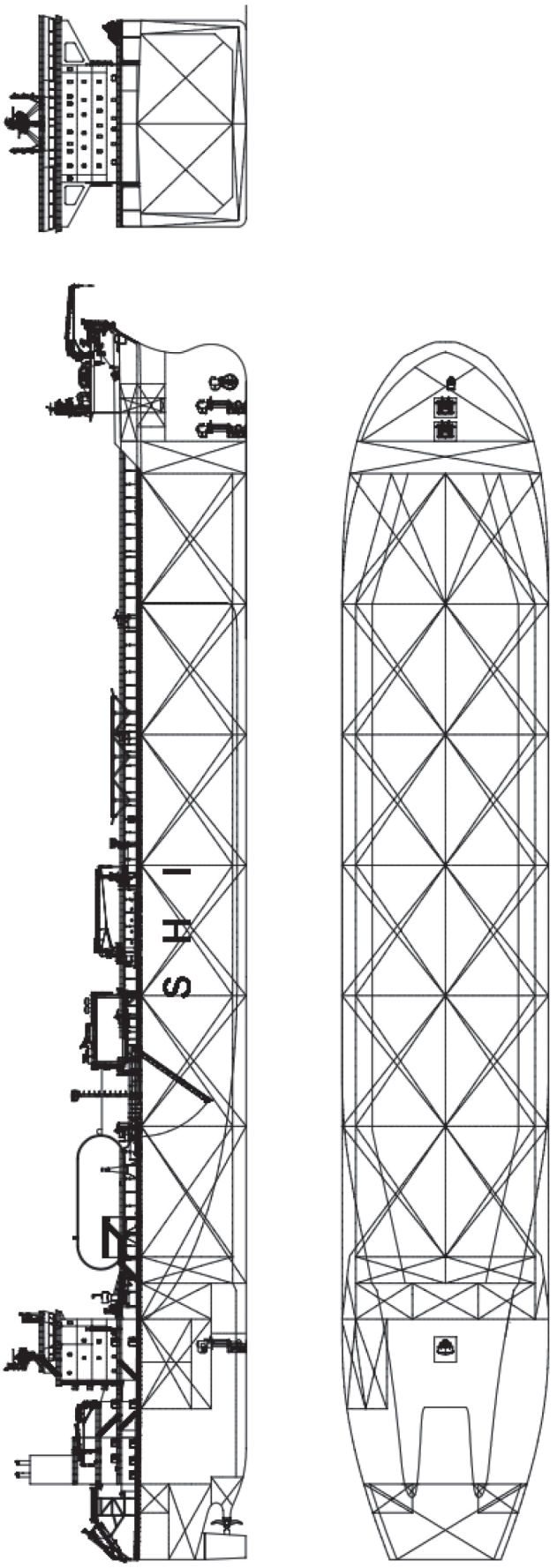
Propulsion
Main engine(s)
Design: .....4-stroke engine
Model: 8L34DF
Manufacturer: .....Wärtsilä
Number: 4
Type of fuel: .....LNG and MDO
Output of each engine: 3,840kW

Gearbox(es)
Make: .....Brunvoll
Model: .....AG TS1400
Number: 2
Output speed: 83rpm
Propeller(s)
Material: .....NI-Al bronze
Designer/Manufacturer: .....Brunvoll
Number: 2
Fixed/Controllable pitch: .....CPP
Diameter: 6.9m
Speed: 83rpm
Main-engine driven alternators
Number: 4
Make/type: .....Wärtsilä
Output/speed of each set: .....3,690kWe / 720rpm
Boilers
Number: 2
Type: .....Oil fired
Make: .....Alfa Laval
Output, each boiler: 20tonnes/h
Bow thruster(s)
Make: .....Brunvoll
Number: .....1x tunnel, 2x azimuth
Output (each): 2,200kW

Stern thruster(s)
Make: .....Brunvoll
Number: .....1x azimuth
Output (each): 2,200kW
Deck machinery
Cargo cranes/cargo gear
Number: 2
Make: .....MacGregor
Type: .....High pressure, self-contained ele.-hyd. single jib type
Performance: .....15tonnes SWL, each
Other cranes
Number: .....Provision crane x2, BLS service crane x1
Make: .....MacGregor
Type: .....High pressure, self-contained ele.-hyd. single jib type
Tasks: .....For provision and equipment handling & BLS service
Performance: .....Provision crane - 8tonnes SWL, each, BLS service crane - 5tonnes SWL
Mooring equipment
Number: .....2x mooring winches combined with windlass (1 C/L + 2 M/D + 1 W/H, each), 6x mooring winches (2 M/D + 1 W/H, each)
Make: .....MacGregor
Type: .....Ele.-hyd. driven (high pressure type), non-auto tension
Special lifesaving equipment
Number of each and capacity: .....1x 36 persons
Make: .....Viking
Type: .....Totally enclosed freefall type
Cargo tanks
Number: 6
Grades of cargo carried: .....Crude oil
Cargo pumps
Number: 4
Type: .....Centrifugal, single stage
Make: .....Wärtsilä
Stainless steel: .....Impeller shaft
Capacity (each): .....2,500m^3/h
Cargo control system
Make: .....Scarna
Type: .....Hydraulic system
Ballast control system
Make: .....Scarna
Type: .....Hydraulic system
Ballast water treatment system
Make: .....Headway
Capacity: .....2 x 2,500m^3/h
Complement
Officers: .....17 persons
Crew: .....13 persons
Suez/Repair Crew: .....6 persons

Navigation and other equipment
Bridge control system
Make: .....Brunvoll
Is bridge fitted for one-man operation: .....Y
Integrated bridge system: .....Y
If yes, make: .....Furuno
Model: FMD-3300
Radars
Number: 3
Make: .....Furuno
Model(s): .....1 x FAR-3330S +2 x FAR-3320
Fire detection system
Make: .....Consilium
Type: .....Salwico Fire Alarm System
Fire extinguishing systems
Engine room: .....Foam fire fighting system
- Make/Type: .....Survitec/High expansion Foam
Cabins: .....Seawater fighting system
- Make/Type: .....SHI
Public spaces: .....Seawater fighting system
- Make/Type: .....SHI
Waste disposal plant
Incinerator,
- Make: .....Teamtec AS / Model: GS900CRSX
Sewage plant
- Make: .....Il-Seung / Model: ISB-07
Other installed monitoring tools: .....Ship performance monitoring system
Energy Saving Technologies: .....Battery (2 x 904kWh), LED light, VFD (Propulsion motors, thrusters, IGG CSW pump, ballast pump, cargo oil pump, cargo stripping pump)
Contract date: .....31 July 2018
Launch/float-out date: .....04 April 2020
Delivery date: .....04 January 2021

ALTERA WAVE



AQUASMERALDA – Product/chemical tanker

Shipbuilder: **Jiangsu New Yangzi Shipbuilding Co. Ltd**
Vessel's name: ***Aquasmeralda***
Owner/Operator: **Chandris**
Country: **Greece**
Designer: **Shanghai Merchant Ship Design & Research Institute, CSSC (SDARI)**
Country: **China**
Model test establishment: **China Ship Scientific Research Centre**
Flag: **Liberia**
IMO number: **9884801**
Total number of sister ships already completed (excluding ship presented): **4**
Total number of sister ships still on order: **Nil**

Aquasmeralda, delivered by New Yangzi Shipbuilding, a subsidiary of Yangzijiang Shipbuilding Group to Greek operator Chandris, is a SDARI-designed MR product/chemical tanker with a length of 182.55m, a beam of 32.20m and a deadweight of 50,295tonnes. The vessel is the first of a pair for the Greek owner and its delivery was followed within weeks by the sister vessel *Aliai*. Two other ships of the same design were delivered to Celsius Shipping.

The ship has 12 cargo tanks and two slop tanks and is designed for carriage of up to six grades of clean and dirty petroleum products and IMO types 2 and 3 chemical liquid cargoes. The tanks are separated by corrugated bulkheads. Cargo handling equipment comprises a Marflex electric deep well pump in each tank. Capacities being 550m^3/h for the main tanks and 300m^3/h for the slop tanks.

Aquasmeralda is powered by a six-cylinder MAN B&W ultra-long stroke G50ME-C9.6 main engine with a power output of 7,240kW driving a 6.9m diameter fixed pitch propeller at 84.1rpm MCR. Service speed at 75% MCR is 14.5knots. With no scrubber installed the ship is required to use low-sulphur fuels. The SDARI design can however be customised for other fuel types and engine choices.

An optimised hull form allows the ship to comfortably meet EEDI requirements. The vessel's attained rating being 4.03 against a required 6.23. A SunRui ballast treatment system which has both IMO and US Coast Guard approvals is installed allowing worldwide trading.

TECHNICAL PARTICULARS

Length oa: 182.55m
Length bp: 174.00m
Breadth moulded: 32.20m
Depth moulded: 19.10m
Width of double skin
side: 2.02m
bottom: 2.15m
Draught
scantling: 13.30m
design: 11.00m
Gross: 29,725t
Deadweight
scantling: 50,295t
design: 38,289t

Speed, service @75%SMCR output: 14.5knots @75% SMCR with 15% SM
Cargo capacity (m^3)
Liquid volume: 55,183
Bunkers (m^3)
Heavy oil: 1,326
Diesel oil: 340
Water ballast (m^3): 21,500

Daily fuel consumption (tonnes/day)
Main engine only: 20.3
Auxiliaries: 2.5

Classification society and notations: BV I ✠ HULL ✠ MACH,Oil and Chemical tanker ESP, CSR, CPS(WBT), unrestricted navigation, SPM, ✠AUT-UMS, BWT, CLEANSHIP, INWATERSURVEY, MON-SHAFT, LI-HG-S3, VCS

% high-tensile steel used in construction: 70%
Roll-stabilization equipment: Bilge keel

Propulsion
Main engine(s)
Design: MAN B&W
Model: 6G50ME-C9.6
Manufacturer: HSD Engine Co., Ltd
Number: 1
Type of fuel: HFO & MGO
Output of each engine: 7,240kW
Is this a diesel-electric or hybrid?: N
Propeller(s)
Material: Ni-Al-bronze
Designer/Manufacturer: CSSRC/Shanghai Marine Propeller Design Co., Ltd
Number: 1
Fixed/Controllable pitch: FPP
Diameter: 6,900mm
Speed: 84.1rpm (MCR)
Diesel-driven alternators
Number: 3
Engine make/type: ZhenJiang China Marine-XianDai Generating Co., Ltd
Type of fuel: HFO & MGO
Alternator make/type: ZhenJiang China Marine-XianDai Generating Co., Ltd
Output/speed of each set: 1,000kW/900rpm

Boilers
Number: 1+1
Type: 1 x oil-fired boiler plus 1 × composite boiler
Make: Alfa Laval
Output: Oil-fired boiler: 18ton/h; Composite boiler: oil-fired section: 1,500kg/h; exhaust gas section: 550kg/h
Stern appendages/special rudders: Semi balance rudder
Deck machinery
Cargo cranes/cargo gear
Number: 1
Make: Jiangyin Safety Sea Marine Equipment Co., Ltd
Type: Electric Hydraulic Hose Crane
Performance: 10tX 5~ 23.5m
Other cranes
Number: 1
Make: Jiangyin Safety Sea Marine Equipment Co., Ltd
Type: Electric Hydraulic Provision Crane
Tasks: Provision and spare handling
Performance: 4t X 2~9m
Mooring winch
Number: 6
Make: FLutek Ltd
Type: Hydraulic

Special lifesaving equipment
Number of each and capacity: 25 person
Make: Jiangyinshi Beihai LSA Co., Ltd
Type: 5.7m Totally enclosed fire-protected lifeboat and gravity luffing arm type davit

Cargo tanks
Number: 12+2
Grades of cargo carried: 6
Product range: product oil, chemical
Coated tanks: Hempel, phenolic epoxy
Stainless steel – piping: 316L for piping
Cargo pumps
Number: 12+2+1
Type: Electric motor driven, deep well, centrifugal pump, frequency converter control
Make: Marflex
Stainless steel: AISI 316L
Capacity (each): 550m^3/h x 12; 300m^3/h x 2; 70m^3/h x1
Ballast water treatment system
Make: SunRui
Capacity: 1,500m^3/h

Complement: 25
Suez/Repair Crew: 6

Navigation and other equipment
Bridge control system
Make: Furuno
Is bridge fitted for one-man operation? N
Integrated bridge system: Y
If yes, make: Furuno
Radars
Number: 2
Make: Furuno
Model(s): FAR-2338SW,FAR-2328W

Fire extinguishing systems
Cargo Deck: Fixed foam system
Make/Type: Lingjack
Engine room: CO_2 and fixed water-based local application fire fighting
Make/Type: Lingjack

Waste disposal plant
Incinerator
Make: Luzhou Machine Co., Ltd
Model: OG200C
Waste compactor
Make: Floriner / Model: BG-E-T3C
Waste shredder/crusher
Make: TGA / Model: 100-2
Sewage plant
Make: Hansun / Model: ST-20U

Efficiency
Attained EEDI value: 4.03g-CO_2/tonne-NM
Required EEDI value: 6.23g-CO_2/tonne-NM
Energy Saving Technologies: cap fin and fan duct
Hull coatings: Antifouling paint

Contract date: 05 June 2015
Launch/float-out date: 11 August 2020
Delivery date: 10 September 2021

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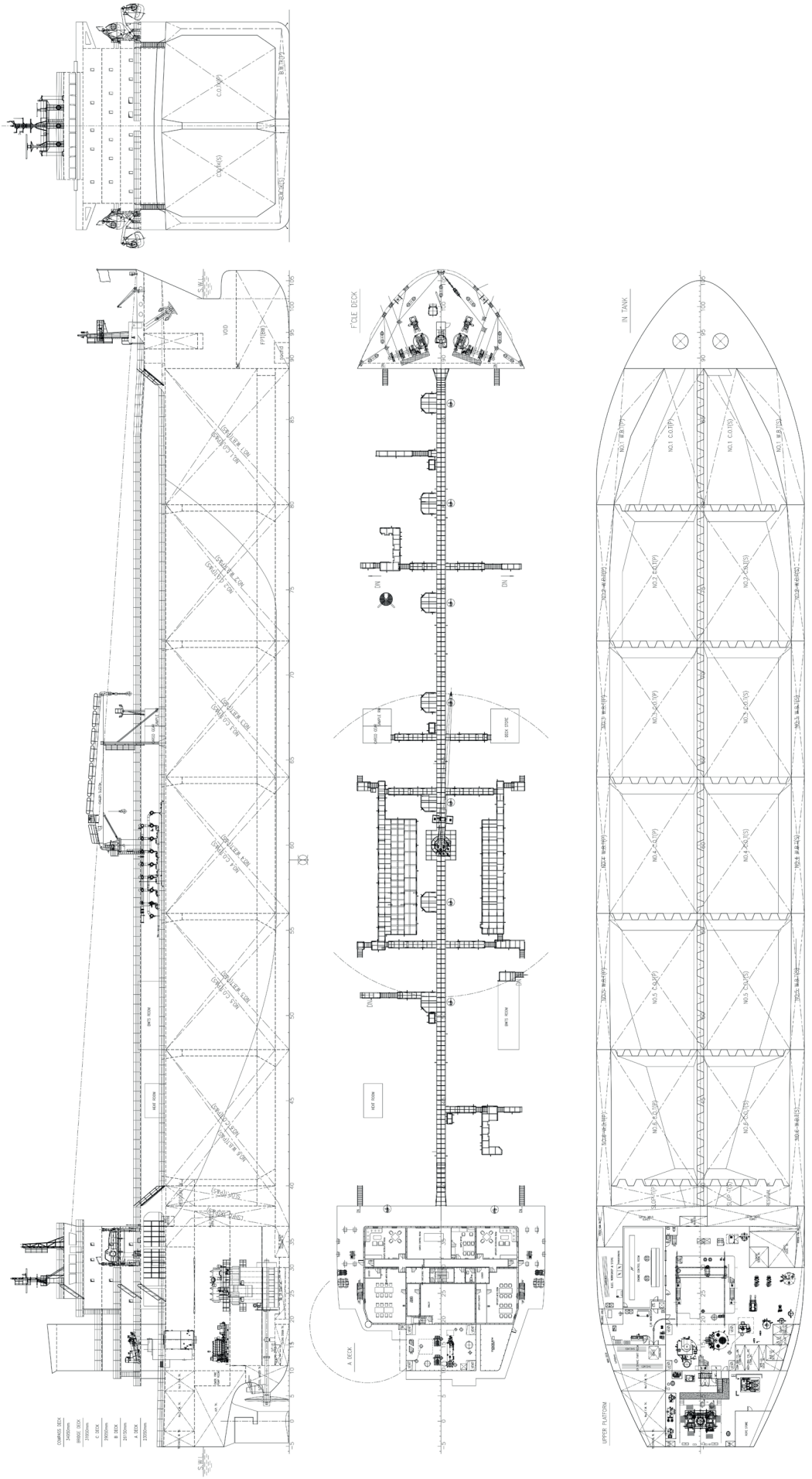
AQUASMERALDA



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ARABELLA – Product/chemical tanker

Shipbuilder:..... **Icdas Celik Enerji Tersane ve Ulasim Sanayi AS**
Vessel's name:..... ***Arabella***
Owner/Operator: ..... **GEFO Gesellschaft für Oeltransporte mbH**
Country:..... **Germany**
Designer: ..... **Delta Marine Engineering and Computer Co.**
Country:..... **Turkey**
Model test establishment used:.... **Analysed by Delta Marine with CFD**
Flag:..... **Cyprus**
IMO number: **9909247**
Total number of sister ships still on order: **Nil**

Superficially a sister ship to the 2018-built *Gioconda*, *Arabella* was delivered to German chemical tanker operator GEFO in September 2021. The vessel is currently the largest and newest vessel in the GEFO fleet. *Arabella* and her sister were built by Icdas Celik Enerji Tersane in Turkey to a design by Turkish designer Delta Marine.

At 110m in length and 18m in beam and with a deadweight of 7,703tonnes, *Arabella* shares the same dimensions as its elder sister. The difference between them is that *Arabella* reflects GEFO's shift to favouring LNG as a fuel rather than HFO. The company has several ships on order with Chinese yards and one of these became the first to run on LNG when delivered last year.

Whilst *Gioconda* was equipped with a MAN 6L32/44CR four-stroke engine, the newer vessel has been equipped with a 6L34DF engine from Wärtsilä that produces 3,000kW of power and also has a main engine driven alternator with an output of 1,000kW. The engine drives a 4.5m controllable pitch propeller through a Wärtsilä SCV105 gearbox for a service speed of 13knots. The vessel was delivered LNG ready with space for two fuel tanks to be installed on deck aft of the deck-mounted slop tanks.

The vessel is equipped with 16 cargo tanks of which 12 are large fitted with Framo 200m^3/h hydraulic deepwell pumps and four are smaller with 100m^3/h pumps.

Efficiency of the vessel is rated at 11.3g CO_2 per tonne/mile against a required EEDI rating for the ship of 15.1.

TECHNICAL PARTICULARS

Length oa:..... 110.00m
Length bp: 107.49m
Breadth moulded:..... 18.00m
Depth moulded
to main deck: 9.20m
Width of double skin
side:..... 1,230mm
bottom:..... 1,200mm
Draught
scantling:..... 7.10m
design:..... 6.95m
Gross:..... 5,582t
Displacement:..... 10,830t
Lightweight: 3,127t
Deadweight
scantling:..... 7,703t
design: 7,446t
Block co-efficient:..... 0.76 (at 7.10m)
Speed, service:..... 13.0knots (90% MCR, 15% sea margin, 200kW S/G included)
Cargo capacity (m^3)
Liquid volume: ..... 8,562m^3:
Bunkers (m^3)
Heavy oil:..... VLSFO: 358m^3
Diesel oil: ..... MGO: 105m^3
Water ballast (m^3):
Tankers: ..... 2,702m^3
Daily fuel consumption:
Main engine only:..... 11.92t/day@13knots

Classification society and notations: .....DNV ✠ 1A Tanker for chemicals Tanker for oil BIS BWM(T) Clean COAT-PSPC(B) E0 ESP Ice(1A) NAUT(NAV) TMON(oil lubricated) VCS(2)
% high-tensile steel used in construction: ... 100%

Propulsion
Main engine(s)
Model: 6L34DF
Manufacturer: ..... Wärtsilä
Number:..... 1
Type of fuel: ..... MGO, VLSFO & LNG
Output of each engine: 3,000kW
Is this a diesel-electric or hybrid?:..... Hybrid
Gearbox(es)
Make: ..... Siemens/Wärtsilä
Model: SCV105
Number: 1
Output speed: 120rpm
Propeller(s)
Material: ..... CuNiAl
Designer/Manufacturer:..... Wärtsilä
Number: 1
Fixed/Controllable pitch: ..... CPP
Diameter:..... 4,500mm
Speed:..... 120rpm
Main-engine driven alternators
Number: 1
Make/type: ..... Wärtsilä
Output/speed of each set: ..... 1,000kW @1,800rpm (800kW boost with PTI)
Diesel-driven alternators
Number: 3
Engine make/type:..... MAN D2862LE328
Type of fuel: ..... MGO
Alternator make/type:..... Leroy Somer / LSAM 19.3 M6/4p
Output/speed of each set:.... 700kW@1,800rpm
Exhaust-gas scrubbing equipment:.... (provided for SCR system)
Boilers
Number: 2
Type: ..... Horizontal execution, Oil-fired thermal oil heaters
Make: ..... GESAB
Output, each boiler: 2,000kW

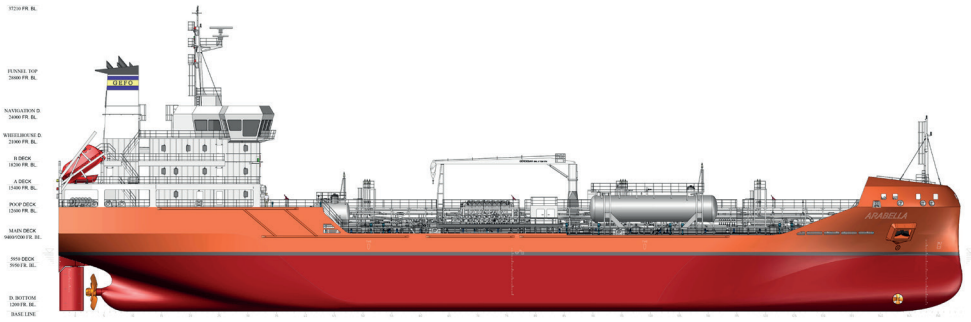
Bow thruster(s)
Make: ..... Schottel
Number:..... 1
Output (each):..... Fixed pitch, 550kW

Deck machinery
Cargo cranes/cargo gear
Number: 1
Make: ..... Gurdesan
Type: ..... Electro-hydraulic, Hose handling crane
Performance: ..... 5t, 17m outreach
Other cranes
Number: 1
Make: ..... Gurdesan
Type: ..... Electro-hydraulic
Tasks: .....
Provision & Rescue Boat
Performance: ..... 2t, 8m outreach
Mooring equipment
Number: ..... 2 x Combined Windlass & Mooring Winch; 2 x Aft Mooring Winch
Make: ..... Gurdesan
Type: ..... Electro-hydraulic driven

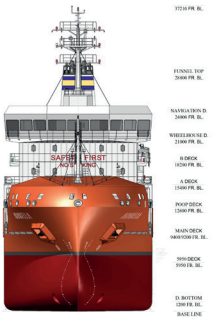
Special lifesaving equipment
Number of each and capacity:..... 20 Persons
Make:..... GEPA G-FFF-2
Type: ..... Free-fall Lifeboat
Cargo tanks
Number: ..... 16 cargo tanks (6 pairs of big, 2 pairs of small tanks); 2 Slop tanks on main deck
Product range:..... Oil Products, IMO II type chemical cargoes (acc. to IBC Code)
Stainless steel – structure/piping:.... Structure, Piping, Outfitting
Cargo pumps
Number:..... 12 tanks with SD125, 4 tanks with SD100, 2 slop tanks with TK80
Type: ..... Hydraulic driven deepwell
Make: ..... Framo
Stainless steel: 316L
Capacity (each): ..... 12 pcs: 200m^3, 4 pcs: 100m^3, 2 pcs:70m^3
Cargo control system
Make:..... BESI
Type: 4-3602-6.2C
Ballast control system
Make:..... BESI
Type: 4-3602-6.1A
Ballast water treatment system
Make:..... Alfa Laval, PureBallast 3.2 300
Capacity: ..... 300m^3/h
Complement
Officers:..... 7
Crew: 8
Integrated bridge system:..... N
Radars
Number:..... 2
Make: ..... JRC
Model(s):..... X-band: JMR-9225-6XN S-band: JMR-9282-SN
Fire detection system
Make:..... Consilium
Type: ..... COMBO- 6022 Addressable
Fire extinguishing systems
Engine room:
- Make/Type: ..... Minimax MX1230
Waste disposal plant
Waste compactor
- Make:..... Evac / Model: UBP-30S
Sewage plant
- Make:..... Detegasa / Model: STPN 420, 4200 L/DAY
Efficiency
- Attained EEDI value:..... 11.3 (g – CO_2/ton * mile)
- Required EEDI value:..... 15.1 (g – CO_2/ton * mile)
- Installed Fuel Meters:..... Volume Type
- Other installed monitoring tools: ..... Torque Meter: Wärtsilä, Sea State: Weather Fax JRC Jax 9b, Napa Ship Loading Software
- Energy Saving Technologies: .... Rudder bulb, twisted rudder
- Hull coatings: ..... Antifouling Paint: Hempel's Antifouling Dynamic 8000, Impressed Current Antifouling System: MME

Contract date: ..... 30 May 2016
Launch/float-out date:..... 23 April 2021
Delivery date: ..... 17 September 2021

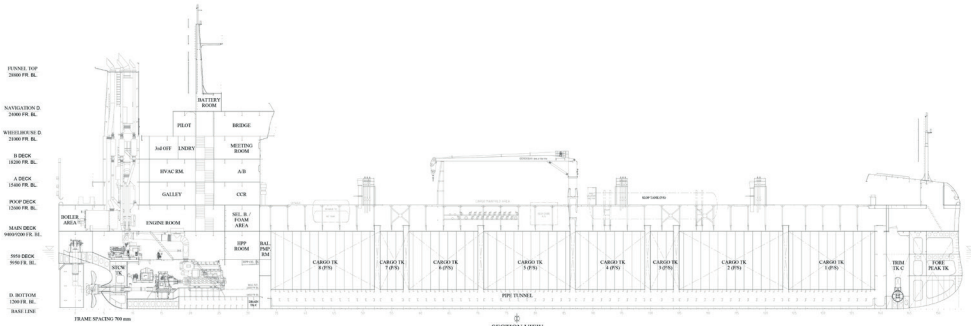
ARABELLA



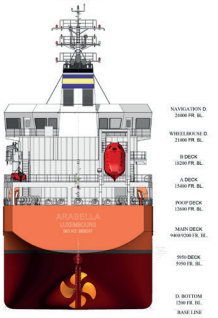
PROFILE



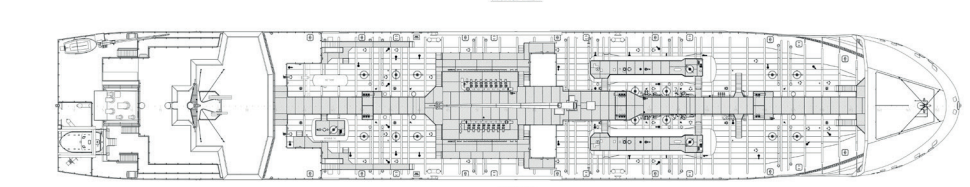
FRONT VIEW

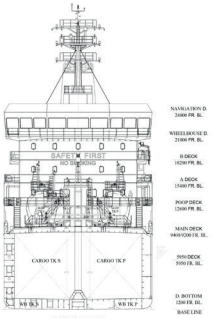


SECTION VIEW

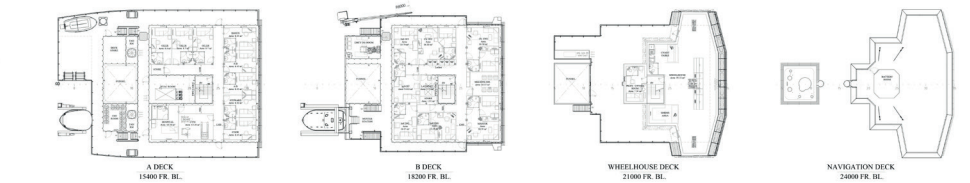


AFT VIEW


TOP VIEW



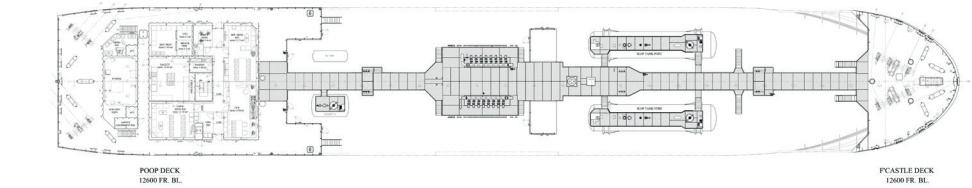
SECTION VIEW


A DECK 15400 FR. BL.

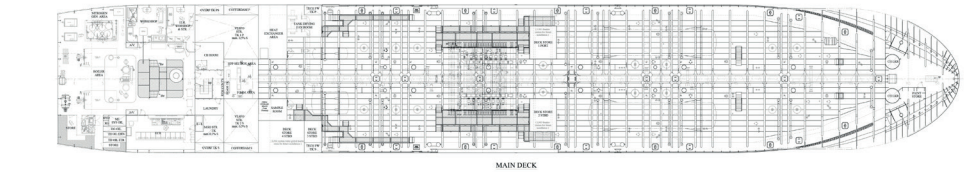
B DECK 18200 FR. BL.

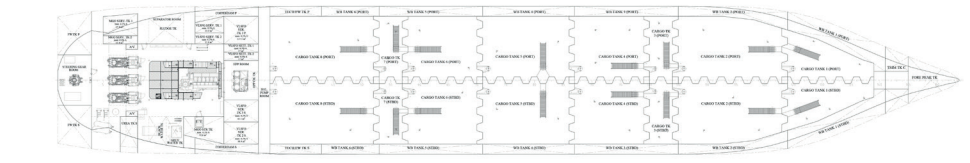
WHEELHOUSE DECK 21000 FR. BL.

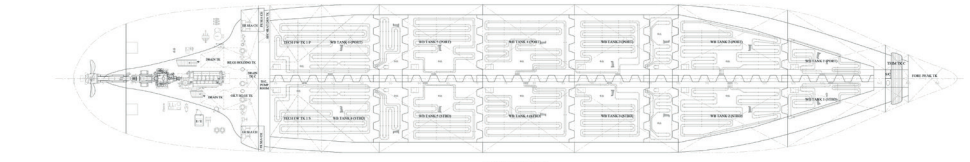
NAVIGATION DECK 24000 FR. BL.


POOP DECK 12600 FR. BL.

F'CASTLE DECK 12600 FR. BL.


MAIN DECK


DECK 5960


DOUBLE BOTTOM

ARVIK I – Icebreaking bulk/multi-purpose carrier

Source: SR Photography

Shipbuilder: ..... **Japan Marine United Corporation**
Vessel's name: ..... ***Arvik I***
Owner/Operator: ..... **Fednav Limited**
Country: ..... **Canada**
Designer: ... **Japan Marine United Corporation**
Country: ..... **Japan**
Flag: ..... **Canada**
IMO number: **9854698**
Total number of sister ships still on order: **Nil**

Arvik I, delivered in March by Japan Marine United to Canadian operator Fednav, is a design evolution of two earlier 'sister' ships, *Umiak I*, delivered in 2006 and *Nunavik*, delivered in 2014. Both earlier ships were constructed by the same builder.

The 30,323dwt, Polar Class 4 vessel is classed with DNV as a bulk carrier but could be considered a multi-purpose vessel. It will be used for shipping nickel concentrate from mines to smelting facilities and on return journeys the vessel can carry containers, equipment, vehicles and two grades of fuel oils in separate cargo oil tanks.

Arvik I has a double hull in its five-hold cargo section of 30,221m^3 capacity and is served by three centreline cranes, two of which are 30.5tonne SWL and that between holds 1 and 2 having a 65tonne capacity a significant increase over the larger crane on its predecessors.

The vessel has continuous icebreaking capability to sail in 1.5m thick ice and is equipped with icebreaking bow, ducted propeller and ice knife in the stern.

In order to comply with IMO NOx Tier III regulations, this vessel is equipped with EGR for main engine and SCR for auxiliary engines. The main engine is a Hitachi Zosen-built MAN 7S70ME-C8.5 with a 21,770kW power output linked to a Kongsberg controllable pitch propeller. An unusual feature for a bulk carrier but necessary for operation in icebreaking mode. The propeller is mounted in a nozzle for optimising thrust and to provide protection from ice pieces. Open water service speed is 13.5knots.

For environmental reasons determined by the owner, operation in arctic areas is done using distillate fuels only. The vessel is exempt from EEDI as a Polar Code 'Category' vessel required to operate in heavy ice.

TECHNICAL PARTICULARS

Length oa: 188.80m
Breadth moulded: 26.60m
Depth moulded to upper deck: 15.70m
Draught scantling: 11.71m

Gross: 22,615t
Deadweight: ..... 30,323 (according to DNV) – MDL 19/2/22
scantling: 31,279t

Speed, service (--%MCR output): 13.5knots

Classification society and notations: ..... ✠1A Bulk Carrier, ESP, BIS, BWM(T), CLEAN, COAT-PSPC(B), DAT(-30), DG(B,P), ECO, Grab (3 -20t), HC(A), Holds Nos. 2, 4 or 3 may be empty, Inert, LCS, PC(4), Strengthened (DK, HA), TMON, SAFELASH

Propulsion
Main engine(s)
Design: ..... MAN Energy Solutions SE
Model: 7S70ME-C8.5-EGRBP
Manufacturer: ..... Hitachi Zosen Corporation
Number: 1
Type of fuel: ..... MGO
Output of each engine: 21,770kW
Is this a diesel-electric or hybrid?: ..... N

Propeller(s)
Material: ..... Ni-Al-Bronze
Designer/Manufacturer: ..... Kongsberg Maritime AB
Number: 1
Fixed/Controllable pitch: ..... Controllable pitch

Diesel-driven alternators
Number: 3
Engine make/type: ..... Daihatsu Diesel Mfg. Co., Ltd / 4-cycle, trunk piston type with SCR system
Type of fuel: ..... MGO
Alternator make/type: ..... Taiyo Electric Co., Ltd

Boilers
Number: 1
Type: ..... Vertical Composite Boiler
Make: ..... Osaka boiler Mfg. Co., Ltd

Stern appendages/special rudders: .... Balanced stream lined double plate type rudder, Propulsion nozzle for propeller

Deck machinery
Cargo cranes/cargo gear
Number: 3
Make: ..... Iknow Machinery Co., Ltd
Type: ..... Electro-hydraulic driven type jib crane
Performance: ..... 1 x 65t x 30m radius, 2 x 30t x 25m radius. Certified for man-riding operations

Mooring equipment
Number: ..... 2 x Windlass & mooring winch, 4x Mooring winch
Make: ..... Fukushima Ltd
Type: ..... Electro-hydraulic driven

Special lifesaving equipment
Number of each and capacity: ..... 1 x 30 persons
Make: ..... Hatecke GmbH
Type: ..... Free-fall type

Cargo/capacity
Hatch covers
Design: ..... MacGregor Japan Ltd
Manufacturer: ..... MacGregor Japan Ltd
Type (upper deck/other decks): ..... End folding type
Containers
Total TEU capacity: 336TEU
Reefer plugs: ..... 18 sets

Cargo tanks
Number: 2
Grades of cargo carried: ..... Product oil

Cargo pumps
Number: 3
Type: ..... Hydraulic driven submerged
Make: ..... Framo Nippon KK

Ballast control system
Make: ..... Nakakita Seisakusho Co., Ltd

Ballast water treatment system
Make: ..... JFE Engineering Corporation

Complement
Officers: 9
Crew: 12
Supernumaries/Spare: 9

Navigation and other equipment
Bridge control system
Make: ..... Nabtesco Corporation
Type: ..... M-800-V M/E & CPP Remote Control System
Is bridge fitted for one-man operation?: ..... N
Integrated bridge system: ..... N

Radars
Number: 2
Make: ..... Japan Radio Co., Ltd
Model(s): JMR-9230-S3, JMR-9225-7X3

Fire detection system
Make: ..... Consilium Nittan Marine Ltd
Type: ..... Salwico CCP

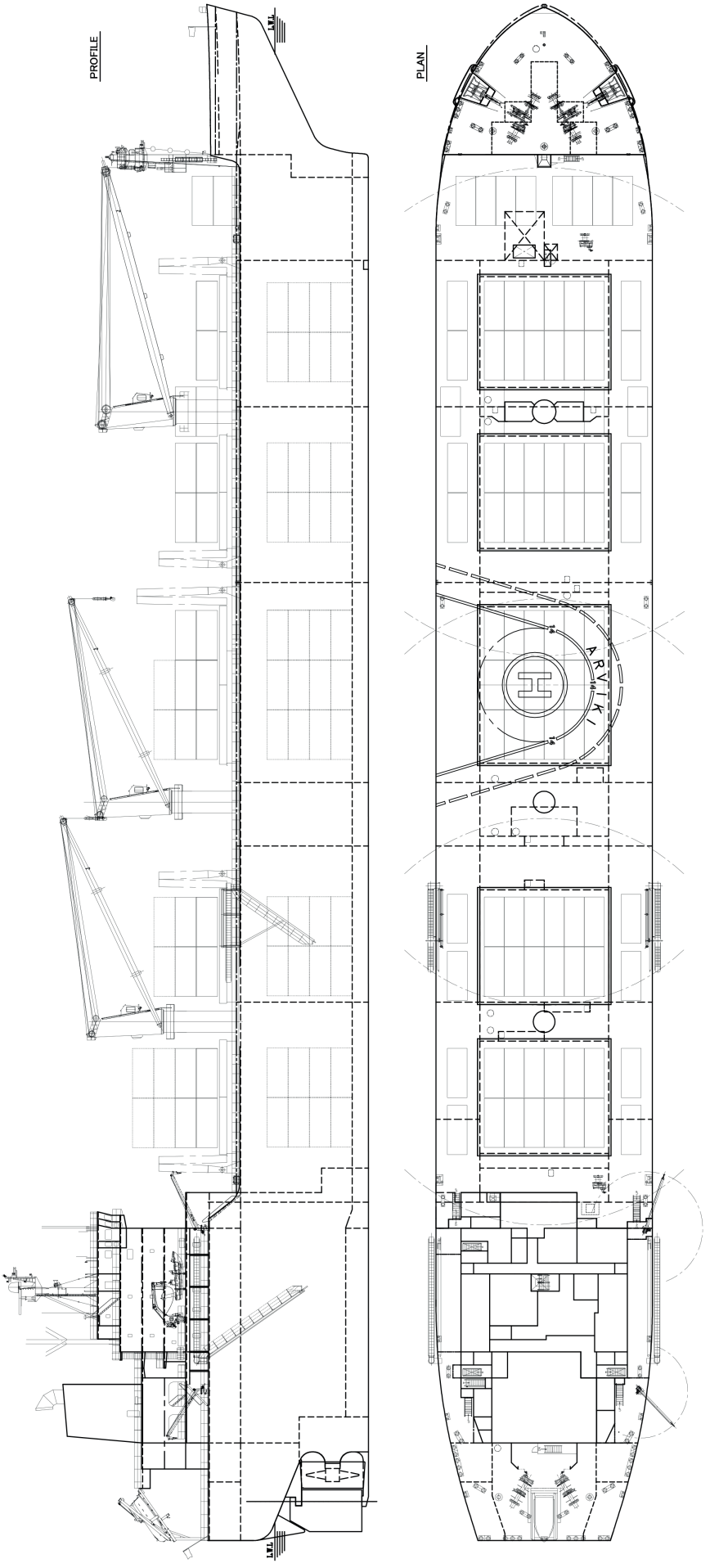
Fire extinguishing systems
Cargo holds: ..... Fixed CO_2 Fire Extinguishing System
Make/Type: ..... Survitec Fire Solutions Japan Co., Ltd
Engine room: ..... Fixed CO_2 Fire Extinguishing System
Make/Type: ..... Survitec Fire Solutions Japan Co., Ltd

Waste disposal plant
Incinerator
Make: ..... Sunflame Co., Ltd
Model: OSV-600SAI
Sewage plant
Make: ..... Evac Oy
Model: ..... Evac MBR 4K

Efficiency
Attained EEDI value: ..... The vessel is exempt from EEDI as a Polar Code "Category A" vessel required to operate in heavy ice
Installed Fuel Meters: ..... Torque meter and ship performance monitoring system installed to optimise efficiency in both open-water and ice transits

Delivery date: ..... 29 March 2021

ARVIK I



AUTO ADVANCE – Vehicles carrier

Shipbuilder: **Jiangnan Shipyard (Group) Co., Ltd**
Vessel's name: ***Auto Advance***
Owner/Operator: **United European Car Carriers**
Country: **Norway**
Designer: **Shanghai Merchant Ship Design And Research Institute (SDARI)**
Country: **China**
Model test establishment: **Shanghai Ship & Shipping Research Institute (SSRI)**
Flag: **Portugal**
IMO number: **9881299**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: **2**

Built by Jiangnan Shipyard for United European Car Carriers, *Auto Advance* is the first in a series of three 3,600CEU PCTCs although its main claim to fame is being the world's first dual-fuel battery hybrid car carrier. The vessel's name is particularly apt as the battery energy storage addition advances the owner's environmental choices beyond being the first to adopt dual-fuel engines in 2016 with the *Auto Eco*.

The SDARI-designed vessel is by no means the largest for a car carrier being 169.1m in length and 28m wide. Its hull form is typical of its type and cargo area is about 30,600m^2 over 10 car decks including two electrically operated hoistable decks.

Auto Advance is powered by a WinGD 6RT-flex50DF main engine with a power output of 8,640kW at 124rpm connected to a controllable pitch propeller. A type C bunker tank with a capacity of 600m^3 is supplemented by a 470m^3 tank for low-sulphur MGO. Along with the 510kWh battery system supplied by Corvus, and which is charged using a shaft generator, the LNG-fuelled power system is claimed to cut emissions of SOx, NOx and CO_2 to significantly low levels.

The energy saving system also permits for only two auxiliary gensets being needed instead of the normal three for a vessel of this size. The energy storage system allows the vessel to manoeuvre in and out of ports without using the main engine. During port stays the ship can make use of shore electricity to eliminate the need for any engines running.

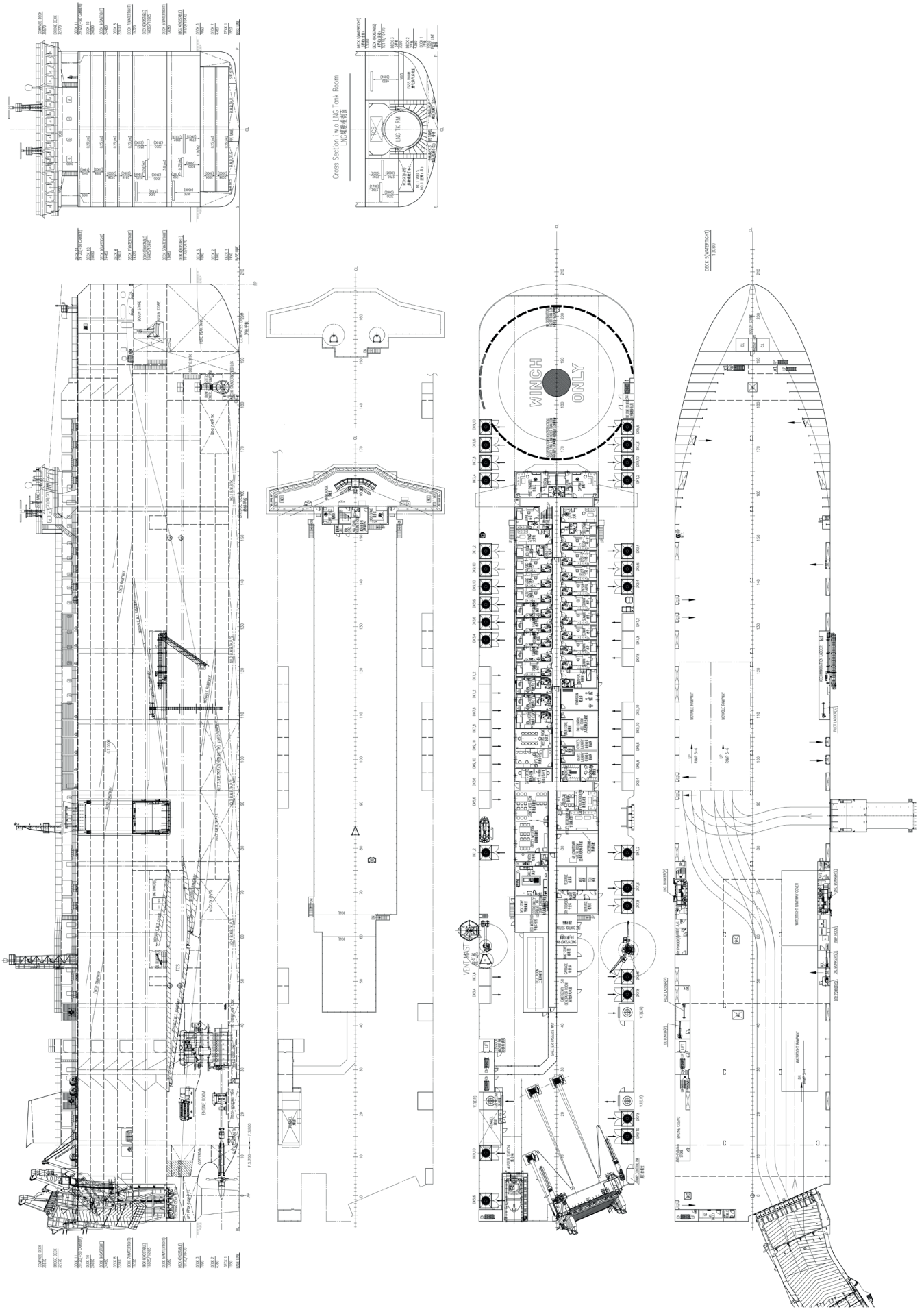
An optimised hull form and the use of LNG as fuel permits the ship to achieve an EEDI rating of 16.661 against a required 18.146.

TECHNICAL PARTICULARS

Length oa: 169.10m
Length bp: 164.50m
Breadth moulded: 28.00m
Depth moulded
to main deck: 13.08m (Freeboard deck/ No.5 deck)
to upper deck: 29.12m
Width of double skin
side: 2.75m
bottom: 1.95m
Draught
scantling: 8.80m
design: 7.70m
Gross: 35,667t
Deadweight
scantling: 12,456.8t
design: 8,222.9t
Speed, service (80%MCR output): 17.80knots
Bunkers (m^3)
Type C LNG tank: 600
L.S M.G.O: 470
Water ballast (m^3): 4,300
Daily fuel consumption (tonnes/day)
Main engine only: 29.1
Classification society and notations: DNV +1A, Car Carrier, MCDK, BIS,EO,TMON(oil Lubricated),LCS, NAUT(NAV),Gas Fuelled, BWM-T,BWM-E(f),DG-(P),Recyclable, Battery(Safety)
% high-tensile steel used in construction: 40%
Heel control equipment: ballast & G.S. pump to be used for anti-heeling

Propulsion
Main engine(s)
Design: WinGD
Model: 6RT-flex50DF Tier-III in Gas Model
Manufacturer: Hudong Heavy Machinery Co., Ltd
Number: 1
Type of fuel: LNG, MGO
Output of each engine: 8,640kW x 124.0rpm
Is this a diesel-electric or hybrid?: Y
Propeller(s)
Material: Ni-Al-Bronze
Designer/Manufacturer: MAN
Number: 1
Fixed/Controllable pitch: Controllable
Diameter: 5.60m
Main-engine driven alternators:
Number: 1
Make/type: WETech / PMM1050-92-1000-20
Output/speed of each set: 1,050kW/ 92`124
Battery:
Number: 6x15 modules
Make/type: Corvus/ NCM lithium-ion battery
Capacity: Total 510kWh
Diesel-driven alternators
Number: 2
Engine make/type: CSSC Marine Power Co., Ltd / 6L28/32DF
Type of fuel: LNG,MGO
Alternator make/type: CM-Hyundai/ HFC6 568-14K
Output/speed of each set: 1,065kW x 720rpm
Boilers
Number: 2
Type: Steam, 1 x Aux boiler, 1 x Exhaust gas boiler
Make: Alfa Laval
Output, each boiler: 800kg/h of Aux boiler, 370kg/h of Exhaust gas boiler
Stern appendages/special rudders: Free hanging spade rudder
Bow thruster(s)
Make: Nakashima Propeller Co., Ltd
Number: 1
Output (each): 1,500kW
Other cranes
Number: 1
Make: ZhenJiang Marine Auxiliary Machinery Works/P.R. China
Type: 4t provision crane
Tasks: provision crane
Performance: 4tx5m for provision crane on starboard
Mooring equipment
Number: 2PCs- Combined mooring winch/ Cable Lifter Unit (W1, W2), 3PCs- Mooring winch (M1, M2, M4), 1PCs- Mooring winch (M3)
Make: Kongsberg Maritime Finland Oy
Type: electric
Special lifesaving equipment
Number of each and capacity: 1
Make: Norsafe
Type: Free-fall life boat
Vehicles
Number of vehicle decks (fixed/moveable): 10 (8/2)
Total cars: 3,580(RT43)
Doors/ramps/lifts/moveable car decks
Number of each: stern ramp -1; side ramp -1, moveable ramp -5; moveable car deck -2
Type: ramps -hydraulic; car deck -electric
Designer: TTS
Ballast control system
Make: BESI Marine Systems
Type: Electro-hydraulic
Ballast water treatment system
Make: Alfa Laval
Capacity: 300m^3/h
Complement
Officers: 10
Crew: 10
Supernumaries/Spare: 2 spare
Single/double/other rooms: 18 Single rooms + 4 double rooms
Passengers:
Total: 6
Number of cabins: 3 (double bed)
Navigation and other equipment
Bridge control system
Make: Kongsberg
Type: Autochief 600
Is bridge fitted for one-man operation?: Y
Integrated bridge system: Y
If yes, make: Furuno
Model: FMD-3300
Radars
Number: 3
Make: Furuno
Model(s): FAR-2338SNXT / FAR-2328 / FAR-2218BB
Fire detection system
Make: Autronica
Type: Autrosafe4
Fire extinguishing systems
Engine room: CO_2, Sea water
Make/Type: Sea hydrant, Danfoss LP-CO_2, portable extinguishers
Vehicle spaces: CO_2, Sea water
Make/Type: Sea hydrant, Danfoss LP-CO_2, portable extinguishers
Cabins: Sea water
Make/Type: Sea hydrant, portable extinguishers
Public spaces: Sea water
Make/Type: Sea hydrant, portable extinguishers
Waste disposal plant
Sewage plant
Make: Jets
Model: Ecomotive 3.33
Efficiency
Attained EEDI value: 16.661 g-CO_2/(t.nmile)
Required EEDI value: 18.146 g-CO_2/(t.nmile) (at phase 2)
Energy Saving Technologies: Full spade rudder with bulb
Contract date: March 2019
Launch/float-out date: April 2021
Delivery date: November 2021

AUTO ADVANCE



AZERBAIJAN – Rail and car ferry

Shipbuilder: **Baku Shipyard LLC**
Vessel's name: ***Azerbaijan***
Owner/Operator: **Azerbaijan Caspian Shipping CJSC**
Country: **Azerbaijan**
Designer: **Marine Engineering Bureau**
Country: **Ukraine**
Flag: **Azerbaijan Republic**
IMO number: **9843106**
Total number of sister ships still on order: **1**

Rail ferries are a rare breed and those combining road and passenger capacity even more so. Which makes *Azerbaijan*, delivered as the first of two sisters by Baku Shipyard to Azerbaijan Caspian Shipping Company (ASCO) in March 2021, particularly significant. Both ships have been built for service on the Caspian Sea connecting the Azerbaijan port of Baku with Turkmenbashi in Turkmenistan and Aktau in Kazakhstan.

Hull dimensions are a loa of 154.5m, beam of 17.5m and a design draught of 4.5m. The ship's two freight decks feature 905 lane metres for trucks and 730m for rail. This equates to 50 trucks and 56 rail wagons. The lower fright deck is fully enclosed, but the upper freight deck has an open area approximately half of the vessel's total length allowing for any hazardous cargo carried to be easily accessible when necessary.

Access is over the stern for all types of traffic and also by a starboard side ramp near the stern that can be used for rapid discharge of road vehicles. The stern ramp is strengthened to allow two tracks to be used simultaneously for rail wagon movements. The two upper forward decks contain accommodation for 100 passengers and 30 crew along with a shop, restaurant, internet café and medical facilities. The open upper deck has a helipad to allow at-sea limited personnel transfers.

The ships power requirements are provided by a pair of Wärtsilä 8L26 min engines each producing 2,600kW of power connected through Wärtsilä gearboxes to twin controllable pitch propellers. These are complemented by four Rigas Dizelis gensets each rated at 1,184kW. The engines are split equally between two separate and redundant engine rooms located on different sides of the vessel.

TECHNICAL PARTICULARS

Length oa: 154.50m
Length bp: 148.00m
Breadth moulded: 17.50m
Depth moulded
to main deck: 7.50m
Width of double skin
side: 3.75m
bottom: 1.48m

Draught
scantling: 4.50m
design: 4.50m
Gross: 8,523t
Displacement: 10,438t
Lightweight: 4,681t
Deadweight
scantling: 5,757t
Block co-efficient: 0.846
Speed, service (-85-%MCR output): 14knots

Bunkers (m³)
Heavy oil: 404.6
Diesel oil: 58.0
Water ballast (m³): 5,078

Daily fuel consumption (tonnes/day)
Main engine only: 20.2
Auxiliaries: 3.1

Classification society and notations: Russian Maritime Register of Shipping (RS) KM ★ R2 AUT1-ICS OMBO ECO HELIDECK Ro-ro passenger ship

% high-tensile steel used in construction: 85%
Roll-stabilisation equipment: Retractable fin stabiliser

Propulsion
Main engine(s)
Design: diesel engine
Model: 8L26
Manufacturer: Wärtsilä
Number: 2
Type of fuel: HFO
Output of each engine: 2,600kW
Is this a diesel-electric or hybrid?: N

Gearbox(es)
Make: Wärtsilä
Number: 2
Output speed: 200rpm

Propeller(s)
Designer/Manufacturer: Wärtsilä
Number: 2
Fixed/Controllable pitch: CPP
Diameter: 3.15m
Speed: 200rpm

Diesel-driven alternators
Number: 4
Engine make/type: Rigas Dizelis
Type of fuel: MDO
Output/speed of each set: 1,184kW/1,500rpm

Boilers
Number: 1
Type: thermal oil
Make: Alfa Laval
Output, each boiler: 1,200kW

Bow thruster(s)
Make: Veth Propulsion B.V
Number: 1
Output (each): 350kW
Stern thruster(s)
Make: Veth Propulsion B.V.
Number: 1
Output (each): 350kW

Mooring equipment
Number: 2 winch fore + 2 capstans aft
Make: Adria Winch
Type: electric

Special lifesaving equipment: MES
Number of each and capacity: 2 x 106
Make: Viking
If MES, vertical or sloping chutes?: vertical

Cargo/capacity
Hatch covers
Design: 2 folding cargo lift cover
Manufacturer: SMS-SME PTE Ltd
Type: Main Deck

Vehicles
Number of vehicle decks: 2 fixed
Total lane length: 905m, rails 730m
Total freight units: 50, length 15.0-16.5m
Total rail units: 56, length 12.02m

Doors/ramps/lifts/moveable car decks
Number of each: 1
Type: side ramp StB
Designer: SMS-SME PTE Ltd

Ballast water treatment system
Make: Alfa Laval
Capacity: 600m³/h

Complement
Officers: 8
Crew: 22
Supernumaries/Spare: 1
Single/double/other rooms: 31 single

Passengers
Total: 100
Number of cabins: 26
Percentage/number outboard: 100%

Navigation and other equipment
Bridge control system
Make: Transas
Is bridge fitted for one-man operation?: Y

Integrated bridge system: Y
If yes, make: Transas

Radars
Number: 2
Make: Transas

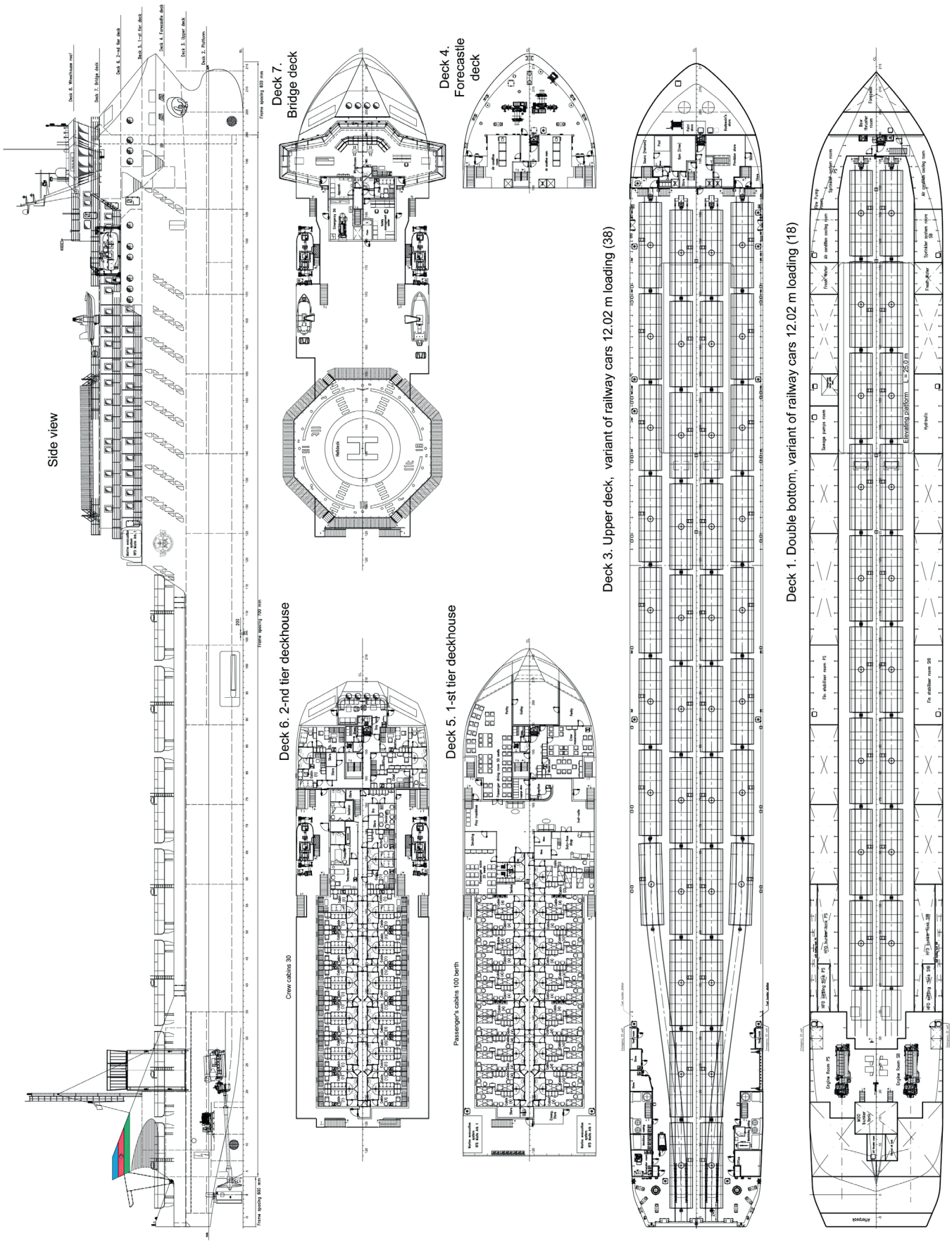
Fire detection system
Make: AKSIS Yangin

Fire extinguishing systems
Engine room: aerosol
Make/Type: Kaskad
Vehicle spaces: water spraying
Make/Type: AKSIS Yangin
Cabins: sprinkler
Make/Type: AKSIS Yangin
Public spaces: sprinkler
Make/Type: AKSIS Yangin

Waste disposal plant
Waste handled:
Incinerator
Make: TeamTec AS / Model: 210kW
Waste shredder/crusher
Make: Loipart
Sewage plant
Make: Detegasa / Model: 25m³/day

Efficiency
Attained EEDI value: 24.00
Required EEDI value: 26.42
Energy Saving Technologies: LED lighting
Hull coatings: antifouling paint

Contract date: 01 January 2015
Launch/float-out date: 13 December 2019
Delivery date: 01 March 2021


Side view
Deck 7.
Bridge deck
Deck 4.
Forecastle
deck
Deck 6. 2-nd tier deckhouse
Deck 5. 1-st tier deckhouse
Deck 3. Upper deck, variant of railway cars 12.02 m loading (38)
Deck 1. Double bottom, variant of railway cars 12.02 m loading (18)
Crew cabins 30
Passenger's cabins 100 berth
Elevating platform L = 25.0 m

BELLAVISTA EXPLORER – LPG carrier

Shipbuilder: **Hyundai Samho Heavy Industries Co., Ltd**
Vessel's name: ***Bellavista Explorer***
Owner/Operator: **Bocomm Leasing**
Country: **China**
Designer: **Hyundai Samho Heavy Industries**
Country: **Republic of Korea**
Flag: **Singapore**
IMO number: **9895305**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: **Nil**

Delivered in June 2021 by Hyundai Samho to Bank of Communications Finance Leasing based in China although eventually destined to be operated by Trafigura, *Bellavista Explorer* claimed the title of world's largest LPG carrier thanks to its 90,000m^3 cargo capacity. In addition to this, the vessel, which has a sister ship under construction, also has a main engine capable of running on LPG for which there is a separate 4,200m^3 fuel tank. This alone gives the vessel a range of over 17,000 nautical miles allowing two round trips from US to South Korea.

The vessel has a length of 229.98m, a beam of 36.6m and a draught of 12.2m. It has been equipped with four cargo tanks for carriage of LPG cargo and a single LPG fuel tank located between cargo tanks 3 and 4. Typically for a VLGC, the cargo tanks are fully refrigerated.

Bellavista Explorer is one of the first vessels to be fitted with MAN Energy Solutions LPG burning dual-fuel engines. In this case it is a MAN B&W 6G60ME-C9.5-LGIP which has a power output of 15,000kW at 93.5rpm. The engine is directly linked to a 7.4m diameter fixed pitch propeller to give a service speed of 16.8knots. When running on LPG, the engine reduces SOx emissions by 90%, NOx by 50% and CO_2 by 20% compared to when running on oil fuel. Auxiliary engines are HiMSEN h21/32 types with one being a nine-cylinder version and the other two seven-cylinder types.

The ship also features a 800m^3/h ballast water treatment system supplied by Erma First which is type-approved by both IMO and the US Coast Guard.

TECHNICAL PARTICULARS

Length oa: 229.98m
Length bp: 224.20m
Breadth moulded: 36.60m
Depth moulded
to main deck: 23.60m
to upper deck: 23.60m
to other decks: 18.937m (Sunken)
Width of double skin
bottom: 1.85m
Draught (moulded)
scantling: 12.20m
design: 11.65m
Gross: 52,868t
Displacement: 78,878t
Lightweight: 21,323t
Deadweight
scantling: 57,555t
design: 53,568t
Block co-efficient: 0.7660 (at Scantling draft)
Speed, service (--%MCR output): 16.8knots at design draft and at NCR without P.T.O. power with 15% sea margin
Cargo capacity (m^3)
Liquid volume: 90,208.3
Bunkers (m^3)
Heavy oil: 2,232.7
Diesel oil: 379.2
Water ballast (m^3): 24,001
Classification society and notations: DNV + 1A Tanker for liquefied gas BIS BWM(T) CMON COAT-PSPC(B) EO LCS Recyclable TMON(oil lubricated) ER(SCR)
% high-tensile steel used in construction: 80%

Propulsion
Main engine(s)
Design: MAN Energy Solutions
Model: Hyundai-MAN B&W 6G60ME-C9.5-LGIP with HP-SCR
Manufacturer: HHI-EMD
Number: One(1) set
Type of fuel: L.F.O. / M.G.O. / GAS (LPG)
Output of each engine: 15,000kW x 93.5rpm
Is this a diesel-electric or hybrid?: N
Propeller(s)
Material: Ni-Al-Bronze
Designer/Manufacturer: Hyundai Heavy Industries
Number: 1
Fixed/Controllable pitch: Fixed
Diameter: 7,400mm
Speed: 93.5rpm at MCR
Main-engine driven alternators
Number: 1
Make/type: WEtech / PWM converter type
Output/speed of each set: 2,100kW
Diesel-driven alternators
Number: 3 sets
Engine make/type: HiMSEN / 9H21/32 x 1 set, 7H21/32 x 2 sets
Type of fuel: LFO / MGO
Alternator make/type: HHI-EES / HFC7 636-08P x 1 set, HFC7 568-08P x 2 sets
Output/speed of each set: 1,400kW x 900rpm x 1 set, 1,300kW x 900rpm x 2 sets

Boilers
Number: 1 set
Type: Automatic, forced draft, heavy fuel oil burning, marine boiler
Make: Kangrim
Output, each boiler: 3,000kg/hr

Stern appendages/special rudders: Hi-PSD and Hi-Rudder with bulb as Energy Saving Device

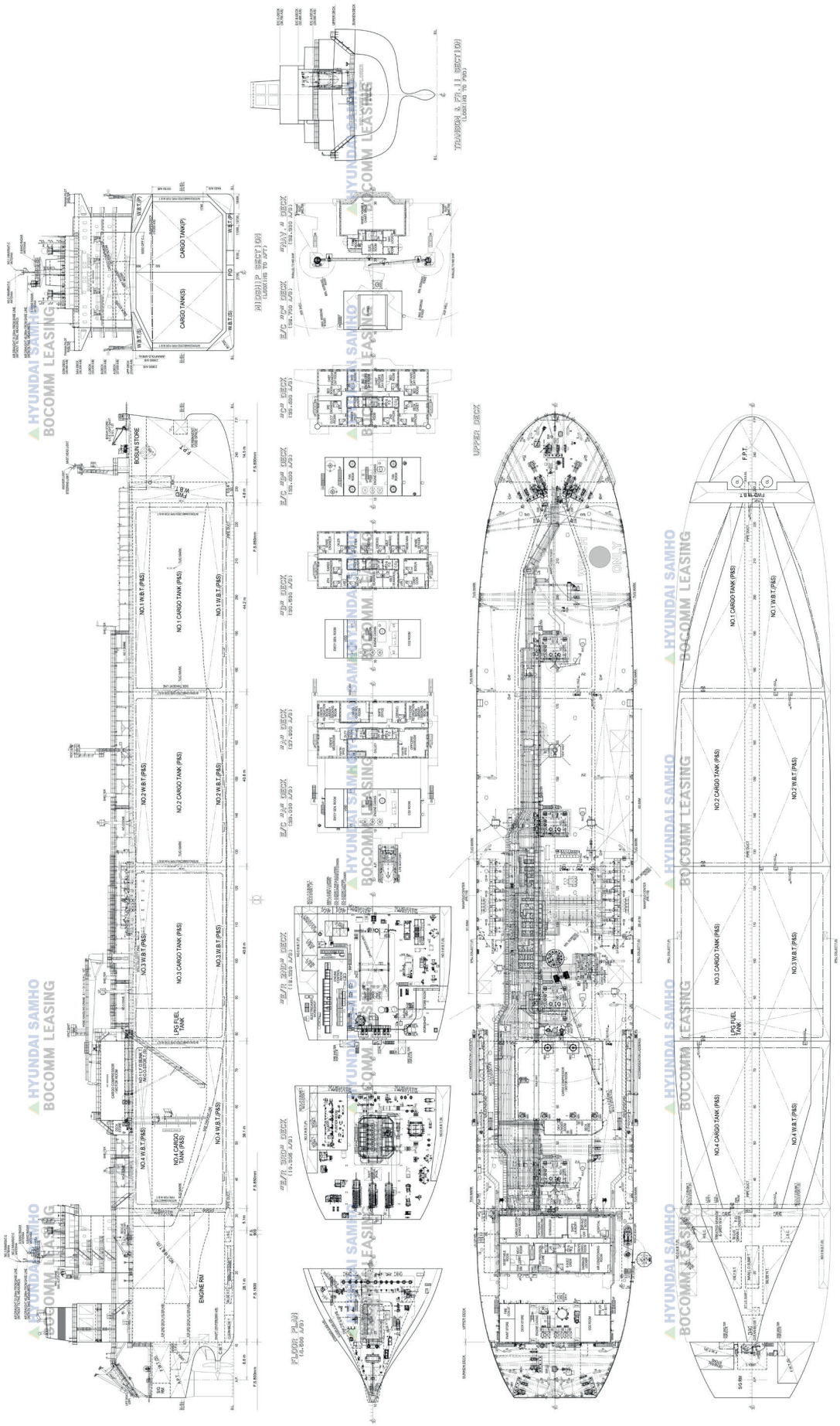
Deck machinery
Cargo cranes/cargo gear
Number: 1 set
Make: Oriental
Type: Electro-hydraulic
Performance: SWL 10t
Other cranes
Number: 2 sets
Make: Oriental
Type: Electro-hydraulic
Tasks: Provision handling
Performance: SWL 5t / SWL 2t
Mooring equipment
Number: 8 sets
Make: Flutek
Type: Electro-hydraulic
Special lifesaving equipment
Number of each and capacity: 1 set / 28 persons
Make: Beihai
Type: Free fall
Cargo tanks
Number: 4
Grades of cargo carried: Commercial Butane/Pure Propane/Commercial Propane/Mixture Propane, Butane/Propylene/Ammonia
Product range: In case of Commercial Propane – Max. 5.0mole % ethane
Cargo pumps
Number: 8
Type: Vertical deepwell
Make: LGE (Svanehoi)
Stainless steel: SUS316/SUS304
Capacity (each): 650m^3/hr x 120mlc
Cargo control system
Make: LGE (Kongsberg)
Type: Intergrated Automation System
Ballast control system
Make: Scana
Type: Hydraulic Valve Control
Ballast water treatment system
Make: Erma First
Capacity: 800m^3/h x 2
Complement
Officers: 14
Crew: 12
Suez/Repair Crew: 6

Navigation and other equipment
Bridge control system
Make: Kongsberg
Type: Autochief-600
Is bridge fitted for one-man operation?: N
Integrated bridge system: N
Radars
Number: 2 sets (S-band, X-band)
Make: Furuno
Model(s): S-band (FAR-3330S-SSD), X-band (FAR-3320-NXT)
Fire detection system
Make: Consilium
Type: SG-43481
Fire extinguishing systems
Cargo deck: Dry Powder/Water Spray/hydrants
Make/Type: NK, LGE
Engine room: Fixed CO_2 Fire Extinguishing
Make/Type: NK
Cabins: Portable Fire Extinguisher/Hydrants
Make/Type: NK

Efficiency
Attained EEDI value: 5.28
Required EEDI value: 6.81(Phase 1)
Energy Saving Technologies: Hi-PSD and Hi-Rudder with bulb as Energy Saving Device

Contract date: 23 August 2019
Launch/float-out date: 03 April 2021
Delivery date: 30 June 2021

BELLAVISTA EXPLORER



BELLE LUNE – Bulk carrier

Shipbuilder: **Tsuneishi Zhoushan**
Vessel's name: ***Belle Lune***
Owner/Operator: **Nissen Kaiun KK**
Country: **Japan**
Designer: **Tsuneishi**
Country: **Japan**
Flag: **Panama**
IMO number: **9897937**
Total number of sister ships already completed (excluding ship presented): **5 (2 at Tsuneishi Zhousan and 3 at Tsuneishi Cebu)**
Total number of sister ships still on order: **4**

Japanese owner Nissen Kaiun took delivery of the *Belle Lune* from Tsuneishi's Chinese yard at Zhousan in May 2021. The ship is distinguished by being the first of the Tsuneishi TESS42 type completed, and the first of a 10-ship series ordered by Nissen Kaiun in June 2019. The ships are spread five each for construction at Zhousan and Cebu in the Philippines.

Tsuneishi's TESS 38 Handymax bulk carrier design has been a popular choice over the years and the new TESS42 type builds on this popularity adding extra capacity and improved efficiency within the same hull envelope dimensions although with a slightly deeper draught.

The ship is 180m in length, 32.2m wide and a 10.75m summer loadline draught. At the same draught as the TESS38 type, the ship has a deadweight of 40,000tonnes but this is increased to a design 42,200dwt when loaded to maximum draught – although *Belle Lune* has been consigned a deadweight of 42,446tonnes by ClassNK.

Belle Lune and its sister ships have the typical five-hold, four-crane configuration of the Handymax type and have been log-fitted for carriage of lumber cargoes both under and on deck adding to the flexible nature of the vessel.

TESS is an acronym for Tsuneishi Economic Ship Series and by optimising the 38 type design, the new ships have reduced fuel consumption by 4% per tonne/mile and been given an extended service range. They are scrubber equipped to meet SOx rules and SCR systems on main and auxiliaries allow compliance with NOx Tier III rules. The main engine is a Mitsui-built MAN B&W S50ME type of five-cylinder configuration producing 6,410kW power at 101rpm.

TECHNICAL PARTICULARS

Length oa: 180m 179.99m
Breadth moulded: 32.2m
Depth moulded: 15.4m
Draught
scantling: 10.75m
design: 9.50m

Gross: 26,700t 26,272t (ClassNK)
Deadweight
scantling: 42,200m 42,446m (ClassNK)

Cargo capacity (m^3)
Bale: 50,088
Grain: 52,400m^3 52,582

Bunkers (m^3): 2,655

Classification society and notations: ClassNK NS*(BCM, BC-XII, GRAB, PSPC-WBT, NC, 1C) (IWS)(PSCM)(EA + GW, R)(IHM)(NOx-III(SCR)) (SOx(EGCS)) MNS*

Propulsion
Main engine(s)
Model: 5-cylinder 2-stroke
Manufacturer: Mitsui E&S
Number: 1
Output of each engine: 6,410kW @101rpm
Is this a diesel-electric or hybrid?: N

Propeller(s)
Number: 1

Diesel-driven alternators
Number: 4
Type of fuel: HFO/MDO
Output/speed of each set: 2,650 total

Exhaust-gas scrubbing equipment
On main engines?: Yes
On auxiliary engines?: Yes

Boilers
Number: 1
Make: Miura

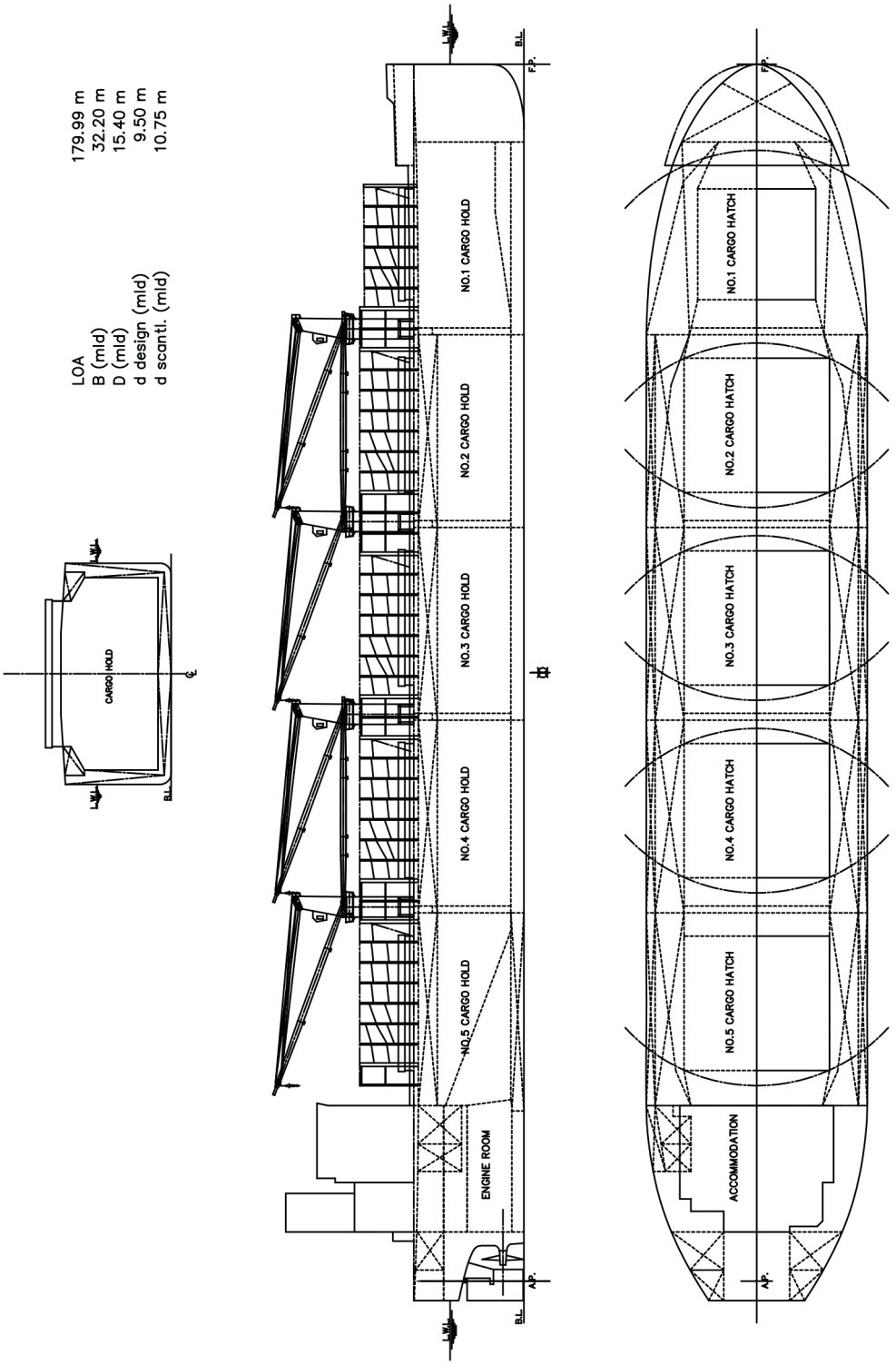
Deck machinery
Cargo cranes/cargo gear
Number: 4

Special lifesaving equipment
Number of each and capacity: 1 totally enclosed freefall – 25 persons, 1 rescue boat – 6 persons, 2 liferafts each 25 persons

Contract date: June 2019
Delivery date: 13 May 2021

BELLE LUNE

LOA	179.99 m
B (mld)	32.20 m
D (mld)	15.40 m
d design (mld)	9.50 m
d scantl. (mld)	10.75 m



BLUE MARJAN – Inland tanker

Shipbuilder: **Concordia Damen Shipbuilding B.V**
Vessel's name: ***Blue Marjan***
Owner/Operator: **Jupiter 8 Limited**
Country: **Bermuda**
Designer: **Concordia Damen**
Country: **Netherlands**
Model test establishment used: **CFD**
Flag: **Netherlands**
ENI number: **02339279**
Total number of sister ships still on order: **39**

Unlike most of the ships in this edition of *Significant Ships*, *Blue Marjan* is not intended for deep-sea work and is intended solely for working on European rivers. The ship is the first in a series of 40 inland tankers designed by Concordia Damen in the Netherlands to be operated by a joint venture between Dutch logistics company VT Group and Cyprus-based Marlow Navigation. Known as the Parsifal tankers, all of the vessels will be chartered by Shell to carry mineral oils and chemicals between Antwerp, Rotterdam, Amsterdam and along the Rhine network. *Blue Marjan* is one of 39 vessels that were entrusted to Shipyard Kladovo in Serbia. The one remaining vessel was built at Shipyard De Hoop Lobith in the Netherlands.

Because the water levels on the Rhine and its tributaries can sometimes drop to low levels, the series of ships, which are 110m in length and 11.5m wide, have been designed with a draught of just 3.25m.

They are considered eco-friendly vessels and their electric propulsion system is powered by a pair of MAN Rollo marine generator sets driven by V12 E3262 LE 201 gas engines, each rated at 525kW at 1,800rpm. Fuel systems for the engines have been supplied by Cryonorm and feature 60m³ type C LNG tanks. A MAN Rollo D2676 LE328 fuelled by MGO and producing 290kW will add back-up power. The main propulsion motors are two TF46 100-24WWR Oswalds with an output of 55kWe.

The ships have eight cargo tanks with a total cargo capacity of 3,030m³. Marflex MDPD80 pumps are installed in each tank for cargo handling.

TECHNICAL PARTICULARS

Length oa: 110.00m
Length bp: 106.43m
Breadth moulded: 11.40m
Depth moulded
  to main deck: approx. 3.50m
  to upper deck: 4.975m
Width of double skin
  side: 1,000mm
  bottom: 700mm
Draught
  design: max. 3.25m
Displacement: 3,769t
Lightweight: 732t
Deadweight
  design: 2,800t
Speed, service (100%MCR output): 16km/h
Cargo capacity (m³)
  Liquid volume: approx. 3,030m³
Bunkers (m³)
  MGO: 20m³
  LNG: 60m³
Water ballast (m³): 1,328m³

Daily fuel consumption (tonnes/day)
Main engine only: 0.18m³/h

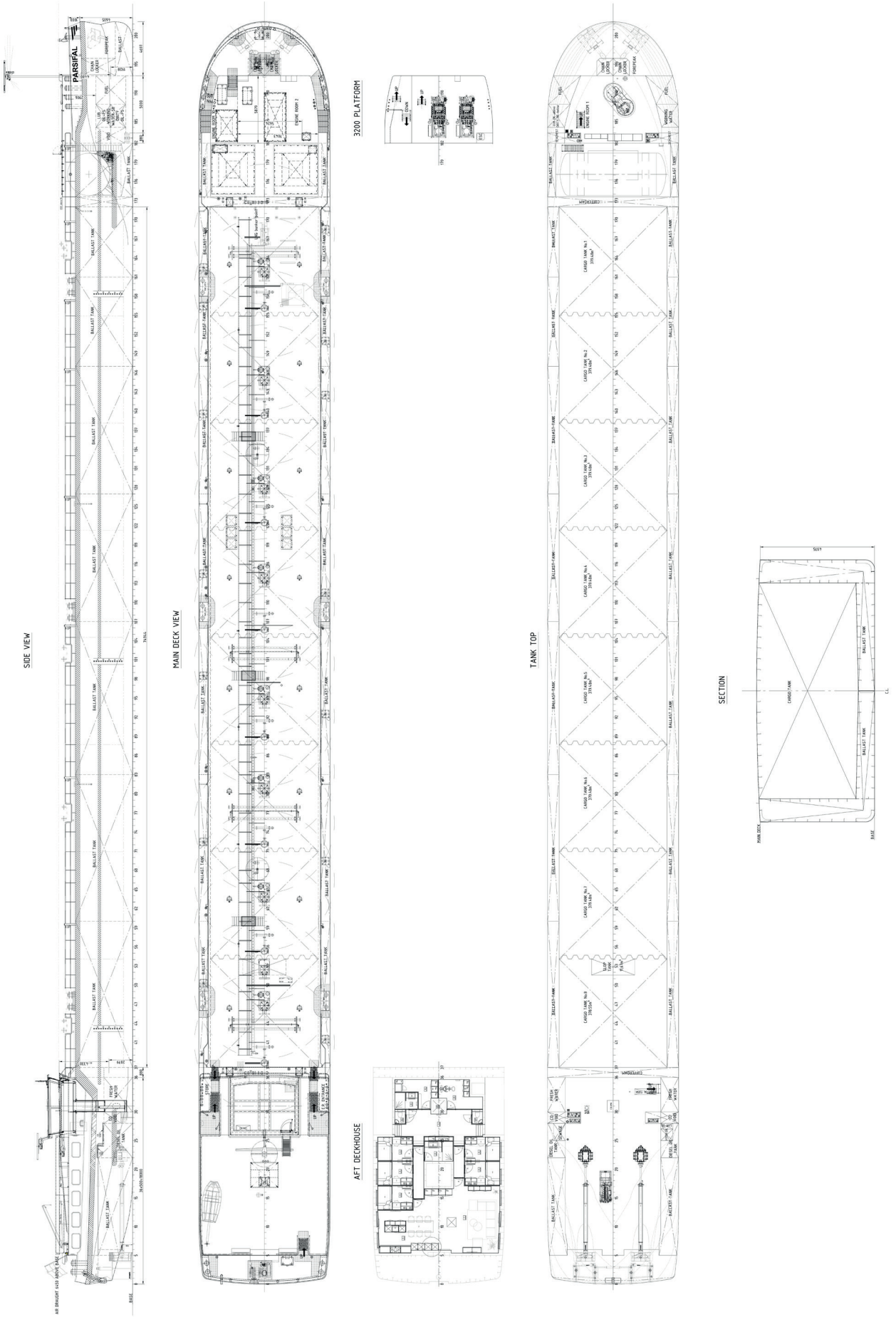
Classification society and notations: + A1 I.W.W Tanker Type C In Association with a list of Defined Cargoes L.S. "T" p.v. +50 kPA S.G. 1.0 [+} LMC, LFPF (GF,NG)

% high-tensile steel used in construction: 23% approx.

Propulsion
Main engine(s)
  Design: Generator engine for main propulsion
  Model: Natural Gas Engine E3262 LE 262
  Manufacturer: MAN Rollo
  Number: 2
  Type of fuel: Natural gas (LNG)
  Output of each engine: 525kW
  Is this a diesel-electric or hybrid?: Y Gas-electric
  Design: Generator engine and main propulsion
  Model: D2676 LE 328
  Manufacturer: MAN Rollo
  Number: 1
  Type of fuel: MGO
  Output of each engine: 290kW
  Is this a diesel-electric or hybrid?: Y Diesel-Electric
  Design: E-motor main propulsion direct driven
  Model: TF46. 100-24WWR
  Manufacturer: Oswald
  Number: 2
  Type of fuel: Electrical
  Output of each engine: 500ekW
  Is this a diesel-electric or hybrid?: Y
Propeller(s)
  Material: CuNiAl
  Designer/Manufacturer: SIP Marine
  Number: 2
  Fixed/Controllable pitch: fixed
  Diameter: 1,500mm
  Speed: maximum: 320-350rpm
Exhaust-gas scrubbing equipment
  Manufacturer: MAN-Rollo
  Type: SCR
  On main engines?: On the MAN-Rollo Diesel, Engine 3
Stern appendages/special rudders:
  - Propeller Nozzle, 2x, high efficiency nozzle
  - 4x hydrodynamic profile rudders
Bow thruster(s)
  Make: Veth
  Number: 1
  Output (each): approx. 450kW
Other cranes
  Number: 1
  Type: davit
  Tasks: lowering overboard rowing boat aft
  Performance: SWL = 350kg
Mooring equipment
  Number: 2
  Make: DMC Damen Marine Components
  Type: electric
Cargo tanks
  Number: 8
  Grades of cargo carried: mineral oils
  Product range: mineral oils
Cargo pumps
  Number: 8
  Type: MDPD80
  Make: Marflex
  Stainless steel: yes
  Capacity (each): 100m³/hour
Complement
  Crew: 5
  Single/double/other rooms: single
Navigation and other equipment
Bridge control system
Is bridge fitted for one-man operation? Y
Integrated bridge system: N
Radars
  Number: 2
  Make: JRC
  Model(s): JMA 610
Fire detection system
  Make: Thorn
  Type: M600Ex
Fire extinguishing systems
  Engine room: Novec 1230
  Make/Type: Minimax
Efficiency
  Other installed monitoring tools: loading, tank, cargo
  Energy Saving Technologies: LNG propulsion, LED lighting

Contract date: November 2020
Launch/float-out date: June 2021
Delivery date: January 2022

BLUE MARJAN


SIDE VIEW
MAIN DECK VIEW
3200 PLATFORM
AFT DECKHOUSE
TANK TOP
SECTION

CALYPSO – Bulk carrier

Shipbuilder: **CSSC Chengxi Shipyard Co., Ltd**
Vessel's name: ***Calypso***
Owner/Operator: **Oldendorff Carriers GmbH & Co. KG**
Country: **Germany**
Designer: **Eide Marine Engineering B.V / CS Marine / Oldendorff Carriers GmbH & Co. KG**
Country: **Netherlands/China/Germany**
Flag: **Liberia**
IMO number: **9892559**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: **Nil**

Delivered in January 2021 by Chengxi Shipyard to German bulk carrier operator Oldendorff Carriers, *Calypso* is one of two highly specialised self-loading and unloading shuttle transloaders designed and built specifically for transhipping coal from Capesize vessels to a coal-fired shore power station in Vietnam. The sister ship *Anna* was delivered six months later.

The ships were contracted in 2018 to serve the newly built coal power system in North Vietnam. All aspects of their design have been optimised for the specific project for which a 25 year contract for the ship has been signed.

With a length of 145m a beam of 34m and a draught of 8.5m, *Calypso* has been optimised for operation in relatively shallow waters. It has a vertical bow and the four-hold ship with its forward mounted superstructure will load from the Capesize vessel using its own twin deck cranes that each have a capacity of 30tonnes at 36m or 36tonnes at 30m outreach. The cranes are located on the starboard side of the vessel which has integrated fenders After the short trip to the power station jetty, the ship will unload using its gravity feed conveyor system that has an outreach of 36m.

Calypso is designed to be highly manoeuvrable and provides a new reference ship type for ABB Azipods as propulsion units. It has two 1.9MW CZ980 pods that were designed for DP enabled vessels. In addition, the ship has a pair of Schottel tunnel thrusters forward. Power is supplied by three MAN8L27/38 gensets each producing 2,500kW at 720rpm. Service speed is 10knots.

TECHNICAL PARTICULARS

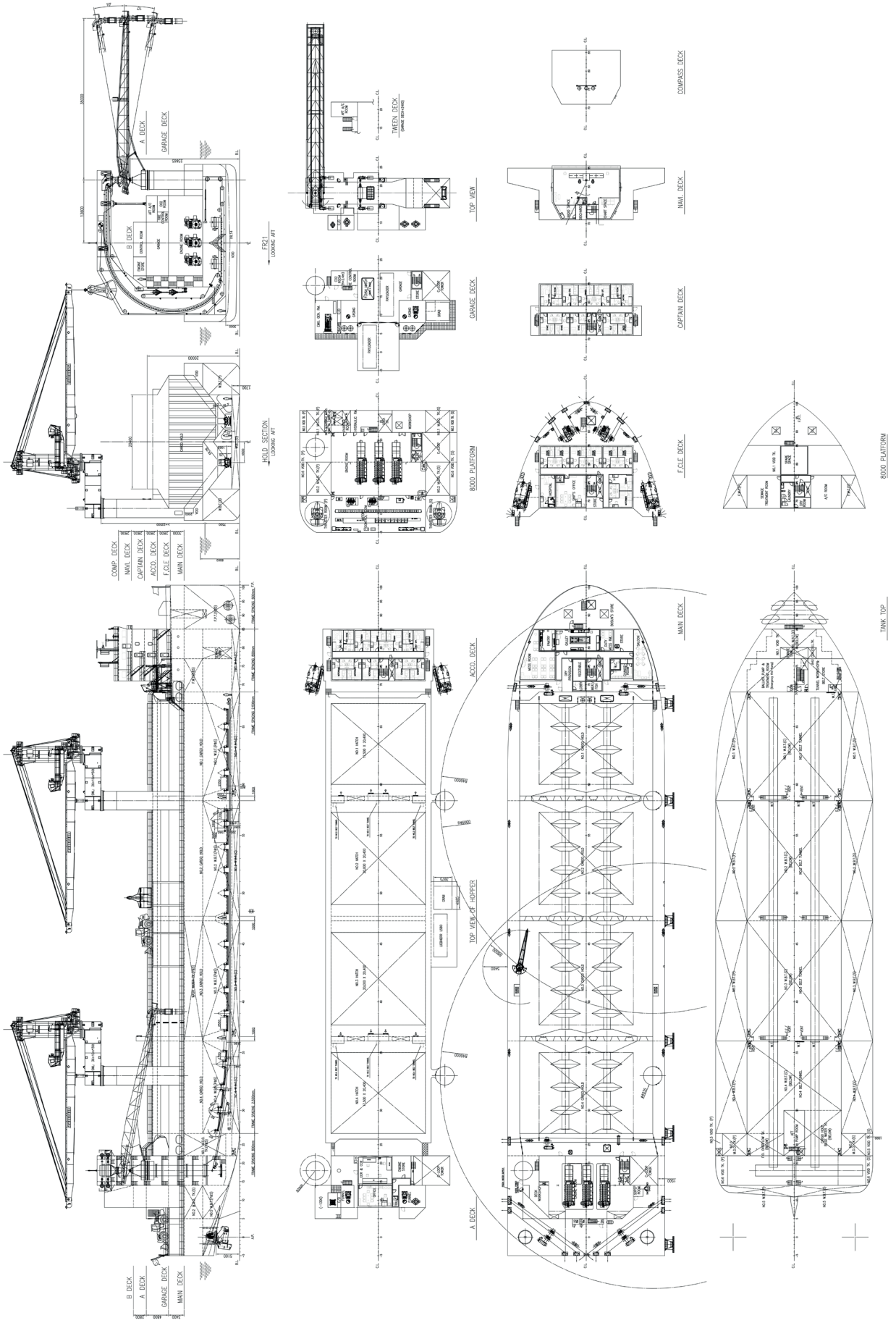
Length oa: 145m
Length bp: 141m
Breadth moulded: 34m
Depth moulded to main deck: 12m
Width of double skin
side: 2.600mm
bottom: 1.700mm
Draught
scantling: 8.5m
design: 7.5m
Gross: 23,739t
Displacement: 31,181.4t
Lightweight: 8,607.8t
Deadweight
scantling: 27,573.6t
design: 22,871.3t
Speed, service (100%MCR output): 10knots
Cargo capacity (m^3)
Grain: 34,205m^3
Bunkers (m^3)
Diesel oil: 747.9m^3
Water ballast (m^3): 14,115.9m^3
Classification society and notations: ClassNK NS* (BC-XII, PSPC-WBT, NC), (IWS), (IHM), (NOx-III(SCR)), MNS* (MO)

Propulsion
Main engine(s)
Design: Azipod Units
Model: CZ980
Manufacturer: ABB Engineering (Shanghai) Ltd
Number: 2
Type of fuel: Electric, 690V AC
Output of each engine: 1,900kW
Is this a diesel-electric or hybrid?: Diesel-electric
Propeller(s)
Material: KAIBC3
Designer/Manufacturer: Changzhou Zhonghai Marine Propeller Co., Ltd
Number: 2
Fixed/Controllable pitch: FPP
Diameter: 2,400mm
Speed: 308rpm
Diesel-driven alternators
Number: 3
Engine make/type: CMP MAN 8L27/38
Type of fuel: MGO
Alternator make/type: ABB AMG0630LR10 LSA
Output/speed of each set: 2,500kW, 720rpm
Stern appendages/special rudders: Azipods (see above)
Bow thruster(s)
Make: Schottel STT4
Number: 2
Output (each): 1,200kW
Deck machinery
Cargo cranes/cargo gear
Number: 2
Make: Liebherr MCCtec Rostock GmbH
Type: CBG 360 36(30) / 30 (36) LIT
Performance: 30t@36m, 36t@30m (Grab and Hook)
Mooring equipment
Number: 2 + 5
Make: SEC EAMW 66Q3 / EMW
Type: Electric
Hatch covers
Design: n/a (Open Hatch)
Doors/ramps/lifts/moveable car decks
Number of each: 1
Type: Self-unloading system with C-loop, conveyor belts and discharge boom
Designer: EMS-Tech Inc
Ballast control system
Make: Pleiger Maschinenbau GmbH & Co. KG
Type: Hydraulic
Ballast water treatment system
Make: Headway Technology Group (Qingdao) Co., Ltd / OceanGuard HMT-1500
Capacity: 1,950m^3/h
Complement
Officers: 12
Crew: 16
Single/double/other rooms: 28/0/0

Navigation and other equipment
Bridge control system
Make: Kwant Controls B.V
Is bridge fitted for one-man operation?: No
Integrated bridge system: No
Radars
Number: 2
Make: Furuno
Model(s): FAR-2318
Fire detection system
Make: Autronica Fire and Security AS
Type: Autroprime
Fire extinguishing systems
Engine room: Fixed water-based / High-pressure CO_2
Make/Type: Desmi, Minimax GmbH / NK
Waste disposal plant
Sewage plant
Make: Jowa AB
Model: STP2016-100

Efficiency
Installed Fuel Meters: volume flow meters
Other installed monitoring tools: draught gauges
Energy Saving Technologies: VFD for electric motors
Hull coatings: self-polishing, low-friction antifouling

Contract date: 25 December 2018
Launch/float-out date: 08 September 2020
Delivery date: 12 January 2021


A DECK
GARAGE DECK
B DECK
FR21
LOOKING AFT
HOLD SECTION
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COMP. DECK
NAVI. DECK
CAPTAIN DECK
ACCO. DECK
F.C/E. DECK
MAIN DECK
B DECK
A DECK
GARAGE DECK
MAIN DECK
TWEEN DECK
TOP VIEW
GARAGE DECK
8000 PLATFORM
ACCO. DECK
TOP VIEW OF HOPPER
A DECK
COMPASS DECK
NAVI. DECK
CAPTAIN DECK
F.C/E. DECK
MAIN DECK
8000 PLATFORM
TANK TOP

CAPE ACE – Bulk carrier

Shipbuilder: ..... **Namura Shipbuilding Co., Ltd**
Vessel's name: ..... ***Cape Ace***
Owner/Operator: ..... **Kawasaki Kisen Kaisha, Ltd**
Country: ..... **Japan**
Designer: ..... **Namura Shipbuilding Co., Ltd**
Country: ..... **Japan**
Flag: ..... **Pamama**
IMO number: **9885051**
Total number of sister ships already completed (excluding ship presented): **2**

Built as the first vessel of a new Post-Panamax bulk carrier design, *Cape Ace* was delivered by Namura Shipbuilding to Japanese owner K Line in December 2020. The delivery was too late to be included in the 2020 edition, but the ship is significant enough to deserve entry here.

Two further vessels of the same type have since been delivered to other owners. Although described as 100,000dwt class ships all three have deadweights in excess of 101,000tonnes. In the case of *Cape Ace*, the figure is 101,314tonnes.

Cape Ace is 249.94m long with a width of 43.00m and draught of 12.90m and has been designed with a wide beam and shallow draught allowing entry to a greater range of ports than vessels of similar deadweight but more conventional design. Whereas a typical Panamax bulker would have seven holds, the Namura design has reduced this to six. The ship is suitable to carry bulk cargoes such as coal and iron ore as well as many other types of bulks and is gearless.

For environmental protection, the vessel is equipped with a main engine and generator engines compliant with the IMO Tier III NOx emissions and a Fuji Electric Co. open loop SOx scrubber is installed allowing operation on HFO. The ballast treatment system has been supplied by Sunrui.

The main engine is a MAN B&W 6S60ME-C8.5 two-stroke directly coupled to a Nakashima fixed pitch propeller equipped with an Eco-Cap energy saving device. The engine produces 10,450kW at 94.5rpm. The ship also features a Namura flow Control Fin on her stern and a Rudder Fin, both Namura Shipbuilding in-house technologies.

TECHNICAL PARTICULARS

Length oa: 249.94m
Breadth moulded: 43.00m
Draught
scantling: 12.90m
Gross: 60,133t
Deadweight: 101,314t
Cargo capacity (m^3)
Grain: ..... abt.121,600m^3
Bunkers (m^3)
Heavy oil: ..... abt.3,000m^3
Diesel oil: ..... abt.300m^3
Water ballast (m^3): ..... abt.60,300m^3

Classification society and notations: ..... ClassNK NS*/MNS* (CSR, BC-B, BC-XII, GRAB 30, PSPC-WBT, NC,1C)(ESP)(IWS)(PSCM)(IHM)(SOx(EGCS))(MO)

Propulsion
Main engine(s)
Design: ..... MAN B&W
Model: ..... 6S60ME-C8.5 (LLO-HPT)
Manufacturer: ..... Mitsui E&S Machinery Co., Ltd
Number: 1
Type of fuel: ..... HFO (up to RMG380) / MDO (DMB) / MGO (DMA,DMZ)
Output of each engine: ..... 10,450kW@ 94.5rpm

Is this a diesel-electric or hybrid?: ..... N

Propeller(s)
Material: ..... Ni-Al Bronze
Designer/Manufacturer: ..... Nakashima Propeller Co., Ltd
Number: 1
Fixed/Controllable pitch: ..... Fixed
Special adaptations: ..... With Eco-Cap
Diesel-driven alternators
Number: 3
Engine make/type: ..... Daihatsu diesel Mfg. Co., Ltd
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: 760kW/900min-1

Exhaust-gas scrubbing equipment
Manufacturer: ..... Fuji Electric Co., Ltd
Type: ..... Open loop system
On main engines?: ..... Applied
On auxiliary engines?: ..... Applied
Boilers
Number: 1
Type: ..... Oil-fired forced-draft smoke tube cylindrical composite type boiler with automatic combustion control (OVS2-135/56-26)
Make: ..... Osaka boiler Mfg. Co., Ltd
Output, each boiler: .... 1,350kg/h of 0.59MPa Saturated steam (Oil-fired side)
Other cranes
Number: 1
Make: ..... Mansei Inc
Type: ..... Electric motor driven
Tasks: ..... Provision crane
Performance: 4ton
Mooring equipment
Number: 8
Make: ..... Kawasaki Heavy Industries, Ltd
Type: ..... Hydraulic oil motor driven
Special lifesaving equipment
Number of each and capacity: 28
Make: ..... Shigi Shipbuilding Co., Ltd
Type: ..... Totally enclosed type
Cargo/capacity
Hatch covers
Design: ..... Namura Shipbuilding Co., Ltd
Manufacturer: .. Namura Shipbuilding Co., Ltd
Type (upper deck/other decks): ..... Hydraulic oil motor driven
Ballast control system
Make: ..... Nakakita Seisakusho Co., Ltd
Type: ..... Hydraulic remote control system
Ballast water treatment system
Make: ..... SunRui Marine Environment Engineering Co., Ltd
Complement
Officers: 13
Crew: 14

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

Radars
Number: 2
Make: ..... Japan Radio Co., Ltd
Model(s): JMR-9272-S, JMR-9225-9X

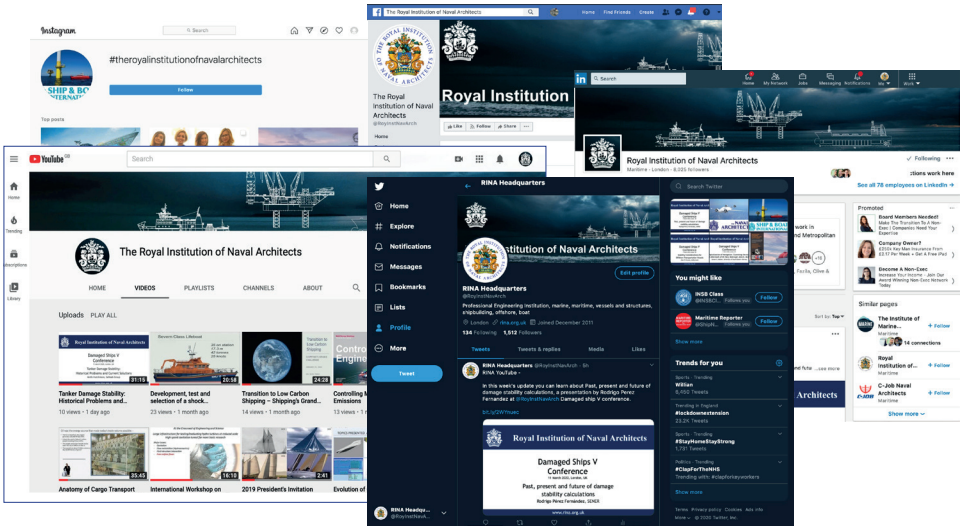
Fire detection system
Make: ..... Nippon Hakuyo electronics, Ltd
Type: ..... Addressable type
Fire extinguishing systems
Engine room: ..... High-expansion foam fire extinguishing system
Make/Type: ..... Kashiwa Co., Ltd
Cabins: ..... Sea water hydrants and Portable fire extinguisher
Public spaces: ..... Sea water hydrants and Portable fire extinguisher
Waste disposal plant
Incinerator
Make: ..... Sunflame Co., Ltd
Model: OSV-600SAI
Sewage plant
Make: ..... Taiko Kikai Industries Co., Ltd
Model: ..... SBH - 40

Efficiency
Installed Fuel Meters:
- 1 set of Main engine & generator engine F.O. flow meter(Volume Type)
- 2 sets of Generator engine F.O. flow meter(Volume Type)
- 1 set of Auxiliary Boiler F.O. flow meter (Volume Type)
- 1 set of MDO/MGO flow meter (Volume Type)
- 1 set of Feed water flow meter (Volume Type)
- 1 set of Cylinder Oil flow meter (Volume Type)

Contract date: ..... 30 June 2015
Launch/float-out date: ..... 01 September 2020
Delivery date: ..... 07 December 2020

The Royal Institution of Naval Architects

Social Media



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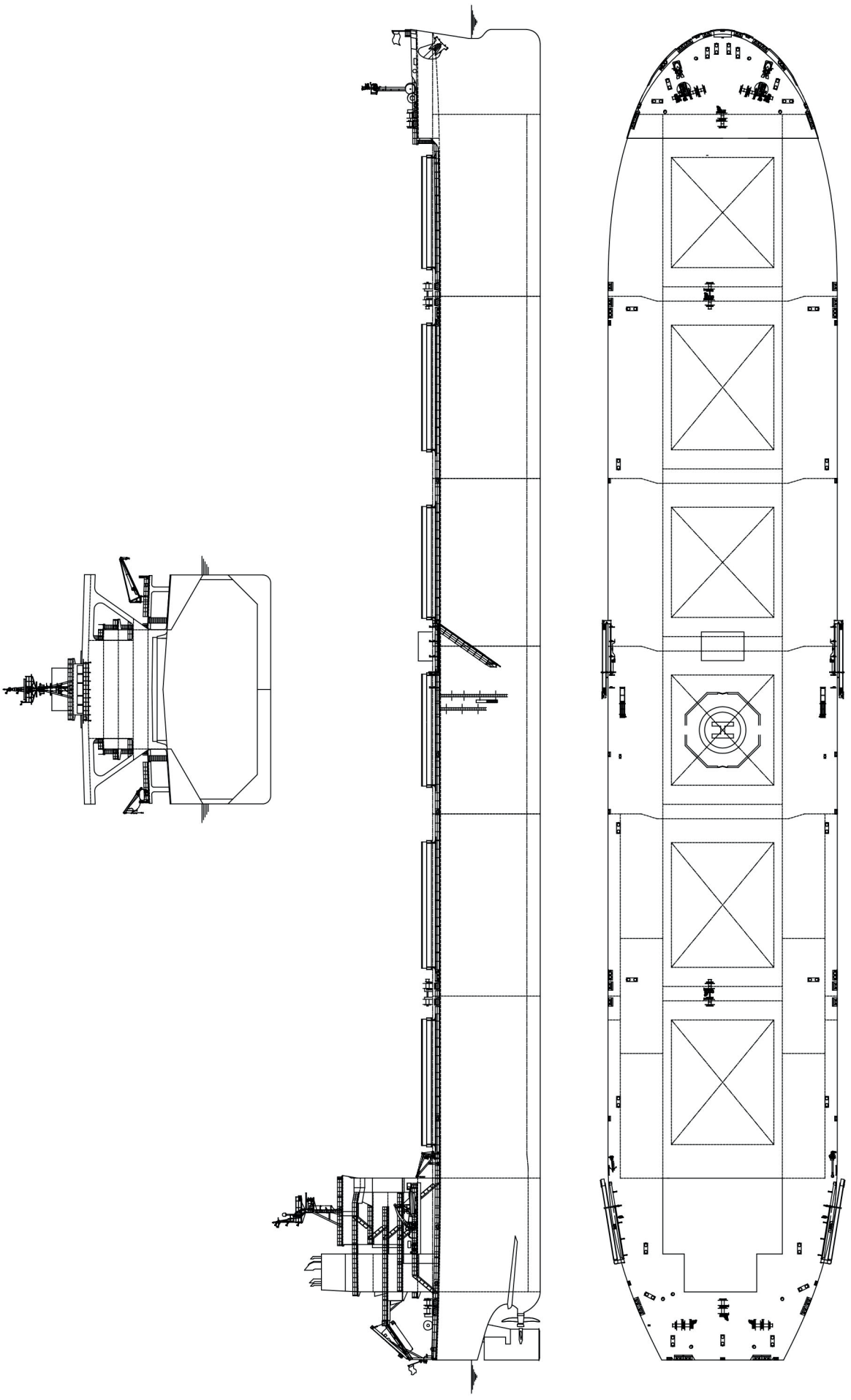

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CENTURY HIGHWAY GREEN – Vehicles carrier

Shipbuilder: ..... **Tadotsu Shipyard Co., Ltd**
Vessel's name: ..... ***Century Highway Green***
Owner/Operator: ..... **Kawasaki Kisen Kaisha, Ltd**
Country: ..... **Japan**
Designer: ..... **Imabari Shipbuilding Co., Ltd**
Country: ..... **Japan**
Flag: ..... **Japan**
IMO number: **9875202**
Total number of sister ships still on order: **Nil**

Century Highway Green was delivered in March by Tadotsu Shipyard to Japanese operator Kawasaki Kisen Kaisha (K Line) as the owner's first LNG-powered PCTC to join its fleet. The ClassNK-classed vessel has an loa of 199.98m, a beam of 37.2m, a depth of 36.51m, a gross tonnage of 73,515, and capacity for 7,080 vehicles over 12 decks. The hull dimensions have been determined by the fact that most car terminals in Japan have a maximum 200m length for vessels. But in order to take best advantage of the opportunities allowed by the New Panama Canal lock, the typical old Panama maximum beam of 32.2m has been stretched by 5m enhancing cargo capacity.

Power for the vessel is provided by a MAN B&W 8S50ME-C9.6-GI dual-fuel main engine outputting 9,380kW coupled directly to a single fixed pitch propeller. The MAN B&W two-stroke dual-fuel engines are known for their ability to keep methane slip to a minimum. NOx emissions are minimal when running on LNG and the engine on this vessel employs EGR to reduce NOx to Tier III requirements when running on MGO.

An LNG fuel tank of 2,439m^3 capacity is installed for running on gas. The tank is an independent type C allowing for higher pressure storage and retention of boil off gas within the tank. The fuel gas supply system has been provided by TGE Marine Gas Engineering. The auxiliary engines are a trio of Daihatsu six-cylinder DE28DF dual-fuel diesel engines which conform to NOx Tier III in gas mode and are fitted with a selective catalytic reduction system (SCR) to meet NOx Tier III requirements in diesel mode, offering flexibility in the choice of fuel.

In most respects the vessel is a typical large car carrier but there are unseen features that mark the ship out as significant. The decision to use LNG is part of K Line's goals to reduce emissions across its fleet of mixed vessel types by 50% by 2030 compared to 2008. This has been evidenced by the choice of name for the vessel. K Line has used the name Century Highway for four previous vessels and its latest environmental focus is reflected by the addition of Green to the name. The Green element is also a response to a demand from major customer Toyota for a vessel that satisfied its green logistics ambitions.

The accommodation provided is sufficient for 50 persons, far in excess of normal crewing numbers but *Century Highway Green* is also intended to be used as a training platform for officers and crew to become familiar with LNG-powered engines and bunkering matters.

This facility will become invaluable as in September 2021, K Line announced it had placed orders for eight more LNG-fuelled 7,000CEU capacity car carriers. The vessels have been spread across different yards with construction taking place at Nihon Shipyard, Shin Kurushima Dockyard, and China Merchants Jinling Shipyard (Nanjing). Delivery of all eight newbuildings is scheduled for between FY2023 and FY2025. Full details of the design and whether they will be sisters for *Century Highway Green* were not divulged at the time of the announcement.

Century Highway Green is also the first ship to be granted ClassNK's Remote Survey (RMSV) notation allowing for regular remote surveys to be done without a surveyor in attendance. To this end the vessel has significantly enhanced communication facilities. This includes a Wi-Fi network throughout the ship that can be used for remote monitoring of equipment as well as to share audio, video, text communication, and electronic files using smartphones and smart glasses. The Wi-Fi connectivity also allows web cameras installed in the cargo deck and the engine room to send real-time video feeds to the crew via their mobile devices and onboard computers. Real-time monitoring of the same video footage can also be done remotely by an operator at a shore control station.

The list of firsts for the vessel also includes the financing arrangements for its construction. With pressure to ensure ships' environmental operation becoming ever more important, K Line arranged an operating lease for *Century Highway Green* through a climate transition loan with Mizuho Bank and Sumitomo Mitsui Trust Bank. According to K Line, the loan is recognised as the very first Climate Transition Finance in Japan.

TECHNICAL PARTICULARS

Length oa: ..... abt. 199.98m
Breadth moulded: 37.2m
Depth moulded 15.22m
to upper deck: 36.51m

Draught
scantling: 9.7m
Gross: 73,515t
Deadweight
scantling: 16,844t
Bunkers (m^3)
LNG: ..... 2,439m^3

Classification society and notations: ..... ClassNK NS*(VC, EQ U LFF, PSPC-WBT, NC, 1C)(IWS)(PSCM)(RMSV)(IHM)(NOx-III(SCR, EGR, DFE))(SOx(LFF))MNS* DNV ✠ 1A Car carrier BIS COAT-PSPC(B) EO Gas fuelled LCS Recyclable TMON(oil lubricated) ER(EGR, SCR, TIER III)

Propulsion
Main engine(s)
Model: ..... 8S50ME-C9.6-GI EGR for NOx reduction when running on oil
Manufacturer: ..... Mitsui MAN B&W
Type of fuel: ..... dual fuel of LNG and MGO
Output of each engine: ..... 9,380kW@92rpm

Propeller(s)
Number: 1

Diesel-driven alternators
Number: 4
Type of fuel: ..... LNG or MGO SCR for NOx when running on MGO
Output/speed of each set: ..... total output 6,400kW

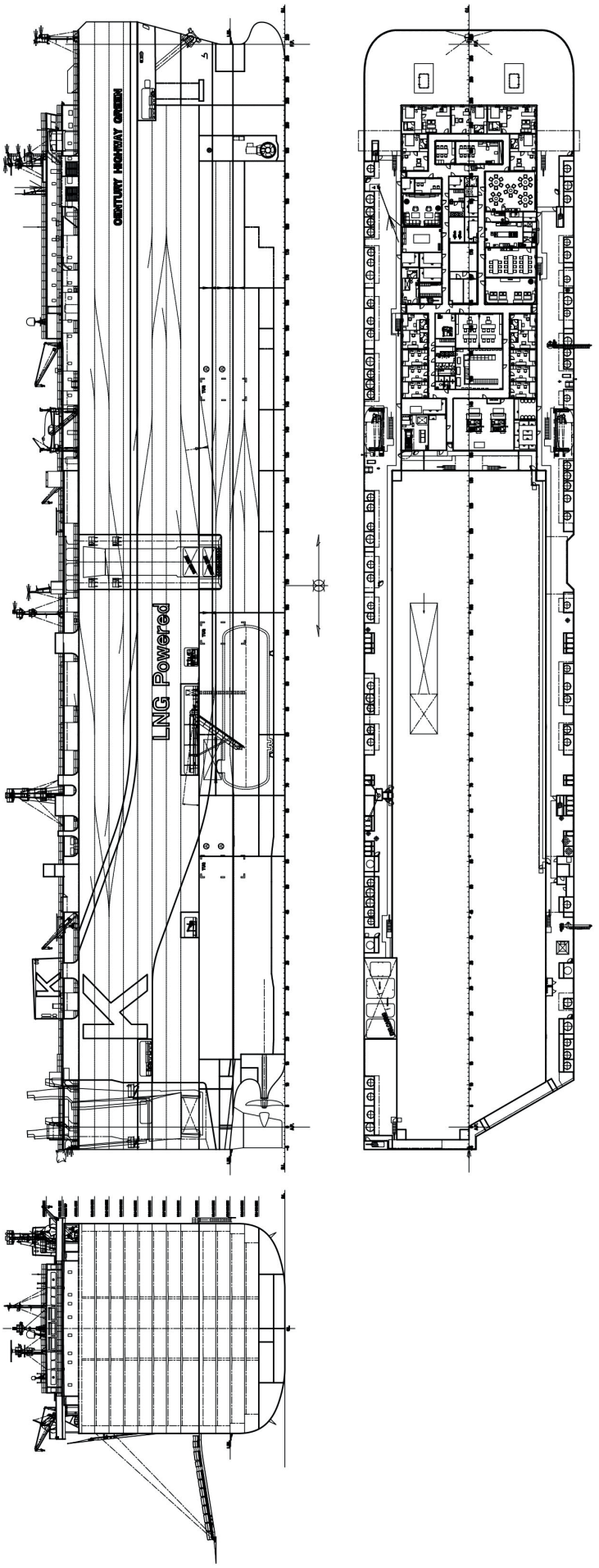
Boilers
Number: 1
Make: ..... Osaka Boiler Mfg Co. Ltd

Vehicles
Number of vehicle decks (fixed/moveable): 12
Total cars: 7,080
Doors/ramps/lifts/moveable car decks: ..... Stern starboard quarter ramp
Number of each: 1

Complement
Crew: ..... up to 50 to allow for personnel training on LNG engines

Contract date: ..... December 2018
Launch/float-out date: ..... 31 July 2020
Delivery date: ..... 12 March 2021

CENTURY HIGHWAY GREEN



CHEROKEE – Rail ferry

Shipbuilder: ..... **CSSC Huangpu Wenchong Shipbuilding Co., Ltd**
Vessel's name: ..... ***Cherokee***
Owner/Operator: ..... **CG Railway Inc**
Country: ..... **United States**
Designer: ..... **CSSC Shanghai Merchant Ship Design & Research Institute (SDARI)**
Country: ..... **China**
Model test establishment used: . **China Ship Scientific Research Centre (CSSRC)**
Flag: ..... **Marshall Islands**
IMO number: **9870927**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: **1**

Cherokee, delivered by CSSC Huangpu Wenchong Shipbuilding in China to US-based rail operator CGR, a joint venture of Genesee & Wyoming Inc. (G&W) and SEACOR Holdings Inc., is the second rail ferry to appear in this year's *Significant Ships* although this vessel is not intended to also carry road vehicles and passengers.

The vessel delivered in June 2021 is the first of a pair developed by SDARI and is believed to be the largest vessel of its type in the world. Along with its sister vessel *Mayan* delivered in September 2021, *Cherokee* will service the route between Mobile, Alabama and Coatzacoalcos in Mexico.

Cherokee has two continuous cargo decks accessed through the stern with the uppermost being the main deck of the ship and open to the elements apart from a small area forward under the ship's accommodation. The two decks have 2,700m of lane length allowing for up to 136 rail cars to be loaded. A large ballasting system is needed to correct heeling as the rail cars are loaded.

Although the ship type falls outside the EEDI requirements, *Cherokee* has an optimised twin skeg hull form based on operation profile to achieve energy saving and reduce fuel cost. The service speed is 14.4knots at CSR with 15% sea margin is almost double the vessels previously serving the route.

Propulsion is provided by a pair of MAN B&W 6S35ME-B9.5 EGRBP two-stroke engines running on MGO and each producing 4,800kW at 155rpm. The propellers are directly linked to the main engines and are 4.4m diameter controllable pitch type supplied by MAN.

TECHNICAL PARTICULARS

Length oa: 180.0m
Length bp: 176.8m
Breadth moulded: 38.6m
Depth moulded: 16.2m
Draught
scantling: 6.9m
design: 6.7m
Gross: 31,400t
Deadweight
scantling: 21,900t
Block co-efficient: ..... 0.78 as per ABS
Speed, service (85%MCR output): 14.4knots
Bunkers (m^3)
Heavy oil: ..... 2,691 (ABS)
Diesel oil: 2,500
Water ballast (m^3): 26,000

Daily fuel consumption (tonnes/day)
Main engine only:
33.9 (2 Sets, Tier II mode)
34.7 (2 Sets, Tier III mode)
Auxiliaries:
5.67 (1 Set, Tier II mode)
5.7 (1 Set, Tier III mode)
Classification society and notations: ...ABS ✠A1, Vehicle Carrier, (E), ✠AMS, ✠ACCU PMP, RW, BWT, IHM, TCM, UWILD

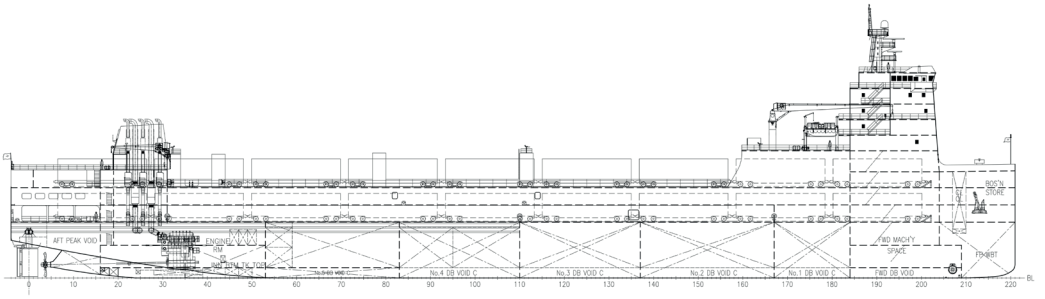
Propulsion
Main engine(s)
Design: ..... MAN
Model: ..... MAN B&W 6S35ME-B9.5 EGRBP Tier III
Manufacturer: ..... China Shipbuilding Industry Corporation Diesel Engine Co.,Ltd
Number: 2
Type of fuel: ..... MGO (maximum sulfur content 0.1%m/m)
Output of each engine: ..... 4,800kW x 155rpm
Is this a diesel-electric or hybrid?: ..... N

Propeller(s)
Material: ..... Ni-Al-bronze(Cu3)
Designer/Manufacturer: ..... MAN
Number: 2
Fixed/Controllable pitch: ..... CPP
Diameter: 4.4m
Speed: 155rpm
Diesel-driven alternators
Number: ..... 3 (2+1)
Engine make/type: ..... CSSC Marine Power Co., Ltd / 4-stroke, single acting trunk piston fresh water-cooled medium-speed engine with L.O. centrifugal bypass filter each rigidly coupled to a single bearing alternator. LP SCR to be selected to fulfill Tier III
Type of fuel: ..... MGO (maximum sulfur content 0.1%m/m)
Alternator make/type: ..... Zhenjiang China Marine-Xiandai Gen.Co.,Ltd / Synchronous blushless self-ventilated drip-proof bracket type with self-lubricating bearing and air filter
Output/speed of each set: ..... 2 x 1,164kW x 900rpm + 1 x 1,330kW x 900rpm

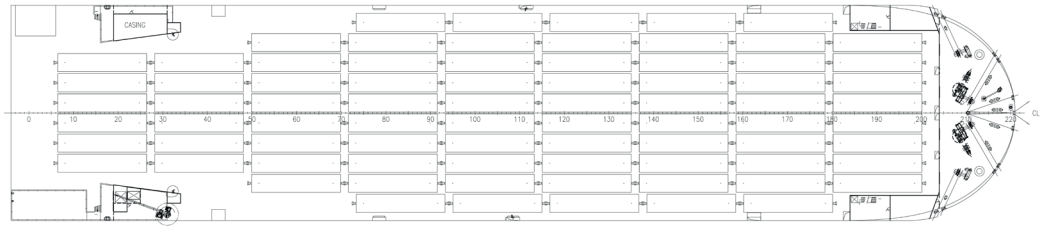
Bow thruster(s)
Make: ..... Wuhan Kawasaki
Number: 1
Output (each): 500kW
Other cranes
Number: 1
Make: ..... SCM
Type: ..... Electric hydraulic
Tasks: YQ1400
Performance: 2t-20m
Mooring equipment
Number: 10
Make: ..... Wuhan Kawasaki
Type: ..... electric
Vehicles
Number of vehicle decks: ..... fixed, 2
Total lane length: 2,700m
Total rail units: 136
Ballast control system
Make: ..... DMH United Steel Industry Co., Ltd
Type: ..... Electrical hydraulic
Ballast water treatment system
Make: ..... Erma First
Capacity: ..... 1 x 2,000m^3/h
Complement
Officers: 13
Crew: 12
Suez/Repair Crew: 3
Single/double/other rooms: 25/0/1
Navigation and other equipment
Bridge control system
Make: ..... Kongsberg
Type: AC600
Is bridge fitted for one-man operation?: .... N
Integrated bridge system: ..... N
Radars
Number: 2
Make: ..... Furuno
Model(s): ..... XN-24CF & SN-36CF
Fire detection system
Make: ..... Consilium
Type: ..... Salwico Cargo(AE)
Fire extinguishing systems
Engine room: ..... Fixed high pressure CO_2 fire extinguishing system
Make/Type: ..... Fain Co., Ltd
- Local water mist fire extinguishing system
Make/Type: ..... Tyco & Seaplus Co., Ltd
Vehicle spaces: ..... Water spraying system
Make/Type: ..... Tyco Fire & Security Marine Services China
Waste disposal plant
Sewage plant
Make: ..... Taiko
Model: SBH-40
Efficiency
Attained EEDI value: ..... phase 2 exempt
Required EEDI value: ..... phase 2 exempt

Contract date: ..... October 2018
Launch/float-out date: ..... 23 January 2021
Delivery date: ..... 08 June 2021

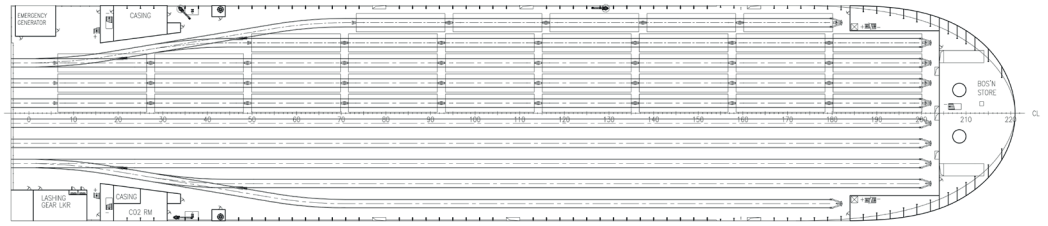
CHEROKEE



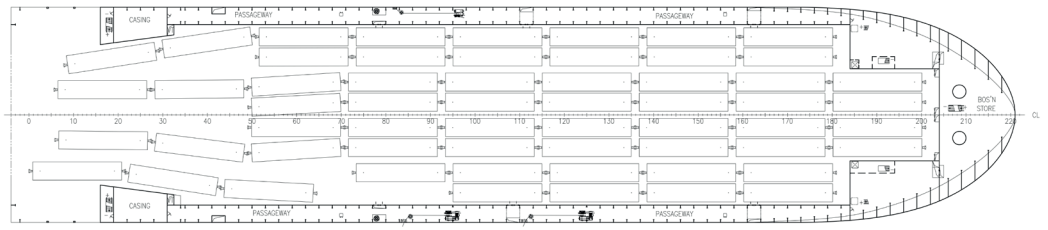
F'CLE DK



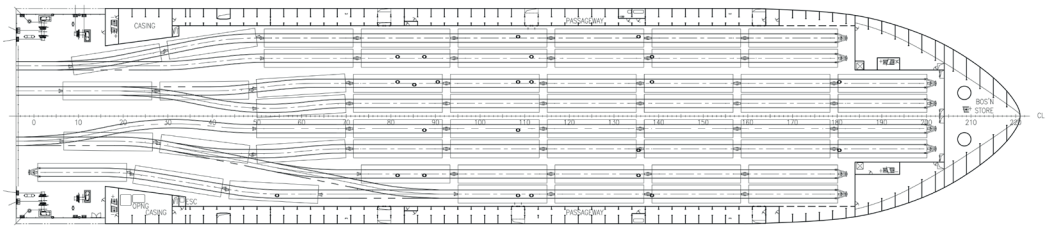
UPPER DK



STRINGER DK



MAIN DK



DOLE MAYA – Reefer container ship

Source: Port Tampa Bay

Shipbuilder: **CSSC Chengxi Shipyard**
Vessel's name: ***Dole Maya***
Owner/Operator: **Ventura Trading Ltd**
Country: **United States**
Designer: **Shanghai Merchant Ship Design & Research Institute, CSSC (SDARI)**
Country: **China**
Model test establishment used: **Shanghai Ship & Shipping Research Institute**
Flag: **Bahamas**
IMO number: **9877729**
Total number of sister ships already completed (excluding ship presented): **2**

Designed specifically for the US fruit and vegetable trade from Latin America by SDARI, *Dole Maya* is a 195m loa 32.20m beam reefer container vessel and one of a pair ordered by Dole. *Dole Maya* was delivered by CSSC Chengxi Shipyard in January and its sister *Dole Aztec* five months later.

The hull form is a conventional one for the vessel type with a bulbous bow and a transom stern. They are fully cellular vessels equipped with three MacGregor hydraulic cranes of 45tonne lift capacity at 28m.

Cargo capacity is nominally 2,336TEU although for reefer vessels it is more normal to discuss in 40ft or FEU capacity. *Dole Maya* can accommodate a total of 1,012FEU – 447 under deck and 565 above deck. A further 312TEUs can be accommodated on deck. At a homogenous 25tonne box weight, capacity is 988FEU. With 919 reefer plugs available 80% of the ships total capacity is covered. The reefer containers under deck are cooled by fresh water, this greatly reduces the number of ventilation fans, electric power load, noise and CO_2 emissions.

The main engine is MAN B&W 7G60ME-C9.5 type with a power output of 18,760kW at 97rpm. For propulsion purposes it is directly linked to a 7m diameter controllable pitch propeller for a service speed of 19.7knots at design draught. Reefer vessels have a high power demand for cooling boxes and to cover this the vessel is fitted with four gensets based on MAN 7L27/38 medium-speed diesels each producing 2,310kW at 720rpm.

To meet SOx rules, an Andritz hybrid scrubber has been fitted treating the exhaust of the main engine and all four auxiliaries.

TECHNICAL PARTICULARS

Length oa: 195.00m
Length bp: 185.00m
Breadth moulded: 32.20m
Depth moulded: 17.00m
Width of double skin
  side: 2.10m
  bottom: 1.65m
Draught
  scantling: 11.50m
  design: 10.50m
Gross: 28,780t
Displacement: 47,430.1t
Lightweight: 13,366.0t
Deadweight
  scantling: 3,4064t
  design: 28,816t
Block co-efficient: 0.656 at design draught
Speed, service (85%MCR output): 19.7knots at 85% MCR with 15% SM
Cargo capacity (m^3)
  Bale: 447
  Refrigerated storage: 444
Bunkers (m^3)
  Heavy oil: 1,994
  Diesel oil: 875
Water ballast (m^3): 12,630
Container ships – water ballast in loaded condition (tonnes): 6,420 at 25t homogeneously loaded at scantling draught
Daily fuel consumption (tonnes/day)
  Main engine only: 63.1, Tier II
  Auxiliaries: 28.6, Tier II
Classification society and notations: DNVGL + 1A Container Ship, CMON, COAT-PSPC(B), BIS, EO, LCS, NAUT(NAV), Clean(Tier III), ER(SCR, EGR, TIER III, EGCS Hybrid), BWM(T), Recyclable, TMON(Oil lubricated), DG(P)
Heel control equipment: 1 pair Anti-heeling tank

Propulsion
Main engine(s)
  Design: MAN B&W
  Model: 7G60ME-C9.5-EGRBP
  Manufacturer: CSSC-MES Diesel Co., Ltd
  Number: 1
  Type of fuel: HFO & MGO
  Output of each engine: 18,760kW
  Is this a diesel-electric or hybrid?: N
Propeller(s)
  Material: Ni-Al Bronze Cu3
  Designer/Manufacturer: SDARI
  Number: 1
  Fixed/Controllable pitch: CPP
  Diameter: 7,000mm
  Speed: 97rpm (MCR)
Diesel-driven alternators
  Number: 4
  Engine make/type: CSSC Marine Power Co.,Ltd / MAN 7L27/38
  Type of fuel: HFO & MGO
  Alternator make/type: ZhenJiang China Marine-XianDai Generating Co., Ltd / HFC6 564-84K
  Output/speed of each set: 2,310kW / 720rpm
Exhaust-gas scrubbing equipment
  Manufacturer: Andritz
  Type: Hybrid
  On main engines?: M/E 85%SMCR (CSR)
  On auxiliary engines?: 3 sets G/E at 85% load

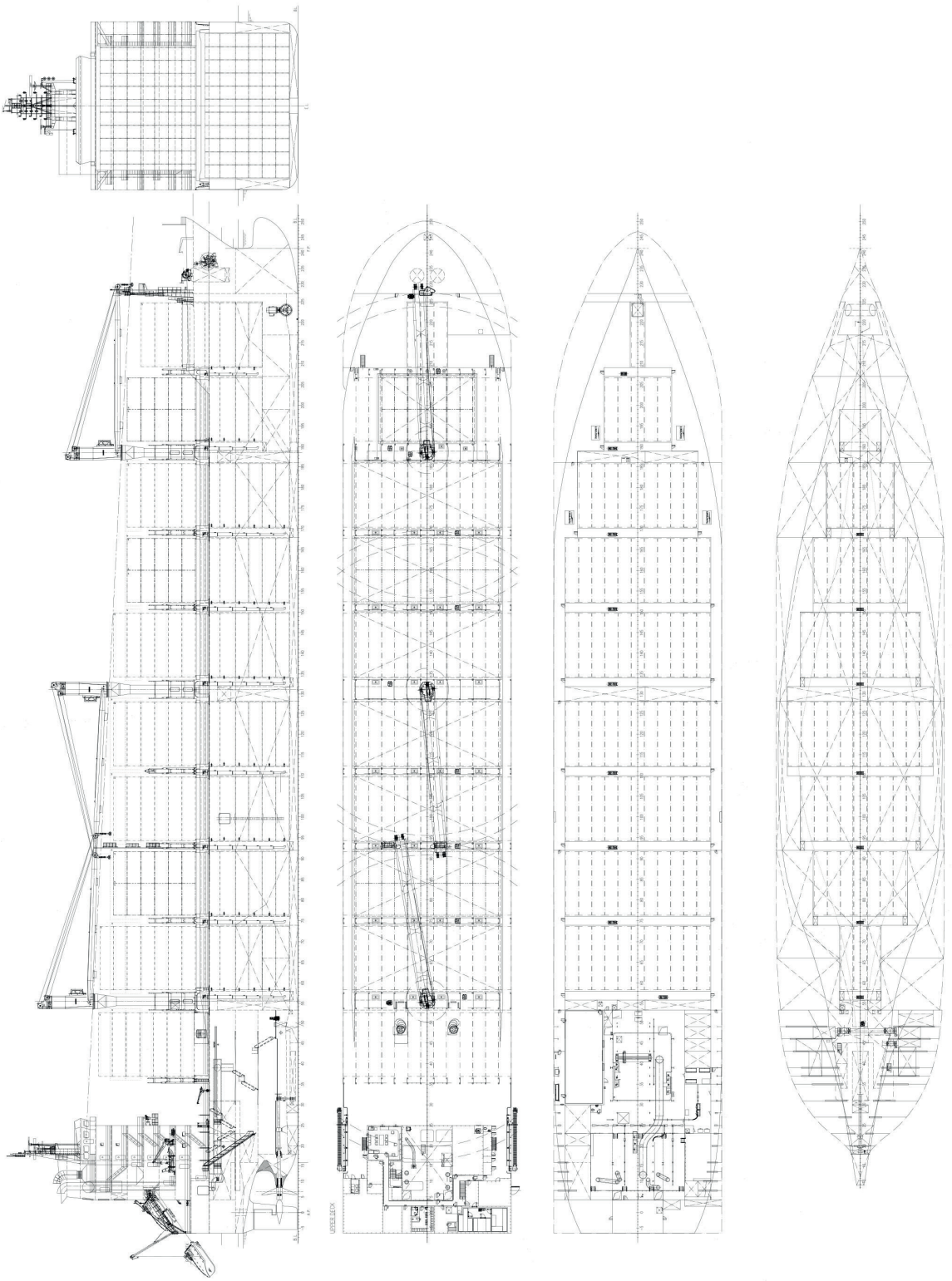
Boilers
  Number: 1
  Type: 1 × composite boiler
  Make: Jiujiang-Mitsubishi Marine Boiler
  Output, each boiler: oil fired section: 2,500kg/h; exhaust gas section: 2,000kg/h

Stern appendages/special rudders: single rudder with bulb
Bow thruster(s)
  Make: Nakashima Propeller Co., Ltd
  Number: 1
  Output (each): 1,200kW
Deck machinery
Cargo cranes/cargo gear
  Number: 3
  Make: MacGregor
  Type: Hydraulic Crane Type GL4528/3930,5-2
  Performance: 45/39t
Other cranes
  Number: 1
  Make: Ningbo Kairong Ship Machinery Co., Ltd
  Type: Electric Provision Crane
  Tasks: Provision handling
  Performance: SWL 7t @ 4m outreach
Mooring equipment
  Number: 8
  Make: TTS Marine
  Type: Electric
Special lifesaving equipment
  Number of each and capacity: 30 person
  Make: Jiangyin Neptune Marine Appliance Co., Ltd
  Type: 6.7m totally enclosed free fall life boat

Cargo/capacity
Hatch covers
  Design: Brightseas Ships Equipment Co., Ltd
  Manufacturer: Chengxi Shipyard Co., Ltd
  Type: Upper Deck
Containers
  Lengths: 20ft, 40ft, 45ft
  Heights: 8ft 6in, 9ft 6in
  Cell guides: 40ft container of 40'(L) x 8' (W) x 9'6"(H) ISO container
  Total TEU capacity: 312TEU/1,012FEU
  On deck: 312TEU/565FEU
  In holds: 0TEU/447FEU
  Homogeneously loaded to: 25tonnes/FEU: 988
  Reefer plugs: 919
  Tiers/rows (maximum)
    On deck: 8 tiers / 13 rows
    In holds: 6 tiers / 11 rows
  Hold refrigeration system: cooled by fresh water
Doors/ramps/lifts/moveable car decks
  Number of each: Sliding pilot side door (2)
  Type: Hydraulic
  Designer: Wuxi Dongzhou Marine Equipment Co., Ltd
Cargo tanks
  Number: 5
  Grades of cargo carried: Containers
Ballast control system
  Make: Panasia
  Type: GloEn-P500
Ballast water treatment system
  Make: Panasia
  Capacity: 500
Complement
  Crew: 25
  Suez/Repair Crew: 6
  Single/double/other rooms: 1 cabin for pilot
Navigation and other equipment
Bridge control system
  Make: Dongze
  Is bridge fitted for one-man operation? N
  Integrated bridge system: N
Radars
  Number: 2
  Make: Furuno
  Model(s): FAR-2338SW,FAR-2328W
Fire detection system
  Make: Apollo
  Type: Syncro
Fire extinguishing systems
  Cargo holds: CO_2
  Engine room: CO_2 and fixed water-based local applicatopm fire fighting
  Make/Type: NK Co. Ltd/DESMI
Waste disposal plant
Sewage plant
  Make: Wärtsilä Water Systems Ltd
  Model: STC06-13
Efficiency
  Attained EEDI value: 16.37g-CO_2/tonne-NM
  Required EEDI value: 19.25g-CO_2/tonne-NM
Energy Saving Technologies: single rudder with bulb
Hull coatings: Antifouling paint

Contract date: 07 January 2019
Launch/float-out date: June 2020
Delivery date: 20 January 2021

DOLE MAYA



ELEANOR ROOSEVELT – Ro-pax ferry

Shipbuilder: ..... **Astilleros Armon**
Vessel's name: ..... ***Eleanor Roosevelt***
Owner/Operator: ..... **Balearia**
Country: ..... **Spain**
Designer: ..... **Incat Crowther**
Country: ..... **Australia**
Flag: ..... **Cyprus**
IMO number: **9863637**
Total number of sister ships already completed (excluding ship presented): **0**
Total number of sister ships still on order: **.0**

Designed by Incat Crowther and built by Spanish shipyard Astilleros Armon for local ferry operator Baleària, *Eleanor Roosevelt* achieved two significant 'firsts' when delivered in early 2021. As well as being the longest fast ro-pax ferry in operation at the time of delivery, the vessel was also the first fast ferry with reciprocating gas-fuelled engines. In addition, *Eleanor Roosevelt* incorporates smart ship technology for onboard services and uses Big Data to monitor its efficiency and emissions in real time.

Baleària has a policy of developing all its fleet to run on LNG whether by way of conversion or newbuildings, although in October 2021 the company switched to using LNG only in port due to rocketing LNG prices. This is seen as a temporary setback as the company is determined to extend its green credentials.

As is to be expected for a fast ferry, *Eleanor Roosevelt* has been constructed from marine grade aluminium. The 12,262gt vessel which is a one-off has capacity for 1,200 passengers and space for 500 linear metres of trucks and 250 cars, or alternatively 450 cars, on the car deck. Access to the two vehicle decks is by a stern ramp.

For passengers, priority has been given to spaciousness and the separation between seats, and comfort on board by means of a state-of-the-art stabilisation system, which will considerably reduce movement. Motions have been reduced with the latest iteration of Incat Crowther's proven catamaran hull form, coupled with an operation-specific centre bow design. A retractable centre T-foil will also be used to smooth the ride, whilst an isolated superstructure provides ultra-quiet passenger spaces. Vibrations and noise will also be minimised thanks to an elastically floating superstructure and the installation of high-tech insulation.

As well as the usual restaurant, shopping and entertainment facilities that are found on most modern ro-pax vessels, *Eleanor Roosevelt* also has some novel features. There are kennels to allow travellers to bring their pets, with kennel monitoring via a smart phone app. In keeping with the shipowner's environmental vision and increasing electric vehicle ownership, the ship has been equipped with electric vehicle charging stations. The ship has also been designed as a 'smart ship' permitting boarding by way of QR codes on passengers' mobile devices through WhatsApp, whilst high-speed Wi-Fi is available throughout the vessel.

On the propulsion side the ship adds a new reference for Wärtsilä's 31DF engine of which four 16-cylinder Vee versions are installed. These produce 8,800kW power each at 750rpm. Two engines are placed in an in-line position in each of the catamaran hulls. The engines in each hull are slightly offset allowing the power to be taken through two Reintjes' SLVJ850 gearboxes to a pair of Wärtsilä LJX 1500SR waterjets. Giving a total of four gearboxes and waterjets powering the vessel. Service speed is around 37knots, but maximum speed is 40knots.

TECHNICAL PARTICULARS

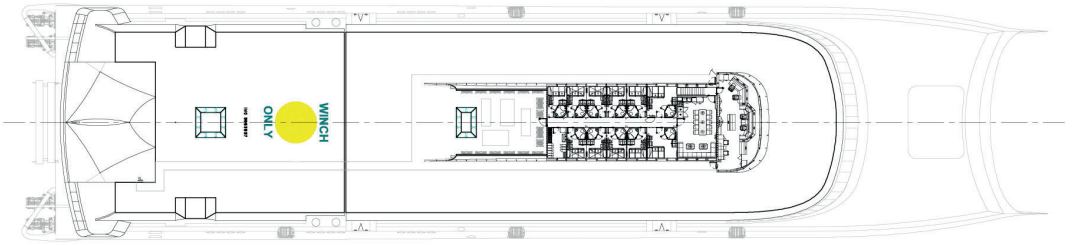
Length oa: 123.0m
Breadth moulded: 28.0m
Depth moulded: 7.8m
Draught design: 3.25m
Lightweight: 2,000t
Deadweight: 1,200t
Speed, service (--%MCR output): 35knots

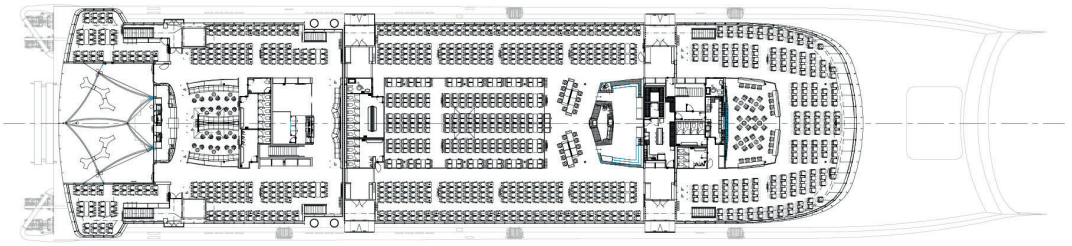
Classification society and notations: ..... Bureau Veritas

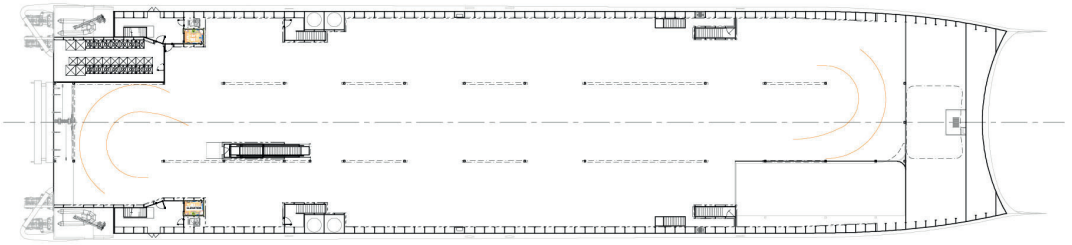
Propulsion
Main engine(s)
Model: ..... 16V31 DF
Manufacturer: ..... Wärtsilä
Number: 4
Type of fuel: ..... Diesel/LNG
Output of each engine: .... 8,800kW@750rpm
Gearbox(es)
Make: ..... Reintjes
Model: ..... SLVJ 850
Number: 4
Propeller(s) - Waterjets
Designer/Manufacturer: ..... Wärtsilä LJX 1500 SR Waterjets
Number: 4
Vehicles
Number of vehicle decks (fixed/moveable): 2
Total cars: 450
Passengers
Total: 1,200
Efficiency
Energy Saving Technologies: ..... Duel fuel, reciprocating engines and LNG tanks

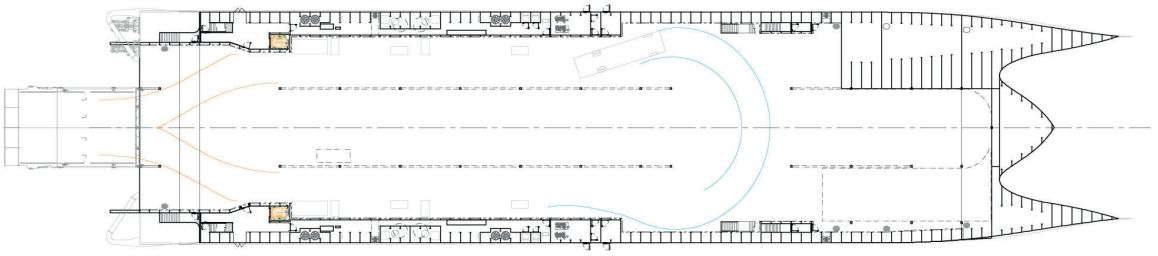
Contract date: ..... May 2018

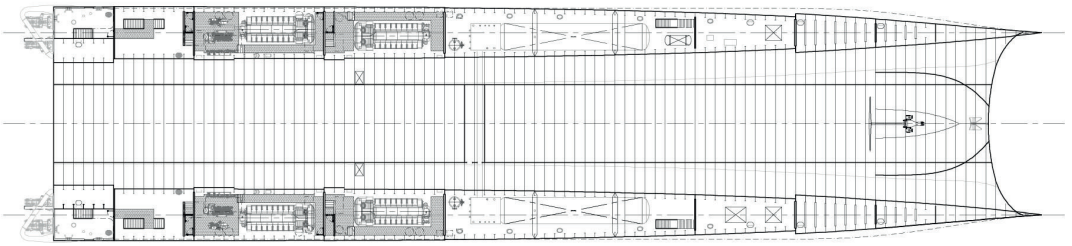
ELEANOR ROOSEVELT











FAUSTINE – Vehicles carrier

Shipbuilder: **Hyundai Mipo Dockyard Co., Ltd**
Vessel's name: ***Faustine***
Owner/Operator: **CLdN**
Country: **Belgium**
Designer: **Hyundai Mipo Dockyard Co., Ltd**
Country: **Republic of Korea**
Flag: **Malta**
IMO number: **9889708**
Total number of sister ships already completed (excluding ship presented): **0**
Total number of sister ships still on order: **1**

Faustine, delivered in October 2021, and sister ship *Seraphine* scheduled for February 2022 delivery are LNG-fuelled freight ro-ros built for Belgian operator CLdN by Hyundai Mipo in South Korea.

The vessels are 216.47m in length with a beam of 32.26m. They have a gross tonnage of 50,450 and a deadweight of 20,200. With their bulbous bows, transom sterns and stern ramps have a typical freight ro-ro profile. They are however, the most technologically advanced vessels in the CLdN fleet and have been designed to run on LNG or biogas. Both vessels will operate on the owner's Zeebrugge to Gothenburg service.

Faustine has seven cargo decks and a total lane length of 4,948m. Two of the decks (3A and 4A) are hoistable car decks. The uppermost deck is an open deck. Capacity is for 318 freight units and 822 cars. All internal ramps and the main stern ramp were supplied by MacGregor. The type-C LNG fuel tank and gas treatment room is installed on the No.3 deck. *Faustine* is equipped with a FLUME tank system for roll reduction.

The propulsion system comprises a HYUNDAI-built MAN B&W 7S50ME-C9.5-GI dual-fuel engine with a power output of 12,460kW at 117rpm driving a Kongsberg controllable pitch propeller. Service speed is 17.6knots. The main engine also has a shaft generator and a power take home mode. Auxiliaries are three HiMSEN 8H25/33 gensets and one HiMSEN 6H21/32.

In February 2022, CLdN ordered two larger 8,000-lane-meter ships from the same builder which will also feature dual-fuel engines in a hybrid configuration.

TECHNICAL PARTICULARS

Length oa: 216.47m
Length bp: 204.00m
Breadth moulded: 32.26m
Depth moulded
  to No.3 deck: 12.20m
  to No.5 deck: 27.30m
Width of double skin
  side: 1.10m
  bottom: 1.70m
Draught
  scantling: 8.20m
  design: 7.40m
Gross: 50,450t
Deadweight
  scantling: 20,200t
  design: 15,800t
Speed, service: 17.60knots
Bunkers (m^3)
  Light Fuel oil: 1,960
  Gas oil: 330
Water ballast (m^3): 12,800

Daily fuel consumption (tonnes/day)
Main engine only: 22.4(gas mode) 27.5(diesel mode)

Classification society and notations: +1A, RO/RO ship, CONTAINER, E0, DG(P), NAUT(AW), CLEAN, BIS, TMON(oil lubricated), Gas fuelled, LCS, Recyclable

Propulsion
Main engine(s)
  Design: MAN ES
  Model: Hyundai-B&W 7S50ME-C9.5-GI (TIER II)
  Manufacturer: HHI-EMD
  Number: 1 set / ship
  Type of fuel: Natural gas / LFO / MGO / MDO
  Output of each engine: 12,460kW x 117rpm (Nominal rating)
  Is this a diesel-electric or hybrid?: N
Propeller(s)
  Material: Ni-Al Bronze
  Designer/Manufacturer: Kongsberg
  Number: 1 set / ship
  Fixed/Controllable pitch: Controllable pitch
  Special adaptations: Propeller shaft clutch for PTH application
Fuel Gas Supply System
  Manufacturer: HHI-EMD (FGSS), Dong-sung (LNG fuel storage tank)
  Type of LNG fuel storage tank: Type C tank, Double hull, Vacuum perlite insulation
  Max. flow of LNG supply pump: abt. 1,672kg/h
Diesel-driven alternators
  Number: 4 sets / ship
  Engine make/type: HHI-EMD / 3 sets/ship of 8H25/33, 1 set of 6H21/32
  Type of fuel: LFO/MGO/MDO
Thermal Oil Heater
  Number: 1 set/ship
  Type: H4-TFO-015
  Make: Alfa Laval
  Output, each boiler: 1,400kW
Bow thruster(s)
  Make: Kawasaki
  Number: 2
  Output (each): 2,000kW x 1,200min
Stern thruster(s)
  Make: Kawasaki
  Number: 2
  Output (each): 1,500kW x 1,200min
Other cranes
  Number: 1
  Make: Shin Myung Tech Co. Ltd
  Type: Elec. driven
  Tasks: Provision Handling
  Performance: Hoisting Speed abt. 10m/min, 4t, 4.5m working radius
Mooring equipment
  Number: 6
  Make: Kongsberg
  Type: Hydraulic
Special lifesaving equipment
  Number of each and capacity: 1
  Make: Viking Norsafe
  Type: Free-Fall Lifeboat

Vehicles
  Number of vehicle decks: 7 decks
  Total lane length: 4,948 lane length
  Total cars: 822 personal cars
  Total freight units (specify size): 318 unit (13.6m x 2.6m trailer)
Doors/ramps/lifts/moveable car decks
  Number of each: 2/3/0/2(38 panels)
  Type: Top Hinged Hyd. Cylinder / Fwd Hinged Hyd. Cylinder/ x / Electric motor driven
  Designer: MacGregor

Ballast water treatment system
  Make: Techcross
  Capacity: 1,000m^3/h
Complement
  Officers: 12
  Crew: 30
  Suez/Repair Crew: 6

Navigation and other equipment
Bridge control system
  Make: HGS
  Is bridge fitted for one-man operation? Y
Integrated bridge system: Y
  If yes, make: JRC
  Model: JAN-9202
Radars
  Number: 2
  Make: JRC
  Model(s): JMR-9282-S & JMR-9225-9X

Fire detection system / Gas detection system
  Make: Consilium
  Type: Salwico Cargo
Fire extinguishing systems
Cargo holds: Low pressure CO_2 Sys./Sea water
  Make/Type: Danfoss-semco/Low pressure CO_2
Engine room: Low pressure CO_2 Sys./Sea water
  Make/Type: Danfoss-semco/Low pressure CO_2
Cabins: Portable fire extinguisher/Sea water
Make/Type: Fain (Portable fire extinguisher)
Public spaces: Portable fire extinguisher/ Sea water
  Make/Type: Fain (Portable fire extinguisher)
LNG bunker station: Dry chemical powder Sys.
  Make/Type: Fain
LNG fuel storage space: Low pressure CO_2 Sys.
  Make/Type: Danfoss-semco/Low pressure CO_2
Fuel Gas Supply Room: Low pressure CO_2 Sys.
  Make/Type: Danfoss-semco/Low pressure CO_2
Waste disposal plant
Incinerator
  Make: HMMCO
Sewage plant
  Make: RWO

Efficiency
  Attained EEDI value: 7.14
  Required EEDI value: 9.58
Other installed monitoring tools: Shaft horse power meter
Energy Saving Technologies: PROMAS
Hull coatings: Hempel Antifouling Globic 9500
Type: Premium high solids chemically hydrolyzing antifouling based on nano technology.

Contract date: 10 July 2019
Launch/float-out date: 27 May 2021
Delivery date: 08 October 2021

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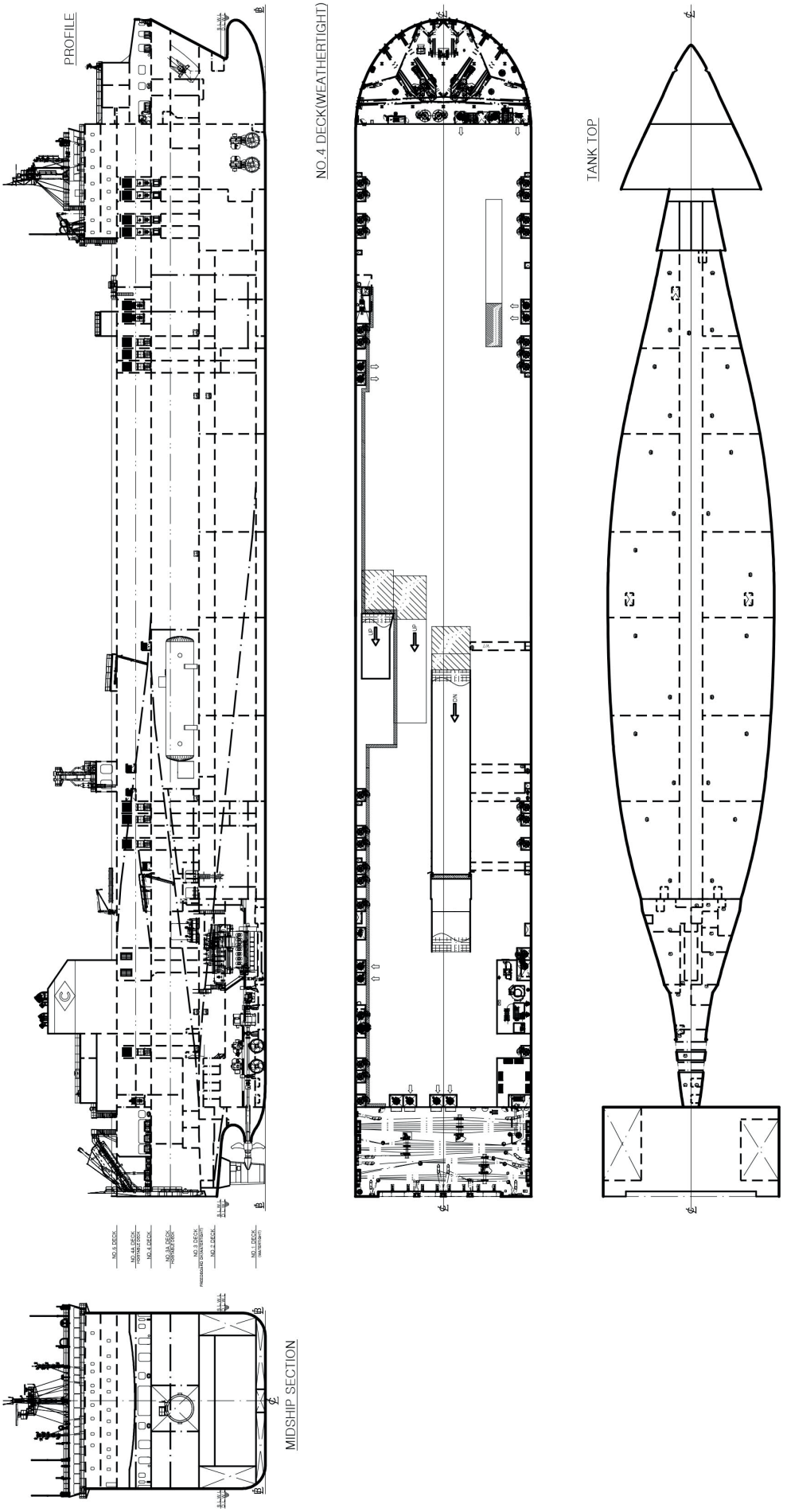
FAUSTINE



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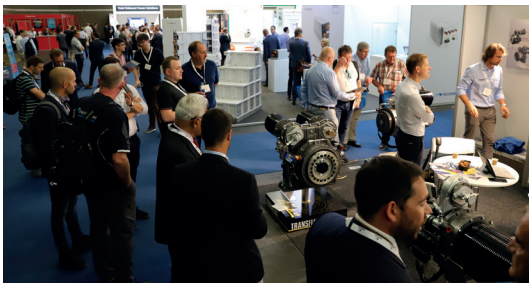

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FERRY KYOTO – Ro-pax ferry

Shipbuilder: ..... **Mitsubishi Shipbuilding Co., Ltd; Shimonoseki, Japan**
Vessel's name: ..... ***Ferry Kyoto***
Owner/Operator: ..... **Japan Railway Construction, Transport and Technology Agency (JRTT) & Meimon Taiyo Ferry Co., Ltd**
Country: ..... **Japan**
Designer: .. **Mitsubishi Shipbuilding Co., Ltd**
Country: ..... **Japan**
Flag: ..... **Japan**
IMO number: **9890991**
Total number of sister ships already completed (excluding ship presented): ..... **Nil**
Total number of sister ships still on order: **1**

Built to replace an older vessel and to meet growing demand in Japan for short-sea ferry operations, *Ferry Kyoto* was built by Mitsubishi Shipbuilding in Shimonoseki for operator Meimon Taiyo Ferry. The 33,390gt ro-pax was delivered in December and commenced operations on the Osaka-Shinmoji Kitakyushu route. A sister vessel, *Ferry Fukuoka*, is due to be delivered in March 2022.

Ferry Kyoto is 195m long, 27.8m wide, and 20.3m deep. It is the largest ship ever operated by Meimon Taiyo Ferry. The vessel has 245 passenger cabins and capacity for 675 persons. There are five car decks with entry via stern or bow ramps and vehicle capacity for approximately 162 12m trucks and 140 passenger cars. The upper car deck has been fitted with ten charging points for EVs.

The vessel has a hybrid propulsion system powered by two JFE Engineering 12PC2-6B engines outputting 8,000kW at MCR. This is a popular engine choice for Japanese ferries and is a development of the SEMT Pielstick engine. The auxiliaries are three Daihatsu 6DE-23 gensets each providing 1,400kWe. The main engines are connected through a gearbox to a 5.8m diameter CPP and in addition there are two electric motor powered azimuthing thrusters. The main engines are intended to be run using high sulphur fuel and to ensure compliance with 2020 SOx regulations, a Valmet scrubber has been installed.

Environmental performance is enhanced by the use of the Mitsubishi Air Lubrication System (MALS) developed by the shipbuilder. This improves energy efficiency and when combined with the overall improved efficiency of the vessel and size increase over existing ships, is claimed to reduce fuel consumption by 35% for each truck carried.

TECHNICAL PARTICULARS

Length oa: 195.00m
Length bp: 184.00m
Breadth moulded: 27.80m
Depth moulded
to main deck: 20.30m (6DK)
to upper deck: 15.15m (5DK)
to other decks: 9.55m (4DK)
Draught
scantling: 6.70m
design: 6.70m

Gross: 33,390t
Deadweight
scantling: 6,273t
design: 6,273t
Speed, service: ..... 23.2knots(85%MCR)

Bunkers (m^3)
Heavy oil: ..... 128.7(Low Sulphur) / 586.9 (High Sulphur)
Diesel oil: 20.1
Water ballast (m^3): 3,649.8

Classification society and notations: ..... JG, MO
Heel control equipment: .... Cross flooding pipe

Propulsion
Main engine(s)
Design: ..... JFE Engineering Corporation
Model: 12PC2-6B
Manufacturer: ..... JFE Engineering Corporation
Number: 2
Type of fuel: ..... HFO (High Sulphur)
Output of each engine: ..... 8,000kW(MCR), 6,800kW(NOR)
Is this a diesel-electric or hybrid?: ..... hybrid

Gearbox(es)
Make: ..... Renk
Model: ..... NDSHL II-4500
Number: 1

Propeller(s) / Azimuthing Propeller(s)
Material: ..... CAC703 / CAC703
Designer, Manufacturer: ..... Nakashima Propeller Co., Ltd
Number: ..... 1 / 2
Fixed, Controllable pitch: ..... CPP / CPP
Diameter: ..... 5.80m / 2.40m

Main-engine driven alternators
Number: 1
Make/type: ..... Nishishiba Electric Co., Ltd
Output/speed of each set: 1,400kW

Diesel-driven alternators
Number: 3
Engine make/type: ..... Daihatsu Diesel MFG. Co., Ltd / 6DE-23
Type of fuel: ..... HFO (Low Sulfur) or MDO
Alternator make/type: ..... Nishishiba Electric Co., Ltd
Output/speed of each set: 1,400kWe/ 900rpm

Exhaust-gas scrubbing equipment
Manufacturer: ..... Valmet
Type: ..... Marine SOx Scrubber
On main engines?: ..... Yes
On auxiliary engines?: ..... No

Boilers
Number: 1
Type: HTB-150L
Make: ..... Miura Co., Ltd
Output, each boiler: 1,744kW

Stern appendages/special rudders: ..... Becker rudder

Bow thruster(s)
Make: ..... Nakashima Propeller Co., Ltd
Number: 1
Output (each): 261.6kN

Mooring equipment
Number: 4
Make: ..... Manabe Zoki Co., Ltd
Type: ..... Electric hydraulic

Special lifesaving equipment
Number of each and capacity: ..... Lifeboat
Make: ..... Mansei Inc
Type: ..... GJ 6.10

Vehicles
Number of vehicle decks: ..... 5 (fixed)
Total cars: 162 (12m trucks), 140 (4.5m cars)

Doors/ramps/lifts/moveable car decks
Number of each: ..... 5 doors / 4 ramps
Type: ..... Linear-motion cylinder, Jigger cylinder / Linear-motion cylinder, Jigger cylinder
Designer: ..... MacGregor
Ballast control system
Make: ..... NYK Trading Corporation
Type: ..... Trim/Heel adjuster

Complement
Officers: 11
Crew: 26
Passengers
Total: 675
Number of cabins: 245
Percentage/number outboard: 0

Navigation and other equipment
Bridge control system
Make: ..... Tokyo Keiki Inc
Type: PR-9000
Is bridge fitted for one-man operation?: ... No
Integrated bridge system: ..... No
Radars
Number: 1
Make: ..... Japan Radio Co., Ltd
Model(s): JMR-9225-9X

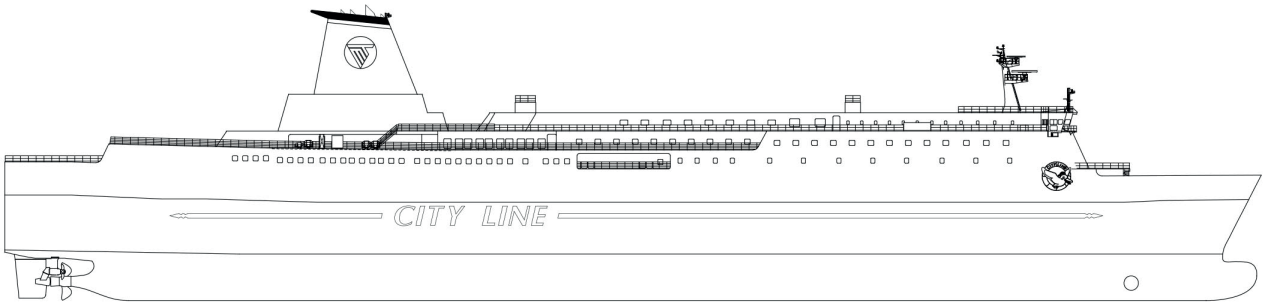
Fire detection system
Make: ..... Consilium Nittan Marine Ltd
Type: ..... Salwico CCP
Fire extinguishing systems
Engine room: ..... CO_2 Fire extinguishing device
Make/Type: ..... Nippon Dry-Chemical Co., Ltd
Vehicle spaces: ..... Manual sprinkler
Make/Type: ..... Nohmi Bosai Ltd / MHS32
Cabins: ..... Seawater fire hydrant
Public spaces: ..... Seawater fire hydrant

Waste disposal plant
Sewage plant
Make: ..... Taiko Kikai Industries Co., Ltd
Model: CRP-9000, CR-125H

Efficiency
Energy Saving Technologies: ..... MALS (Mitsubishi Air Lubrication System)
Hull coatings: ..... Self-polishing antifouling paint

Contract date: ..... 26 July 2019
Launch/float-out date: ..... 13 May 2021
Delivery date: ..... 10 December 2021

FERRY KYOTO



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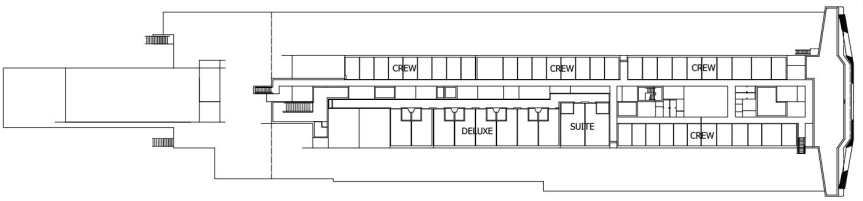

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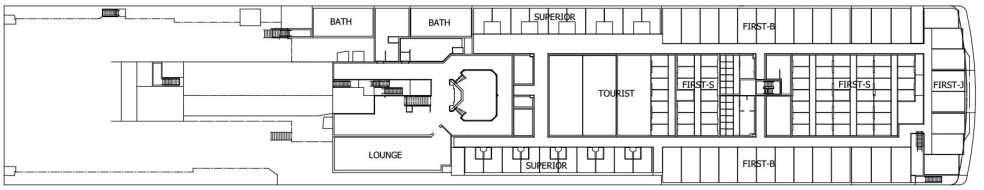

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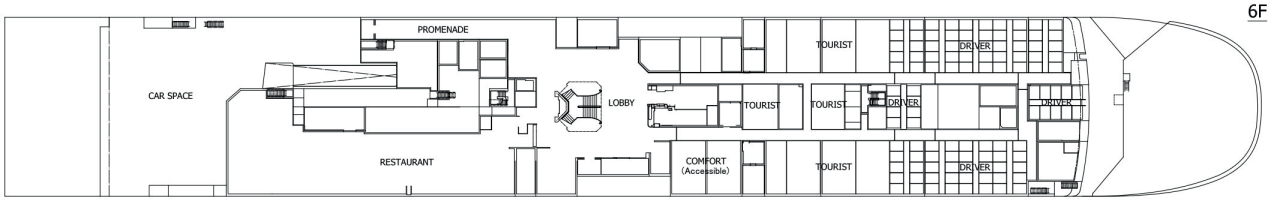

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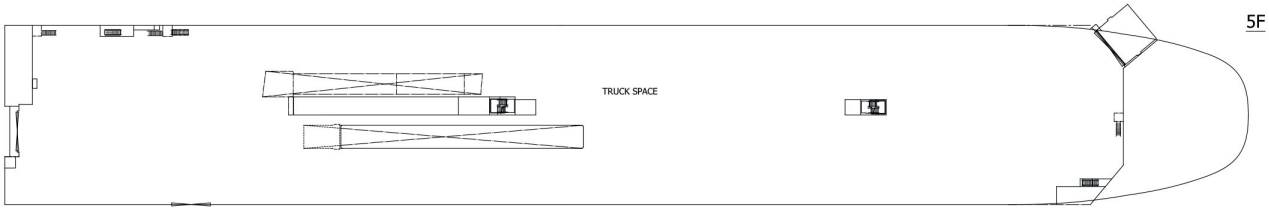

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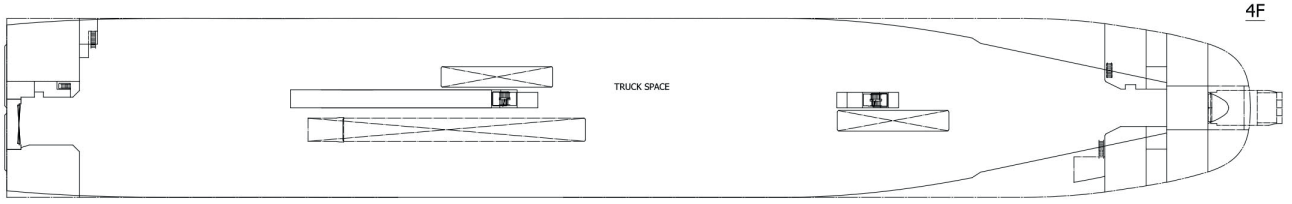

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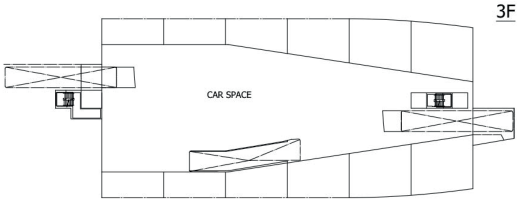

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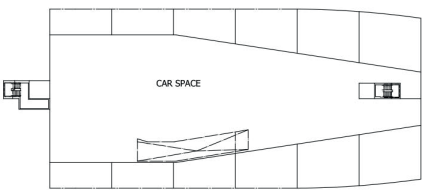


GAS GABRIELA – LPG carrier

Shipbuilder: **Hyundai Heavy Industry Co., Ltd**
Vessel's name: ***Gas Gabriella***
Owner/Operator: **KSS Line Ltd**
Country: **Republic of Korea**
Designer: .**Hyundai Heavy Industry Co., Ltd**
Country: **Republic of Korea**
Flag: **Panama**
IMO number: **9887451**
Total number of sister ships already completed (excluding ship presented): **4**
Total number of sister ships still on order: **0**

Built by Hyundai Heavy Industries for Korean operator KSS Line, *Gas Gabriella* is an 84,000m^3 capacity VLGC that was delivered in January 2021 directly into a long-term charter with Spanish energy trader Vilma Oil.

The vessel is the first in a series of six ships, four sisters were delivered later in 2021 – *Gas Ares* (February), *Gas Gala* (March), *Gas Barbarossa* (April and *Gas Ghazi* (October). The final vessel in the series hasn't yet been named but is scheduled for delivery in July 2022.

the VLGC segment is one which has seen rapid vessel size growth over the last few years with records for the largest expected to tumble regularly. *Gas Gabriella* is not the largest in the segment by some distance but because of its 32.25m beam, can claim the title of being the largest capacity vessel able to use both the old and new Panama Canal lock systems.

Most of the vessels of similar capacity have been designed only to use the new locks and can, according to KSS, suffer delays as a consequence. Most vessels which can use the old locks have a capacity of 75,000m^3 to 80,000m^3 and therefore the 84,000m^3 capacity of *Gas Gabriela* allows for 5% more cargo to be carried.

In most other respects, *Gas Gabriella* is typical of the type and has a length of 229.98m and a scantling draught of 12.1m. The main engine is a MAN B&W 6G60ME-C9.5-HPSCR outputting 12,253kW and driving a directly coupled 7.2m diameter propeller. The HPSCR suffix indicating the vessel has a high pressure selective catalytic reduction system for controlling NOx. A Hyundai open loop scrubber ensures compliance with SOx rules.

The higher cargo capacity also permits the vessel to comfortable meet EEDI requirements with an attained rating of 5.72 against a required rating of 7.02.

TECHNICAL PARTICULARS

Length oa: 229.98m
Length bp: 223.45m
Breadth moulded: 32.25m
Depth moulded
to main deck: 23.75m
to upper deck: 23.75m
to other decks: 18.50m (mooring deck)
Width of double skin
side: 1.695m
bottom: 1.85m
Draught
scantling: 12.1m
design: 11.7m
Gross: 48,858t
Deadweight
scantling: 53,779.9t
design: 51,106.9t
Speed, service (--%MCR output): 16.9knots
Cargo capacity (m^3)
Liquid volume: 84,021.3
Bunkers (m^3)
Heavy oil: 2,167.8
Diesel oil: 233.6
Water ballast (m^3): 21,661.5
Daily fuel consumption (tonnes/day)
Main engine only: 39.7

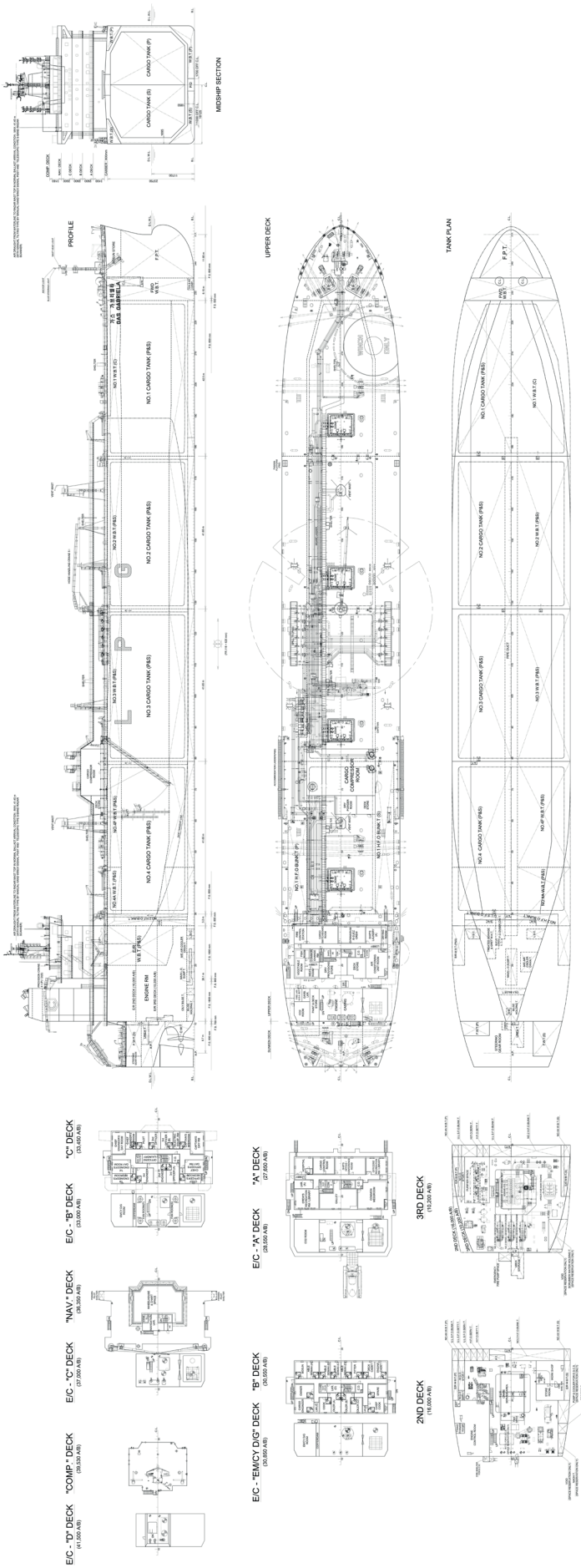
Classification society and notations: KR + KRS 1, Liquefied Gas Carrier, 2G 1A(R)/ 0.28 bar, -52°C, 0.61SG(IGC), IWS, SeaTrust(HCM, DSA1, FSA1), PSPC, LI, +KRM1-UMA, Reliquefaction, BWT, STCM, LG, CLEAN1, IHM, IGS, EEAS-SCR, EEAS-EGC-O

Propulsion
Main engine(s)
Design: Hyundai-MAN B&W
Model:
6G60ME-C9.5-HPSCR
Manufacturer: Hyundai-MAN B&W
Number: 1
Type of fuel: HFO, ULSFO, MGO
Output of each engine: 12,253kW
Is this a diesel-electric or hybrid?: N
Propeller(s)
Material: Ni-Al-Bronze
Designer/Manufacturer: HHI-EMD
Number: 1
Fixed/Controllable pitch: Fixed pitch
Diameter: 7.2m
Speed: 93.2rpm
Diesel-driven alternators
Number: 3
Engine make/type: HiMSEN, 6H21/32
Type of fuel: HFO, ULSFO, MGO
Alternator make/type: Hyundai Electric / HFC7 564-08P
Output/speed of each set: Diesel Engine: 1,320kW / Alternator: 1,200kW
Exhaust-gas scrubbing equipment
Manufacturer: Hyundai Power System
Type: Open Loop Wet Scubber
On main engines?: Yes (Up to 85% of MCR)
On auxiliary engines?: Yes (Up to 90% of MCR for 2 Sets with M/E simultaneous operation)
Boilers
Number: 1
Type: Composite boiler
Make: Kangrim
Output, each boiler: 3,000 / 1,000kg/hr Steam generation (Oil-fired / Exh-gas)
Stern appendages/special rudders: Hi-PSD and Hi-Rudder with bulb

Deck machinery
Cargo cranes/cargo gear
Number: 1
Make: Oriental
Type: Electro-hydraulic
Performance: SWL 5t, Working radius Max. 25m ~ min. 5.2m
Other cranes
Number: 2
Make: Oriental
Type: Electro-hydraulic
Tasks: Provision crane
Mooring equipment
Number: 8
Make: Flutek Ltd
Type: Hydraulic
Special lifesaving equipment
Number of each and capacity: 1 x Life boat (26 persons)
Make: Norsafe
Type: Free-fall type
Cargo tanks
Number: 4 (No.1~4)
Grades of cargo carried: 2
Product range: Commercial Butane, Pure Propane, Commercial Propane, Mixture of Propane and Butane in any proportion, Propylene
Coated tanks – make and type of coating: Low Temperature Steel
Structure: Low Temperature Steel, Piping, ASTM A312 Gr 304L
Cargo pumps
Number: 8
Type: Vertical Deepwell Pump
Make: Wärtsilä Svanehoj
Stainless steel: Acid resistant steel, AISI 316
Capacity (each): 600m^3/h
Cargo control system
Make: Kongsberg Maritime AS
Type: K-Chief 600
Ballast control system
Make: Hanla IMS
Type: Hydraulic actuators for valves
Ballast water treatment system
Make: HiBallast
Capacity: Electrolysis Unit - 2,000m^3/h x 1 / Filter Unit – 1,000m^3/h x 2
Complement
Officers: 13
Crew: 12
Supernumaries/Spare: 1
Suez/Repair Crew: 6
Navigation and other equipment
Bridge control system
Make: Tokyo Keiki
Type: PR-9340A-DW-SS2
Is bridge fitted for one-man operation?: N
Integrated bridge system: N
Radars
Number: 2
Make: JRC
Model(s): JMR-9282-S(S-Band 1 set) & JMR-9225-6X(X-Band 1 set)
Fire detection system
Make: Autronica
Type: UEN024/63-1
Fire extinguishing systems
Cargo holds: Dry powder
Make/Type: NK Co., Ltd
Engine room: CO_2 fire extinguishing
Make/Type: NK Co., Ltd
Waste disposal plant
Incinerator
Make: Hyundai Marine Machinery Co., Ltd
Model: MAXI T50 SL WS
Waste compactor
Sewage plant
Make: IL-Seung Co., Ltd / Model: ISB-02
Efficiency
Attained EEDI value: 5.72
Required EEDI value: 7.02
Energy Saving Technologies: Hi-PSD and Hi-Rudder with bulb
Hull coatings: Nippon Paint Marine antifouling paint
Performance Monitoring Regime: Hyundai-ISS

Contract date: 22 May 2019
Launch/float-out date: 23 October 2020
Delivery date: 18 January 2021

GAS GABRIELA



HACHINOHE MARU – Wood chip carrier

Shipbuilder: **Oshima Shipbuilding Co., Ltd**
Vessel's name: ***Hachinohe Maru***
Owner/Operator: **Nippon Yusen Kabushiki Kaisha**
Country: **Japan**
Designer: **Oshima Shipbuilding Co., Ltd**
Country: **Japan**
Flag: **Japan**
IMO number: **9913781**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: **0**

Built by Japanese bulk carrier specialist Oshima Shipbuilding for NYK Line, *Hachinohe Maru* is one of a series of six woodchip carriers and was delivered in December 2021. Other vessels of the same type have also been delivered to different owners through the year.

This new variant of what has become a standard Oshima design is claimed to be some 15% more efficient than previous types. It retains the 210m length and 37m which is a standard for ships of this type and capacity.

Wood chip carriers are a strong segment for Japanese ship operators traditionally carrying cargo to meet the demands of the Japanese paper industry. More recently the opening of biomass power plants in Japan has seen a new opportunity for the ship type.

With a deadweight of 60,288, the vessel appears superficially similar to an Ultramax bulker but woodchip carriers are designed for carriage of a lower density cargo and tend to have deeper holds and in this case six rather than five cargo holds. The cargo capacity is 122,517m^3 and the vessel is equipped with three deck cranes with a SWL of 14.7tonnes at 27m outreach and a self-unloading system of conveyor belts.

The vessel is an eco-ship that uses approximately 15% less fuel compared to conventional wood-chip carriers. These advancements have been made through improvements to the hull form while maintaining transportation capacity and the use of a larger propeller that improves propulsion. The carrier is also equipped with ladder fins that improve water flow generated at the aft-end of the vessel. SOx emissions from the JEC 6UEC50LSH-Eco-C2 main engine and three Daihatsu auxiliaries are handled by a PureteQ scrubber.

TECHNICAL PARTICULARS

Length oa: 209.96m
Breadth moulded: 37m
Depth moulded
to main deck: 22.8m
to upper deck: 22.8m
Width of double skin
side: single hull type for all cargo hold
Draught
scantling: 11.523m
Gross: 49,887t
Deadweight
scantling: 60,288t
Speed, service (--%MCR output): 14.20knots

Cargo capacity (m^3)
Grain: 122,517m^3
Bunkers (m^3)
Heavy oil: 2,753m^3
Diesel oil: 319m^3
Water ballast (m^3): 30,910m^3

Classification society and notations: ClassNK NS*(BC-XII, PSPC-WBT, NC), SOx(EGCS), (EEDI-p3), IHM, MNS* (SOx-EGCS-M/E), G/E(Nos. 1, 2, 3)

Propulsion
Main engine(s)
Design: Japan Engine Corporation
Model: 6UEC50LSH-Eco-C2
Manufacturer: Japan Engine Corporation
Number: 1
Type of fuel: HFO
Is this a diesel-electric or hybrid?: No

Propeller(s)
Material: Ni-Al-Bronze
Designer/Manufacturer: Nakashima Propeller Co., Ltd
Number: 1
Fixed/Controllable pitch: Fixed pitch

Diesel-driven alternators
Number: 3
Engine make/type: Daihatsu Diesel Mfg. Co., Ltd
Type of fuel: HFO
Alternator make/type: Nishishiba Electric Co., Ltd

Exhaust-gas scrubbing equipment
Manufacturer: PureteQ K.K.
Type: Inline type
On main engines?: 1 set of main engine exhaust gas line
On auxiliary engines?: 3 sets of main generator engine exhaust gas line

Boilers
Number: 1
Type: Horizontal smoke tube vertical composite boiler
Make: Tortoise Engineering Co., Ltd

Deck machinery
Cargo cranes/cargo gear
Number: 3
Make: I Know Machinery Co., Ltd
Type: Jib type
Performance: 14.7T x 27m

Other cranes
Number: 1
Make: Kyoritsu Kikai Co., Ltd
Type: Electric motor driven
Tasks: Machinery parts/Provision handling crane
Performance: 3.0t

Mooring equipment
Number: 4-mooring winch, 2-windlass/mooring winch
Make: Nippon Pusnes Co., Ltd
Type: Electro-hydraulic

Special lifesaving equipment
Number of each and capacity: 2 lifeboats 25 persons
Make: Shigi Shipbuilding Co., Ltd
Type: F.R.P. totally enclosed

Cargo/capacity
Hatch covers
Design: I Know Machinery Co., Ltd
Manufacturer: I Know Machinery Co., Ltd
Type: Weather tight folding type

Ballast control system
Make: Nakakita Seisakusyo Co., Ltd
Type: multi control panel

Ballast water treatment system
Make: Sunrui Marine Environment Engineering Co., Ltd

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

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

Radars
Number: 2
Make: Furuno

Fire detection system
Make: Nohmi Bosai Ltd
Type: Smoke, Thermal, Flame

Fire extinguishing systems
Cargo holds:
Make/Type: Air Water Safety Service Inc. / CO_2 fire extinguishing system
Engine room:
Make/Type: Air Water Safety Service Inc. / CO_2 fire extinguishing system
Cabins: as per rule requirement
Public spaces: as per rule requirement

Waste disposal plant
Waste handled: Garbage and waste oil
Incinerator
Make: Sunflame Co., Ltd
Waste shredder/crusher
Make: Mitsuboshi Chuki Mfg.Co., Ltd
Sewage plant
Make: Taiko Kikai Industries Co., Ltd

Efficiency
Attained EEDI value: -34.9%

Delivery date: 28 December 2021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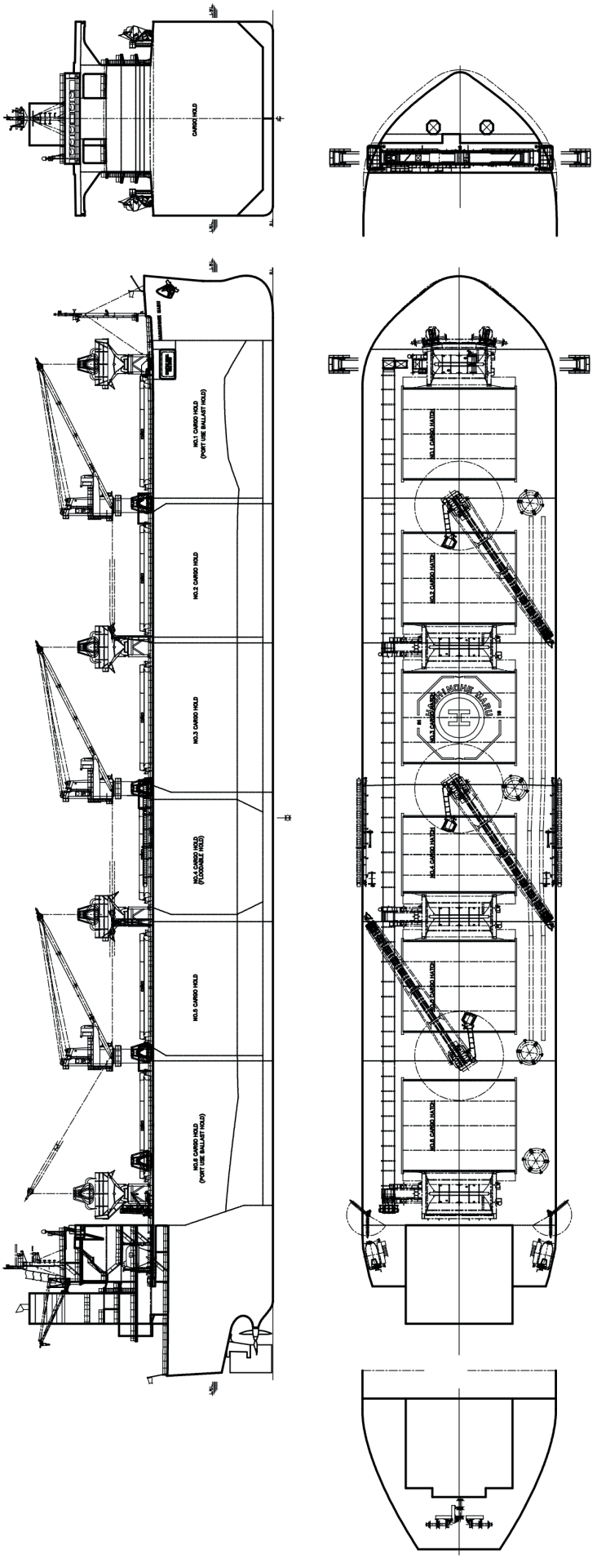
HACHINOHE MARU



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HAMAYU – Ro-pax ferry

Shipbuilder: **Mitsubishi Shipbuilding Co., Ltd., Nagasaki, Japan**
Vessel's name: ***Hamayu***
Owner/Operator: **Shin Nihonkai Ferry Co., Ltd**
Country: **Japan**
Designer: **Mitsubishi Shipbuilding Co., Ltd**
Country: **Japan**
Model test establishment used: **MHI Nagasaki R&D Centre, Japan**
Flag: **Japan**
IMO number: **9894569**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: **0**

The first of two sister 31,408gt ro-pax vessels ordered in 2019, *Hamayu* was delivered by Mitsubishi Shipbuilding to Shin Nihonkai Ferry Co. in February 2021. Sister ship *Soleil* was delivered in June 2021. The vessels are part of a restructuring that is taking place in Japan's ferry routes aimed at shifting freight off roads and on to short sea services. *Hamayu* and *Soleil* operate on a service that links Tokyo with the island of Kyūshū and takes on average 20 hours.

Dimensions of the vessels are an overall length of 225m, beam of 25m and a scantling draught of 7.44m. Vehicular access is via a stern centre ramp or a stern quarter ramp depending upon berthing arrangements and there are also two side shell doors. The ships have two fixed vehicle decks and can accommodate 154 trucks and 30 cars. There are 51 passenger cabins and room for 268 passengers in total.

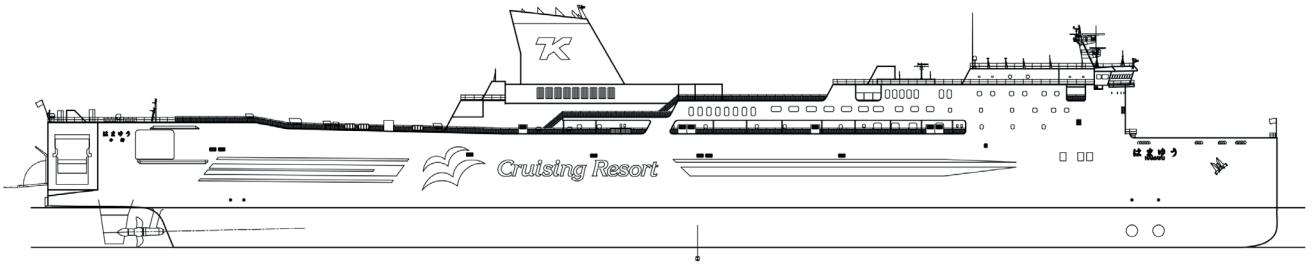
The ship has a vertical bow form that is designed to increase the efficiency of the vessel compared to older ferries in use. Considering the route time and length, a relatively high service speed of 28.3knots was decided as essential and to achieve this the ship is fitted with four Wärtsilä 14V31 engines intended for use with HFO or MDO. Each engine produces 8,540kW power and are used in pairs in separate engine rooms driving two controllable pitch propellers through Wärtsilä gearboxes. SOx scrubbers are adopted for the main engines and generators.

While *Hamayu* is the lead ship of the pair, *Soleil* has added its own distinction being used to test autonomous ship operation in Japanese waters. In January 2022 the vessel made a seven-hour voyage fully autonomously including berthing and unberthing using turning and reversing movements and high-speed navigation of up to 26knots.

TECHNICAL PARTICULARS

Length oa: 222.5m
Length bp: 209.30m
Breadth moulded: 25.00m
Depth moulded
to main deck: 10.00m
to upper deck: 20.40m
Draught
scantling: 7.44m
design: 7.20m
Gross: 31,408t
Deadweight
scantling: 6,631t
design: 5,662t
Speed, service (--%MCR output): 28.3knots
Bunkers (m^3)
Heavy oil: 1,129
Diesel oil: 104
Water ballast (m^3): 3,504
Classification society and notations: Not applied
Heel control equipment: Auto Heeling system
Roll-stabilisation equipment: Fin Stabilizer
Propulsion
Main engine(s)
Design: Wärtsilä
Model: 14V31
Manufacturer: Wärtsilä
Number: 4
Type of fuel: HFO & MDO
Output of each engine: 8,540kW
Is this a diesel-electric or hybrid?: Diesel–electric
Gearbox(es)
Make: Wärtsilä
Number: 2
Propeller(s)
Material: CAC703
Designer/Manufacturer: Kawasaki Heavy Industries, Ltd
Number: 2
Fixed/Controllable pitch: CPP
Diameter: 5.4m
Main-engine driven alternators
Number: 2
Make/type: Nishisiba Electric Co., Ltd.
Diesel-driven alternators
Number: 3
Engine make/type: Yanmar Co., Ltd / 6EY26LW
Type of fuel: HFD & MDO
Exhaust-gas scrubbing equipment
Manufacturer: Wärtsilä
Type: I-SOx Open Loop EGC System
On main engines?: Yes
On auxiliary engines?: Yes
Boilers
Number: 1
Make: Miura Co., Ltd
Output, each boiler: 4,000kg/h
Stern appendages/special rudders: reaction rudder with bulb
Bow thruster(s)
Make: Kawasaki Heavy Industries, Ltd
Number: 2
Output (each): 17.5t
Stern thruster(s)
Make: Kawasaki Heavy Industries, Ltd
Number: 2
Output (each): 12.5t
Mooring equipment
Number: 5 x Mooring winch, 2 x windlass
Make: Manabe Zoki Co., Ltd
Type (electric/hydraulic/steam): EL-HY
Special lifesaving equipment
Number of each and capacity: MES-2
Make: Fujikura Composites Inc
Type: FSMES-180 • N
If MES, vertical or sloping chutes?: vertical
Vehicles
Number of vehicle decks: 2 (fixed)
Total cars: Truck 154, Car 30
Doors/ramps/lifts/moveable car decks
Number of each: 4
Type: 1 x stern side ramp, 1 x stern center ramp, 2 x side shell door
Designer: Kyoritsu Kikai Co., Ltd
Ballast control system
Make: NYK Trading Corporation
Complement
Officers: 10
Crew: 20
Supernumaries/Spare: 7
Passengers
Total: 268
Number of cabins: 51
Navigation and other equipment
Bridge control system
Make: Nabtesco
Type: electric
Radars
Number: 2
Make: JRC
Model(s): JMR-9230-S, JMR-9225-9X
Fire detection system
Make: NHE Nippon Hakuyo Electronics, Ltd
Type: Smoke detector type & Temperature type
Fire extinguishing systems
Engine room:
Make/type: Kashiwa Co., Ltd / inside air
Vehicle spaces:
Make/type: Nohmi Bosai Ltd / fixed
Public spaces:
Make/Type: Nohmi Bosai Ltd / sprinkler

Contract date: 27 June 2019
Launch/float-out date: 07 August 2020
Delivery date: 26 February 2021



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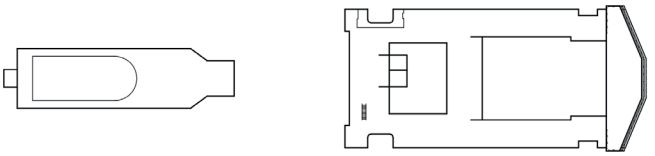

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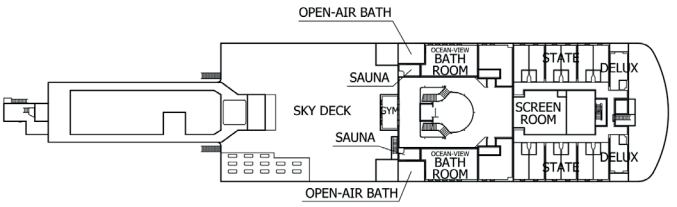

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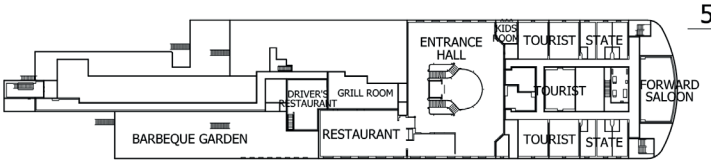

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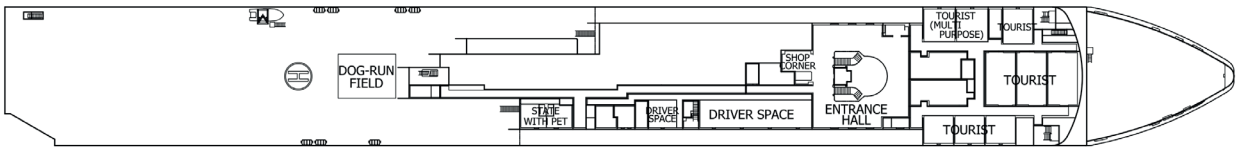

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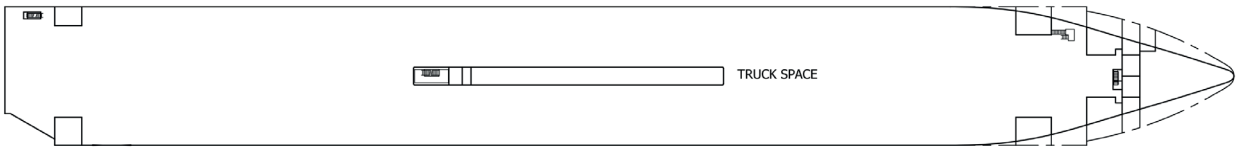

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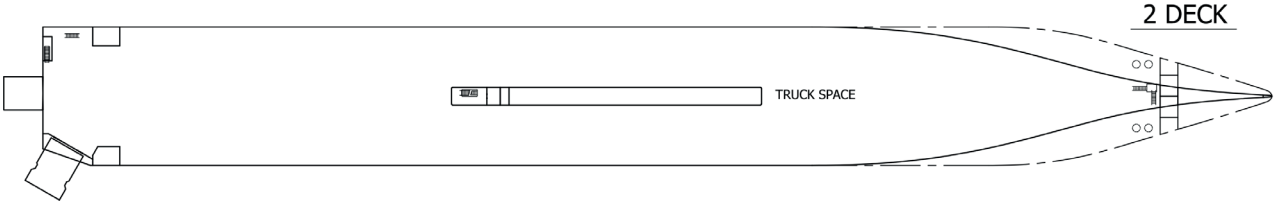


HAVILA CAPELLA – Ro-pax ferry

Shipbuilder: **Tersan Shipyard Inc**
Vessel's name: ***Havila Capella***
Owner/Operator: **Havila Kystruten Operations AS**
Country: **Norway**
Designer: **HAV Ship Design**
Country: **Norway**
Flag: **Norway**
IMO number: **9865570**
Total number of sister ships already completed (excluding ship presented): **Nil**
Total number of sister ships still on order: **1**

When Turkey's Tersan shipyards delivered *Havila Capella* in October 2021 it was not just as the first of four innovative new design coastal ferries, but also the very first vessel for operator Havila Kystruten. The ships were designed by HAV Ship design, a sister company of the operator.

Havila Kystruten was formed in 2017 for the purpose of bidding for one of three licences for coastal ferry services from the Norwegian government which had decided to end the monopoly of the famous Hurtigruten brand. The ship operates on the Bergen-Kirkenes service taking an average seven days and calling at multiple ports along the way.

In line with Norway's penchant for green vessels, the 15,519gt ship is powered by Bergen LNG engines driving two Azipull thrusters in a diesel electric configuration. There are four C26:33L engines, two of which are nine-cylinder units and two six-cylinder giving a total 8,100kW between them. When delivered its 6,500kWh battery pack was the world's largest. It allows the vessel to sail for four hours on battery power alone.

The vessel can be charged with clean hydropower at the quay and it has a waste energy recovery system that will make use of the 65% of fuel energy that is normally lost through the exhaust and cooling water systems. A further 5% fuel saving is made possible by the use of a Wavefoil retractable bow foil device. A future transition to hydrogen power is anticipated when technology permits.

There is capacity for 640 passengers of which 468 can be accommodated in cabins while 172 will be day passengers. The vessel also has capacity for nine cars and some palletised cargoes.

TECHNICAL PARTICULARS

Length oa: 12.10m
Length bp: 115.20m
Breadth moulded: 22.10m
Depth moulded
to main deck: 8.20m
to upper deck: 11.30m
Width of double skin
bottom: 1.5m
Draught
scantling: 5.35m
design: 5.2m

Gross: 4,419t
Displacement: 8,639.7t
Lightweight: 6,768.4t
Deadweight: Abt.
scantling: 18,71.3t
design: 1,800t

Block co-efficient (please state relevant draught): 0.6251 / 5.4mt
Speed, service (--%MCR output): 16knots

Bunkers (m^3)
LNG: abt: 370m^3 (2 x LNG storage tanks)

Water ballast (m^3): 2,100m^3

Daily fuel consumption (tonnes/day)
Main engine only: 7,550kj/kWh+5% (LNG) per engine

Classification society and notations: DNV, + 1A1, Passenger Ship, Comfort C(2)-V(2) Naut (AW), BIS, Gas Fuelled, Battery (Power), Clean (Design), E0, Recyclable

% high-tensile steel used in construction: 97%
% aluminium used in hull/superstructure: 3%

Roll-stabilisation equipment: Active Fin Stabilizers on each side, STB and PS

Propulsion
Main engine(s)
Design: Bergen Engines AS
Model: 2 x C26:33L6AG and 2 x C26:33L9AG
Manufacturer: Bergen Engines AS
Number: as above
Type of fuel: LNG
Output of each engine: 2 x 1,620kW (+) 2 x 2,430kW
Is this a diesel-electric or hybrid?: Hybrid; LNG - Battery

Propeller(s)
Material: Ni-Al-Bronze
Designer/Manufacturer: Kongsberg Maritime
Number: 2 pcs Azipul type thrusters
Fixed/Controllable pitch: CPP
Diameter: 3,300mm
Speed: variable, 205rpm at MCR

Main-engine driven alternators
Number: 2 + 2
Make/type: 2 x NEGR 560 LA6 + 2 x NEGR 630 LA6
Output/speed of each set: 2 x 1,555kW (+) 2 x 2,330kW

Boilers
Number: 4 pcs
Type: A300-2500
Make: Ulmatec Pyro AS

Stern appendages/special rudders: 2 x Azipull aft thrusters

Bow thruster(s)
Make: Bergen Maritime, type: TT2400 DPN CP "Super Silent
Number: 2 pcs
Output (each): 1,600kW

Vehicles
Total cars: 9 cars

Doors/ramps/lifts/moveable car decks
Number of each: 1 pcs car/cargo ramp combined lift
Designer: Ulmatec Handling Systems

Passengers
Total: 715 (468 passengers in cabins + 172 daily passengers + 75 crew)

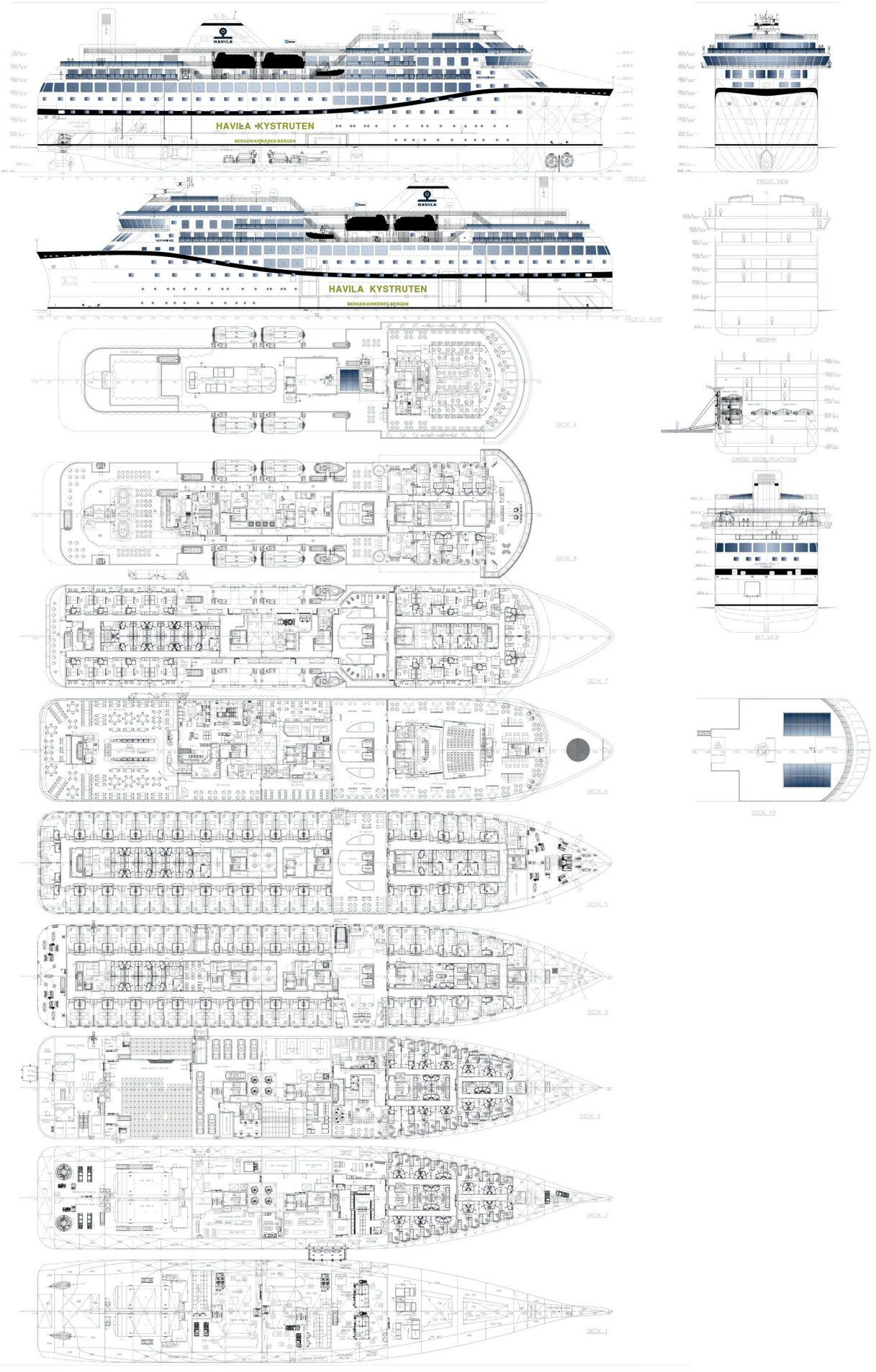
Navigation and other equipment
Bridge control system
Make: Norwegian Control Systems
Is bridge fitted for one-man operation?: No

Integrated bridge system: Yes

Efficiency
Energy Saving Technologies: Waste Energy Recovering System, Battery Storage Systems, total capacity: 6,500kWh

Contract date: October 2018
Launch/float-out date: September 2020
Delivery date: October 2021

HAVILA CAPELLA



HL ECO – Bulk carrier

Shipbuilder: **Hyundai Samho Heavy Industries Co., Ltd**
Vessel's name: ***HL Eco***
Owner/Operator: **H-Line**
Country: **Republic of Korea**
Designer: **Hyundai Samho Heavy Industries Co., Ltd**
Country: **Republic of Korea**
Flag: **Panama**
IMO number: **9869332**
Total number of sister ships already completed (excluding ship presented): **2**
Total number of sister ships still on order: **1**

HL Eco is a pioneer of the trend for more vessel types to adopt LNG as a marine fuel. Although dual-fuel and gas powered small vessel types have more than two decades of history, it is only recently that larger vessels have adopted the idea – mostly as a means of meeting increasingly stringent emission regulations.

Delivered by Hyundai Samho to South Korean operator H-Line in December 2020, *HL Eco* was too late to make the last edition of *Significant Ships*, but as the world's first LNG-fuelled Newcastlemax bulk carrier its significance should not be overlooked. The 179,070dwt ship along with its sister *HL Green* were built, launched and delivered almost simultaneously. Two further sisters, *HL Oceanic* and *HL Sunny* are due for delivery in April and July 2022 respectively.

As well as being the first large bulk carriers to be LNG-fuelled, the ships can also claim to be the first where 9% Nickel steel has been used for the cryogenic fuel tank construction. The ships are fitted with two 1,600m^3 tanks for LNG fuel installed at the aft of the vessel behind the superstructure.

With a length of 292m, a breadth of 45m, and a depth of 24.8m, the ships follow typical Newcastlemax construction and have a nine hold configuration with side rolling hatches. Holds 2, 4 and 8 are partially floodable and hold 6 fully floodable for trimming purposes during cargo operations.

The main engine is a WinGD 6X72DF type producing 16,180kW at 76.5rpm. Running on LNG, the ships are designed to achieve a 99% reduction in emissions of SOx and particulate matter, up to an 85% reduction in NOx and a 30% reduction in GHG emissions compared to the levels of existing ships.

TECHNICAL PARTICULARS

Length oa: 291.90m
Length bp: 286.90m
Breadth moulded: 45m
Depth moulded
to main deck: 24.80m
to upper deck: 24.80m
Width of double skin bottom: 2.6m
Draught
scantling: 18m(mould)
design: 16.50m(mould)

Gross: 97,545t
Displacement: 207,202t
Lightweight: 28,132t
Deadweight
scantling: 179,070t
design: 159,996t

Block co-efficient: 0.8674(at Scantling draft)
Speed, service (--%MCR output): 14.5knots at design draught and at NCR of M/E with 15% Sea margin

Cargo capacity (m^3)
Bale: 199,872.4m^3

Bunkers (m^3)
Heavy oil: 1,328.9m^3
Diesel oil: 676.8m^3
LNG Fuel: 3,203.6m^3

Water ballast (m^3): 79,162.6m^3 (inc. No.6 floodable hold)
% high-tensile steel used in construction: 80%

Propulsion
Main engine(s)
Design: WinGD
Model: W6X72DF
Manufacturer: Hyundai (HHI-EMD)
Number: 1 set
Type of fuel: L.F.O. / M.G.O. / Gas(LNG)
Output of each engine: 16,180kW x 76.5rpm
Is this a diesel-electric or hybrid?: N

Propeller(s)
Material: Ni-Al-Bronze
Designer/Manufacturer: Hyundai Heavy Industries
Number: 1
Fixed/Controllable pitch: Fixed
Diameter: 8,800mm
Speed: 76.5rpm at MCR

Diesel-driven alternators
Number: 3 sets
Engine make/type: HiMSEN 5H22C DF
Type of fuel: LFO / MGO / GAS
Alternator make/type: HHI-EES
Output/speed of each set: 1,010kW x 900rpm

Boilers
Number: One(1) set
Type: DF type
Make: Alfa Laval
Output, each boiler: 4,000kg/h X 6K

Stern appendages/special rudders: Hi-PSD and Hi-Rudder with bulb as Energy Saving Device

Other cranes
Number: 2 (Port - 1, Stb'd - 1)
Make: Oriental
Type: Electro-hydraulic driven, cylinder luffing type jib crane
Tasks: Handling provision, engine room part
Performance: Port – 7.5t, Stb'd – 2t

Mooring equipment
Number: 8
Make: Flutek
Type: Electric

Special lifesaving equipment
Number of each and capacity: Free-fall lifeboat – 1 (25P)
Make: Viking Norsafe
Type: Free-fall type

Cargo/capacity
Hatch covers
Design: SMS-SME
Manufacturer: Hyundai Samho Heavy Industries Co. Ltd
Type (upper deck/other decks): Side rolling type(Upper deck)

Ballast control system
Make: Hanla IMS
Type: Hydraulic valve remote control system
Ballast water treatment system
Make: Techcross
Capacity: 2,600m^3/h x 2 sets

Complement
Officers: 11 persons
Crew: 14 persons
Suez/Repair Crew: 6 persons

Navigation and other equipment
Bridge control system
Make: Kongsberg
Type: Autochief-600
Is bridge fitted for one-man operation?: N

Integrated bridge system?: N

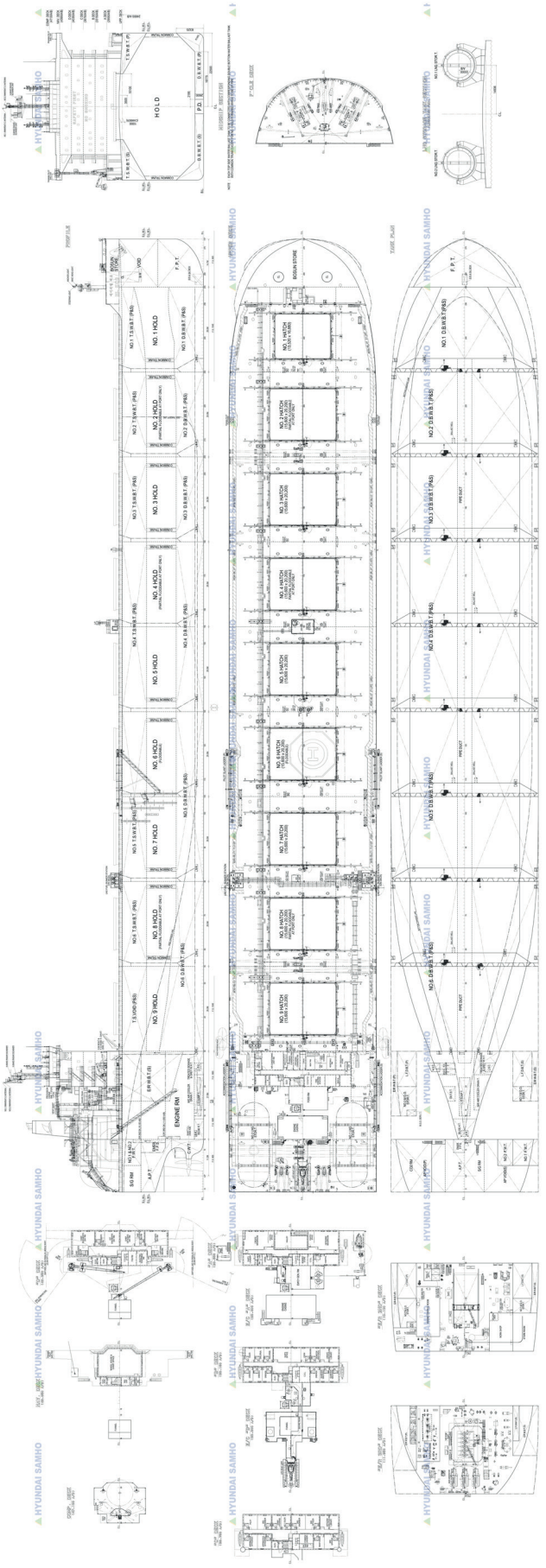
Radars
Number: 2 sets (S-band, X-band)
Make: JRC
Model(s): S-band(JMR-9230-S), X-band(JMR-9225-6X)

Fire detection system
Make: Consilium
Type: SG–42229/30. 42923/24

Fire extinguishing systems
Cargo holds: Sea Water Hydrants
Engine room: High pressure CO_2 / Portable Fire Extinguisher / Local Fire Fighting / Sea Water Hydrants
Make/Type: NK / Fain / Fain /
Cabins: Portable Fire Extinguisher / Sea Water Hydrants
Make/Type: Fain
Public spaces: Portable Fire Extinguisher / Sea Water Hydrants
Make/Type: Fain

Efficiency
Attained EEDI value: 2.51
Required EEDI value: 2.70(Phase 1)
Energy Saving Technologies: Hi-PSD and Hi-Rudder with bulb as Energy Saving Device

Contract date: 12 October 2018
Launch/float-out date: 27June 2020
Delivery date: 16 November 2020



HMM NURI – Container ship

Shipbuilder: **Hyundai Heavy Industry Co., Ltd**
Vessel's name: ***HMM Nuri***
Owner/Operator: **HMM Co., Ltd**
Country: **Republic of Korea**
Designer: **Hyundai Heavy Industry Co., Ltd**
Country: **Republic of Korea**
Model test establishment used: **Hyundai Maritime Test Institute**
Flag: **Liberia**
IMO number: **9869162**
Total number of sister ships already completed (excluding ship presented): **7**
Total number of sister ships still on order: **0**

In 2018, South Korean operator HMM placed orders for 20 new vessels, 12 of these were to be ships of the HMM Algeciras class of 24,000TEU ships and at one point the lead ship was the largest box ship in service. The other order for eight ships was thus a little overshadowed, but the class of 16,000TEU vessels headed by *HMM Nuri* which was delivered by Hyundai Heavy Industries in March 2021 has its own merits.

Designed to be as flexible as possible, *HMM Nuri* is said to have the highest cargo capacity for any box ship that can pass through the Panama Canal thus allowing worldwide trading with only port dimensions dictating access.

The series of vessels were constructed quite rapidly, with *HMM Gaon* following into service a week after *HMM Nuri* and then remaining six all entering service between 30 April and 25 June in the same year.

The ships are 365.16m in length, 51m wide and with a draught of 16m. Total cargo capacity of the fully cellular ships is 16,010TEU of which 6,450 are under deck and 9,560 on deck. At 14tonnes homogenous the capacity is 10,462TEU at scantling draught. The cell guides have been designed and strengthened for mixed of 8'6" and 9'6" boxes. There are 1,200 reefer points.

The ships main engine is a 9G95ME-C10.5 with a 46,444kW output allowing for a 22.35knots service speed, and there are four HiMSEN auxiliaries – two 9-cylinder and two 7-cylinder H32/40 types. A HPS open loop scrubber is installed to treat exhaust from all engines allowing running on high sulphur HFO.

TECHNICAL PARTICULARS

Length oa: 365.16m
Length bp: 350.00m
Breadth moulded: 51.00m
Depth moulded
- to main deck: 29.85m
- to upper deck: 29.85m
- to other decks: 25.628m (mooring deck)

Width of double skin
- side: 2.5m
- bottom: 2.3m

Draught
- scantling: 16.00m
- design: 14.50m

Gross: 152,003t
Deadweight
- scantling: 203,981t
- design: 180,434t

Speed, service (86.8%MCR output): 22.35knots
Bunkers (m^3)
- Heavy oil: 8,377.3
- Diesel oil: 1,241.1

Water ballast (m^3): 42,102.4
Container ships – water ballast in loaded condition (tonnes): 11,200t based on 10T cont. loading
Daily fuel consumption (tonnes/day)
- Main engine only: 148.9

Classification society and notations: ABS +A1, Container Carrier, (E), RW, SH, SHCM, SH-DLA, SFA(20), CPS, UWILD, +AMS, +ACCU, TCM, BWT, BWE, IHM, CSC, CLP-V, HVSC, HIMP, EGC-SOx, NOx Tier III, LNG Ready(ME convertible to gas) KR +KRS1 Container, Ship LS(CL, RS), SeaTrust(DSA2,FSA3,HCM), CLEAN1, IWS, ERS, CDG, IHM, PSPC, LNG Ready I(ME-C), EEAS-SCR, EEAS-EGC, LG, LI, +KRM1 UMA3, BWT, STCM, HVSC
Heel control equipment: Anti-heeling system
Propulsion
Main engine(s)
- Design: Hyundai-MAN B&W
- Model: 9G95ME-C10.5
- Manufacturer: Hyundai Heavy Industry Co., Ltd
- Number: 1
- Type of fuel: HFO, ULSFO, MGO
- Output of each engine: 46,444kW
- Is this a diesel-electric or hybrid?: N

Propeller(s)
- Material: Ni-Al-Bronze
- Designer/Manufacturer: HHI-EMD
- Number: 1
- Fixed/Controllable pitch: Fixed pitch
- Diameter: 10.0m
- Speed: 75.7rpm

Diesel-driven alternators
- Number: 4
- Engine make/type: Hyundai-HiMSEN 9H32/40 x 2 sets, 7H32/40 x 2 sets
- Type of fuel: HFO, ULSFO, MGO
- Alternator make/type: HSJ9 915-10P / HSJ9 805-10P
- Output/speed of each set: 4,500kW x 720rpm, 3,500kW x 720rpm

Exhaust-gas scrubbing equipment
- Manufacturer: HPS
- Type: Open loop
- On main engines?: 1
- On auxiliary engines?: 4

Boilers
- Number: Aux. boiler x 1 set
- Type: Water tube, Oil-fired
- Make: Kangrim
- Output, each boiler: 5,000kg/h

Stern appendages/special rudders: Pre-swirl duct / Full spade rudder with bulb
Bow thruster(s)
- Make: Kawasaki heavy industries
- Number: 2
- Output (each): 1,800kW x 2

Other cranes
- Number: 2
- Make: Oriental
- Type: Electro-hydraulic
- Tasks: Provision
- Performance: SWL 3t x 2

Mooring equipment
- Number: Foreship - 2 Windlass, 2 Mooring Winch Stern Deck - 4 Mooring Winch
- Make: Mirae industries
- Type: Electric

Special lifesaving equipment
- Make: Jiangyinshi Beihai Isa
- Type: Totally enclosed, Davit launched type

Cargo/capacity
Hatch covers
- Design: SMS-SME
- Manufacturer: Kangrim / Marinetech
- Type: Pontoon, non-sequential operation type

Containers
Lengths: 6,058 (20ft) / 12,192 (40ft) / 13,716 (45ft)
Heights: 2,591 (20ft) / 2,591, 2,896 (40ft) / 2,896 (45ft)
Cell guides: Cell guide is strengthened for mixed storage of 8'6" and 9'6"
Total TEU capacity: 16,010
- On deck: 9,560
- In holds: 6,450

Homogeneously loaded to 14tonnes: 10,462 TEU at scant. draught
Reefer plugs: In accordance with C.E.E 17 standards and I.E.C. as well as I.S.O. 1496-2 Featuring AC380V to AC440V configuration with circuit breakers and C.E.E 17 3H contact position
Tiers/rows (maximum)
- On deck: 12 / 20
- In holds: 11 /18

Ballast control system
- Make: Pleiger
- Type: Hydraulic type valve remote control

Ballast water treatment system
- Make: Panasia
- Capacity: 1,200m^3 / hr

Complement
- Officers: 12
- Crew: 16

Navigation and other equipment
Bridge control system
- Make: Nabtesco
- Type: M-800V

Is bridge fitted for one-man operation?: N
Integrated bridge system: Y
- If yes, make: MECys
- Model: HTB22

Radars
- Number: 2
- Make: Furuno
- Model(s): FAR-3330S-SSD, FAR-3320

Fire detection system
- Make: B-I Industries
- Type: BSD-4000

Fire extinguishing systems
Cargo holds: CO_2 Fire extinguishing
- Make/Type: NK / CO_2

Engine room: CO_2 Fire extinguishing
- Make/Type: NK / CO_2

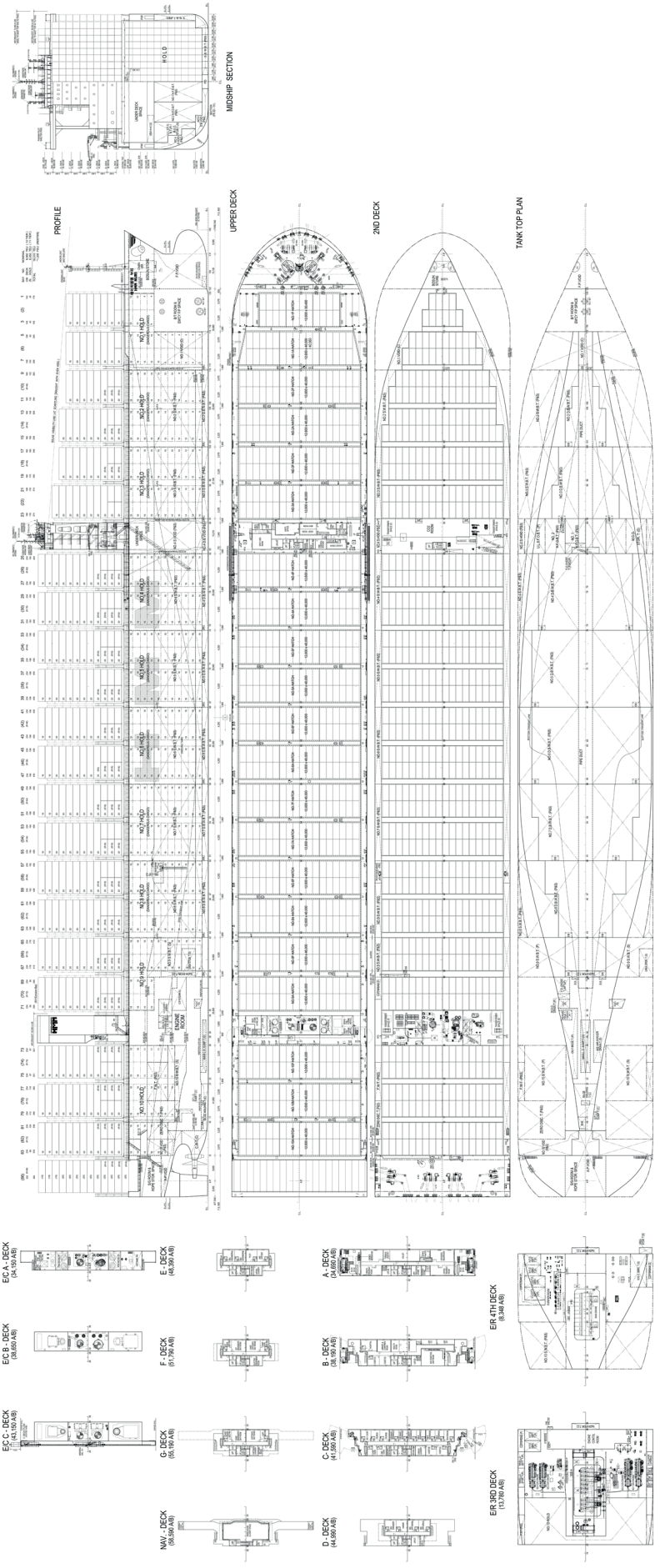
Waste disposal plant
Incinerator
- Make: HMMCO
- Model: MAXI 1500SL WS

Efficiency
- Attained EEDI value: 7.45
- Required EEDI value: 14.1

Installed Fuel Meters: Mass flow type for fuel oil
Other installed monitoring tools: Shaft torque & power & thrust meter, draught gauge
Energy Saving Technologies: Pre-swirl duct, Rudder bulb
Hull coatings: Tin free SPC antifouling paint manufactured by Jotun
Performance Monitoring Regime: Ship management system (SMS) with IP-based network equipment

Contract date: 28 September 2018
Launch/float-out date: 09 September 2020
Delivery date: 19 March 2021

HMM NURI


MIDSHIP SECTION
PROFILE
UPPER DECK
2ND DECK
TANK TOP PLAN
E/C A - DECK (54,390 AB)
E - DECK (45,390 AB)
A - DECK (34,690 AB)
E/R 4TH DECK (8,348 AB)
E/C B - DECK (58,690 AB)
F - DECK (51,790 AB)
B - DECK (38,190 AB)
E/C C - DECK (41,590 AB)
G - DECK (55,190 AB)
C - DECK (41,590 AB)
E/R 3RD DECK (13,780 AB)
NAV. - DECK (58,590 AB)
D - DECK (44,690 AB)

HUI ZHI HAI – Newcastlemax bulk carrier

Shipbuilder: ..... **COSCO Shipping Heavy Industry (Yangzhou) Co., Ltd**
Vessel's name: ..... ***Hui Zhi Hai***
Owner/Operator: ..... **China COSCO Bulk**
Country: ..... **China**
Designer: . **Shanghai Merchant Ship Design & Research Institute, CSSC (SDARI)**
Country: ..... **China**
Model test establishment used: ... **China Ship Scientific Research Centre**
Flag: ..... **Hong Kong**
IMO number: **9887683**
Total number of sister ships already completed (excluding ship presented): **0**

Delivered at the end of 2020 and entering service in January 2021, *Hui Zhi Hai* is the first of an eight-ship series of 210,000 ordered from COSCO Shipping Heavy Industry (Yangzhou) by China COSCO Bulk. The other seven vessels in the series were all delivered in the first six months of 2021.

With a deadweight of 210,918, a length of 299.95, beam of 50m and draught of 18.5m, the series of Newcastlemax ships are the largest ever built at the yard which was established in 2007. They are the newest Newcastlemax ships in the owner's fleet but with over 400 vessels operated by COSCO Bulk including VLOC's up to 400,000dwt they are not the largest.

The ships were designed by SDARI and according to the owner, the yard, the designer and the twin classification societies of LR and CCS to ensure as far as possible that the vessels were 'cutting edge' with the highest possible cargo capacity for hull dimensions and lowest possible fuel consumption.

The vessel is constructed as a conventional Newcastlemax ship with nine holds and side rolling hatch covers. It has a grain capacity of 226,455m^3 and is strengthened for heavy cargoes. In operation the vessel is permitted to sail with the even number holds empty. It has a vertical erect stem and transom stern.

Power comes from a MAN B&W 6G70ME-C9.5 long stroke engine directly coupled to a 9.6m diameter fixed pitch propeller. The engine outputs 15,650kW allowing for a 14.5knots service speed at 90%MCR. To achieve this the engine consumes 45.3tonnes of fuel daily. With no scrubber installed the ship is obliged to use 2020 compliant fuels.

TECHNICAL PARTICULARS

Length oa: 299.95m
Length bp: 295.20m
Breadth moulded: 50.00m
Depth moulded
to main deck: 25.00m
to upper deck: 25.00m
Width of double skin bottom: 2.50m
Draught
scantling: 18.50m
design: 16.10m
Gross: 108,588t
Deadweight
scantling: 210,918t
design: 177,052t
Speed, service 90%MCR output): 14.5knots
Cargo capacity (m^3)
Grain: 226,455
Daily fuel consumption (tonnes/day)
Main engine only: 45.3

Classification society and notations: ..... CCS ★ CSA Bulk Carrier, CSR, BC-A, (Holds Nos 2,4,6&8 may be empty), Grab[35], Strengthened for Heavy Cargoes, COMPASS(R,D,F), PSPC(B), CM, i-Ship(N,M,E,I), Loading Computer(S,I,G), ESP, In-Water Survey, ERS ★ CSM AUT-0, SCM, PMS, Clean, FTP, GWC, BWMP, Green Ship II, EEDI(II+), GPR, BWMS, Crew Accommodation(MLC), IBTS

Propulsion
Main engine(s)
Design: ..... MAN B&W
Model: 6G70ME-C9.5
Manufacturer: ..... China Shipbuilding Industry Corporation Diesel Engine Co., Ltd
Number: 1
Type of fuel: ..... HFO & MDO & MGO
Output of each engine: 15,650kW
Is this a diesel-electric or hybrid?: ..... N
Propeller(s)
Material: ..... Ni-Al-Bronze
Designer/Manufacturer: ..... Shanghai Marine Propeller Design Co., Ltd
Number: 1
Fixed/Controllable pitch: ..... FPP
Diameter: 9,600mm
Diesel-driven alternators
Number: 3
Engine make/type: ..... Yanmar Co., Ltd / MAN 6EY22ALW
Type of fuel: ..... HFO & MDO & MGO
Alternator make/type: ..... Hanshin Electric Mfg Co., Ltd / 6EY22
Output/speed of each set: 950kW/900rpm
Boilers
Number: 2
Type: ..... 1 × composite boiler
Make: ..... ZhangJiaGang Greens Shazhou Boiler Co., Ltd
Output: ..... 3,000Kg/h(oil section); 1,200Kg/h(exhaust gas section)
Other cranes
Number: 2
Make: ..... Ningbo Kairong Ship Machinery Co., Ltd
Type: ..... Electric-hydraulic Cylinder luffing
Tasks: ..... Provision handling
Performance: ..... SWL 8t @ 4~18m working radius
Mooring equipment
Number: 9
Make: ..... Masada
Type: ..... Electric-hydraulic

Special lifesaving equipment
Number of each and capacity: ..... 1 and 28 person
Make: ..... Jiangyin Neptune Marine Appliance Co., Ltd
Type: ..... 7.5m Totally enclosed Life
Complement
Crew: 28
Single/double/other rooms: ... 1 cabin for pilot

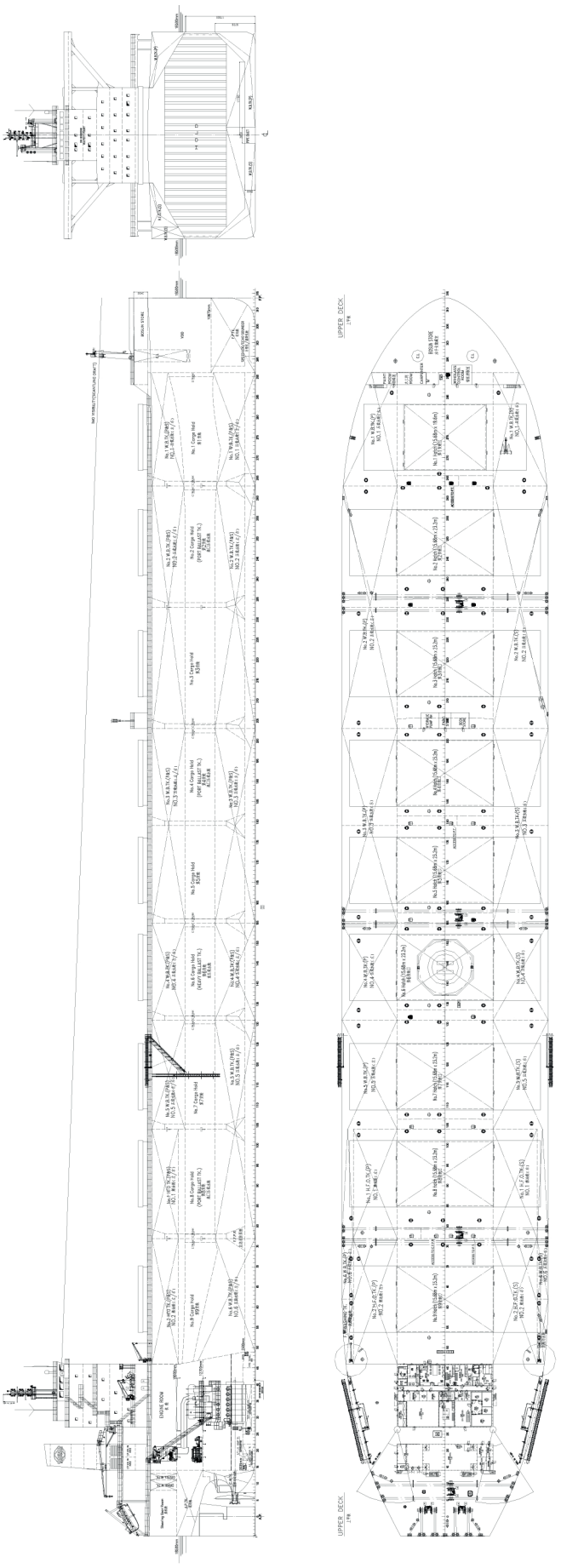
Navigation and other equipment
Bridge control system
Make: ..... Furuno
Is bridge fitted for one-man operation?: ..... N
Integrated bridge system?: ..... N

Radars
Number: 2
Make: ..... Furuno
Model(s): FAR-2338SW,FAR-2328W
Fire detection system
Make: ..... Apollo
Type: ..... Syncro
Fire extinguishing systems
Engine room: ..... CO_2 and fixed water-based local application fire-fighting
Make/Type: ..... CSSC Jiujiang Fire Equipment Co. Ltd / Shanghai Sure-Safe Fire Equipment Co. Ltd
Vehicle spaces: ..... CO_2 / water spray
Make/Type: ..... Jiangsu Nanji Machinery Co., Ltd / Shanghai Sure-Safe Fire Equipment Co. Ltd

Waste disposal plant
Sewage plant
Make: ..... Jiangsu Nanji Machinery Co., Ltd
Model: ..... WCMBR-50(UII)
Efficiency
Attained EEDI value: 2.12
Required EEDI value: 2.78
Energy Saving Technologies: ..... Duct + Cap

Contract date: 2019
Delivery date: ..... December 2020

HUI ZHI HAI



JAARLI – Crude oil tanker

Shipbuilder: **Hyundai Heavy Industry Co., Ltd**
Vessel's name: ***Jaarli***
Owner/Operator: **Neste**
Country: **Finland**
Designer: **Hyundai Heavy Industry Co., Ltd**
Country: **Republic of Korea**
Model test establishment used: **Hyundai Maritime Research Institute**
Flag: **Finland**
IMO number: **9892432**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: **0**

In 2015, Finnish oil and energy company Neste completed its departure from shipowning with the sale of its final two vessels. Four years later, it decided to re-enter the arena and ordered a pair of ice-classed LR2 Aframax vessels from Hyundai Heavy Industries. *Jaarli* was delivered in September 2021 as the first of the pair with *Jantuli* following three months later.

When determining what sort of vessel was best suited to its operations, Neste employed the help of Aker Arctic. After deciding against a double acting ship or one with an ice breaker bow, the final choice was a conventional tanker based upon the design principals of the 2005-built *Stena Arctica* but with much improved features. The dimensions of the vessel with its 249.84loa, beam of 44m and draught of 151m correspond almost exactly to those of *Stena Arctica*.

Cargo facilities are typical of the type with six pairs of cargo tanks for 125,300m^3 capacity and one pair of slop tanks of 1,400m^3 each. The ship has three cargo pumps of 3,000m^3/h capacity supplied by Hamworthy Pumps marking that company's return to the mainstream after being sold off by Wärtsilä in 2018. The ship is powered by a MAN B&W 6G60ME-C9.5 main engine which has an NCR of 11,220kW at 84.5rpm and an MCR of 15,646kW at 94.4rpm.

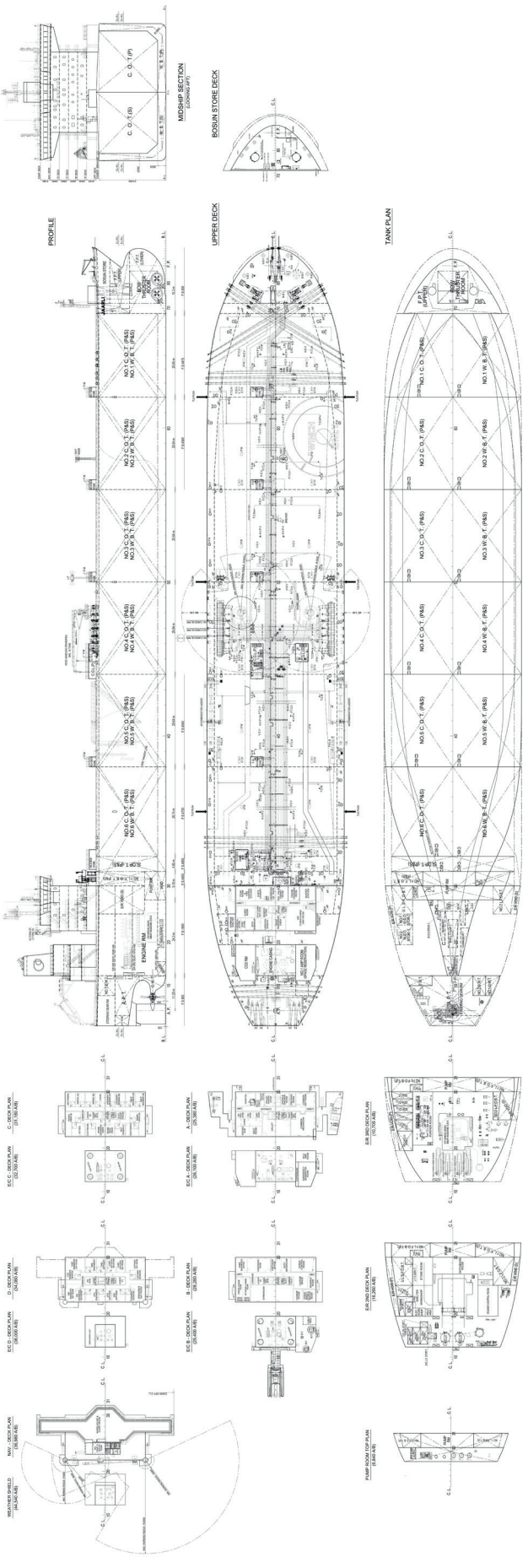
Intended service area for the vessel is the Baltic Sea from Russia's Primorsk and Ust-Luga terminals to Porvoo and Naantali in Finland. Thus the ship has been designed for the 1A Finnish-Swedish Ice Class with Ice Class 1A FS notation and has ice navigating capability. A high lift rudder for good manoeuvring characteristics and Ice-knife are fitted. There is a rudder bulb to improve propulsion efficiency and a controllable pitch propeller.

Other modern features include a cyber security system arranged in accordance with the requirements for the LR's Cyber Security notation and HYUNDAI-ISS (Integrated Smart ship Solution) to help voyage monitoring, route optimisation, fuel/energy flow monitoring, performance analysis and reporting.

TECHNICAL PARTICULARS

Length oa: 249.84m
Length bp: 238.90m
Breadth moulded: 44.00m
Depth moulded
to main deck: 21.40m
to upper deck: 21.40m
Width of double skin
side: 2.35m
bottom: 2.60m
Draught
scantling: 15.1m
design: 13.60m
Gross: 63,532t
Deadweight
scantling: 112,459t
design: 97,727t
Speed, service (--%MCR output): 13.9knots
Cargo capacity (m^3)
Liquid volume: 125,334.6
Bunkers (m^3)
Heavy oil: 2,327.3
Marine gas oil: 427.1
Water ballast (m^3): 44,318.0
Daily fuel consumption (tonnes/day)
Main engine only: 43.4
Classification society and notations: Lloyd's Register +100A1, Double Hull Oil Tanker, CSR, ESP, ShipRight (ACS(B, C) CM), *IWS, LI, SPM4, ECO (BWT, P, VECS-L), +LMC, UMS, BWTS, NAV1, IBS, Ice Class1A FS with descriptive Notes, ShipRight (BWMP(T), SCM, IHM, MPMS), Cyber Security (ICMS, HISS), SERS

Propulsion
Main engine(s)
Design: Hyundai-MAN B&W
Model: 6G60ME-C9.5
Manufacturer: HHI Engine & Machinery Division
Number: 1
Type of fuel: LFO / ULSFO / MGO
Output of each engine: MCR: 15,646kW x 94.4rpm / NCR: 11,220kW x 84.5rpm
Is this a diesel-electric or hybrid?: N
Propeller(s)
Material: Ni-Al-Bronze
Designer/Manufacturer: Kongsberg
Number: 1
Fixed/Controllable pitch: Controllable
Diameter: 7.8m
Diesel-driven alternators
Number: 4
Engine make/type: Hyundai HiMSEN 9H25/33 x 2sets, 6H25/33 x 2sets
Type of fuel: LFO, ULSFO, MGO
Alternator make/type: HFC7 716-08P x 2 sets, HHC7 636-08P x 2 sets
Output/speed of each set: 2,650kW x 2 sets, 1,790kW x 2 sets, 900rpm
Boilers
Number: 2
Type: large oil-fired boiler
Make: Alfa Laval
Output, each boiler: 15t/h x 2 sets
Stern appendages/special rudders: Full spade rudder
Bow thruster
Make: Kawasaki
Number: 2
Output (each): Max. 1,700kW
Deck machinery
Cargo cranes/cargo gear
Number: 2
Make: Oriental
Type: Electro-Hydraulic
Performance: SWL 15t
Other cranes
Number: 2
Make: Oriental
Type: Electro-Hydraulic
Tasks: Provision
Performance: SWL 4t / 2t
Mooring equipment
- Foreship: 2 Windlass, 1 Mooring Winch
- Upper Deck: 2 Mooring Winch
- Stern Deck: 3 Mooring Winch
Make: Kongsberg
Type: Electric
Special lifesaving equipment
Number of each and capacity: 1 x 34 persons
Make: Viking Norsafe
Type: Totally enclosed free-fall type
Cargo tanks
Number: 12 (excl. slop tanks)
Grades of cargo carried: 3 Groups
Product range: Crude Oil
Cargo pumps
Number: 3
Type: Vertical Centrifugal Single Stage, Variable Speed Electric Motor Driven.
Make: Hamworthy Pump(Wärtsilä)
Capacity (each): 3,000m^3/h x 130mTH
Cargo control system
Make: Scana Korea
Type: Hydraulic type valve remote control
Ballast control system
Make: Scana Korea
Type: Hydraulic type valve remote control
Ballast water treatment system
Make: Alfa Laval
Capacity: 3,000m^3/h x 2 set, 250m^3/h x 1 set
Complement
Officers: 9
Crew: 14
Suez/Repair Crew: 6
Riding Crew: 8
Navigation and other equipment
Bridge control system
Make: Hyundai Global Service
Type: One man
Is bridge fitted for one-man operation? Y
Integrated bridge system: Y
If yes, make: JRC
Model: GRD-921
Radars
Number: 2
Make: JRC
Model(s): JMR-9282-S, JMR-9225-6X
Fire detection system
Make: Consilium
Type: Salwico Cargo
Fire extinguishing systems
Engine room: CO_2 Fire Extinguishing Sys
Make/Type: Fain/CO_2 Fire Extinguishing Sys.
Waste disposal plant
Sewage plant
Make: Evac Oy
Model: Ecotreat 2
Efficiency
Attained EEDI value: 3.58
Required EEDI value: 3.76
Energy Saving Technologies: Rudder bulb
Hull coatings: Marathon IQ 2 & Jotun Seaquantum POR U
Contract date: 28 June 2019
Launch/float-out date: 15 June 2021
Delivery date: 30 September 2021


MIDSHIP SECTION
BOSUN STORE DECK
PROFILE
UPPER DECK
TANK PLAN
ENGINE RM
C. DECK PLAN
A. DECK PLAN
B. DECK PLAN
PUMP ROOM TOP PLAN

JI LONG DAO – Ro-pax ferry

Shipbuilder: ..... **CSSC Guangzhou Shipyard International Company Ltd**
Vessel's name: ..... ***Ji Long Dao***
Owner/Operator: ..... **COSCO Shipping Ferry Co., Ltd**
Country: ..... **China**
Designer: ... **Shanghai Merchant Ship Design & Research Institute, CSSC (SDARI)**
Country: ..... **China**
Model test establishment used: .... **Shanghai Ship & Shipping Research Institute**
Flag: ..... **China**
IMO number: **9904003**
Total number of sister ships already completed (excluding ship presented): **0**
Total number of sister ships still on order: **1**

Ordered by COSCO Shipping Ferry in 2019 and delivered by CSSC Guangzhou Shipyard in August 2021, *Ji Long Dao* is a 43,195gt ro-pax that is the first of two and on delivery was the largest ro-pax vessel operated by its owner and the second largest in operation on Bohai Bay. A sister vessel *Xiang Long Dao* was delivered in December 2021. Its service speed of 22.5kt also gives it another claim to fame as the fastest ro-pax vessel currently operating in China.

With an overall length of 208m and a width of 28.6m, the vessel can accommodate 1,375 passengers in 360 cabins. Three vehicle decks with a total of 2,800 lane meters are available for 500 vehicles of 5m length. There is a straight stern ramp, a quarter stern ramp on the starboard side and a bow ramp for loading and unloading.

The ship has a twin propulsion system which gives redundancy. The two main engines are MAN 12V48/60CR units each with a power output of 14,400kW. The power train for each engine includes a Renk RSH-1180 gearbox reducing output speed to 133.3rpm. The propellers, also supplied by Man, are controllable pitch types of 5.1m diameter, installed in front of twin flap rudders.

Passenger accommodation and service areas are located over four upper decks. Facilities include restaurants, VIP lounges, a cinema and children's play areas. The owners have installed an intelligent passenger system to facilitate rapid embarkation and access to different services.

Evacuation systems comprises of 120-person lifeboats and 350 person vertical chute rapid evacuation systems.

TECHNICAL PARTICULARS

Length oa: 208.00m
Length bp: 193.60m
Breadth moulded: 28.60m
Depth moulded: 9.80m
Width of double skin
bottom: 1.50m
Draught
scantling: 6.60m
design: 6.40m
Gross: 43,195t
Deadweight
scantling: 8,500t
design: 7,500t
Block co-efficient (please state relevant draught): ..... 0.637 at design draught
Speed, service 85%MCR output): ..... 22.3knots at 85% MCR with 15% SM
Daily fuel consumption (tonnes/day)
Main engine only: 103.3
Classification society and notations: ..... China Classification Society
★ CSA RO-RO Passenger Ship; Ice Class B
★ CSM MCC; SCM; PMS
Heel control equipment: ..... 1 pair of Anti-heeling tank
Roll-stabilization equipment: ..... 1 pair of fin stabilizer

Propulsion
Main engine(s)
Design: ..... MAN B&W
Model: ..... MAN 12V48/60CR
Manufacturer: ..... MAN
Number: 2
Type of fuel: ..... HFO & MDO& MGO
Output of each engine: 14,400kW
Is this a diesel-electric or hybrid?: ..... N

Gearbox(es)
Make: ..... Renk
Model: RSH-1180
Number: 2
Output speed: 133.3rpm

Propeller(s)
Material: ..... Ni-Al-Bronze
Designer/Manufacturer: ..... MAN
Number: 2
Fixed/Controllable pitch: ..... CPP
Diameter: 5,100mm
Speed: ..... 133.3rpm (MCR)

Diesel-driven alternators
Number: 3
Engine make/type: ..... Yanmar Co., Ltd
Type of fuel: ..... HFO, MDO & MGO
Alternator make/type: .... Taiyo Electric Co., Ltd
Output/speed of each set: 1,000kW/750rpm
Boilers
Number: 3
Type: ..... 2 × Exhaust gas heaters; 1x oil-fired thermal oil heater
Make: ..... Heatmaster
Output: ..... Exhaust gas heaters: 1,500kW; oil-fired thermal oil heater: 3,000kW
Stern appendages/special rudders: ..... 2 flap rudders

Bow thruster(s)
Make: ..... Wuhan Kawasaki Marine Machinery Co., Ltd
Number: 2
Output (each): 1,000kW
Other cranes
Number: 2
Make: ..... Jiangyin Safety Sea Marine Equipment Co., Ltd
Type: ..... Electric Provision Crane
Tasks: ..... Provision handling
Performance: ..... SWL 2t @ 6m outreach
Mooring equipment
Number: 8
Make: ..... Jiangsu Masada Heavy Industries Co. Ltd
Type: ..... hydraulic

Special lifesaving equipment
Number of each and capacity: ..... 120p for each lifeboat and 350p for each MES
Make: ..... CSSC Luzhou Zhenjiang Marine Auxiliary Machinery Co., Ltd and Shanghai Star Rubber Products Co., Ltd
Type: ..... Totally enclosed FRP lifeboat
If MES, vertical or sloping chutes?: ..... vertical
Vehicles
Number of vehicle decks (fixed/moveable): 3
Total lane length: 2,800m

Doors/ramps/lifts/moveable car decks
Number of each:
- 1 set bow door;
- 1 set bow ramp;
- 1 set inner bow door;
- 1 set stern ramp;
- 1 set inner stern door;
- 1 set stern side ramp/door;
- 1 set movable ramp dk5;
- 1 set ramp cover dk3;
- 1 set combined ramp dk1 (aft);
- 1 set cargo lift;
- 1 set lift cover;
- 6 sets shell doors

Type: ..... Hydraulic
Designer: ..... TTS-Huahai

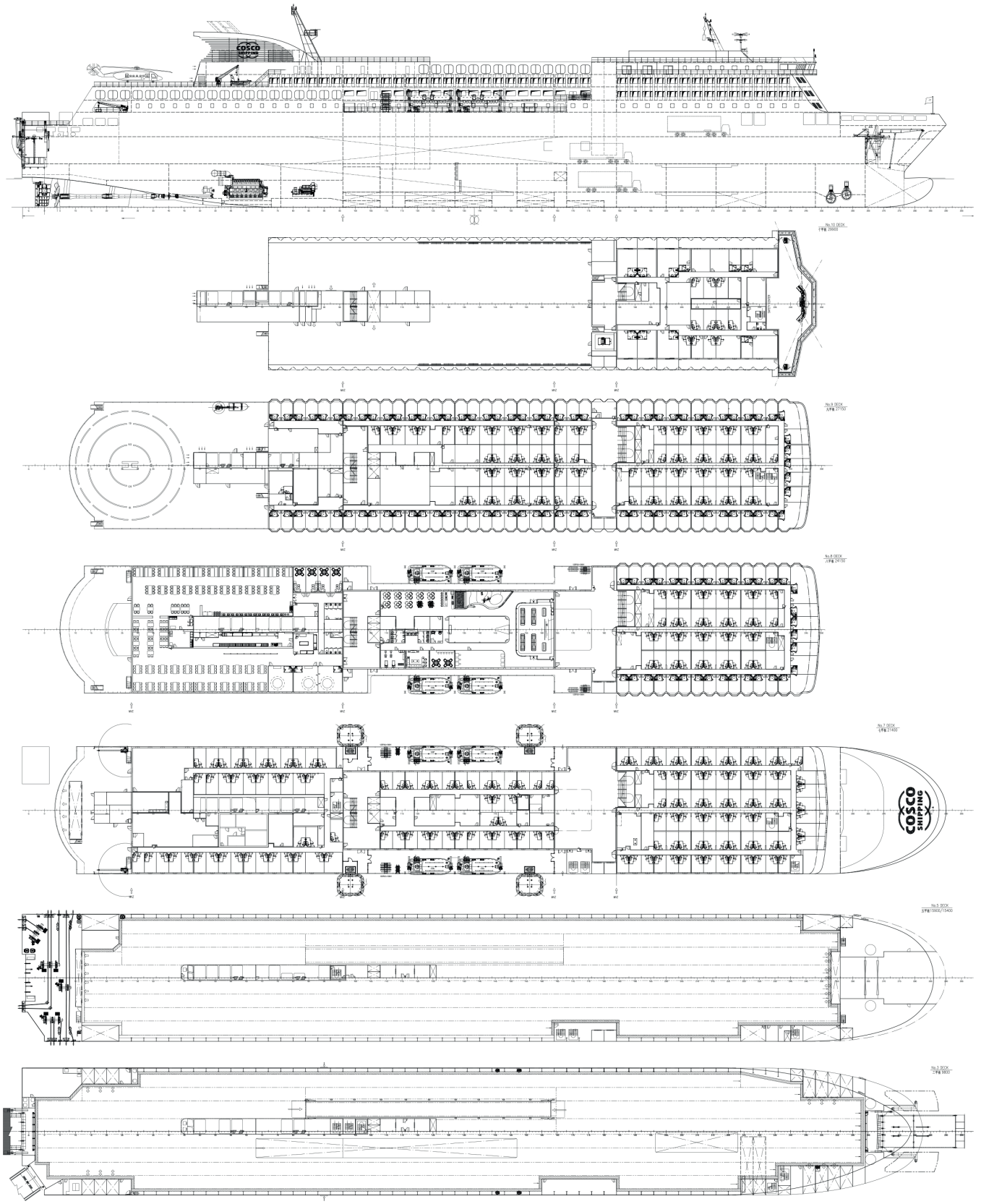
Complement
Officers: 8
Crew: 75
Passengers
Total: 1,375
Number of cabins: 360

Navigation and other equipment
Bridge control system
Make: ..... Hangyue Electric
Is bridge fitted for one-man operation?: ..... N
Integrated bridge system: ..... N
Radars
Number: 3
Make: ..... Furuno
Model(s): FAR-2338S,FAR-2228

Fire detection system
Make: ..... Consilium
Type: ..... Salwico Ro/Pax
Fire extinguishing systems
Engine room: ..... CO_2 / ER water mist system
Make/Type: ..... Shanghai Sure-safe Fire Equipment Co. Ltd. / Jiujiang Fire Fighting Equipment Co. Ltd
Vehicle spaces: ..... CO_2 / fixed spraying fire fighting system
Make/Type: ..... Shanghai Sure-safe Fire Equipment Co. Ltd / Ningbo Yonghang Fire Equipment Co. Ltd
Cabins: ..... Fixed sprinkler system
Make/Type: ..... Shanghai Sure-safe Fire Equipment Co. Ltd
Waste disposal plant
Sewage plant
Make: ..... VAC Drain
Model: ..... CSWC-200 x 3 sets /CSWC-120 x 1 set
Efficiency
Attained EEDI value: ..... g-CO_2/tonne-NM
Required EEDI value: ..... g-CO_2/tonne-NM

Contract date: ..... March 2019
Launch/float-out date: ..... January 2021
Delivery date: ..... August 2021

JI LONG DAO



KATORI – Multi-purpose vessel

Shipbuilder: **Nanjing Jinling Shipyard Co., Ltd (China)**
Vessel's name: ***Katori***
Owner/Operator: **Nippon Yusen Kaisha**
Country: **Japan**
Designer: **CSSC Shanghai Merchant Ship Design & Research Institute (SDARI)**
Country: **China**
Model test establishment used: **CSSC Shanghai Merchant Ship Design & Research Institute (SDARI)**
Flag: **Panama**
IMO number: **9892937**
Total number of sister ships still on order: **0**

Multi-purpose and heavy lift vessels have not been much in demand in recent years so any order can be considered interesting. The 13,230dwt *Katori* with a lifting capacity of 800tonnes is not the largest vessel of the type by any means but it is significant in that it is the first vessel of its type built by Nanjing Jinling Shipyard for Japanese owners – in this case NYK Bulker & Projects, a subsidiary of NYK Group. The vessel was delivered in September 2021 and a sister vessel, *Kifune* was handed over in January 2022.

Katori is 138m in length, 23.6m in width, 12.8m in depth and has a draught of 8.3m. the ship is a SDARI design intended for service in Southeast Asia and Africa for transporting large equipment and bulky parts.

It is claimed that the ship has the longest hold of any ship currently in operation. The 95.25m by 17.6m hold has no bulkheads or other obstructions. The ship can operate hatch coverless enabling the loading of tall and large cargo and with a forward superstructure there is no disruption to forward visibility during navigation. Two 400tonne capacity cranes are located on the port side of the vessel and can operate at full capacity within a radius of 20m reducing to 65tonnes at the full outreach of 35m. The cranes can tandem lift 800tonne loads in an area between them.

The ship's engine room is located aft of the single hold and houses a Japan Engine Corporation 6UEC35LSE-Eco-B2-SCR engine with a 3,200kW power output linked to a fixed pitch propeller. Service speed is 13knots.

TECHNICAL PARTICULARS

Length oa: 138.0m
Length bp: 135.0m
Breadth moulded: 23.6m
Depth moulded: 12.8m
Draught
scantling: 8.3m
design: 7.5m
Gross: 12,792t
Deadweight
scantling: 13,230t

Speed, service (--%MCR output): 13knots

Cargo capacity (m^3)
Grain: 18,800

Bunkers (m^3)
Heavy oil: 900
Diesel oil: 330
Water ballast (m^3): 8,460

Daily fuel consumption (tonnes/day)
Main engine only: 10.8
Auxiliaries: 3.0

Classification society and notations: DNV

Propulsion
Main engine(s)
Design: UE Engine
Model: 6UEC35LSE-Eco-B2-SCR
Manufacturer: J-ENG
Number: 1
Type of fuel: HFO & MGO
Output of each engine: 3,200kW x 123rpm
Is this a diesel-electric or hybrid?: N

Propeller(s)
Material: Ni-Al-Bronze(Cu3)
Designer/Manufacturer: Nakashima
Number: 1
Fixed/Controllable pitch: FPP
Diameter: 4.85
Speed: 123

Diesel-driven alternators
Number: 3
Engine make/type: Daihatsu Diesel Mfg. Co., Ltd/ 6DE-18
Type of fuel: HFO & MGO
Alternator make/type: Nishishiba/NTAKL-VE
Output/speed of each set: 650kW x 900rpm

Boilers
Number: 1
Type: Thermal oil heater
Make: Miura Co., Ltd
Output, each boiler: 930kW

Bow thruster(s)
Number: 1
Output (each): 736kW

Deck machinery
Cargo cranes/cargo gear
Number: 2
Performance: 400t-20m

Mooring equipment
Number: 4
Type: hydraulic

Special lifesaving equipment
Number of each and capacity: 22p
Type: Gravity fall arm type lifeboat

Hatch covers
Design: TTS Hua Hai
Type: Lifting type

Complement
Officers: 10
Crew: 11
Suez/Repair Crew: 6
Single/double/other rooms: 21/0/1

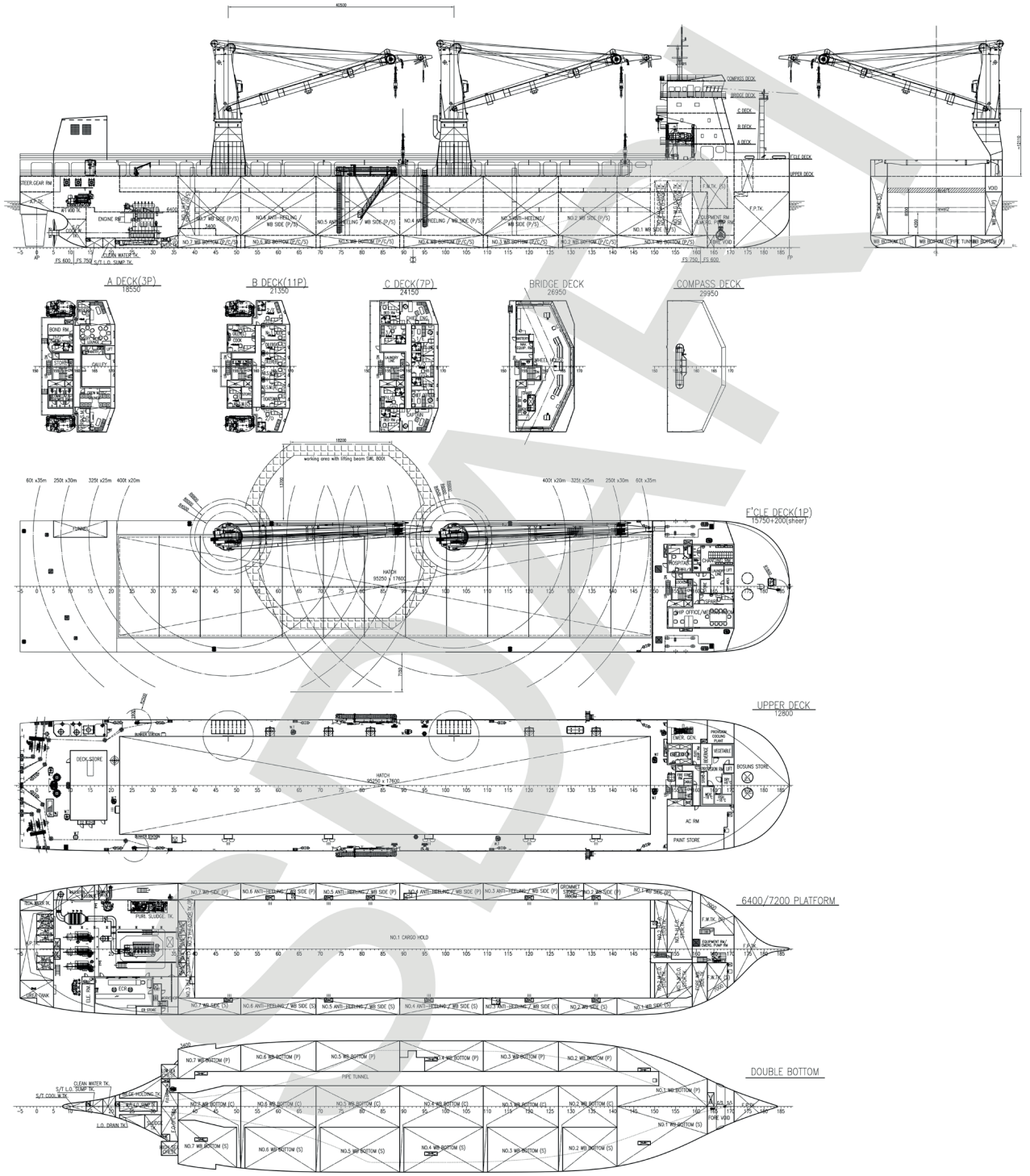
Navigation and other equipment
Bridge control system
Make: Nabtesco
Type: M-800-V
Is bridge fitted for one-man operation?: N

Integrated bridge system: N

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

Fire detection system
Make: Consilium
Type: Salwico Cargo

Contract date: August 2019
Launch/float-out date: March 2021
Delivery date: September 2021


A DECK(3P)
18550
B DECK(11P)
21350
C DECK(7P)
24150
BRIDGE DECK
26950
COMPASS DECK
29950
F'CLE DECK(1P)
15750+200(sheer)
UPPER DECK
12800
6400/7200 PLATFORM
DOUBLE BOTTOM

LE COMMANDANT CHARCOT – Polar expedition ship

Shipbuilder: **Vard**
Vessel's name: ***Le Commandant Charcot***
Owner/Operator: **Ponant**
Country: **France**
Designer: **Stirling Design**
Country: **France**
Model test establishment used: **SSPA (Sweden) & Aker Arctic**
Flag: **France**
IMO number: **9846249**
Total number of sister ships already completed (excluding ship presented): **0**
Total number of sister ships still on order: **0**

Delivered by Vard to French expedition cruise operator Ponant, *Le Commandant Charcot* has been one of the most discussed and written about vessels since it was first announced in 2017. The hybrid, LNG-fuelled polar expedition ship's hull was built at Tulcea in Romania and completed by Vard's Soviknes yard in Norway. After fitting out there the vessel was moved in July 2020 to St Nazaire in France for installation of its Azipod propulsion system before returning to Norway for completion and delivery in August 2021.

Le Commandant Charcot is 31,283gt, 149.9m long, 28.3m wide and can accommodate 245 passengers in 123 staterooms, in addition to a crew of 215 persons. The ship is Polar Class 2 with icebreaking capabilities forward and aft. As a double acting vessel, it is able to keep a constant speed of 2knots in 2.4m thick intact ice and cross ice ridges of more than 15m.

In addition to four 14-cylinder and two 10-cylinder Wärtsilä 31DF main engines, Wartsila also supplied the fuel gas supply system of two membrane LNG tanks with a total capacity of 4,500m^3. The engines have a total power output of 37,400kW to provide electric power for the two 17MW ABB azipod propulsion thrusters. A pair of 1,600kW bow thrusters provide manoeuvring power and also allow the ship to have a station keeping ability in cross winds up to 35knots. A Corvus Energy Orca battery system with a capacity of 4,520kWh provides zero emission peak shaving and spinning reserve functionality.

TECHNICAL PARTICULARS

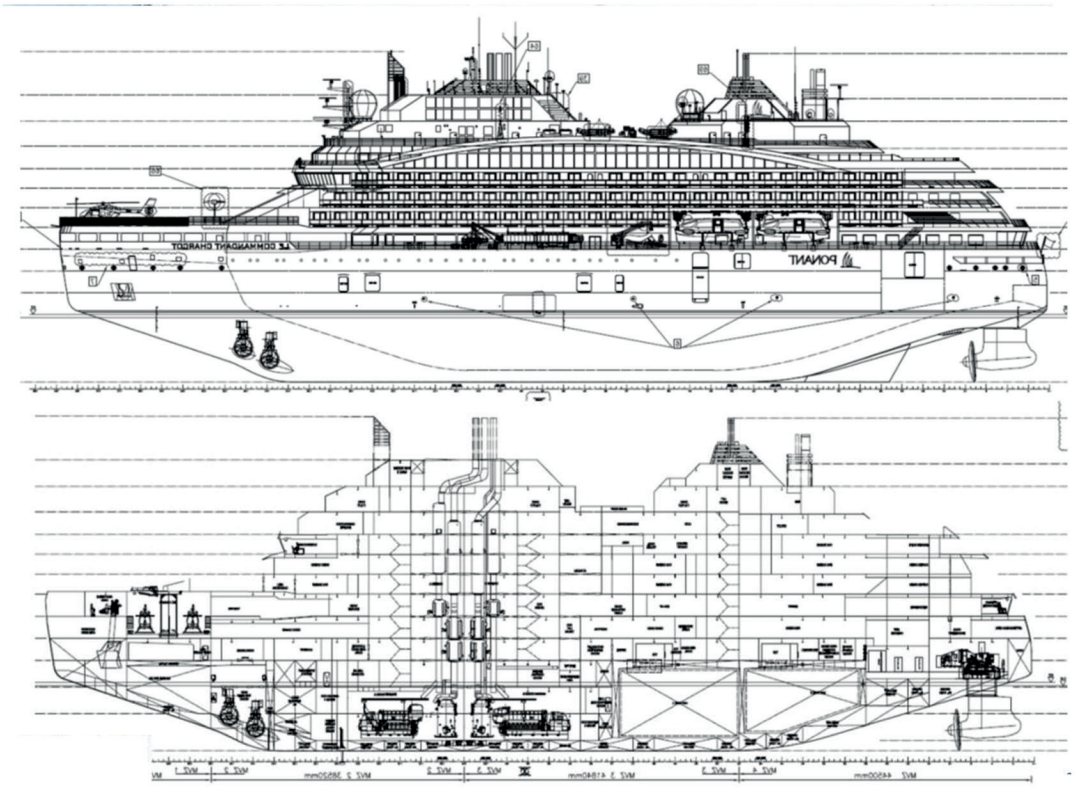
Length oa: 149.9m
Length bp: 142.345m
Breadth moulded: 28.3m
Depth moulded
to upper deck: 15.3m
Width of double skin
side: 2.95m
bottom: 1.915m
Draught
scantling: 10.2m
design: 9.5m open water 10.0m in ice
Gross: 31,283t
Displacement: 28,973.5t
Lightweight: 21,521.3t
Deadweight:
design: 7,452.2t
Block co-efficient (please state relevant draught): 0,6769 at 9.50m & 0,6892 at 10.00m
Speed, service (--%MCR output): 18.04knots at 9.50m at 54,25% MCR
Bunkers (m^3)
Diesel oil: 3,800m^3
LNG: 4,509m^3
Water ballast (m^3): 4,289m^3
Daily fuel consumption (tonnes/day)
Main engine only: Electrical propulsion system, varies according to speed and navigation condition (open water / ice)
Classification society and notations: Bureau Veritas ✠HULL ✠MACH, Unrestricted Navigation, Passenger Ship - SRTP - DUALFUEL - POLAR CAT A ✠AUT-PORT ✠AUT-UMS ✠VeriSTAR-HULL POLAR CLASS 2 ICEBREAKER 3 (Bow) ICEBREAKER 4 (Stern) COLD (H -15°C, E -25°C) INWATERSURVEY CLEANSHIP BWT AWT-A/B COMF-NOISE-1 COMF-VIB-1 ERS-S HYBRID ELECTRIC (PM,ZE)
Heel control equipment: Framo
Roll-stabilisation equipment: SKF Marine Retractable Fin Stabilizer Type UHL S600 -12m^2

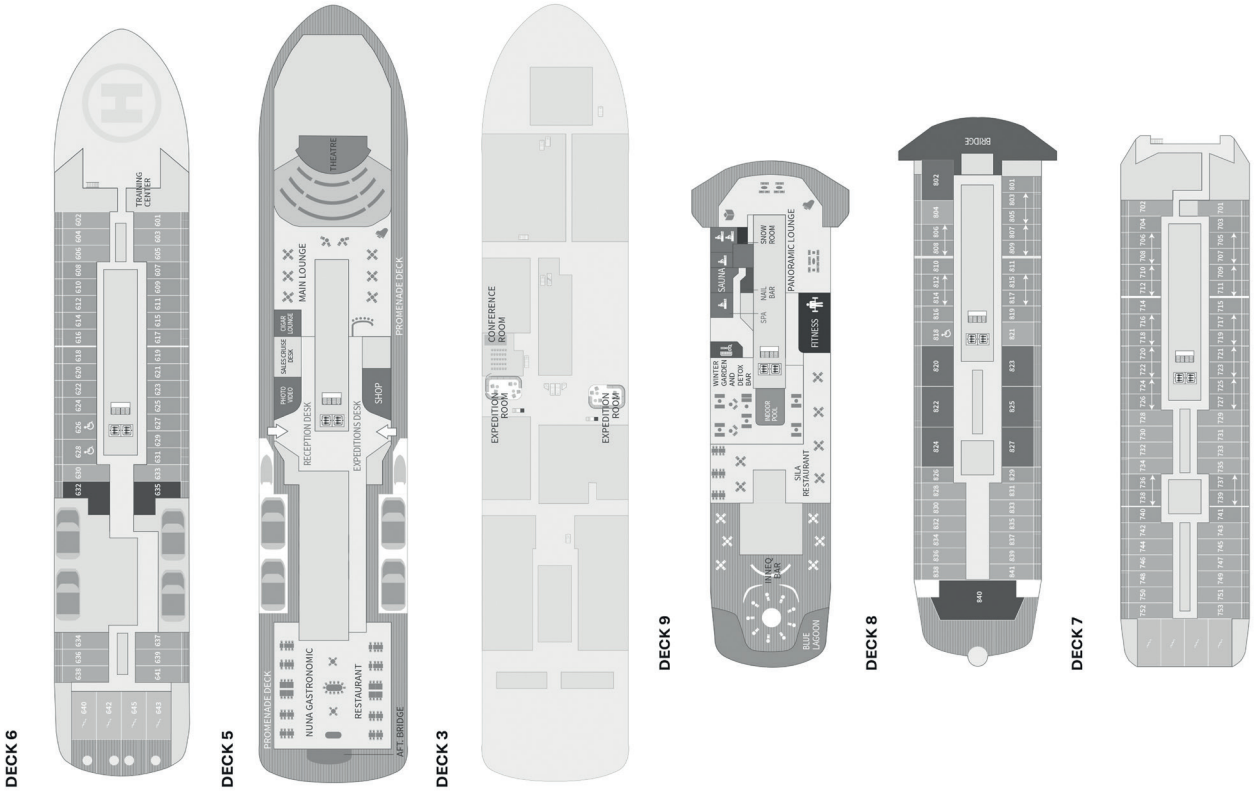
Propulsion
Main engine(s)
Design: Dual Fuel
Model: 31DF
Manufacturer: Wärtsilä
Number: 6
Type of fuel: Dual fuel, MDO and NG
Output of each engine: 2x 5,500kW and 4x 7,700kW
Is this a diesel-electric or hybrid?: Y
Propeller(s)
Material: Stainless steel
Designer/Manufacturer: ABB
Number: 2x5
Fixed/Controllable pitch: fixed
Diameter: 6m
Speed: 135rpm
Boilers
Number: 2
Type: CHB 6000 dual fuel
Make: Alfa Laval - Aalborg
Output, each boiler: 6,000Kg/h 8 bar
Stern appendages/special rudders: Azimuth thrusters ABB Pod
Bow thruster(s)
Make: Brunvoll
Number: 2
Output (each): 17,000kW
Deck machinery
Cargo cranes/cargo gear
Number: 2
Make: Seaonics
Type: foldable boom
Performance: 2t 16m
Mooring equipment
Number: 7
Make: Palfinger
Type: electric
Special lifesaving equipment
Number of each and capacity: 4 polar lifeboat 115 /tender 60 + 8 polar GSK ICECUBE 64p each
Make: Fassmer
Type: PLL 1099 polar design
Cargo/capacity
Hatch covers
Design: Helicopter Hangar deck hatch and elevator 4t
Manufacturer: Ulmatech
Type (upper deck/other decks): Helideck
Cargo pumps: Fuel Gaz Handling System
Number: 8 GVU + 2 BOG compressor + 2 Nitrogen generator + 2 TCS fuel gaz prep unit
Make: Wärtsilä
Complement
Crew: 260
Single/double/other rooms: 37 single, 79 double crew standard, 15 double occ. pax standard
Passengers
Total: 240
Number of cabins: 120
Navigation and other equipment
Bridge control system
Make: Wärtsilä
Type: Platinum
Is bridge fitted for one-man operation?: Y
Integrated bridge system: Y
If yes, make: Wärtsilä
Model: Nacos Platinum
Radars
Number: 4
Make: Wärtsilä
Model(s): Nacos Platinum
Fire detection system
Make: Autronica
Type: Autrosafe
Fire extinguishing systems
Engine room: water mist and gaz
Make/Type: Ultrafog + Novec
Cabins: water mist
Make/Type: Ultrafog
Public spaces: water mist
Make/Type: Ultrafog
Waste disposal plant
Incinerator
Make: Evac / Model: DI 500
Waste compactor
Make: Evac
Waste shredder/crusher
Make: Evac
Sewage plant
Make: Evac / Model: MBR 145 K
Efficiency
Attained EEDI value: 17.53
Required EEDI value: 18.55
Installed Fuel Meters: Massic flowmeter Emerson for MDO and NG
Other installed monitoring tools:
- Greenpilot energy efficiency monitoring system developed by Maroka.
- Innovating Adrena Ice routing software
- Continuous Ice measurement system SIMS
- Continuous Thermosalinometer
- Meteorological recording station

Energy Saving Technologies: Corvus ESS system 4.5MWh ORCA type.
Hull coatings: INERTA abrasion resistant paint
Performance Monitoring Regime:
- 2 SCR for NOx reduction Wärtsilä
- 6 exhaust gaz boiler for heat recovery of central heating loop (HVAC, potable hot water, swimming pools, laundray, galley, tank heating)
- Sea water exchanger for chilled water in polar area
- Fan coil for pax cabin HVAC
- HVAC AHU with VFD and enthalpic wheels

Contract date: December 2017
Launch/float-out date: February 2020
Delivery date: 19 July 2021

LE COMMANDANT CHARCOT





LEGACY – LPG carrier

Shipbuilder: ..... **Hyundai Mipo Dockyard Co., Ltd**
Vessel's name: ..... ***Legacy***
Owner/Operator: ..... **Nieto Trading B.V**
Country: ..... **Netherlands**
Designer: ..... **Hyundai Mipo Dockyard Co., Ltd**
Country: ..... **Republic of Korea**
Flag: ..... **Malta**
IMO number: **9893656**
Total number of sister ships already completed (excluding ship presented): **0**
Total number of sister ships still on order: **0**

When *Legacy*, a 38,322m³ LPG carrier was deliver by Hyundai Mipo to Mexican gas supply specialist Empresas Nieto on 2 July 2021, it marked the beginning of the company's status as a shipowner.

Until taking delivery of *Legacy*, Empresas Nieto had been involved in most parts of the gas supply chain, from terminals, pipelines, storage, land transport as well as energy trading but had always relied upon chartered vessels for sea transport.

At 179.86m in length and with a 28.4m beam, *Legacy* is considered a midsize LPG carrier. In many respects the vessel is typical of its type and the basic design is a staple of Hyundai Mipo which has built many of the type and has several more on order for different owners.

The ship has six cargo tanks in three pairs and one deck tank. Two grades of cargo can be carried and the ship is certified for carriage of 1,3-Butadiene, Butane, Butylene, Propane, Commercial propane, Propylene, Vinyl Chloride monomer and Mixed C4.

The cargo pumps are six Svanehøj deepwell cargo pumps, DW200/200-3-K+I, two booster pumps of type NMB150c and two Fuel and Sampling pumps, EFP11-6.

The main engine is a further reference for MAN B&W LGIP range able to run on LPG. This engine is becoming increasingly popular since its introduction in late 2018 and at the time of its ordering for *Legacy* almost 80% of all LPG carriers over 2,500m³ were stipulating its installation. The unit on *Legacy* is a 6G50ME-C9.6-LGIP-HPSCR producing 10,320kW at 100rpm and allowing a 16knots speed. The lower CO_2 emissions from LPG allow the ship to have an attained EEDI of 6.65 which is well below the required maximum of 9.32.

TECHNICAL PARTICULARS

Length oa: 179.86m
Length bp: 173.50m
Breadth moulded: 28.40m
Depth moulded
to main deck: 18.20m
to upper deck: 18.20m
Width of double skin
side: 1.40m
bottom: 1.70m
Draught
scantling: 10.40m
design: 9.50m
Gross: 25,110t
Deadweight
scantling: 28,886t
design: 24,871t
Speed, service: 16.00knots
Cargo capacity (m³)
Liquid volume: 38,321.9m³
Bunkers (m³)
Light oil: 1,366.1m³
Gas oil: 274.9m³
Water ballast (m³): 11,756.4m³
Daily fuel consumption (tonnes/day)
Main engine only: 23.9t/day

Classification society and notations: ..... DNV, +1A, Tanker for Liquefied Gas, E0, BIS, TMON, COAT-PSPC(B), LCS, BWM(T), Recyclable, Clean, SPM, CMON, ER(SCR, TIER III)

Propulsion
Main engine(s)
Design: ..... Hyundai-MAN B&W
Model: ..... Hyundai -MAN B&W 6G50ME-C9.6-LGIP-HPSCR
Manufacturer: ..... HHI Engine & Machinery Division
Number: 1
Type of fuel: ..... LFO & MGO
Output of each engine: ..... 10,320kW x 100.0rpm (Nominal rating)
Is this a diesel-electric or hybrid?: ..... N
Propeller(s)
Material: ..... NiAl-Bronze
Designer/Manufacturer: ..... Hyundai Heavy Industries Co., Ltd
Number: 1
Fixed/Controllable pitch: ..... Fixed
Main-engine driven alternators
Diesel-driven alternators
Number: 3
Engine make/type: ..... HHI – Engine & Machinery Division
Type of fuel: ..... HFO & MDO
Alternator make/type: ..... Hyundai Electric Co., Ltd
Output/speed of each set: ..... 960kW x 720rpm
Boilers
Number: 1
Type: ..... LFO Burning
Make: ..... Kangrim
Output, each boiler: ..... 3,500/600kg/hr (Oil-fired/Exh gas side) / 7/9kg/cm2g (working/design pressure)
Deck machinery
Cargo cranes/cargo gear
Number: 1
Make: ..... Oriental
Type: ..... Electro-hydraulic
Performance: ..... SWL 5ton / Outreach 6.2 ~ 29.0m
Other cranes
Number: 1
Make: ..... Jiangsu Masada Heavy Industries Co. Ltd
Type: ..... Electro-hydraulic
Tasks: ..... Provision and machinery parts handling in engine room
Performance: ..... SWL 3.2tons / Outreach 2.4 ~ 9.5m
Mooring equipment
Number: 8
Make: ..... Flutek Ltd.
Type: ..... Electro-hydraulic
Special lifesaving equipment
Number of each and capacity: ..... 2 / 30
Make: ..... Jiangyinshi Beihai LSA Co., Ltd
Type: ..... Davit-launched type
Cargo tanks
Number: ..... 6 Cargo tanks / 1 deck tank
Grades of cargo carried: ..... 2 grades
Product range: ..... 1,3-Butadiene, Butane, Butylene, Propane, Commercial propane, Propylene, Vinyl Chloride monomer, Mixed C4
Stainless steel – structure/piping: ..... ASTM A312 Gr 304L
Cargo pumps
Number: 6
Type: ..... Deepwell, Electric Motor driven
Make: ..... Babcock Liquid Gas Equipment Ltd
Stainless steel: ..... ANSI A312 Gr 304L
Capacity (each): 400m³/hr
Cargo control system
Make: ..... Wärtsilä
Type: ..... MOS Platinum
Ballast control system
Make: ..... Hanla IMS
Ballast water treatment system
Make: ..... Techcross
Capacity: 1,000m³/hr

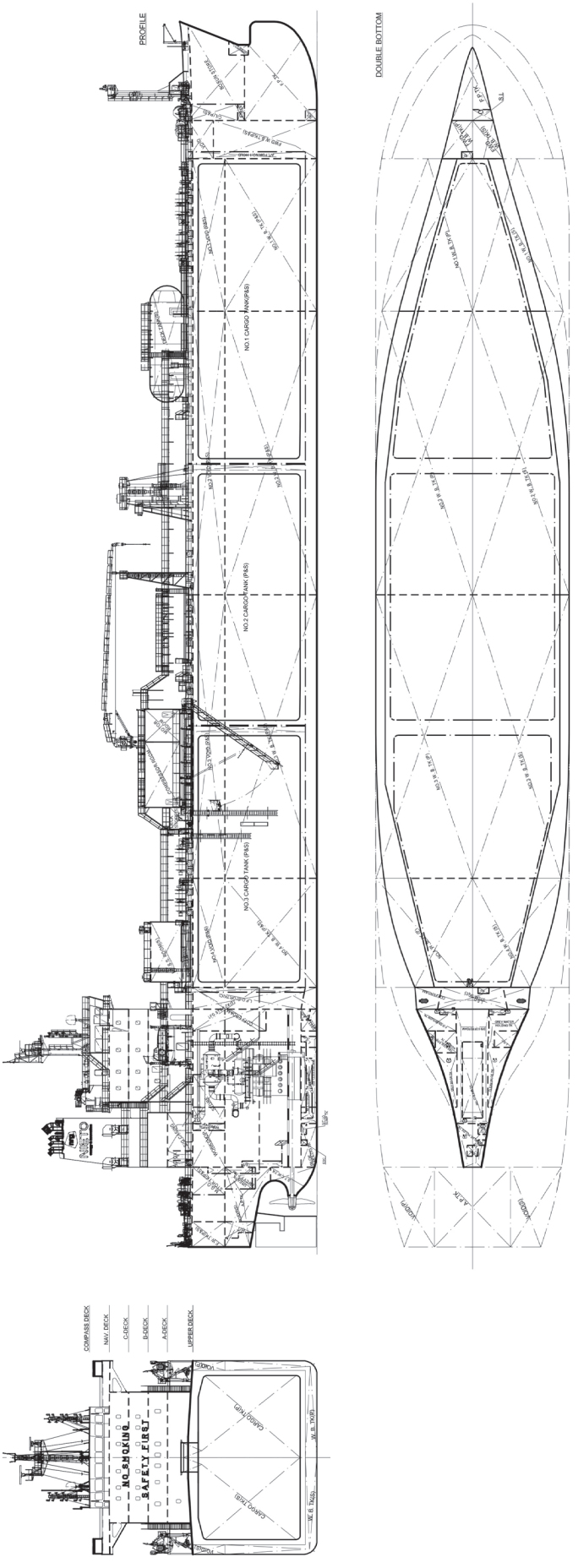
Complement
Officers: 8
Crew: 15
Suez/Repair Crew: 6
Single/double/other rooms: ..... 2 (Cadat, Owner)

Navigation and other equipment
Bridge control system
Make: ..... Hyundai Heavy Industries
Is bridge fitted for one-man operation?: ..... No
Integrated bridge system: ..... Y
If yes, make: ..... JRC
Model: GRD-921
Radars
Number: ..... S-Band Radar (1EA), X-Band Radar (1EA)
Make: ..... JRC
Model(s): ..... JMR-9282-S / 9225-6X

Fire detection system
Make: ..... Autronica fire and security
Type: ..... Autoprime BS-250
Fire extinguishing systems
Cargo holds: ..... Dry powder
Make/Type: ..... Fain
Engine room: ..... CO_2
Make/Type: ..... Fain
Cabins: ..... Dry powder
Make/Type: ..... Fain / 6kg portable
Public spaces: ..... Foam
Make/Type: ..... Fain / 9kg portable
Waste disposal plant
Incinerator
Make: ..... HMMCO / Model: MAXI NG50SL WS
Sewage plant
Make: ..... IL Sung Co. Ltd / Model: ISB-03

Efficiency
Attained EEDI value: ..... 6.65gCO_2/tnm
Required EEDI value: ..... 9.32gCO_2/tnm
Installed Fuel Meters: ..... Electro pneumatic type tank level gauge
Other installed monitoring tools: ..... Electro pneumatic type draft gauge
Hull coatings: ..... KCC / EGISPACIFIC(L)

Contract date: ..... 23 July 2019
Launch/float-out date: ..... 19 March 2021
Delivery date: ..... 02 July 2021


PROFILE
DOUBLE BOTTOM
NO.1 CARGO TANK (P&S)
NO.2 CARGO TANK (P&S)
NO.3 CARGO TANK (P&S)
NO.4 CARGO TANK (P&S)
COMPASS DECK
NAV. DECK
C-DECK
B-DECK
A-DECK
UPPER DECK
NO SMOKING
SAFETY FIRST

MSC SEASHORE – Cruise ship

Shipbuilder: **Fincantieri**
Vessel's name: ***MSC Seashore***
Owner/Operator: **MSC Cruises**
Country: **Switzerland**
Designer: **Fincantieri**
Country: **Italy**
Flag: **Malta**
IMO number: **9843792**
Total number of sister ships still on order: **1**

MSC Seashore delivered in July 2021 and its sister *MSC Seascape* due for delivery in June 2023 are a development of the owner's Seaside class appropriately dubbed as the Seaside EVO class. Both vessels are the products of Fincantieri's Monfalcone yard.

The 170,412gt *MSC Seashore* has had 65% of the public areas completely reimagined and is significantly larger than the earlier class which had a 153,516gt and a length of 323m The vessel is also deeper by more than 2m. An additional 10,000m² of open deck space gives it the highest ratio of outdoor space per guest of any MSC ship. Passenger capacity is 5,877 maximum or 4,540 at double occupancy. The additional space on the new vessel has allowed an extra 200 cabins to be installed bringing the total to 2,270.

During the Covid pandemic a lot of thought was given to making cruise ships safer for guests and *MSC Seashore* reflects this by being given the Biosafe Ship Notation by classification society RINA. It is claimed the vessel is the first ship in the world to integrate the Safe Air system which uses UV-C lamps technology guaranteeing clean and safe air for all guests and crew. RINa has also rewarded the environmental aspects of the ship by giving it a Sustainable Ship notation.

Four Wärtsilä 14V46F engines provide a total power output of 67.2MW for the diesel electric propulsion which drives two 6.1m controllable pitch propellers. Wärtsilä has also supplied a hybrid exhaust gas cleaning system which keeps emissions from all four engines compliant with 2020 SOx rules and SCR is used for NOx Tier III compliance. The ship has an attained EEDI of 8.8 against the required 10.38.

TECHNICAL PARTICULARS

Length oa: 339m
Length bp: 311.71m
Breadth moulded: 41m
Depth moulded to main deck: 14.99m
Draught
scantling: 8.8m
design: 8.55m
Gross: 170,412t
Displacement: 83,102t
Block co-efficient: 0.744 @8.55m of draught
Speed, service (87%MCR output): 21.1knots

Bunkers (m^3)
Heavy oil: 3,694.1m^3
Diesel oil: 1,213.1m^3
Water ballast (m^3): 4,908.3m^3

Classification society and notations: RINa

% high-tensile steel used in construction: 80% approx

Propulsion
Main engine(s)
Model: 14V46F with Selective Catalytic Reduction
Manufacturer: Wärtsilä
Number: 4
Type of fuel: HFO and MGO
Output of each engine: 16.8MW
Is this a diesel-electric or hybrid?: Y

Propeller(s)
Material: Ni Al Bronze
Designer/Manufacturer: Mecklenburger Metallguss GmbH
Number: 2
Fixed/Controllable pitch: Fixed
Diameter: 6.1m
Speed: abt. 129rpm

Diesel-driven alternators
Number: 4
Alternator make/type: NIDEC ASI / GSCR 11 Y 12
Output/speed of each set: 600rpm

Exhaust-gas scrubbing equipment
Manufacturer: Wärtsilä
Type: Hybrid
On main engines?: Y

Boilers
Number: 2 + 4
Type: OFB, EGB
Make: Saacke GmbH, Alfa Laval
Output, each boiler: 2 x 25t/h, 4.5t/h @85% MCR

Bow thruster(s)
Make: Wärtsilä
Number: 4
Output (each): 3,100kW

Stern thruster(s)
Make: Wärtsilä
Number: 3
Output (each): 3,100kW

Deck machinery
Cargo cranes/cargo gear
Number: 3
Make: Concrane
Type: Slewing crane
Performance: 2 x 2.5t / 1 x 1t

Other cranes
Number: 4
Make: Fuchs
Type: Telescopic crane
Tasks: Diesel generators
Performance: 2t

Mooring equipment
Number: 8
Make: Kongsberg
Type: Electric

Special lifesaving equipment
Number of each and capacity: 14 Lifeboat (314pax each); 4 Lifeboat/Tender (267pax each); 2 Liferaft (60pax each)
Make: Boat maker: Hatecke; Raft maker: Hatecke;
Type: PEL12,5/PL14/ GSL7.6C; Boat type: Semi-enclosed; Raft type: Totally enclosed
If MES, vertical or sloping chutes?: Vertical

Ballast water treatment system
Make: Alfa Laval
Capacity: 500m^3/h

Complement
Crew: 1,648
Single/double/other rooms: 943

Passengers
Total: 5,632
Number of cabins: 2,270
Percentage/number outboard: 77%

Navigation and other equipment
Bridge control system
Make: APSS Wärtsilä

Radars
Number: 5
Model(s): 2 S-Bands downmast, 1 X-Bands downmast, 2 X-Bandsupmast

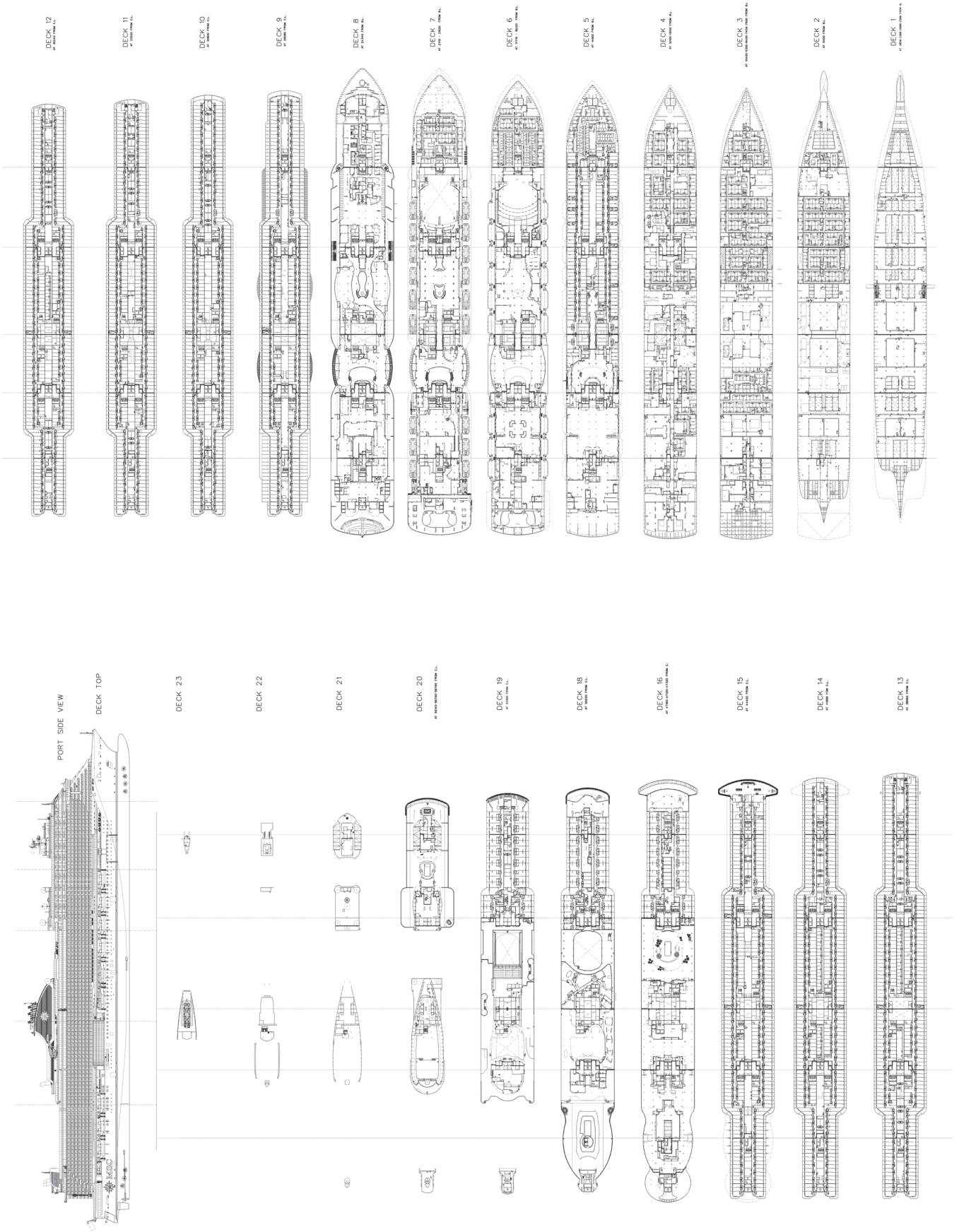
Fire detection system
Type: Martec
Fire extinguishing systems
Engine room: CO_2
Make/Type: Tyco
Cabins: Water Mist
Make/Type: Marioff
Public spaces: Water Mist
Make/Type: Marioff

Waste disposal plant
Waste handled: black, grey water, food rejected water, can &tin, paper/cardboard, plastic, glass
Incinerator
Make: Wärtsilä
Waste compactor
Make: Wärtsilä
Waste shredder/crusher
Make: Wärtsilä
Sewage plant
Make: Wärtsilä

Efficiency
Attained EEDI value: 8.8
Required EEDI value: 10.38
Installed Fuel Meters: mass flow

Contract date: 29 November 2017
Launch/float-out date: 20 August 2020
Delivery date: 26 July 2021

MSC SEASHORE



NING MAY – Bulk carrier

Shipbuilder: **Chengxi Shipyard Co., Ltd**
Vessel's name: ***Ning May***
Owner/Operator: **Foremost (Shanghai) Maritime Co., Ltd**
Country: **China**
Designer: **Shanghai Merchant Ship Design & Research Institute, CSSC (SDARI)**
Country: **China**
Model test establishment used: **China Ship Scientific Research Centre**
Flag: **Liberia**
IMO number: **9891866**
Total number of sister ships already completed (excluding ship presented): **4**
Total number of sister ships still on order: **10**

ASDARI designed Post-Panamax bulk carrier of 85,200dwt built by Chengxi Shipyard for Foremost Shipping, *Ning May* is one of a new breed of vessel aimed at being among the most flexible and suited to many trades.

The ship was the first of its design to be delivered at the very end of 2020 but has been joined since by four sister ships including *Xiao May* delivered in March 2021 for the same owner. The other delivered vessels and a further 10 still on order or under construction are for different owner/operators.

With a 229.9m loa the vessel falls into the KamsarMax category although at 36m beam and having a scantling draught of 13.68m, it is wider and has a shallower draught than most of the other ships in this size bracket. These dimensions allow it to make use of the New Panama locks and would have permitted the ship to operate fully laden at all times over the past two years when lack of rains and low water levels at Lake Gatun have caused the Canal Authority to restrict sailing draughts through the Canal.

The ship has the typical seven-hold configuration of this class and its wider beam allows for a 106,000m^3 grain capacity which is higher than the vessels which maintained the old Panama Canal beam of 32.2m. In keeping with modern trends, the bow form is erect without a bulb.

The main engine is a MAN B&W 6S60ME-C super long stroke type producing 9,600kW at 84rpm and driving a single propeller to give a service speed of 14.3knots. A fan cap and propeller duct aid efficiency allowing for an attained EEDI of 3.23 comfortably below the required figure of 3.85.

A SunRui ballast treatment system is installed and approved by both IMO and US Coast Guard.

TECHNICAL PARTICULARS

Length oa: 229.90m
Length bp: 226.40m
Breadth moulded: 36m
Depth moulded: 20.15m
Draught
scantling: 13.68m
design: 11.50m
Displacement: ~99,800t
Lightweight: ~14,600t
Deadweight
scantling: ~85,200t

Block co-efficient (please state relevant draught): Ts 0.87
Speed, service CSR output): ~14.3knots

Cargo capacity (m^3)
Grain: ~106,000
Bunkers (m^3)
Heavy oil: 2,350
Diesel oil: 600
Water ballast (m^3): 26,800

Daily fuel consumption (tonnes/day)
Main engine only: ~26.0

Classification society and notations: ABS ✠ A1 (E), Bulk Carrier, BC-A (Holds 2, 4 & 6may be empty), CSR, AB-CM, ESP, GRAB[30], UWILD, CPS, BWE , PMA, POT, CRC(SP), RW, MLC-ACCOM, ENVIRO, IHM, RRDA ✠ AMS, ✠ ACCU, TCM, BWT+, EGC-SOx

% high-tensile steel used in construction: ~88%

Propulsion
Main engine(s)
Design: MAN B&W
Model: MAN B&W 6S60ME-C
Manufacturer: HuDong Heavy Machinery Co., Ltd
Number: 1
Type of fuel: HFO & MDO
Output of each engine: 9,600kW 84rpm MCR
Is this a diesel-electric or hybrid?: N

Diesel-driven alternators
Number: 3
Engine make/type: Daihatsu/ 6DE-18
Type of fuel: HFO & MDO
Output/speed of each set: 780kW / 900rpm

Boilers
Number: 1
Type: 1 × Composite boiler
Make: Aalborg OC-TCi
Output, each boiler: 1,500kg/h / 500kg/h

Mooring equipment
Type: Hydraulic

Ballast water treatment system
Make: SunRui Marine Environment Engineering Co., Ltd
Capacity: 1,500m^3/H x 2

Complement
Officers: 11
Crew: 15
Single/double/other rooms: ...1 cabin for pilot

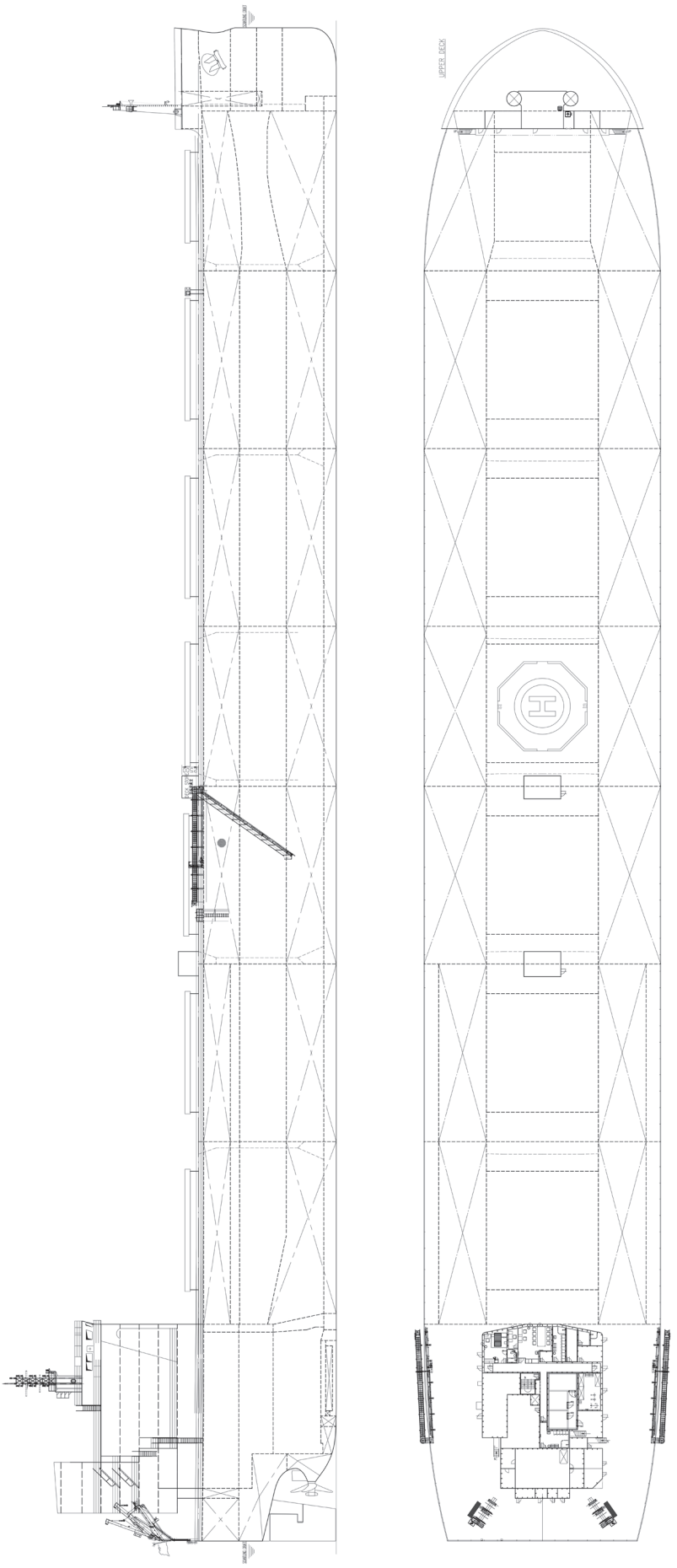
Navigation and other equipment
Bridge control system
Is bridge fitted for one-man operation?: N
Integrated bridge system: N

Fire extinguishing systems
Cargo holds: CO_2
Engine room: CO_2 and fixed water-based local application fire fighting

Efficiency
Attained EEDI value: 3.23
Required EEDI value: 3.85
Installed Fuel Meters: mass flow
Energy Saving Technologies: SDARI Fan Cap & Fan Duct

Hull coatings: antifouling paint

Contract date: October 2018
Delivery date: December 2020


UPPER_DECK

NORDIC NULUUJAAK – Bulk carrier

Shipbuilder: **Guangzhou Shipyard International Co Ltd**
Vessel's name: ***Nordic Nuluujaak***
Owner/Operator: **Nordic**
Country: **China**
Designer: **Shanghai Merchant Ship Design & Research Institute, CSSC (SDARI)**
Country: **China**
Model test establishment used: **China Ship Scientific Research Centre, HSVA**
Flag: **Marshall Islands**
IMO number: **9884966**
Total number of sister ships already completed (excluding ship presented): **3**
Total number of sister ships still on order: **0**

Nordic Nuluujaak, claimed by its owner Nordic Bulk Carriers as the most efficient ship trading in the Arctic, was delivered by Guangzhou International Shipyard in China in May 2021. The vessel is the first of four 95,758dwt ice classed Post Panamax vessels with the remaining three having been delivered at various times throughout 2021.

The SDARI-designed ships will be used for transport of iron ore under a contract between the owner's parent Panagea Logistics Solutions and Baffinland Iron Mines which owns facilities in the Canadian Arctic. The *Nordic Nuluujaak* has ice-class 1A which allows for sailing only through one-year Arctic ice up to about 30cm thick so it will be obliged to follow icebreakers on some voyages as it moves cargoes via the Northern Sea Route to China.

The ice strengthened vessel is 229.5m in length and with a 38m beam while the scantling draught is 15m. Cargo spaces are the familiar seven holds with side rolling hatch covers. Grain capacity is 114,593m^3 and bale 113,400.

Nordic Nuluujaak's propulsion and steering system comprises a MAN B&W 6G60ME-C9.5 Main engine producing 14,000kW at 60% MCR. A design requirement was for an efficient system and the engine consumes 31.7tonnes daily when operating at service speed. A 7.8m fixed pitch propeller with a fan cap operates in front of a twisted flap type rudder. The required EEDI for the vessel is 3.64 and the attained value is 3.26.

The engine meets NOx Tier II requirements under normal conditions and makes use of high pressure SCR when operating in ECAs. There is no scrubber so the ship must make use of compliant fuels to meet SOx requirements.

A Techcross 3,000m^3/h ballast treatment system type-approved by both IMO and US Coast Guard is installed.

TECHNICAL PARTICULARS

Length oa: 229.50m
Length bp: 225.50m
Breadth moulded: 38.00m
Depth moulded
to main deck: 21.30m
to upper deck: 21.30m
Width of double skin bottom: 1.90m
Draught
scantling: 15.00m
design: 12.20m

Gross: 54,066t
Displacement: 112,008.2t
Lightweight: 16,249.82t
Deadweight
scantling: 95,758.4t
design: 72,762.3t

Block co-efficient (please state relevant draught): Td 0.8288 Ts 0.8485
Speed, service 60%MCR output): 14.43knots

Cargo capacity (m^3)
Bale: 113,400
Grain: 114,593
Bunkers (m^3)
Heavy oil: 2,382
Diesel oil: 397
Water ballast (m^3): 28,531
Daily fuel consumption (tonnes/day)
Main engine only: 31.7

Classification society and notations: DNV, 1A, Bulk Carrier, BC (A), CSR, ESP, Grab (30), Hold (2, 4&6) may be empty, CMON, ICE (1A), COAT-PSPC (B), BIS, LCS, Recyclable, Clean, E0, BWM (T), TMON (Oil Lubricated)

% high-tensile steel used in construction: 73%
Heel control equipment: 1 pair Anti-heeling tank

Propulsion
Main engine(s)
Design: MAN B&W
Model: 6G60ME-C9.5 Tier II/III (HP SCR)
Manufacturer: CSSC-MES Diesel Co., Ltd
Number: 1
Type of fuel: HFO & MGO
Output of each engine: 14,000kW
Is this a diesel-electric or hybrid?: N

Propeller(s)
Material: Ni-Al-Bronze
Designer/Manufacturer: Lyen Marine Technology Co., Ltd
Number: 1
Fixed/Controllable pitch: FPP
Diameter: 7,800mm
Speed: 90rpm

Diesel-driven alternators
Number: 3
Engine make/type: CSSC Marine Power Co., Ltd / MAN 7L23/30H
Type of fuel: HFO & MGO
Output/speed of each set: 1,050kW / 900rpm

Boilers
Number: 1
Type: 1 × Oil fired boiler / 1× exhaust gas boiler
Make: Aalborg
Output, each boiler: 1 × 4,000kg/h / 1 × 800kg/h

Stern appendages/special rudders: twisted flap type rudders

Other cranes
Number: 1
Make: South China marine machinery Co., Ltd
Type: Hydraulic telescope Cylinder luffing
Tasks: Provision handling
Performance: SWL 4t @3m outreach

Mooring equipment
Number: 8
Make: Jiangsu Masada Heavy Industries Co., Ltd
Type: Hydraulic

Special lifesaving equipment
Number of each and capacity: 1 Liferaft for 6 persons, throw over board type/ 2 Liferaft for 16 persons, throw over board type/2 Liferaft for 16 persons, davit launchable type
Make: Viking
Type: 6DK/ 16DK/ 16DKF

Cargo/capacity
Hatch covers
Design: 7
Manufacturer: TTS

Ballast control system
Make: Techcross
Type: ECS 3200B
Ballast water treatent system
Make: Techcross
Capacity: 3,000m^3/h

Complement
Crew: 28
Single/double/other rooms: 1 cabin for pilot

Navigation and other equipment
Bridge control system
Make: Hangyue
Is bridge fitted for one-man operation: N
Integrated bridge system: N
Radars
Number: 2
Make: Furuno
Model(s): FAR-2328,FAR-2338S

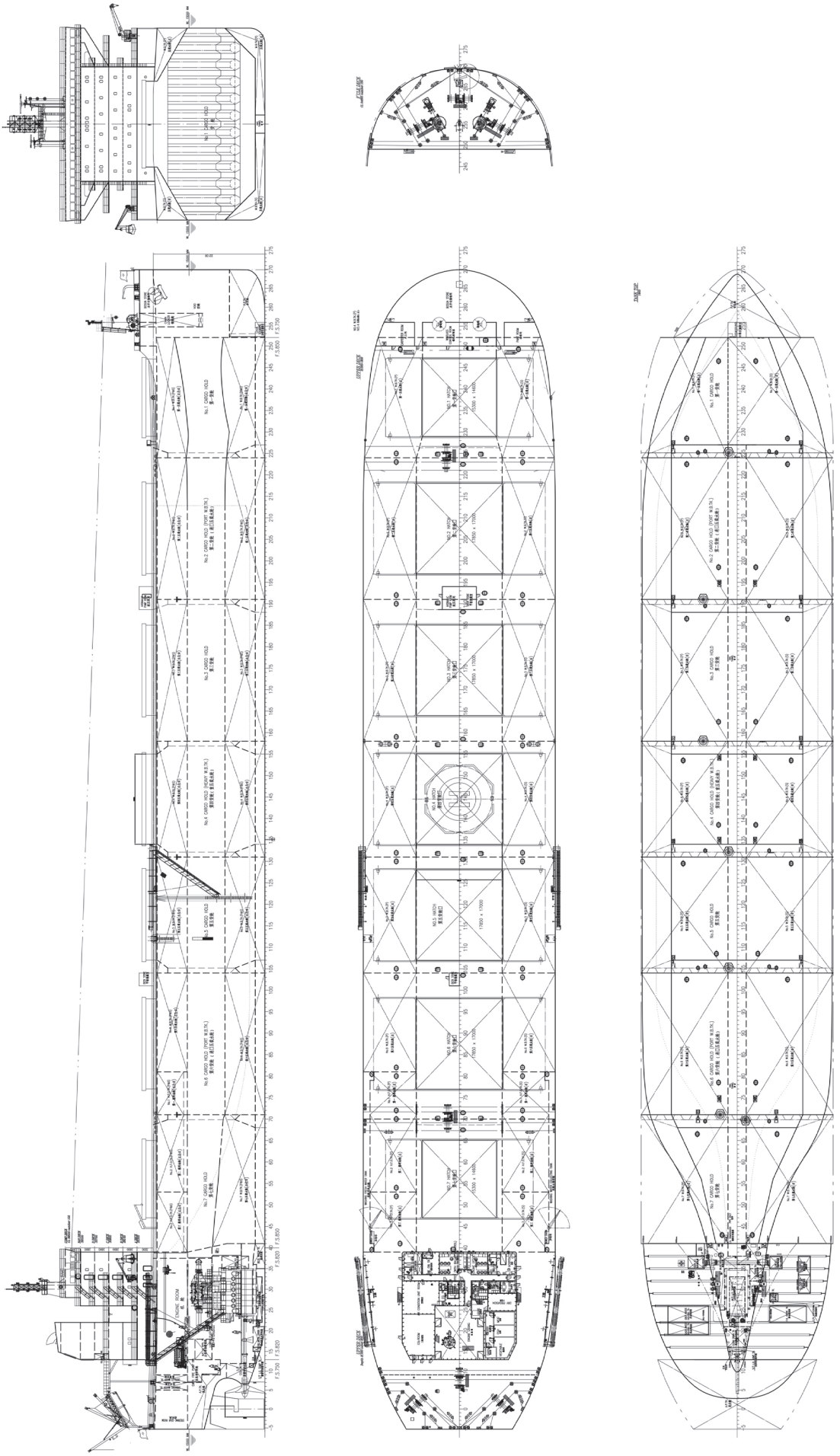
Fire detection system
Make: Consilium
Type: Salwico Cargo
Fire extinguishing systems
Engine room: CO_2 and fixed water-based local application fire fighting
Make/Type: Seaplus / Seaplus

Waste disposal plant
Sewage plant
Make: CSSC Nanjing Luzhou Machine Co., Ltd
Model: STD-2

Efficiency
Attained EEDI value: 3.26
Required EEDI value: 3.64
Energy Saving Technologies: Propeller Fan Cap

Contract date: April 2019
Launch/float-out date: February 2021
Delivery date: May 2021

NORDIC NULUUJAAK



ONEX PEACE – Product/chemical tanker

Shipbuilder: **Hyundai Samho Heavy Industries Co., Ltd**
Vessel's name: ***ONEX Peace***
Owner/Operator: **ONEX DMCC**
Country: **United Arab Emirates**
Designer: **Hyundai Samho Heavy Industries Co., Ltd**
Country: **Republic of Korea**
Flag: **Panama**
IMO number: **9893204**
Total number of sister ships already completed (excluding ship presented): **2**
Total number of sister ships still on order: **0**

ONEX Peace, an Aframax LRS product tanker built by Hyundai Samho Heavy Industries and delivered to its owner UAE-based *ONEX DMCC* achieved significance by becoming the world's first merchant ship to receive DNV's SILENT-E notation.

ONEX Peace was delivered on 31 March and was followed in May by *ONEX Precious* and in September by the third in class *ONEX Phoenix*. Although not the first vessels in the operator's fleet, the trio were the first ships ordered as newbuildings. After deliver *ONEX Peace* was placed in the Scorpio LR2 Pool.

At 249.99m in length with a beam of 44m and a deadweight of 114,600tonnes the ships are fairly typical of the type in dimension. There are 12 cargo tanks in six pairs and two slop tanks located between the No. 6 cargo tanks and pump room and bunker tanks.

A Hyundai-MAN B&W 6G60ME-C9.5_HPSCR engine of 12,000kW at 78.8rpm gives the ship a 14.5knots service speed.

DNV is the first classification society to offer an underwater noise notation and in developing it DNV, HHI and Korea Research Institute of Ships & Ocean conducted a joint research project on measuring and evaluating underwater radiation noise. As part of the study, the parties carried out the underwater noise measurement and analysis of the *ONEX Peace*.

SILENT-E notation ensures ships do not exceed typical average-to-moderate Underwater Radiation Noise (URN) levels. Vessels with this notation can avoid harmful impact on marine life and document noise performance for authorities or those demanding proof of noise emissions for transit through vulnerable areas. The noise reduction is assisted by the use of a pre-swirl duct and a rudder bulb.

TECHNICAL PARTICULARS

Length oa: 249.99m
Length bp: 245.00m
Breadth moulded: 44.00m
Depth moulded to upper deck: 21.60m
Width of double skin
side: 2.30m
bottom: 2.40m
Draught
scantling: 15.2m
design: 13.6m
Gross: 63,134t
Displacement: 134,650t
Lightweight: 20,030t
Deadweight
scantling: 114,600t
design: 98,800t
Block co-efficient (please state relevant draught): 0.7998 (scantling draught)
Speed, service (--%MCR output): 14.50knots (78% NCR with 15% SM)
Cargo capacity (m^3)
Liquid volume: 130,900
Bunkers (m^3)
Heavy oil: 2,480
Diesel oil: 580
Water ballast (m^3): 37,410
Daily fuel consumption (tonnes/day)
Main engine only: 36.2

Classification society and notations: DNV +1A Tanker for Oil, ESP, CSR, EO, BIS, TMON, COAT-PSPS(B.C), CMON, LCS, BWM(T), CLEAN, VCS(2B), SPM, Recyclable, ER(SCR, Tier III)

Propulsion
Main engine(s)
Model: Hyundai-Man B&W 6G60ME-C9.5_HPSCR
Manufacturer: HHI-EMD
Number: 1
Type of fuel: HFO
Output of each engine: 12,000kW x 78.8rpm
Propeller(s)
Material: Ni-Al-Bronze
Designer/Manufacturer: HHI-EMD
Number: 1
Fixed/Controllable pitch: FPP
Diameter: 8,300mm

Diesel-driven alternators
Number: 3
Engine make/type: HHI-EMD / HiMSEN 6H21/32
Type of fuel: HFO
Alternator make/type: HHI-EES / HFC7 564-08P
Output/speed of each set: 1,150kW x 900rpm

Boilers
Number: 1 Composite boiler
Type: Automatic, forced draft, F.O. burning marine boiler
Make: Kangrim
Output, each boiler: Evaporation (Kg/H) – 1,800

Deck machinery
Cargo cranes/cargo gear
Number: 2
Make: Sangsangin
Type: Elect.-hyd
Performance: SWL 15t

Other cranes
Number: 2
Make: Sangsangin Industry Co., Ltd
Type: Elect-hyd
Tasks: Hose Handling Crane
Performance: SWL 15t

Mooring equipment
Number: 8
Make: Flutek Ltd
Type: Hydraulic

Special lifesaving equipment
Number of each and capacity: 36 Person
Make: Viking Norsafe Co., Ltd
Type: JYN-65 MKI

Cargo tanks
Number: 14 ea tanks
Grades of cargo carried: Product Carrier Cargo tanks - IPK / THA 700/703, THA 702/703

Cargo pumps
Number: 3
Type: KV450-3A
Make: Shinko
Capacity (each): 4,000m^3/h x 135mth
Cargo control system
Make: Hanla IMS
Type: Hydraulic Valve Operated Control System

Ballast control system
Make: Hanla IMS
Type: Hydraulic Valve Operated Control System
Ballast water treatment system
Make: Hyundai Heavy Industries Co., Ltd
Capacity: 1,700m^3/h x 2

Complement
Officers: 13 persons
Crew: 16 persons

Navigation and other equipment
Bridge control system
Make: MESCO
Radars
Number: 1x S-BAND, 2x X-BAND
Make: Furuno
Model(s): S-BAND: FAR-332Q, X-BAND: FAR-3320
Fire detection system
Make: Consilium
Type: SG-43000/01/02

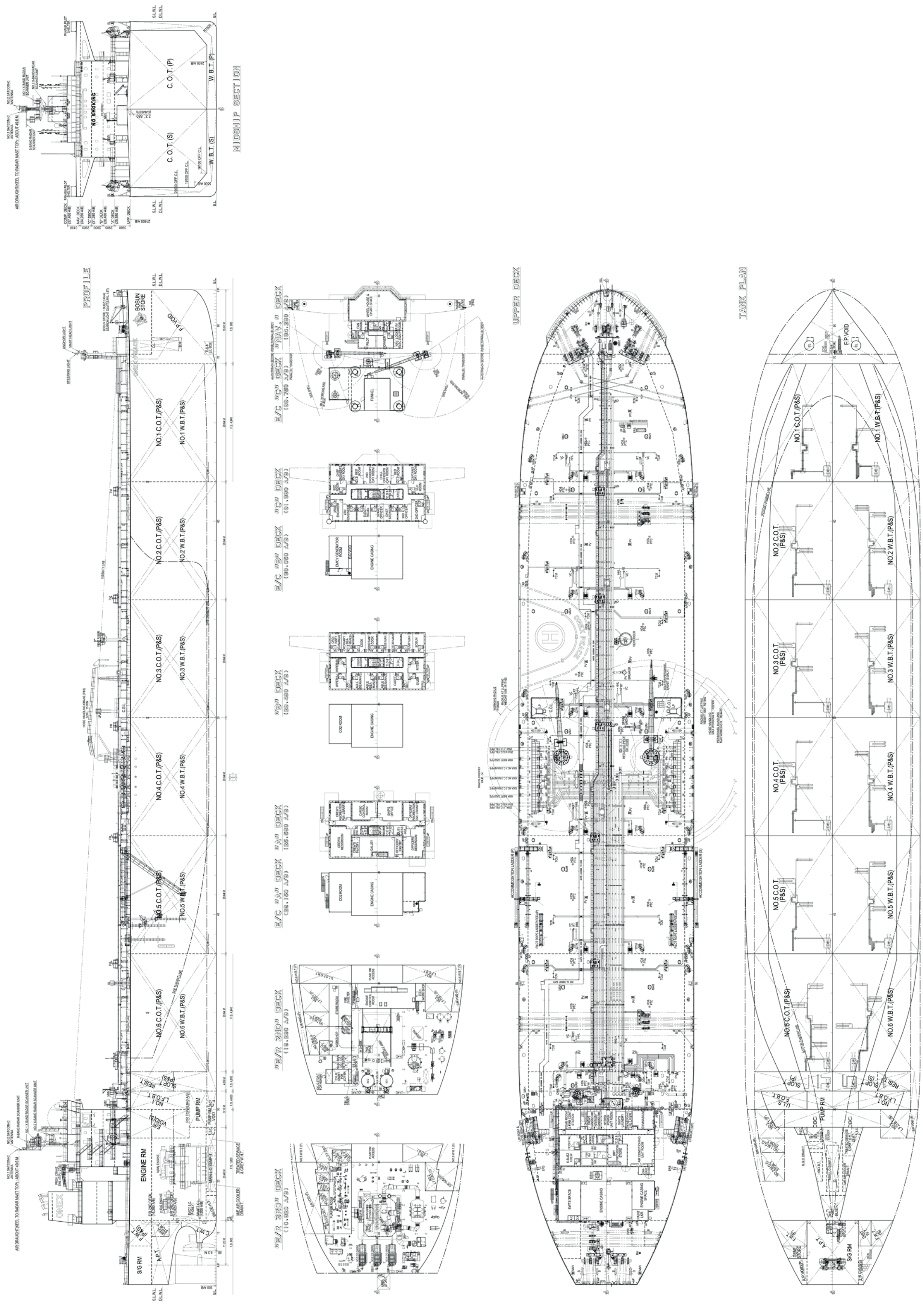
Fire extinguishing systems
Engine room:
Make/Type: Fain Co., Ltd / CO_2
Cabins:
Make/Type: Portable fire extinguisher
Public spaces:
Make/Type: Portable fire extinguisher

Waste disposal plant
Incinerator
Make: Hyundai Marine Machinery Co., Ltd
Model: MAXI NG150SL WS
Sewage plant
Make: Il Seung Co., Ltd
Model: ISB-02

Efficiency
Attained EEDI value: 3.0526
Required EEDI value: 3.3121
Energy Saving Technologies: Hyundai Pre-Swirl Duct, Hyundai Rudder Bulb

Contract date: 23 August 2019
Launch/float-out date: 08 January 2021
Delivery date: 31 March 2021

ONEX PEACE



MIDSHIP SECTION
PROFILE
UPPER DECK
TANK PLAN
C.O.T. (P)
C.O.T. (S)
W.B.T. (P)
W.B.T. (S)
NO.1 C.O.T.(P&S)
NO.1 W.B.T.(P&S)
NO.2 C.O.T.(P&S)
NO.2 W.B.T.(P&S)
NO.3 C.O.T.(P&S)
NO.3 W.B.T.(P&S)
NO.4 C.O.T.(P&S)
NO.4 W.B.T.(P&S)
NO.5 C.O.T.(P&S)
NO.5 W.B.T.(P&S)
NO.6 C.O.T.(P&S)
NO.6 W.B.T.(P&S)
ENGINE RM
PUMP RM
S/G RM
BOSUN STORE
F.P. VOID

PACIFIC INEOS BELSTAFF – Ethane/ethylene carrier

Shipbuilder: ..... **Jiangnan Shipyard (Group) Co., Ltd**
Vessel's name: ..... ***Pacific Ineos Belstaff***
Owner/Operator: ..... **Pacific Gas**
Country: ..... **China**
Designer: ..... **Jiangnan Shipyard (Group) Co., Ltd**
Country: ..... **China**
Model test establishment used: ..... **SSSRI**
Flag: ..... **Hong Kong**
IMO number: **9901398**
Total number of sister ships already completed (excluding ship presented): **0**
Total number of sister ships still on order: **6**

Pacific Ineos Belstaff is the world's first and largest very large ethane/ethylene carrier (VLEC) with an IMO Type B tank design. Delivered to Pacific Gas on 28 December 2021, 99,000m^3 capacity vessel has been chartered by the INEOS Group for the transportation of American liquified ethane to an ethylene cracker in Belgium.

The VLEC is 230m long, 36.6m wide and 22.5m deep and was fully designed and constructed by Jiangnan Shipyard (Group) Co., Ltd. It is the first in a series of seven Panda gas ships being built by the shipyard.

One of the vessel's most outstanding features is the adoption of the Type B cargo containment system (CCS), named BrilliancE® CCS, which was also developed by Jiangnan. Compared with existing ethane/ethylene carriers, most of which use GTT's membrane CCS, BrilliancE® CCS is said to be high in safety, high in reliability, low in maintenance costs, and free from sloshing concerns.

Pacific Ineos Belstaff's two deck cargo/fuel buffer tanks provide flexibility for carrying LPG or ethylene as alternative fuels. The vessel is powered by MAN's latest ethane dual-fuel GIE engine with an in-line shaft generator, cutting the SOx emission by 99% and CO_2 emissions by 18%, and has reached EEDI Phase 4 in advance thanks in part to a Jiangnan-developed hull form (VS-BOW®) technique and optimised propeller reaction fin-CAPRO®.

Its maiden voyage was from Houston to Taizhou, a shallow-draught port in Yangtze River. The partially loaded vessel arrived in March 2022, with no sloshing problems reported in the Type B tanks, demonstrating strong seaworthiness in the harsh winter Pacific and the benefits of its refined hull form with VS-BOW.

TECHNICAL PARTICULARS

Length oa: 230m
Length bp: 226m
Breadth moulded: 36.6m
Depth moulded
to main deck: 22.5m
Draught
scantling: 12.8m
design: 11.9m
Gross: 56,081t
Deadweight
scantling: 60,226t
Speed, service (--%MCR output): 16.75knots

Cargo capacity (m^3)
Liquid volume: 99,152
Bunkers (m^3)
Heavy oil: 2,300
Diesel oil: 400
Water ballast (m^3): 24,000

Daily fuel consumption (tonnes/day)
Main engine only: 35.8

Classification society and notations: ..... ABS ✠ A1 (E), Liquefied Gas Carrier, SH, SHCM, CPS, UWILD, NBLES, ENVIRO, IHM, TCM, BWE, BWT, DFD-Ethane ✠ AMS, ✠ ACCU. With description in the record: "Ship type 2G with Independent Tanks type B (Min. cargo temperature -1040C, Max. vapour pressure 0.25 barG), IDM-A"

Propulsion
Main engine(s)
Design: ..... MAN Energy Solutions
Model: ..... 6G60ME-C9.5 GIE
Manufacturer: ..... Hyundai Engine
Number: 1
Type of fuel: ..... Ethane/HFO/MDO
Output of each engine: 12,480kW

Propeller(s)
Material: ..... Ni-Al-Bronze
Designer/Manufacturer: ..... Dalian
Number: 1
Fixed/Controllable pitch: ..... FPP
Speed: 90rpm

Diesel-driven alternators
Number: 3
Engine make/type: ..... Yanmar
Type of fuel: ..... HFO/MDO
Alternator make/type: ..... Taiyo
Output/speed of each set: ..... 1,720kW x 720rpm

Boilers
Number: 1
Type: ..... Smoke Tube
Make: ..... Alfa Laval
Output, each boiler: 3,000kg/h

Deck machinery
Cargo cranes/cargo gear
Number: ..... 1 x hose handling crane
Make: ..... Hengyuan
Type: ..... Electro-hydraulic
Performance: ..... SWL 15t
Mooring equipment
Number: ..... 2 windlass, 7 mooring winches
Make: ..... Wuhan Marine Machinery Plant Co., Ltd
Type: ..... Electro-hydraulic
Special lifesaving equipment
Number of each and capacity: ..... 1 x 30 persons
Make: ..... Jiangsu Jiaoyan Marine Equipment Co., Ltd
Type: ..... Free fall
Cargo tanks
Number: 4
Grades of cargo carried: 2
Product range: ..... Ethane, Ethylene, Propane, Butane, Propylene
Cargo pumps
Number: 8
Type: ..... Deepwell
Make: ..... Svanehøj
Capacity (each): ..... 650m^3/h x 140mlc
Ballast water treatment system
Make: ..... Optimarin

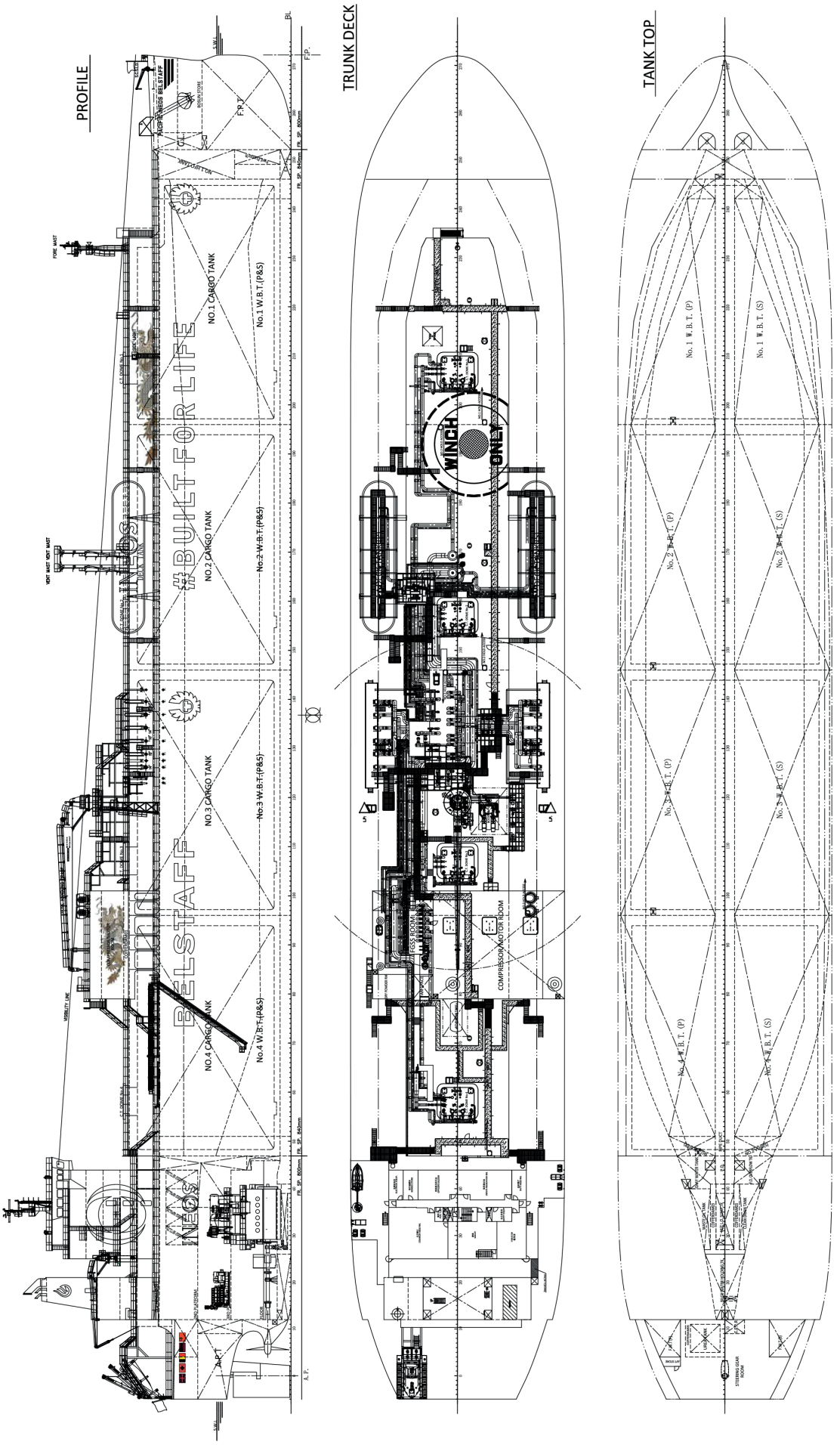
Complement
Officers: 14
Crew: 14

Navigation and other equipment
Bridge control system
Make: ..... Furuno, Yokogawa
Type: ..... Auto-pilot (Yokogawa), ECDIS (Furuno)
Radars
Number: 2
Make: ..... Furuno

Fire detection system
Make: ..... Tyco
Type: ..... Addressable
Fire extinguishing systems
Upper deck: ..... Johnson/Dry powder
Engine room: ..... Johnson Control/CO_2
Waste disposal plant
Incinerator
Make: ..... TeamTec
Model: OG400CS
Sewage plant
Make: ..... Evac
Model: Ecotreat5

Contract date: ..... 30 December 2019
Launch/float-out date: ..... 31 August 2021
Delivery date: ..... 28 December 2021

PACIFIC INEOS BELSTAFF



PRISM COURAGE – LNG carrier

Shipbuilder: **Hyundai Heavy Industry Co., Ltd**
Vessel's name: ***Prism Courage***
Owner/Operator: **SK Shipping**
Country: **Republic of Korea**
Designer: .**Hyundai Heavy Industry Co., Ltd**
Country: **Republic of Korea**
Model test establishment used: **Hyundai Maritime Research Institute**
Flag: **Panama**
IMO number: **9888481**
Total number of sister ships already completed (excluding ship presented): **2**
Total number of sister ships still on order: **1**

Delivered in October 2021, *Prism Courage* is the third in a series of 180,000m³ LNG carriers built by Hyundai Heavy Industries for South Korean operator SK Shipping. Ships to the same design have also been delivered to other owners. The 299m long and 48m wide vessel was ordered in 2016 and along with its two sisters accounted for almost half of the LNG carrier orders that year globally.

The two earlier sisters were both delivered in May 2019 before the 2020 SOx regulations came into effect. *Prism Courage*, although in most respects identical to *Prism Agility* and *Prism Brilliance*, reflects some of the necessary changes made to comply with the 2020 rules. For example, despite having dual-fuel engines and running most of the time on boil off, the two earlier vessels had bunker tanks for 4,390m³ of HFO and 1,160m³ of MDO. *Prism Courage* by contrast only carries MGO as alternative to the boil off and has a tank capacity of 5,563m³. The cargo containment system is a GTT Mark III Flex type comprising four tanks. Cargo handling is by two Shinko pumps per tanks.

As with many large LNG carriers, the ship has a twin skeg design. Like its earlier sisters, *Prism Courage* is powered by a pair of WinGD 5X72DF engines producing 12,949kW at 71/5 rpm. The twin 8.7m fixed pitch propellers allow for a service speed of 19.65knots very slightly faster than the 2019 pair. Auxiliary engines are Himsen 35DF types – two each of eight and six cylinder variants.

Prism Courage features propriety Hyundai Hi-Rudder TS and Hi-Fin for improving propulsion efficiency. Hyundai-ISS (Integrated Smart ship Solution) is installed to help voyage monitoring, route optimisation, fuel/energy flow monitoring, performance analysis and reporting.

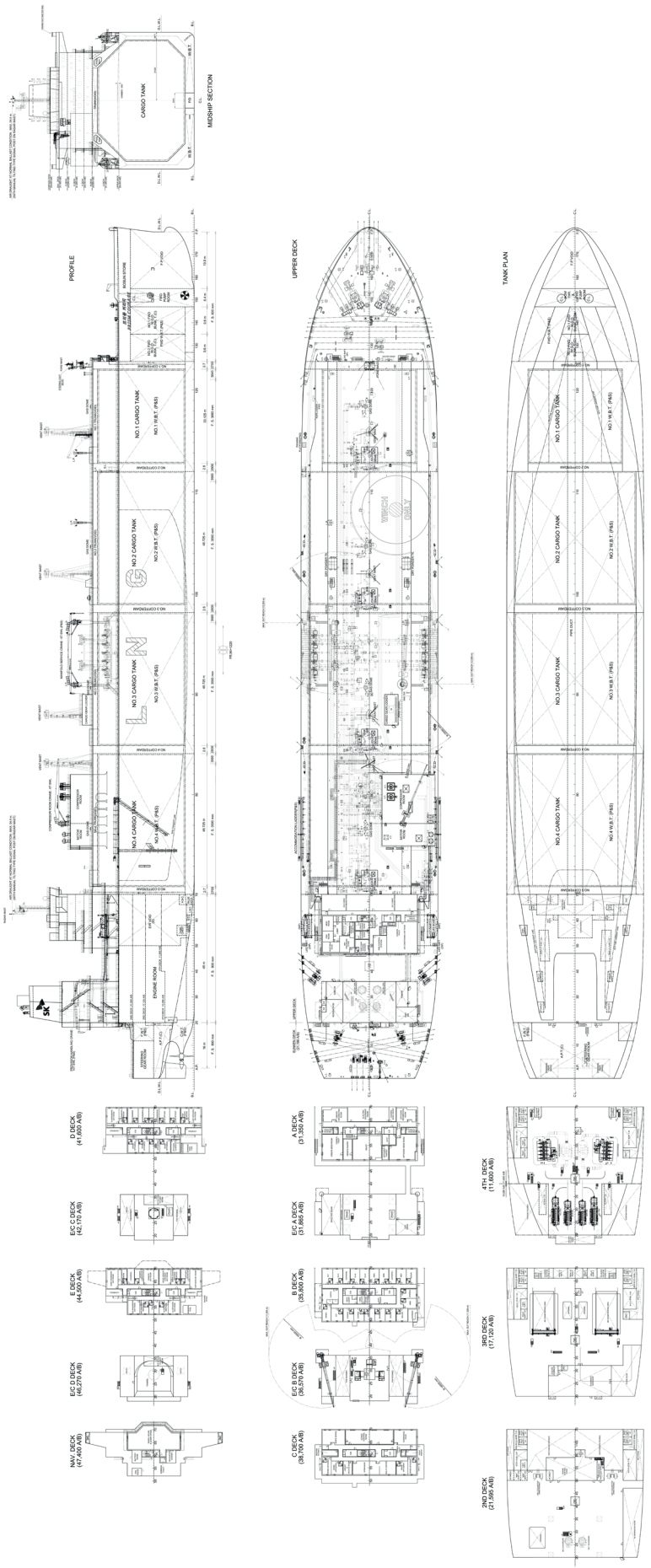
TECHNICAL PARTICULARS

Length oa: 298.97m
Length bp: 293.6m
Breadth moulded: 48.00m
Depth moulded
to main deck: 35.50m
to upper deck: 26.40m
Width of double skin
side: 2.677m
bottom: 3.20m
Draught
scantling: 12.5m
design: 11.5m
Gross: 122,166t
Deadweight
scantling: 97,493.6t
design: 85,659.6t
Speed, service (--%MCR output): 19.65knots
Cargo capacity (m³)
Liquid volume: 180,063
Bunkers (m³)
Marine gas oil: 5,563.0
Water ballast (m³): 67,994.7
Daily fuel consumption (tonnes/day)
Main engine only: 89.7
Auxiliaries: 6.7
Classification society and notations: <KR> +KRS1 - Liquefied Gas Carrier, 2G 3M(R)/0.35 bar, -163°C, 0.5SG(IGC), SeaTrust(DSA1,FSA2, HCM), IWS, ERS, PSPC, IHM, CLEAN1, PA, LG, LI, EEAS-SCR +KRM1 - UMA, STCM, NBS2, DFDE, GCU, IGS, BWT <ABS> +A1(E), Liquefied Gas Carrier, Ship Type 2G, Methane(LNG) in membrane tanks, maximum vapour pressure 0.35barg, minimum cargo temperature minus 163°C, Specific Gravity 0.5 kg/m³, RW, SHCM, SH, FL(40), +AMS, +ACCU, ENVIRO, IHM, BWT, CPS, UWILD, POT, RRDA, TCM, CRC, NIBS, DFD, GCU, PMP, PORT, EGC-SCR

Propulsion
Main engine(s)
Design: Hyundai-WinGD
Model: 5X72DF
Manufacturer: HHI Engine & Machinery Division
Number: 2
Type of fuel: MGO, LNG
Output of each engine: MCR : 2x 12,949kW x 71.5rpm / NCR : 2x 11,007kW x 67.7rpm
Is this a diesel-electric or hybrid?: N
Propeller(s)
Material: NiAl-Bronze
Designer/Manufacturer: HHI / HHI Engine & Machinery Division
Number: 2
Fixed/Controllable pitch: Fixed pitch
Diameter: 8.7m
Speed: MCR 2 x 12,949kW x 71.5rpm
Special adaptations: Hi-Fin
Diesel-driven alternators
Number: 4
Engine make/type: HHI Engine / 2 x 8H35DF & 2 x 6H35DF
Type of fuel: MGO, LNG
Alternator make/type: HHI-EES / HSJ7 809-10P & HSJ9 805-10P
Output/speed of each set: 3,840kW at 720rpm & 2,880kW at 720rpm
Boilers
Number: 6
Type: 2 x Aalborg OS-TCi / 2 x Aalborg XS-7V / 2 x Aalborg XS-TC7A
Make: Alfa Laval
Output, each boiler: 2 x 7,500kg/h / 2 x 1,300kg/h / 2 x 1,100kg/h
Stern appendages/special rudders: Skeg bulb / Hi-Rudder TS
Bow thruster(s)
Make: Kawasaki
Number: 1
Output (each): 2,500kW x 900min-1
Deck machinery
Cargo cranes/cargo gear
Number: 2 (P&S)
Make: Oriental
Type: Electro-Hydraulic
Performance: SWL 5.0t, Hoisting Height (60m), Working radius (Max.25m ~ min.5.2m)
Other cranes
Number: 1
Make: Oriental
Type: Electro-Hydraulic
Tasks: Cargo Compressor Room Crane
Performance: SWL 6t, Hoisting Height (65m)
Number: 2 (P&S)
Make: Oriental Precision & Engineering Co., Ltd
Type: Electro-hydraulic driven
Tasks: Provision Handling Crane
Performance: SWL 10t, Hoisting Height (65m)
Mooring equipment
Number: Windlass 2ea, Winch 8ea
Make: Flutek
Type: Electric
Cargo tanks
Number: 4
Cargo pumps
Number: 8
Type: Vertical Submerged
Make: Shinko
Stainless steel: Aluminim Alloy Casting
Capacity (each): 1,850m³/h
Cargo control system
Make: KSB
Type: Hydraulic Actuators for Valves
Ballast control system
Make: KSB
Type: Hydraulic Actuators for Valves
Ballast water treatment system
Make: HiBallast
Capacity: Electrolysis Unit – 6,000m³/h x 1 / Filter Unit – 3,500m³/h x 2
Complement
Officers: 23
Crew: 17
Suez/Repair Crew: 6
Navigation and other equipment
Bridge control system
Make: Tokyo Keiki
Type: TG-8000
Is bridge fitted for one-man operation?: Y
Integrated bridge system: Y
If yes, make: JRC
Model: GRD-921
Radars
Number: 3
Make: JRC
Model(s): JMR-9282-S(1 set), JMR-9225-6X(2 sets)
Fire detection system
Make: Consilium
Type: SG-42647
Fire extinguishing systems
Cargo holds: Dry powder
Make/Type: NK Co., Ltd
Engine room: High Expansion Foam
Make/Type: NK Co., Ltd

Efficiency
Attained EEDI value: 6.77
Required EEDI value: 8.76
Energy Saving Technologies*: Hi-Rudder TS, Hi-Fin
Hull coatings: Jotun antifouling paint
- Flat bottom: Seaquantum Pro U, 205 MIC.
- Side bottom: Seaquantum Pro U, 340 MIC.
Contract date: 01 July 2019
Launch/float-out date: 09 April 2021
Delivery date: 17 October 2021

PRISM COURAGE



RAVENNA KNUTSEN – LNG carrier

Shipbuilder: **Hyundai Mipo Dockyard Co., Ltd**
Vessel's name: ***Ravenna Knutsen***
Owner/Operator: **Knutsen OAS Shipping**
Country: **Norway**
Designer: **Hyundai Mipo Dockyard Co., Ltd**
Country: **Republic of Korea**
Flag: **NIS**
IMO number: **9874040**
Total number of sister ships already completed (excluding ship presented): **0**
Total number of sister ships still on order: **1**

Built as a one-off vessel for Knutsen OAS by Hyundai Mipo, *Ravenna Knutsen* was ordered to serve a small-scale LNG field developed by Edison off Ravenna, Italy. The vessel is a 30,000m³ LNG carrier and has been taken on a 12 year charter with option to extend for further eight years. The ship has been constructed with a fatigue life of 40 years.

Ravenna Knutsen is 183.03m in length, has a beam of 28.4m and a scantling draught of 8.4m. It has a bulbous bow and a transom stern.

The cargo arrangements comprise three independent, self-supporting type C tanks with a bi-lobe shape. The cargo handling system has been designed for the ship to load a fully refrigerated cargo in 12 hours and to discharge the same using all six Svanhoj deepwell tanks with a capacity of 335m³/h. The ship also features a reliquefaction unit which guarantees a higher level of operational flexibility and a reduced environmental impact with regard to boil off.

Propulsion comes from a WinGD5X52DF main engine producing 7,450kW at 105rpm driving a controllable pitch propeller through a Renk gearbox. Service speed is 15.4knots. The ship also has a main engine driven generator and three Wärtsilä 8L20DF auxiliaries. The rudder is a flap type.

With all engines being dual fuel, the ship can run on LNG or 2020 compliant MGO. The LNG will be boil off from the cargo and there is 400m³ MGO tank. The ship's required EEDI is 19.4 but the attained EEDI based on the ship running only on LNG is a significantly lower 7.5.

TECHNICAL PARTICULARS

Length oa: 183.03m
Length bp: 171.20m
Breadth moulded: 28.40m
Depth moulded to upper deck: 19.40m
Width of double skin bottom: 1.8m
Draught scantling: 8.4m
design: 8.1m
Gross: 27,000t
Deadweight scantling: 29,000t
design: 27,800t
Speed, service: 15.4knots
Cargo capacity (m³)
Liquid volume: 30,000
Bunkers (m³)
Diesel oil: 400
Water ballast (m³): 13,000

Daily fuel consumption (tonnes/day)
Main engine only: 21 (Gas mode)

Classification society and notations: DNV +1A,Tanker for liquefied gas Ship 2G(-163 C, 500kg/m, 3.8bar) GF, E0, BIS, TMON(Oil lubricated), COAT-PSPC(B), LCS, BWM(T), Recyclable with descriptive note on fatigue life for 40 years in world wide operation

Propulsion
Main engine(s)
Model: Hyundai-WinGD 5X52DF
Manufacturer: Hyundai Heavy Industries
Number: 1
Type of fuel: MGO and LNG
Output of each engine: 7,450kW x 105rpm (Nominal rating)
Is this a diesel-electric or hybrid?: N

Gearbox(es)
Make: Renk
Model: SHH II 1600/765
Number: 1

Propeller(s)
Material: Ni-Al Bronze
Designer/Manufacturer: Wärtsilä
Number: 1
Fixed/Controllable pitch: Controllable pitch

Main-engine driven alternators
Number: 1
Make/type: ELIN / MKH845E06
Output/speed of each set: 1,000kWe / 1,800.7rpm (at M/E 93.7rpm)

Diesel-driven alternators
Number: 3
Engine make/type: Wärtsilä 8L20DF
Type of fuel: MGO and LNG
Alternator make/type: Hyundai Electric and Energy Systems / HFC7 568-06P
Output/speed of each set: 1,775kVA x 1,200rpm

Bow thruster(s)
Make: Kongsberg
Number: 1
Output (each): 1,500kW

Deck machinery
Cargo cranes/cargo gear
Number: 1
Make: Oriental
Type: Electro-hydraulic driven, cylinder luffing type jib crane
Performance: SWL 5t / Working radius 5.8~27m

Other cranes
Number: 1
Make: Oriental
Type: Electro-hydraulic driven, cylinder luffing type jib crane
Tasks: Provision and machinery part handling in engine room.
Performance: SWL 3.5t / Working radius 2.7~10m

Mooring equipment
Number: 6
Make: Fluteck
Type: Hydraulic

Special lifesaving equipment
Number of each and capacity: 1 x 25P
Make: Viking Norsafe
Type: Free fall type

Cargo tanks
Number: 3
Grades of cargo carried: 1
Product range: LNG
Stainless steel – structure/piping: NI 9% Low temperature steel

Cargo pumps
Number: 6
Type: Deepwell
Make: Svanhoj
Stainless steel: Yes
Capacity (each): 335m³/h

Cargo control system
Make: Wärtsilä
Type: Piano type console

Ballast control system
Make: Kongsberg
Type: K-chief 700
Ballast water treatment system
Make: Alfa Laval
Capacity: 1,000m³/h

Complement
Officers: 12
Crew: 13
Suez/Repair Crew: 6

Navigation and other equipment
Bridge control system
Make: Konsberg
Type: AutoChief 600
Is bridge fitted for one-man operation?: N
Integrated bridge system: N

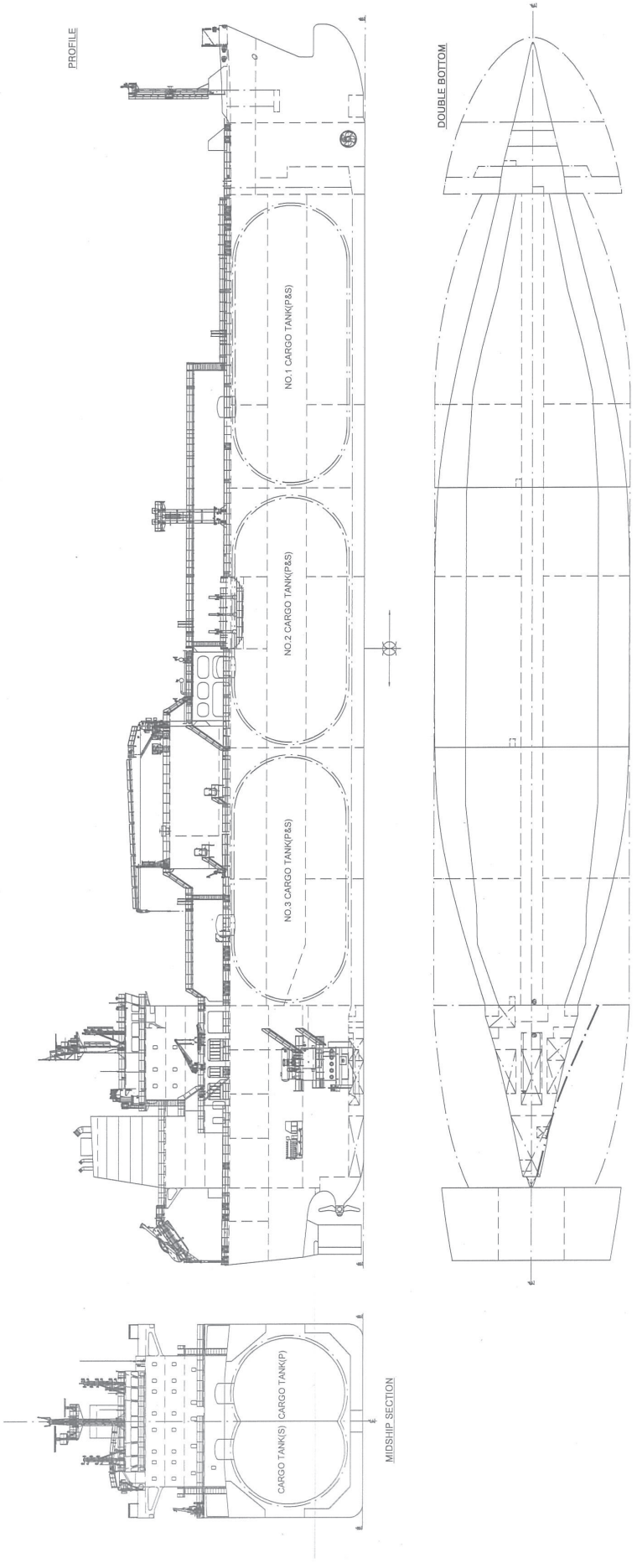
Radars
Number: 2
Make: Furuno
Model(s): FAR-2338S-NXT / FAR-2328

Fire detection system
Make: Autronica
Type: Autrosafe 4
Fire extinguishing systems
Engine room: CO_2
Make/Type: NK/Total Flooding

Efficiency
Attained EEDI value: 7.5
Required EEDI value: 19.4
Other installed monitoring tools: Torsion meter, Electro pneumatic type tank & draught gauge
Energy Saving Technologies: Flap rudder
Hull coatings: SeaQuantum X200
Type: Hydrolysing silyl methacrylate antifouling coating

Contract date: 05 December 2018
Launch/float-out date: 27 July 2020
Delivery date: 09 February 2021

RAVENNA KNUTSEN



SILVER DAWN – Cruise ship

Shipbuilder: **Fincantieri**
Vessel's name: ***Silver Dawn***
Owner/Operator: **Silversea Cruises**
Country: **Bermuda**
Designer: **Fincantieri**
Country: **Italy**
Flag: **Bahamas**
IMO number: **9857937**
Total number of sister ships already completed (excluding ship presented): **2**
Total number of sister ships still on order: **0**

In most aspects *Silver Dawn*, delivered by Fincantieri's Ancona yard to Silversea Cruises, is very much an identical sister to its two sisters, *Silver Muse* delivered in 2017 and *Silver Moon* delivered in 2020. The ship was ordered by Silversea in May 2018 as Royal Caribbean Group took a US$1 billion stake in the company and by the time the vessel was delivered the Silversea brand was entirely owned by Royal Caribbean.

Silversea has cultivated a niche as a luxury brand, small ship operator and at 212.9m in length and with a gross tonnage of 40,855, *Silver Dawn* falls well into this category. The major difference between *Silver Dawn* and her sisters is in the degree of luxury that passengers can expect. Accommodating a maximum 596 passengers in 298 cabins spread over eight decks and all but 12 with individual verandas, the owner describes the ship as the natural evolution of its fleet saying '*Silver Dawn* inherits the best features of her sister ships *Silver Muse* and *Silver Moon* but is in a class all of her own. Sumptuous suites plus cutting-edge design and technology, *Silver Dawn* sets new standards of luxury'.

The ship is a twin screw diesel electric vessel powered by four Wärtsilä 9L38 engines each rated at 6,525kW. The ship's environmental features which enable it to claim a Green Star 3 design notation from classification society RINa, include a high voltage shore connection that manages the load transfer operation between ship and shore to be done with just a single diesel generator on the network. It also features an open loop scrubber system to meet the 2020 SOx requirements.

TECHNICAL PARTICULARS

Length oa: 212.9m
Length bp: 180.85m
Breadth moulded: 27m
Depth moulded to main deck: 8.6m
Draught
scantling: 6.7m
design: 6.55m
Gross: 40.855t
Displacement: abt. 22.085t
Block co-efficient: ...0.707 @6.56m of draught
Speed, service (--%MCR output): 17knots
Bunkers (m^3)
Heavy oil: 1.459m^3
Diesel oil: 314m^3
Water ballast (m^3): 1.939m^3

Classification society and notations: R.I.Na, C+ Passenger ship, Unrestricted navigation, + AUT-UMS, Green star 3 design, inwatersurvey

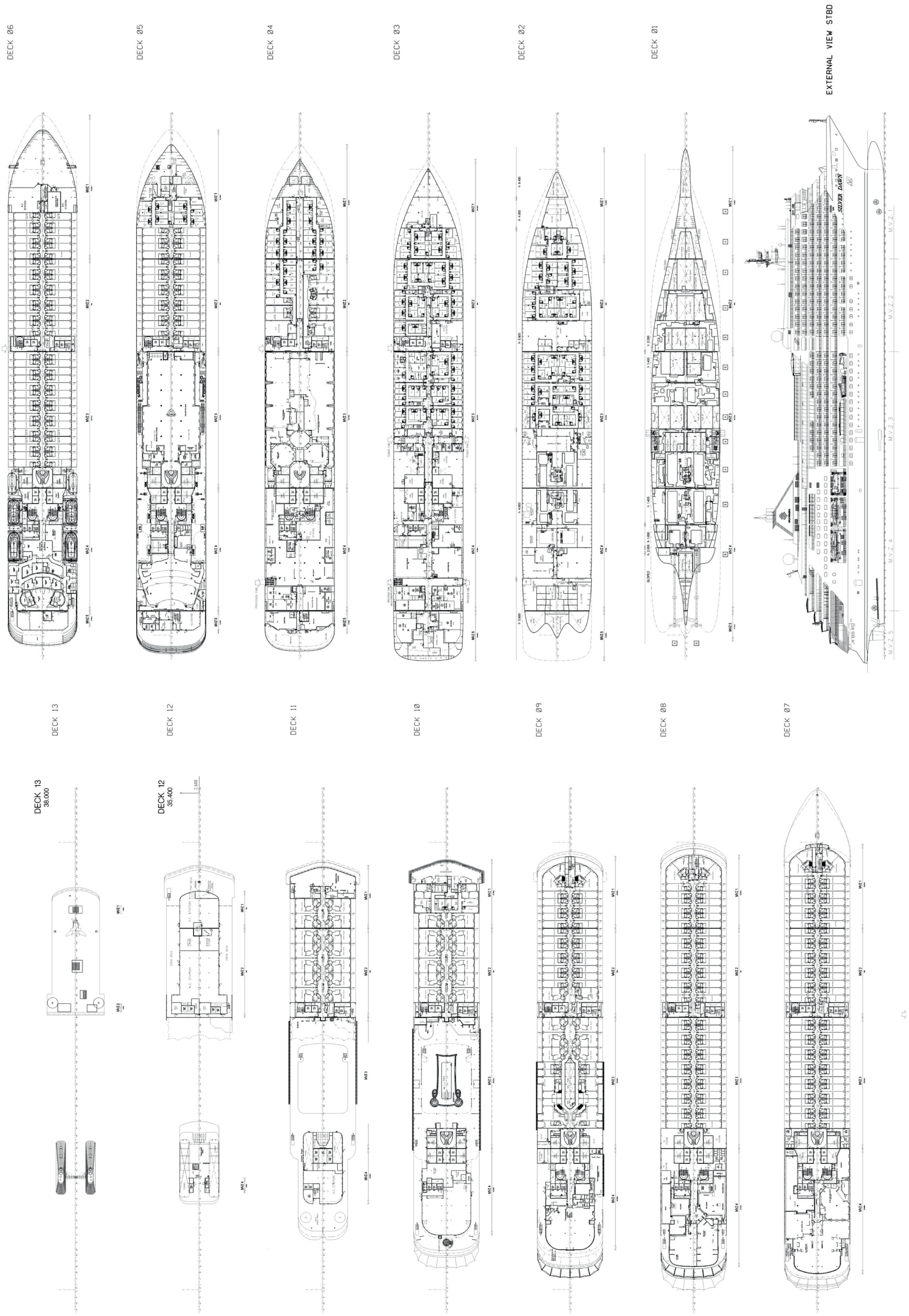
% high-tensile steel used in construction: abt. 80%

Propulsion
Main engine(s)
Model: 9L38
Manufacturer: Wärtsilä
Number: 4
Type of fuel: HFO and MGO
Output of engine: 6.525kW
Is this a diesel-electric or hybrid?: Y
Propeller(s)
Material: Ni-Al Bronze
Designer/Manufacturer: Wärtsilä
Number: 2
Fixed/Controllable pitch: Fixed
Diameter: 4.6m
Speed: abt. 152rpm
Main-engine driven alternators
Number: 4
Make/type: VEM
Output/speed of each set: 600rpm
Exhaust-gas scrubbing equipment
Manufacturer: Wärtsilä Moss AS
Type: Open Loops
On main engines?: Y
Boilers
Number: 2 + 4
Type: OFB, EGB
Make: Alfa Laval Aalborg Oy
Output, each boiler: 2 x 6 t/h, 4 x 1,7 t/h @80% MCR
Bow thruster(s)
Make: Fincantieri
Number: 2
Output (each): 1,000kW
Stern thruster(s)
Make: Fincantieri
Number: 1
Output (each): 1,500kW
Deck machinery
Cargo cranes/cargo gear
Number: 1
Make: Nuova Co.Vis srl
Type: Slewing crane
Performance: 0.75t
Other cranes
Number: 2
Make: Concrane
Type: Telescopic crane
Tasks: Zodiac handling
Performance: 0.9t
Mooring equipment
Number: 6
Make: Kongsberg
Type: Electric
Special lifesaving equipment
Number of each and capacity: 4 Lifeboat/Tender (150pax each); 2 Lifeboat (90pax each); 20 Liferaft (35pax each)
Make: Boat maker: Hatecke, Raft maker: Viking
Type: Boat type: partially enclosed; Raft type: davit-launched
Ballast water treatment system
Make: Alfa Laval
Capacity: 140m^3/h
Complement
Crew: 380
Single/double/other rooms: 431
Passengers
Total: 660
Number of cabins: 596
Percentage/number outboard: 100%
Waste disposal plant
Waste handled:
Incinerator
Make: Scanship
Model: SE600
Waste compactor
Make: Scanship
Model: X10
Waste shredder/crusher
Make: Scanship
Model: BDR110/600
Sewage plant
Make: Scanship

Efficiency
Attained EEDI value: 15,3 [G-CO_2/GRT Mile]
Required EEDI value: 15,4 [G-CO_2/GRT Mile]

Launch/float-out date: 14 January 2021
Delivery date: 12 November 2021

SILVER DAWN



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SUISO FRONTIER – Liquid hydrogen carrier

Shipbuilder: ..... **Kawasaki Heavy Industries, Ltd., Kobe Shipyard**
Vessel's name: ..... ***Suiso Frontier***
Owner/Operator: ..... **HySTRA**
Country: ..... **Japan**
Designer: ...**Kawasaki Heavy Industries, Ltd**
Country: ..... **Japan**
Flag: ..... **Japan**
IMO number: **9860154**
Total number of sister ships still on order: **0**

Delivered on 3 December 2021, by Kawasaki Heavy Industries Kobe yard, the 7,849gt *Suiso Frontier* has claimed the distinction of being the world's first liquid hydrogen carrier. It is very much a prototype as few of the cargo control and storage systems have previously been used at sea. The ship is involved in shipping experimental cargos of liquid hydrogen from Australia to Japan.

For sea carriage, hydrogen is cooled to -253°C to be liquefied and its volume is reduced to 1/800 of its original gas-state volume. The cargo containment system comprises a double shell vacuum insulated IMO Type C tank of 1,250m^3 capacity tank which was developed by Kawasaki Heavy Industries with support of NEDO (New Energy and Industrial Technology Development Organization). The support structure for the tank is made of highly durable GFRP to further ensure a reduction in heat transfer.

Because liquid hydrogen boils off up to 10 times faster than LNG, a compressor-less, hydrogen-compatible gas combustion unit supplied by German industrial burner manufacturer Saacke will ensure that any boil-off gas is completely and safely combusted to reduce the risk of increased pressure. The cargo pumps are a pair of 100m^3/h Shinko submerged electric centrifugal type.

Suiso Frontier has a loa of 116m and a beam of 19m. The propulsion system comprises three Daihatsu DE-23 1,320kW diesel engines and two 1,360kW electric motors connected through a Daihatsu gearbox to a single 3.2m diameter controllable pitch propeller and giving a maximum speed of 13knots. With an 880m^3 fuel tank and a consumption of 16tonnes of MDO per day the ship has around 50 days endurance.

TECHNICAL PARTICULARS

Length oa: 116.00m
Length bp: 109.00m
Breadth moulded: 19.00m
Depth moulded:
to main deck: 10.60m
to upper deck: 10.60m
Width of double skin
side: 3.20m
bottom: 1.30m
Draught
scantling: 4.5m
design: 4.5m
Gross: 7,849t
Deadweight
scantling: 2,272t

Speed, service (--%MCR output): ..... abt 13knots at normal output with 50% sea margin

Cargo capacity (m^3)
Liquid volume: ..... 1,253m^3 (100% full at -253°C, excluding inner vessel dome)
Bunkers (m^3)
Diesel oil: ..... abt 880m^3 (Diesel and gas oil tank including service tank)
Water ballast (m^3): ..... abt 3,000m^3
Daily fuel consumption (tonnes/day): ..... abt 16.0 at 100% MCO

Classification society and notations: ..... NS* (Liquefied Gas Carrier Type 2G, PSPC-WBT,NC) MNS* (MO)
Descriptive note; Design Maximum Pressure 0.5 MPaA / Minimum Temperature -253°C, Vacuum Insulation Performance Deterioration Monitoring System

Propulsion
Main propulsion motors
Design: ..... 3-phase induction motor for marine totally enclosed air-cooled type
Model: NTIKE-RC5
Manufacturer: ..... Nishishiba Electric Co., Ltd
Number: 2
Speed of each motor: ..... abt 885rpm
Output of each motor: ..... 1,360kW at M.C.O.
Is this a diesel-electric or hybrid?: ..... Y

Gearbox(es)
Make: ..... Daihatsu Diesel Mfg. Co., Ltd
Model: RCD-25J
Number: 1
Output speed/power: ..... abt 216rpm / 2,650kW at MCO

Propeller(s)
Material: ..... KALBC3 (Ni-Al-Bronze)
Designer/Manufacturer: ..... Kamome propeller Co., Ltd.
Number: 1
Fixed/Controllable pitch: ..... Controllable pitch
Diameter: 3,200mm
Speed: ..... abt 216rpm

Diesel-driven alternators
Number: 3
Engine make/type: ..... Daihatsu Diesel Mfg. Co., Ltd / 6DE-23
Type of fuel: ..... MDO or MGO
Alternator make/type: ..... Nishishiba Electric Co., Ltd. / Single bearing and self lubrication type
Output/speed of each set: ..... 1,400kW / 900rpm

Boilers
Number: 1
Type: ..... Vertical oil-fired boiler
Make: ..... Osaka Boiler Mfg. Co., Ltd
Output, each boiler: 700kg/h, 0.4MPaG

Stern appendages/special rudders: ..... Monovec hanging rudder

Bow thruster(s)
Make: ..... Kawasaki Heavy Industries, Ltd
Number: 1
Output (each): ..... Approx. 78kN (Approx. 8.0t)

Other cranes
Number: 1
Make: ..... Kyoritsu Kikai Co., Ltd
Type: ..... Electric motor driven
Tasks: ..... Engine parts/Provisions handling
Performance: ..... 0.9t ×10m

Mooring equipment
Number: 4
Make: ..... Kawasaki Heavy Industries, Ltd
Type: ..... Electro-Hydraulic

Special lifesaving equipment
Number of each and capacity: ..... 1, 25 persons
Make: ..... Viking life-Saving Equipment K.K.
Type: ..... Freefall lifeboat

Cargo tanks
Number: 1
Grades of cargo carried: ..... Liquid Hydrogen
Product range: ..... 1,250m^3

Cargo pumps
Number: 2
Type: ..... Electric motor driven centrifugal submerged type
Make: ..... Shinko Ind. Ltd
Capacity (each): ..... 100m^3/h

Ballast water treatment system
Make: ..... Techcross Co., Ltd.
Capacity: ..... 150m^3/h

Complement
Officers: 10
Crew: 13
Supernumaries/Spare: 2

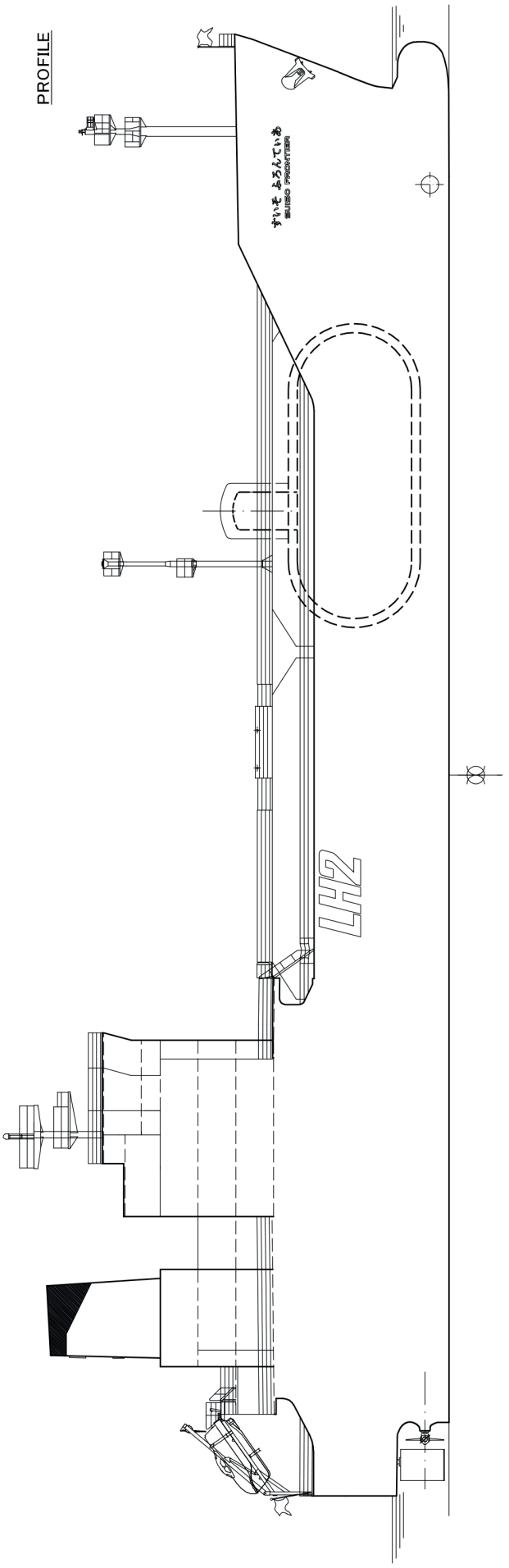
Navigation and other equipment
Bridge control system
Make: ..... Furuno Electric Co., Ltd
Is bridge fitted for one-man operation?: ..... N
Integrated bridge system: ..... N

Radars
Number: ..... 2 sets
Make: ..... Furuno
Model(s): ..... FAR-2328 (X-band) / FAR-2338S(S-band)
Fire detection system
Make: ..... Nippon Hakuyo Electronics, Ltd
Type: FF-3063
Fire extinguishing systems
Engine room:
Make/Type: ..... Kashiwa Co., Ltd / Fixed Local Application Fire Extinguishing System
Air Water Safety Service Inc. / CO_2 Fire Extinguishing System
Cabins:
Make/Type: ..... Shinko Ind Ltd / Fire & Wash Deck System
Yamato Protec / Portable fire extinguishers

Waste disposal plant
Sewage plant
Make: ..... Sasakura engineering Co., Ltd
Model: SD-3R

Contract date: ..... 25 September 2017
Launch/float-out date: ..... 11 December 2019
Delivery date: ..... 03 December 2021

SUISO FRONTIER



TAIXING – Heavy lift multipurpose vessel

Shipbuilder: **CSSC Chengxi Shipyard Co., Ltd**
Vessel's name: ***Taixing***
Owner/Operator: **Chinese-Polish Joint Stock Shipping Company**
Country: **China**
Designer: **CSSC Shanghai Merchant Ship Design & Research Institute (SDARI)**
Country: **China**
Model test establishment used: **Shanghai Ship & Shipping Research Institute**
Flag: **Hong Kong**
IMO number: **9930909**
Total number of sister ships already completed (excluding ship presented): **0**
Total number of sister ships still on order: **7**

Built by Chengxi Shipyard and delivered in December, the 62,000dwt *Taixing* is the first of four new vessels to join the fleet of heavy lift specialist Chipolbrok (Chinese-Polish Joint Stock Shipping Company). The three later vessels have scheduled delivery dates in 2022. Power and propulsion system comprises a 6G50ME-C9.6

The vessel is claimed to be the world's largest multipurpose heavy lift vessel, it measures 199.9m in length and has a 32.26m beam and has a vertical bow form. The vessel was designed by SDARI and is a double hull vessel with five holds the longest of which is 40m in length for special project cargoes.

Four of the holds are box shaped and all have strengthened tank tops for heavy cargoes. The ship has pontoon type tween decks that can be employed in all five holds. Total bale capacity is 73,000m^3. The flush hatch covers allow for a length of 160m and some 5,000m^2 of space for deck cargoes.

Cargo handling is facilitated by four deck cranes with a 38m outreach, and the two 150tonne capacity cranes located either end of hatch 3 can work in tandem to lift 300tonnes. The other two cranes have safe working loads of 45 and 60tonnes.

The ship's power and propulsion system comprises a six-cylinder MAN B&W G50ME-C9.6 engine producing 8,000kW @83rpm. This drives a 6.9m diameter fixed pitch propeller to give a service speed of 14.5knots. To achieve Tier III NOx compliance, the engine makes use of high pressure selective catalytic reduction. A Blue Ocean Shield ballast treatment system allows for worldwide operation having type approval from IMO and USCG.

TECHNICAL PARTICULARS

Length oa: 199.90m
Length bp: 196.50m
Breadth moulded: 32.26m
Depth moulded: 19.3m
Draught
  scantling: 13.50m
  design: 11.30m
Gross: 39,433t
Deadweight
  scantling: 62,000t
Speed, service (--%MCR output): 14.5knots
Cargo capacity (m^3)
  Grain: 75,000
Bunkers (m^3)
  Heavy oil: 1,750
  Diesel oil: 450
Water ballast (m^3): 23,500
Daily fuel consumption (tonnes/day)
Main engine only:
- 24.6 (1 Set, Tier II mode)
- (2 Sets, Tier III mode)
Auxiliaries:
- (1 Set, Tier II mode)
- (1 Set, Tier III mode)

Classification society and notations: DNV & CCS

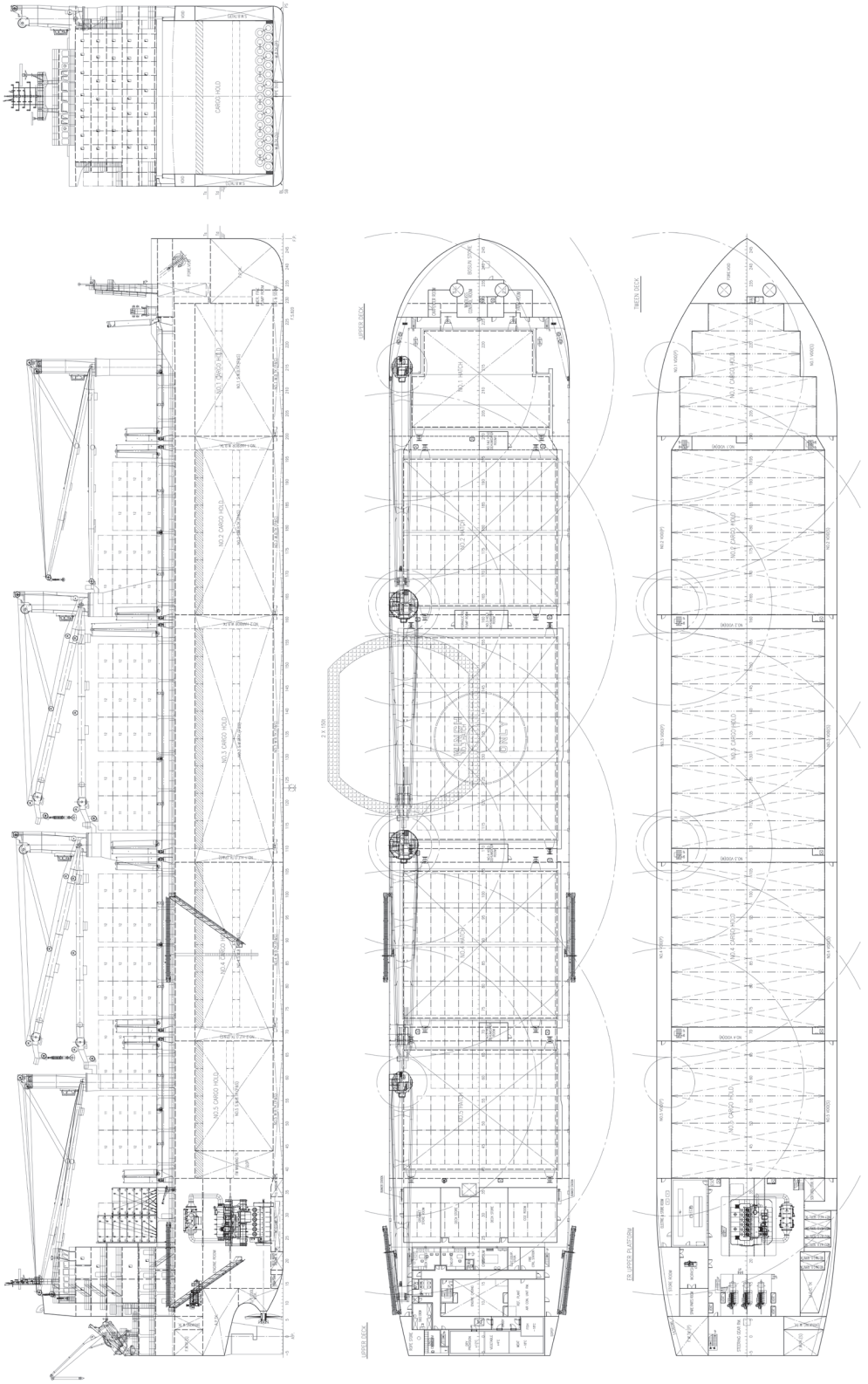
Propulsion
Main engine(s)
  Design: MAN
  Model: 6G50ME-C9.6 HPSCR
  Manufacturer: Hudong Heavy Machinery Co. Ltd
  Number: 1
  Type of fuel: HFO & MGO
  Output of each engine: 8,000kW x 83rpm
Propeller(s)
  Material: Ni-Al-bronze(Cu3)
  Designer/Manufacturer: CSSC Shanghai Merchant Ship Design & Research Institute (SDARI)
  Number: 1
  Fixed/Controllable pitch: FPP
  Diameter: 6.9
  Speed: 77
Diesel-driven alternators
  Number: 3
  Engine make/type: CSSC Marine Power Co.,Ltd. CMP-MAN 6L23/30H MK2
  Type of fuel: HFO & MGO
  Alternator make/type: ZhengJiang China Marine-XianDai Generating Co., Ltd
  Output/speed of each set: 850kW x 720rpm
Boilers
  Number: 1
  Type: Composite boiler
  Make: Alfa Laval
  Output, each boiler: fuel /ME exh. exh.side (1,500/800kg/h)
Deck machinery
Cargo cranes/cargo gear
  Number: 4
  Make: MacGregor
  Type: 2XGL8024/MLC/4538-2/3338GR, 2XGLH15018/MLC/6038-2/4538GR
  Performance: 45t-38m, 60t-38m/150t-18m
Other cranes
  Number: 1+1
  Make: Wuxi Haidelong Marine Equipment Co., Ltd
  Type: Hydraulic slewing crane
  Tasks: For provision
  Performance: 1.5t-7.2m, 1.5t-11.4m
Mooring equipment
  Number: 4
  Make: WMMP
  Type: hydraulic
Special lifesaving equipment
  Number of each and capacity: 26p
  Make: Jiangsu Jiaoyan Marine Equipment Co., Ltd
  Type: Free-fall lifeboat
  If MES, vertical or sloping chutes?: sloping
Cargo/capacity
Hatch covers
  Design: TTS Hua Hai
  Type: folding type
Ballast control system
  Make: Hoppe
  Type: electro-hydraulic
Ballast water treatment system
  Make: Blue Ocean Shield
  Capacity: 900m^3/h
Complement
  Officers: 12
  Crew: 14
  Suez/Repair Crew: 6
  Single/double/other rooms: 26/0/1

Navigation and other equipment
Bridge control system
  Make: Kongsberg
  Type: Autochief 600
  Is bridge fitted for one-man operation? N
Integrated bridge system: N
Radars
  Number: 3
  Make: Furuno
  Model(s): FAR-2328/FAR-2338S/FAR-2218

Fire detection system
  Make: Consilium
  Type: Salwico cargo
Fire extinguishing systems
Cargo holds: CO_2
  Make/Type: VTI
Engine room: CO_2/ Local Mist Spray
  Make/Type: VTI/DESMI
Waste disposal plant
Incinerator
  Make: Nanjing Luzhou
  Model: OG200CS
Sewage plant
  Make: Nanjing Luzhou
  Model: STC-2

Contract date: April 2020
Launch/float-out date: July 2021
Delivery date: November 2021

TAIXING



TANG HONG – Vehicles carrier

Shipbuilder: **China Merchants Heavy Industry (Jiangsu) Co., Ltd**
Vessel's name: ***Tang Hong***
Owner/Operator: **China Merchants Shen Zhen RoRo Shipping Co., Ltd**
Country: **China**
Designer: **Shanghai Merchant Ship Design and Research Institute (SDARI)**
Country: **China**
Model test establishment used: **Shanghai Ship and Shipping Research Institute (SSSRI)**
Flag: **China**
IMO number: **9903205**
Total number of sister ships already completed (excluding ship presented): **2**
Total number of sister ships still on order: **0**

Designed by SDARI and built by China Merchants Heavy Industry Jiangsu, the 35,245gt PCTC *Tang Hong* was delivered to China Merchants Shen Zhen RoRo Shipping in March 2021 as the first of a pair. The sister ship *Mao Hong* was handed over in July.

With their dimensions of 169.1m length, beam of 28m and draught of 8.5m together with a capacity of 4,066ceus, the ships are not among the largest of their kind although they are claimed as being the largest domestic service car carriers in China. *Tang Hong* has 11 car decks including one hoistable deck and on deck six can accommodate vehicles up to 5m in height.

Cargo operations faster than other ships of its type are facilitated by way of two 50tonne SWL quarter stern ramps one on each side of the vessel. The ventilation system allows for 20 air changes/hour during cargo operations and 10 changes per hour at other times.

In appearance, *Tang Hong* is typical of the PCTC type and to improve its efficiency SDARI has featured some lower wind resistance for the superstructure, an S-Bow design and a 5.6m diameter fixed pitch propeller with boss cap fin. Power is provided by a MAN B&W 6S50ME-C8.5 main engine producing 7,550kW at 120rpm. In operation, the ship makes use of shore power during port stays further limiting emissions. The attained EEDI value is 15.626 significantly below the required minimum of 21.915.

The ship has a ballast water capacity of 4,000m^3 but because it is intended for purely domestic use in Chinese waters, no ballast water treatment system is required.

TECHNICAL PARTICULARS

Length oa: 169.10m
Length bp: 164.50m
Breadth moulded: 28.00m
Depth moulded
to main deck: 13.82m (Freeboard deck/ No.6 deck)
to upper deck: 28.79m
Width of double skin
side: 2.75m
bottom: 1.95m
Draught
scantling: 8.50m
design: 7.70m
Gross: 35,425t
Deadweight
scantling: 11,780t
design: 8,730t
Speed, service (70%MCR output): 16.00knots

Bunkers (m^3)
Heavy oil: 800
Diesel oil: 110
Water ballast (m^3): 4,000
Daily fuel consumption (tonnes/day)
Main engine only: 20

Classification society and notations: CCS ★ CSA Car Carrier; R1; Ice Class B; FTP; Green Ship 1; In-Water Survey ★ CSM AUT-0; SCM; AMPS

% high-tensile steel used in construction: 30%

Propulsion
Main engine(s)
Design: MAN B&W
Model: 6S50ME-C8.5, Tier II
Manufacturer: Hudong Heavy Machinery Co., Ltd
Number: 1
Type of fuel: HFO,MGO
Output of each engine: 7,550kW x 120rpm
Is this a diesel-electric or hybrid?: N
Propeller(s)
Material: Ni-Al-Bronze
Designer/Manufacturer: SDARI
Number: 1
Fixed/Controllable pitch: Fixed
Diameter: 5.60m
Diesel-driven alternators
Number: 3
Engine make/type: Yanmar Co., Ltd./ 6EY22ALW
Type of fuel: HFO,MGO
Alternator make/type: Taiyo FE 547-6
Output/speed of each set: 830kW x 1,000rpm

Boilers
Number: 2
Type: Steam, 1 x Aux boiler, 1 x Exhaust gas boiler
Make: Alfa Laval
Output, each boiler: 1,500kg/h of Aux boiler, 550kg/h of Exhaust gas boiler
Bow thruster(s)
Make: Wuhan Kawasaki Marine Machinery Co., Ltd
Number: 1
Output (each): 1,000kW

Other cranes
Number: 2
Make: Jiangyin Chengjiang Ship Equipment Co., Ltd
Type: 4t provision crane
Tasks: provision crane
Performance: 4t x 5m for provision crane on starboard/4t x 4m for provision crane on portside
Mooring equipment
Number: 4
Make: Jiangsu Masada Heavy Industries Co., Ltd
Type: hydraulic
Special lifesaving equipment
Number of each and capacity: 2
Make: Jiangyin Neptune Marine Appliance Co., Ltd
Type: totally enclosed life boat

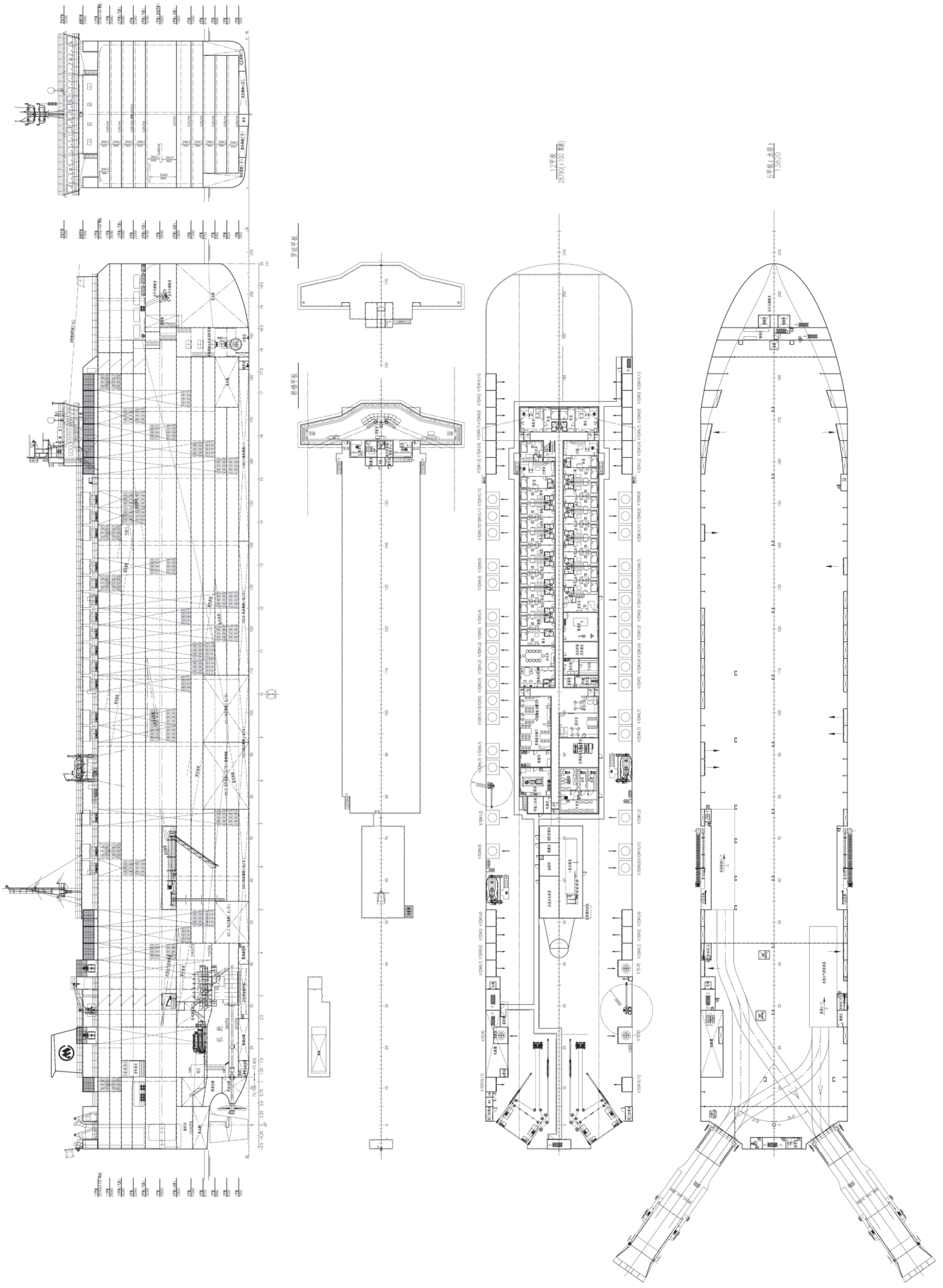
Vehicles
Number of vehicle decks: 11 (10 fixed / 1 moveable)
Total cars: 4,066(RT43)
Doors/ramps/lifts/moveable car decks
Number of each: stern ramp x2; moveable ramp x3; moveable car deck x1
Type: ramps, hydraulic; car deck, electric
Designer: TTS HuaHai

Complement
Officers: 9
Crew: 13
Supernumaries/Spare: 1 spare +1 pilot +1 owner
Single/double/other rooms: 25 Single rooms

Navigation and other equipment
Bridge control system
Make: Kongsberg
Type: Autochief 600
Is bridge fitted for one-man operation? N
Integrated bridge system: N
Radars
Number: 2
Make: Furuno
Model(s): FAR-2328 / 2338S

Fire detection system
Make: Autronica
Type: Autrosafe4
Fire extinguishing systems
Engine room: CO_2
Make/Type: Sea hydrant, Danfoss LP-CO_2, portable extinguishers
Vehicle spaces: CO_2
Make/Type: Sea hydrant, Danfoss LP-CO_2, portable extinguishers
Cabins: Sea water
Make/Type: Sea hydrant, portable extinguishers
Public spaces: Sea water
Make/Type: Sea hydrant, portable extinguishers
Waste disposal plant
Sewage plant
Make: China Merchants Heavy Industry (Jiangsu) Co., Ltd
Model: STD-2
Efficiency
Attained EEDI value: 15.6260 g-CO_2/(t.nmile)
Required EEDI value: 21.9150 g-CO_2/(t.nmile)
Energy Saving Technologies: SDARI fan cap for propeller
Contract date: June 2019
Launch/float-out date: December 2020
Delivery date: March 2021

TANG HONG



TRANSGAS POWER – LNG carrier/FRSU

Shipbuilder: **Hudong-Zhonghua Shipbuilding (Group) Co., Ltd**
Vessel's name: ***Transgas Power***
Owner/Operator: **Dynagas**
Country: **Greece**
Designer: **Hudong-Zhonghua Shipbuilding (Group) Co., Ltd**
Country: **China**
Flag: **Malta**
IMO number: **9861809**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: **0**

In July, Hudong-Zhonghua Shipbuilding delivered *Transgas Power* to Dynagas, marking the first ever large FSRU to be built in China. The ship is also significant as being only the second FSRU built for a Greek owner. A sister vessel, *Transgas Force*, was delivered in November.

Transgas Power has a loa of 294.0m and a beam of 46.95m. It has a GTT NO96 cargo containment system with a capacity of 174,000m^3. The ship has been built for a dual purpose role as either a conventional LNG carrier or as a FSRU serving as a link between a shore connection and other gas carriers.

The vessel's regasification system consisting of three trains installed at both sides of the first LNG cargo tank was supplied by Wärtsilä. In addition, Wärtsilä also supplied related regasification equipment comprising pumps, heat exchangers, valves, and instrumentation for installation in the engine room. The regasification system uses seawater and steam as energy sources, and water/glycol as the energy carrier in a combined loop. The three trains each have a capacity of approximately 500m^3/h.

The ship's power plant is an unusual choice at a time when many gas carriers are utilising two-stroke dual-fuel engines. *Transgas Power* has been equipped with four MAN medium-speed 51/60DF engines. Two are nine-cylinder units each producing 9,000kW and the other pair are eight-cylinder versions rated at 8,000kW each – all engines run at 514rpm. The ship has twin 8.2m diameter fixed pitch propellers connected to the engines through Renk gearboxes. The arrangement allows a service speed of 19.5knots.

TECHNICAL PARTICULARS

Length oa: 294.00m
Length bp: 288.00m
Breadth moulded: 46.95m
Depth moulded
to main deck: 26.25m
to upper deck: 33.40m
Width of double skin
side: 2,585mm
bottom: 2.99m
Draught
scantling: 12.50m
design: 11.60m
Gross: 117,573t
Deadweight
scantling: 94,415t
design: 83,587t
Speed, service (--%MCR output): 19.5kn@DPP
Cargo capacity (m^3)
Liquid volume: 174,000m^3
Bunkers (m^3)
Heavy oil: ~3,800m^3
Diesel oil: ~850m^3
Water ballast (m^3): 60,500m^3
Classification society and notations: ABS +1A1, Liquefied Gas Carrier, (E) (Ship type 2G), LNG(R), SH, SHCM, +ACCU, ENVIRO, UWILD, SH-DLA, CPS, DFD, TCM, +AMS,BWE,NIBS,SFA(40),POT, IHM, RRDA, GCU, SElev, CRC, BWT,RW
Cargo tank working pressure shall be based on below two mode:
1. When acting as LNGC, the cargo tank pressure shall be 25kpa;
2. When acting as FSRU, the cargo tank pressure shall be 70kpa.

Propulsion
Main engine(s)
Design: MAN 2×9L51/60DF&2×8L51/60DF
Model: 2×9L51/60DF&2×8L51/60DF
Manufacturer: MAN
Number: 4
Type of fuel: HFO & MDO & MGO & GAS
Output of each engine:
- 9L51/60DF:MCR=9,000kW @ 514rpm
- 8L51/60DF:MCR=8000kW @ 514rpm
Is this a diesel-electric or hybrid?: Y
Gearbox(es)
Make: Renk
Model: RSH-2050
Number: 2
Output speed: n 1=517rpm~605rpm; n 2=65~76rpm
Propeller(s)
Material: solid HSP Type
Designer/Manufacturer: Nakashima Propeller
Number: 2
Fixed/Controllable pitch: Fixed
Diameter: 8.2m
Speed: 69rpm
Boilers
Number: 2
Type: FMB-VM
Make: Saacke
Output, each boiler: 6,000kg/h
Stern appendages/special rudders: 2 full-spade type rudders
Bow thruster(s)
Make: Kawasaki
Number: 1
Output (each): 2,500kW

Deck machinery
Cargo cranes/cargo gear
Number: 2
Make: TTS
Type: Electro-hydraulic
Performance: 5tx25m
Other cranes
Number: 4
Make: TTS, Ningbo Kairong Ship Machinery Co., Ltd
Type: Electro-hydraulic
Performance: 5tx17m, 10tx17m, 8tx13m, 20tx32m
Mooring equipment
Number: 2 combined Windlass & Mooring winch +8 Mooring winches
Make: MacGregor
Type: electrically driven with frequency inverter control

Special lifesaving equipment
Number of each and capacity: 1set ,50P
Make: CSSC Luzhou Zhenjiang Marine Auxiliary Machinery Co., Ltd
Type: fire-protected free fall lifeboat

Cargo pumps
Number: 8pcs 2pcs/tank
Type: Vertical submerged 3-phases indication
Make: Shinko
Stainless steel: Al Alloy casting
Capacity (each): 1,800m^3/h
Cargo control system
Make: Intergrated into IAS
Ballast control system
Make: Intergrated into IAS
Ballast water treatment system
Make: Sunrui Marine Environment Engineering Co., Ltd
Capacity: 2x 2,500m^3/h

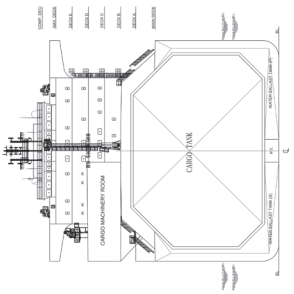
Complement
Officers: 19
Crew: 19
Supernumaries/Spare: 4
Suez/Repair Crew: 6
Single/double/other rooms: 38/2/1
Passengers
Total: 4
Number of cabins: 2

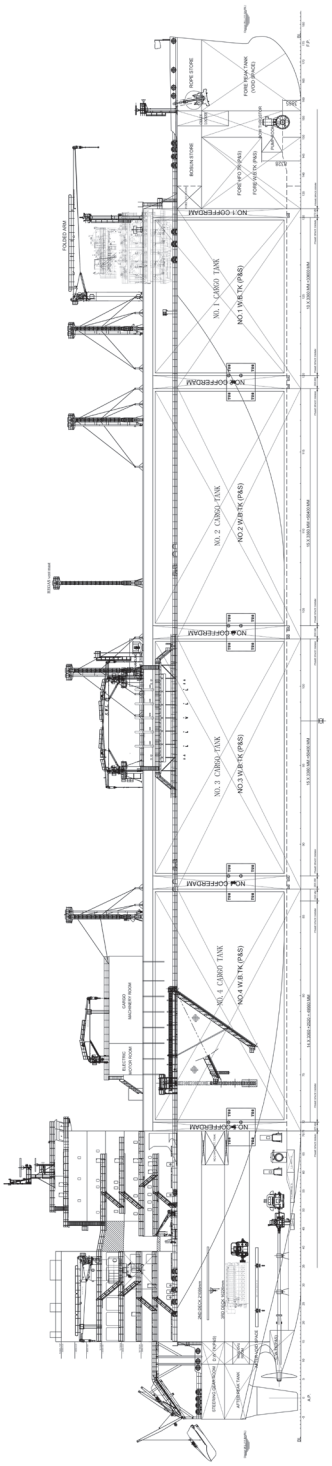
Navigation and other equipment
Bridge control system
Make: ABB
Type: PCS 800xA
Is bridge fitted for one-man operation? NIBS
Integrated bridge system: Y
If yes, make: JRC
Radars
Number: 2
Make: JRC
Model(s): JMR-9282-SN,JMR-9225-9XN

Fire detection system
Make: Consilium
Type: Salwico CCP
Fire extinguishing systems
Engine room:
Make/Type: Main fire extinguishing systems, Local water based mist (SEMCO), high expansion foam system (Survitec), portable fire extinguisher (Lingjack)
Cargo machinery spaces:
Make/Type: Main fire extinguishing systems, water spray system, CO_2 system (Survitec), portable fire extinguisher (Lingjack)
Switchboard room:
Make/Type: CO_2 system (Survitec), portable fire extinguisher (Lingjack)
Paint store, chemical store:
Make/Type: CO_2 system (Survitec)

Efficiency
Attained EEDI value: 6.03g-CO_2/ton mile, fulfil with EEDI Phase III
Required EEDI value: 8.8914 g-CO_2/ton mile (Phase I)

Launch/float-out date: 30 March 2020
Delivery date: 15 July 2021


CARGO TANK
CARGO MACHINERY ROOM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NO.1 CARGO TANK
NO.1 W.B.TK (P&S)
NO.2 COFFERDAM
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NO.3 COFFERDAM
NO.3 CARGO TANK
NO.3 W.B.TK (P&S)
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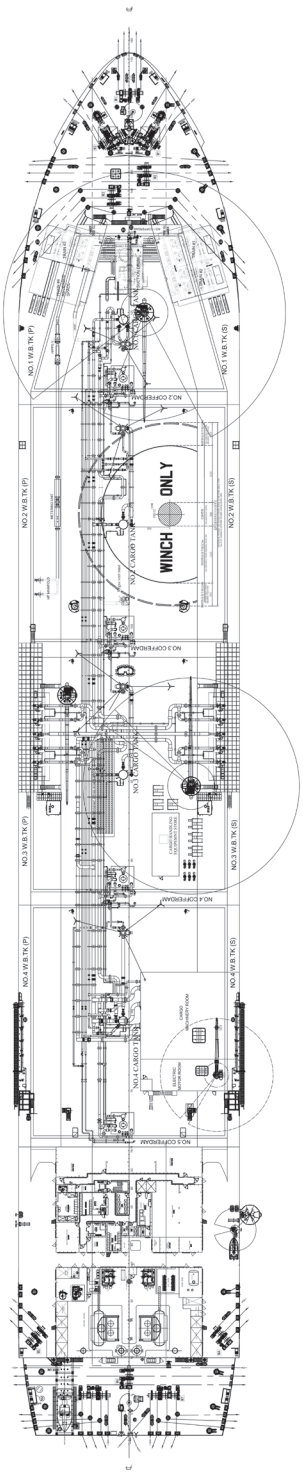
NO.4 W.B.TK (P&S)
NO.5 COFFERDAM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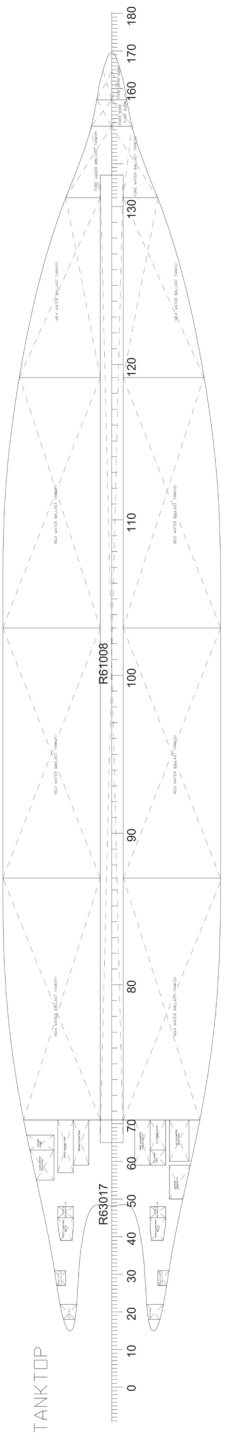
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110
120
130
160
170
180

WU TONG – Chemical/product tanker

Shipbuilder: .....**CSSC Wuchang Shipbuilding Industry Group Co., Ltd**
Vessel's name: ..... ***Wu Tong***
Owner/Operator: .....**Shanghai Gentco Logistics Co., Ltd**
Country: .....**China**
Designer: ..... **CSSC Shanghai Merchant Ship Design & Research Institute (SDARI)**
Country: .....**China**
Model test establishment used: ....**Shanghai Ship & Shipping Research Institute**
Flag: .....**China**
IMO number: **9889722**
Total number of sister ships already completed (excluding ship presented): **0**
Total number of sister ships still on order: **1**

Delivered in October 2021, *Wu Tong* is the latest generation of small size stainless steel chemical tanker developed by SDARI and built by Wuchang Shipbuilding Industry Group for Shanghai Gentco Logistics. The vessel is the first of a pair with its sister *Mu Mian* due for delivery in April 2022.

The 111.4m loa and 17.6m beam ship has a deadweight of 7,200tonnes. It has been designed to carry eight grades of product simultaneously in six pairs of tanks with No. 6 tank on port side doubling as a slop tank. For chemical cargoes the ship is restricted to types 2 and 3.

Each tank is fitted with a Framo submerged hydraulically driven centrifugal pump. Ten of the pumps have a capacity of 200m^3/h while two are smaller and rated at 120m^3/h. The tank heating systems use thermal oil as heat transfer medium allowing carriage of cargoes not permitted to be heated by water or steam. Additional PV valves are provided for much higher pressure setting during recirculating tank washing in harbour when using high volatile detergent to minimise emission as well as reducing the consumption of detergent and tank washing time.

The hull form is optimised for efficiency and manoeuvring with a vertical bow form without bulb. Power is provided by a six-cylinder Guangzhou Diesel Factory G32 medium-speed engine. Output of the engine is 2,665kW at 600rpm. The drive is through a CNG power gearbox to a 4.2m fixed pitch propeller with boss cap fin running at 176rpm. The daily fuel oil consumption is 9.95t/day at a service speed 13knots and 7.1m draught.

TECHNICAL PARTICULARS

Length oa: 111.40m
Length bp: 107.40m
Breadth moulded: 17.60m
Depth moulded: 9.50m
Draught
scantling: 7.10m
design: 7.10m
Gross:.....5,416t
Deadweight
scantling: 7,200t
Speed, service (--%MCR output): 13.0knots
Cargo capacity (m^3)
Liquid volume: 8,350
Bunkers (m^3)
Heavy oil: 280
Diesel oil: 100
Water ballast (m^3): 2,900
Tankers – percentage segregated ballast:...100%

Daily fuel consumption (tonnes/day)
Main engine only: 9.95

Classification society and notations: .....CCS

Propulsion
Main engine(s)
Design:.....GDF
Model: 6G32
Manufacturer: .....Guangzhou Diesel Engine Factory Co., Ltd
Number: 1
Type of fuel: .....HFO & MGO
Output of each engine: .....2,665kW x 600rpm
Is this a diesel-electric or hybrid?:.....N

Gearbox(es)
Make: ..... CN Gpower Gearbox Co., Ltd
Model: GWS6066
Number: 1
Output speed: 146.5rpm

Propeller(s)
Material: .....Ni-Al-Bronze(Cu3)
Designer/Manufacturer:..... CSSC Shanghai Merchant Ship Design & Research Institute (SDARI)
Number: 1
Fixed/Controllable pitch: .....FPP
Diameter: 4.2

Diesel-driven alternators
Number: 3
Engine make/type: .....Chongqing Cummins Engine Co., Ltd CCEC K19-DM
Type of fuel: .....MGO
Alternator make/type:.....CSIC Electrical Machinery Science & Technology Co., Ltd
Output/speed of each set: ..... 400kW x 1,800rpm

Boilers
Number: 2
Type: .....Auxiliary, Composite Boiler
Make: .....Sanjie Industry
Output, each boiler: ..... Auxiliary 8,000kg/h, Composite (Oil-fired /ME exh-side 1,000/800kg/h)

Deck machinery
Cargo cranes/cargo gear
Number: 1
Make: ..... Jiangyin Safety Sea Marine Equipment Co., Ltd
Type: .....Electric-hydraulic
Performance: 5t-14m
Other cranes
Number: 1
Make: ..... Jiangyin Safety Sea Marine Equipment Co., Ltd
Type: .....Electric
Tasks: ..... for Engine spare
Performance: 1.5t-4.5m

Mooring equipment
Number: 4
Make: .....Jiangsu Masada Heavy Industries Co., Ltd
Type: .....Hydraulic

Special lifesaving equipment
Number of each and capacity: 20p
Make: .....Wuxi Wenjiao F. R. R. P Factory
Type: .....Free-fall lifeboat

Cargo tanks
Number: 12
Grades of cargo carried: 8
Product range:.....Product oil (excluding asphalt, bitumen) and /or chemicals (ship type 2 and 3)
Stainless steel – structure/piping:.....205/316L
Cargo pumps
Number: 12
Type: .....Submerged centrifugal pumps, hydraulic motor driven
Make: .....Framo
Stainless steel: ..... 316L (Mo≥2.5%)
Capacity (each): .....10-200m^3/h x 110mLc, 2-120m^3/h x 110mLc
Cargo control system
Make:.....Framo
Type: ..... Framo cargo pumping system
Ballast control system
Make:.....API Marine
Type: .....hydraulic
Ballast water treatment system
Make:..... Ahead Ocean Technology (Dalian) Co., Ltd
Capacity: .....200m^3/h

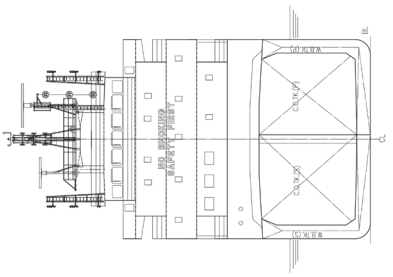
Complement
Officers: 10
Crew:.....8
Suez/Repair Crew: 6
Single/double/other rooms: 18/0/1

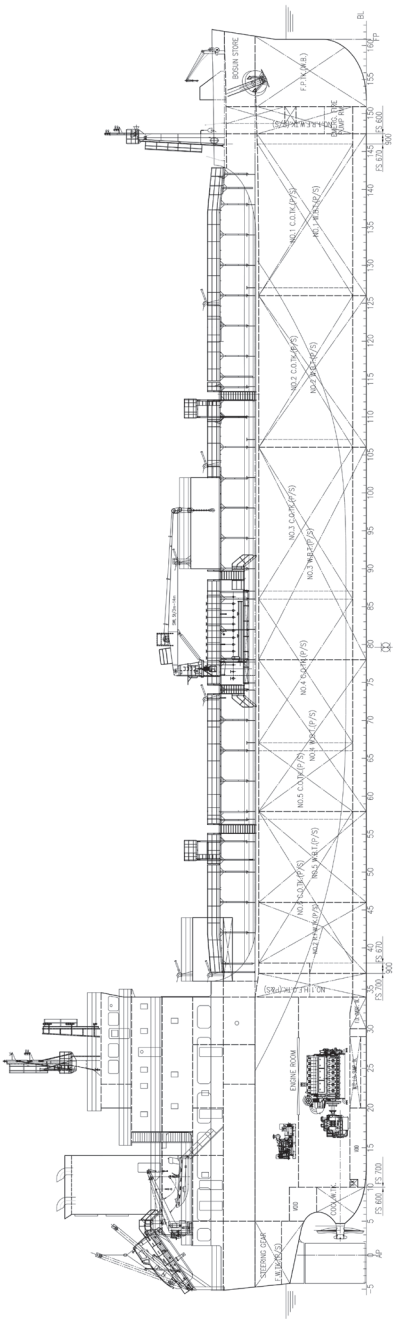
Navigation and other equipment
Is bridge fitted for one-man operation?: .....N
Integrated bridge system:.....N
Radars
Number: 2
Make: .....Furuno
Model(s): FAR-2328/FAR-2338S

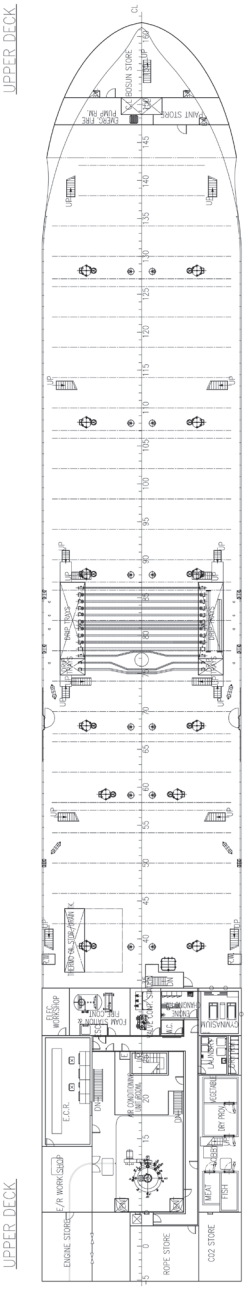
Fire detection system
Make: .....Brightsky
Fire extinguishing systems
Cargo holds:.....Deck area, deck foam fire fighting system, and sea water
Make/Type:.....Shanghai Anhang Maritime Firefighting Equipment, Co., Ltd / Deck foam
Engine room: .....CO_2 / Local Mist Spray
Make/Type: .....Shanghai Anhang Maritime Firefighting equipment, Co., Ltd
Cabins: .....Sea water
Public spaces: .....Sea water
Waste disposal plant
Incinerator
Make: .....Hansun (Shanghai) Marine Technology Co., Ltd
Model: HSINC-18
Sewage plant
Make:.....Wuhan Zhongzhou Env. Protection Equipment Co., Ltd
Model: WCBx-20C

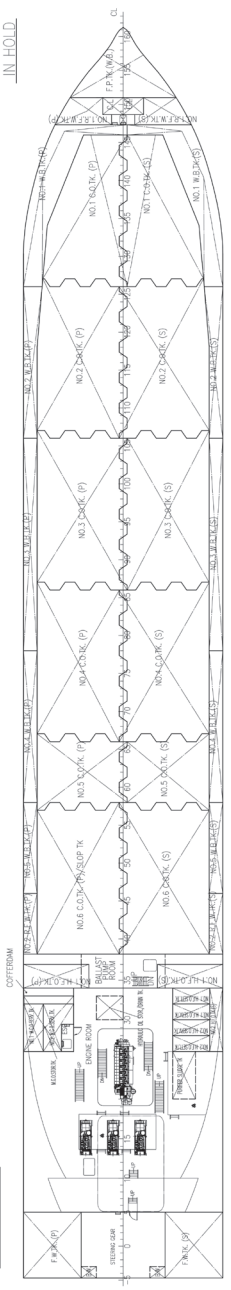
Contract date: .....November 2018
Launch/float-out date: .....May 2021
Delivery date: .....October 2021

WU TONG









XIANG AN KOU – Heavy lift vessel

Shipbuilder: ..... **CSSC Guangzhou Shipyard International Co. Ltd**
Vessel's name: ..... ***Xiang An Kou***
Owner/Operator: .... **COSCO (HK) Investment & Development Co., Ltd**
Country: ..... **China**
Designer: . **Shanghai Merchant Ship Design & Research Institute, CSSC (SDARI)**
Country: ..... **China**
Model test establishment used: .... **Shanghai Ship & Shipping Research Institute**
Flag: ..... **Liberia**
IMO number: **9888089**
Total number of sister ships already completed (excluding ship presented): **0**
Total number of sister ships still on order: **0**

Xiang An Kou is a 48,500dwt semi-submersible heavy lift vessel tailor-made for Chinese Owner COSCO (HK) Investment & Development and delivered in May 2021. The vessel was built by CSSC Guangzhou Shipyard and although a one off is a development of three earlier vessels in the owner's X-Class.

While the hull dimensions of 216.7m length and 43m beam are the same as the older vessels, and all four share the same configuration of forward superstructure and aft casings, *Xiang An Kou* can be distinguished by its vertical bow and lack of a bulb. The vessel also has a different propulsion system and is more powerful than its elder siblings.

It is designed as a twin screw, diesel-electric with four MAN 8L32/40 powered gensets each producing 3,860kW at 720rpm. The SCR NOx emission treatment system on the four main engines and auxiliary generators ensure compliance with the Tier III emission limit. The ship's twin fixed pitch propellers are each driven at a maximum 94.8rpm by Siemens 6,000kW electric motor through reduction gearboxes. *Xiang An Kou* has two bow thrusters and two stern thrusters with DP2 dynamic positioning capability.

The open deck has a length of 164.8m from the superstructure to the front of the aft casings and 177.6m from superstructure to the stern between the casings. The ballasting system comprises four 6,600m^3/hr air compressors, two 1,200m^3/hr pumps, and two 160m^3/hr pumps. No less than 61 ballast tanks, including top tanks, double bottom tanks, centre tanks and side tanks enable the vessel to better control motions and accelerations. The ship can ballast down to have 13m of water above the main deck.

Xiang An Kou can carry a non-buoyant cargo of 20,000tonnes with a VCG OF 23m above the ship's main deck or a buoyant cargo of 30,000tonnes and a VCG of 25m above the ship's main deck.

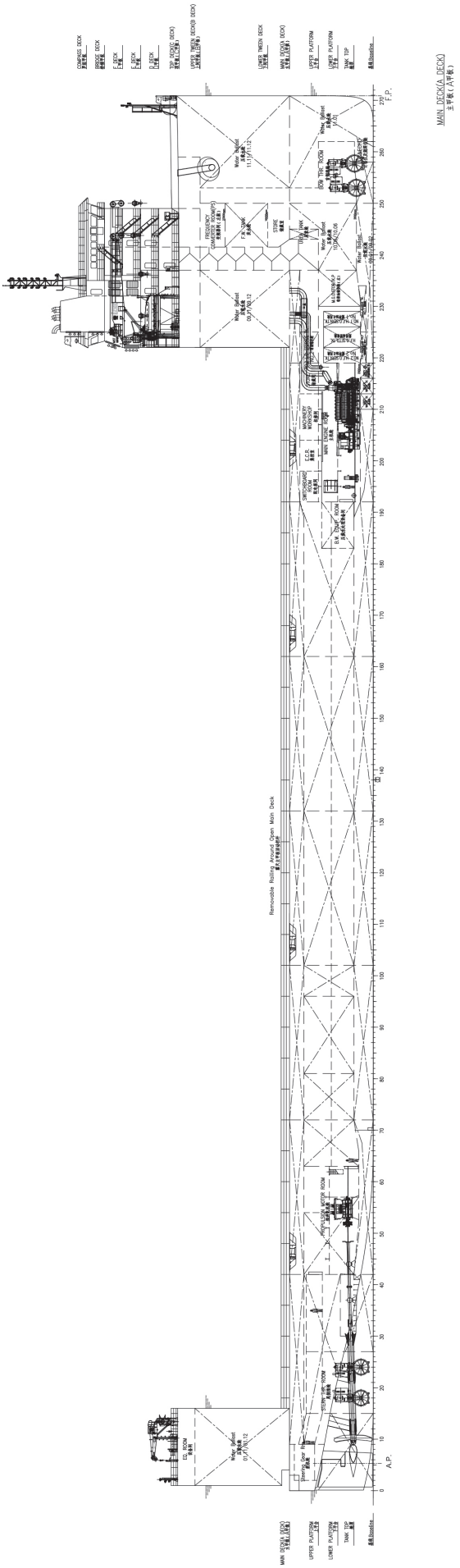
TECHNICAL PARTICULARS

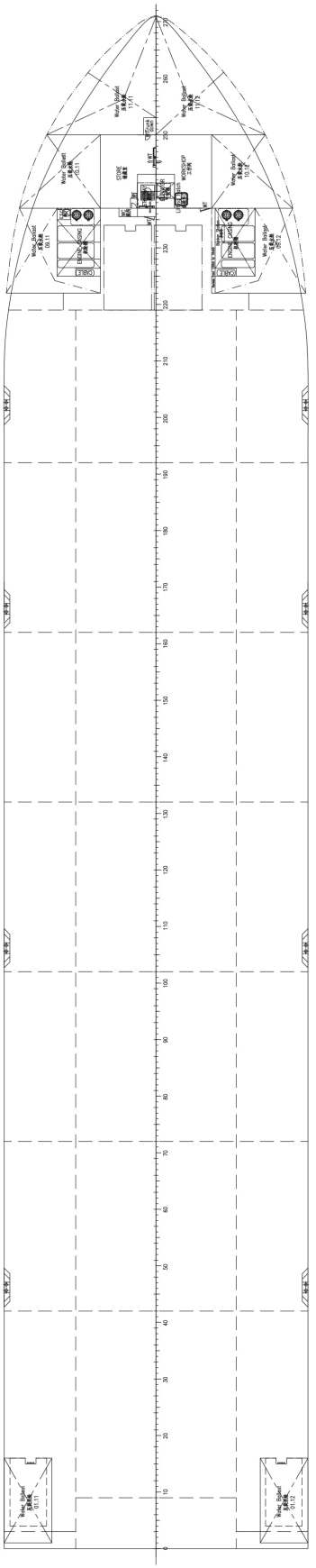
Length oa: 216.70m
Length bp: 212.46m
Breadth moulded: 43.00m
Depth moulded
to main deck: 13.00m
to upper deck: 13.00m
Draught
scantling: 9.60m
design: 9.60m
Gross: 38,935t
Deadweight
scantling: 48,500t
design: 48,500t
Speed, service: 14.5knots
Bunkers (m^3)
Heavy oil: 4,750
Diesel oil: 360
Water ballast (m^3): 93,500
Classification society and notations: ..... CCS ★ CSA Semi-Submersible Vessel; ERS; PSPC(B); Ice Class B; BWMP; Loading Computer(S,I); In-Water Survey ★ CSM AUT-0; SCM; GPR(EU); Green Ship I; NEC(III); BWMS; FTP;PR-2
Propulsion
Propulsion Motor(s)
Design: ..... Siemens
Manufacturer: ..... Siemens
Number: 2
Output of each engine: 6,000kW
Is this a diesel-electric or hybrid?: ..... Y
Gearbox(es)
Make: ..... Nanjing High Accurate Marine Equipment Co., Ltd
Number: 2
Output speed: 94.8rpm
Propeller(s)
Material: ..... Ni-Al-Bronze
Designer/Manufacturer: ..... Shanghai Merchant Ship Design & Research Institute, CSSC (SDARI)
Number: 2
Fixed/Controllable pitch: ..... FPP
Diameter: 6,000mm
Speed: 74.8rpm
Diesel-driven alternators
Number: 4
Engine make/type: ..... Shaanxi Diesel Engine Heavy Industry Co., Ltd / MAN 8L32/40
Type of fuel: ..... HFO & MDO
Alternator make/type: TFJ4 906-3
Output/speed of each set: 3,860kW/720rpm
Boilers
Number: 5
Type: ..... 1x Oil Fired Thermal Oil heater/ 4 x Exhaust Gas heater
Make: ..... Göteborgs Energy Systems AB
Output, each boiler: ..... 1 × 1,600kW / 4 × 400kW
Stern appendages/special rudders: ..... semi-balanced rudders with rudder bulbs
Bow thruster(s)
Make: ..... SMMC
Number: 2
Output (each): 1,800kW
Stern thruster(s)
Make: ..... SMMC
Number: 2
Output (each): 1,500kW
Other cranes
Number: 2
Make: ..... Ningbo Kairong Ship Machinery Co., Ltd
Type: YB2-315M-4-H
Tasks: ..... Provision handling
Performance: ..... SWL 35t @ 21m
Mooring equipment
Number: 10
Make: ..... Jiangsu Masada Heavy Industries Co., Ltd
Type: ..... Hydraulic
Special lifesaving equipment
Number of each and capacity: ..... 50 person
Make: ..... Jiangsu Jiaoyan Marine Equipment Co., Ltd
Type: ..... Totally enclosed lifeboat and rescue boat
Ballast water treatment system
Make: ..... Headway Technology Co., Ltd
Capacity: ..... 1,200m^3/h
Complement
Crew: 37
Passengers
Total: 12
Number of cabins: 3

Navigation and other equipment
Bridge control system
Make: ..... COSCO Shipping Electronics (Guangzhou) Co., Ltd
Is bridge fitted for one-man operation? ..... N
Integrated bridge system: ..... N
Radars
Number: 2
Make: ..... Furuno
Model(s): FAR-2328,FAR-2338S
Fire detection system
Make: ..... Consilium
Type: ..... Salwico Cargo
Fire extinguishing systems
Engine room: ..... CO_2
Waste disposal plant
Incinerator
Make: ..... Hansun
Model: HSINC-50A
Efficiency
Installed Fuel Meters: ..... mass flow
Energy Saving Technologies: ..... rudder bulb

Contract date: ..... May 2019
Launch/float-out date: ..... December 2020
Delivery date: ..... May 2021

XIANG AN KOU


MAIN DECK(A DECK)
主甲板(A甲板)
Removable Railing Around Open Main Deck
F.P.
A.P.



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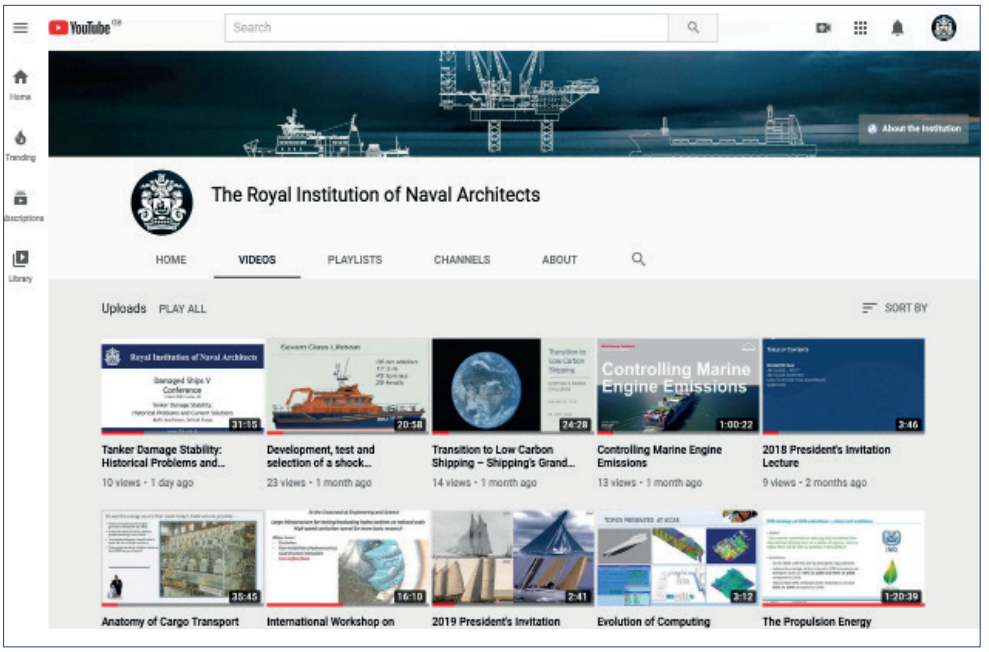

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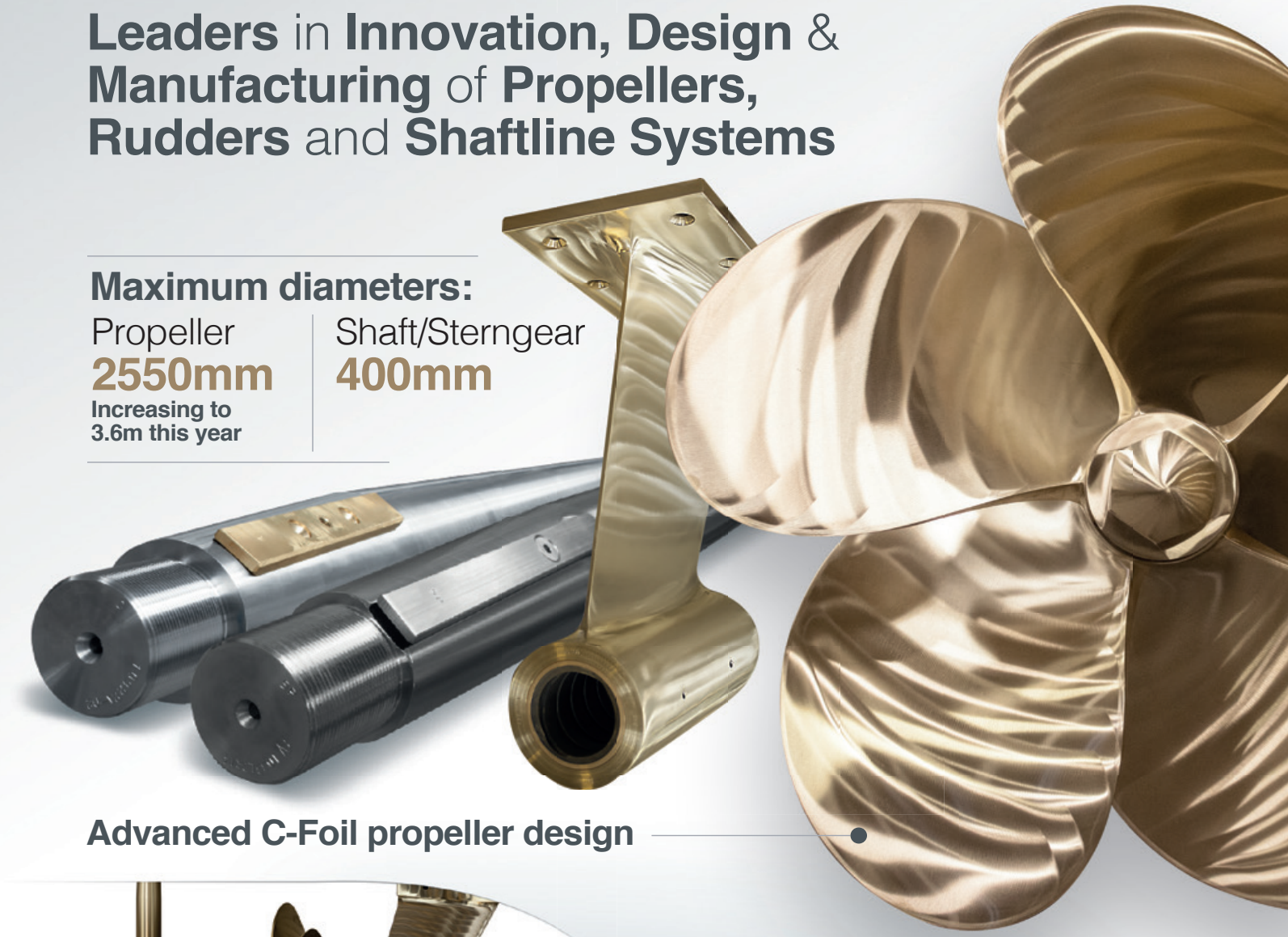

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