

**VESSEL PARTICULARS (FORM C)**  
**LPG/C ECO NEMESIS**  
**(Updated 25/09/2019)**

Specifications of the vessel and the gas installation which are representations by the Owners.

**(A) VESSEL'S CHARACTERISTICS**

**PREAMBLE**

Name : **LPG/C ECO NEMESIS**  
Owner : **SANTA BARBARA INC.**  
Flag : **Marshall Islands**  
Build : **Kitanihon Shipbuilding Co., Ltd., JAPAN**  
Date on Service :  
Class : **American Bureau of Shipping (ABS)**  
IMO Number : **9719525**  
GRT International : **4,748** Suez : **5,466 T**  
Panama : **4,748 T**  
NRT International : **1424** Suez : **4,302 T**  
Panama : **1,424 T**  
Is vessel build according to USCG regulations? : **Yes**  
Japanese regulation? : **Yes**  
Has vessel received USCG approval? : **tbc**

**HULL**

LOA : **99.98 M**  
LBP : **95.50 M**  
Breadth(Moulded) : **17.80 M**  
Depth (Moulded) : **8.00 M**  
Summer Draft : **6.213 M** corresp. SDWT = abt. 5,200 T (TPC: 15.69 MTS)  
Freeboard (summer) : **1.824 M**  
Light Draft : **2.65 M**  
Full load displacement : **8451 T**  
Light displacement : **3250 T**  
Parallel Length perpendiculars : **23.2 mtrs**

Estimated draft with full cargo and full bunkers are as follows.

Product	Draft Fore' (m)	Draft Aft' (m)	Draft Mean (m)	Corresponding Deadweight (t)
<b>Propane (98%)</b>	<b>3.90 M</b>	<b>6.32 M</b>	<b>5.11 M</b>	<b>3524 Mtons</b>
<b>N-Butane (98%)</b>	<b>4.31 M</b>	<b>6.48 M</b>	<b>5.39 M</b>	<b>3961 Mtons</b>
<b>Butadiene (98%)</b>	<b>4.49 M</b>	<b>6.55 M</b>	<b>5.52 M</b>	<b>4157 Mtons</b>
<b>VCM (98%)</b>	<b>5.15 M</b>	<b>7.17 M</b>	<b>6.16 M</b>	<b>5173 Mtons</b>

**Propeller immersion** : In Condition which Ballast Water properly arranged.

Immersion (TPC) in Salt water :

At draft 4.01 m correspond. : 14.01 tons per centimetre (Ballast Condition)

At draft 5.11 m correspond. : 14.98 tons per centimetre (Propane load condition)

## COMMUNICATION EQUIPMENT

Call letter : 9V2511  
Radio Station normally watched : GMDSS  
Radio MF/HF NBDP : JRC JSS- 2250 / TO CONFIRM  
Radio MF/HFTEL/DSC : JRC JSS-2250 / MMSI TO CONFIRM  
VHF : JRC JHS-770S on CH.16/70  
Satellite Communication Inmarsat 'C' : JRC JUE-87 / TLX NR: 456470210  
TELEPHONE NR : +870773255762  
FAX NR : 870783231360  
EMAIL : [Econemesis@stealth.gr](mailto:Econemesis@stealth.gr)

## MACHINERY

**Main Engine x 1**  
Type and make : MAKITA CORPORATION, two cycle, single acting, cross head type diesel engine, B&W 5L35MC6.1  
Max. Power / RPM : 2850 KW / 185  
No of Cylinders : 5 Cylinder  
Cyl Bore x Stroke : 350mm x 1050mm  
Grade of fuel used : 380 CST

**Auxiliaries**  
Type and make (Electrical) : Yanmar Diesel Engine 6EY18ALW x 2 sets  
400 KW, 900 RPM, AC450V, 60HZ, 3 phase, 642A  
(Mechanical) : 619 PS (455 KW)  
Grade of fuel used : HFO, MDO, MGO  
No off : 2

**Emergency Gen**  
Maker : MITSUI ZOSEN MACH.  
Type : NT855D(M)  
No off : 1

**Bow Thruster**  
Type : KT-55B3  
Maker : KAWASAKI HEAVY IND., LTD.  
Capacity : 58 kN  
No off : 1

**Boiler**  
Type : GK-1628-800/400, Vertical water tube composite boiler  
Maker : MIURA CO., LTD.  
Evaporation : 800 kg/h  
Max Design Pressure : 0.7 MPa  
No off : 1  
Grade of Fuel used : Same as ME used heavy oil

**Exhaust Economiser** : N/A

<b>Air Compressors (Main)</b>	Type / Capacity	: YANMAR SC-10N 45 M3/H X 2.94 MPa
	No off	: 2
<b>Air Compressors (Emergency)</b>	Type	: YANMAR KSC3N 10.3 M3/H X 2.94 MPa
	No off	: 1 set
<b>Fuel Oil Purifier</b>	Type	: SJ-10A ( Maker : MITSUBISHI SELFJECTOR )
	No off	: 2 sets
	Capacity	: 1000 L/H at 380 CST / 50 deg. C
<b>Lub Oil Purifier</b>	Type	: SJ-10A ( Maker : MITSUBISHI SELFJECTOR )
	No off	: 1 unit
	Capacity	: 500 L/H (Cross H./Trunk P.)
<b>Evaporator</b>	Type	: ALFA LAVAL Model : JWP-16-C50
	Capacity	: 10 tons/day
<b>Fresh Water Sterilizer</b>	Type	: CEMCO CO., LTD., IDN6
	Capacity	: 26cc/min
<b>Fresh Water Mineraliser</b>	Type / Capacity	: NIL
<b>Waste Oil Incinerator (IMO MEPC 76 (40))</b>	Type	: BGW-30N ( Maker: MIURA CO. LTD )
	Capacity	: 20 kg/h
<b>Oily Water Separator</b>	Type	: TAIKO KIKAI, USH-10
	Capacity	: 1 m3/H
<b>Sewage Treatment plant</b>	Type	: SBH-25 ( Maker : TAIKO KIKAI ) Rated number of persons = 25 men / day unit
	Capacity	: Sewage BOD volume = 13.5 g / Man – Day Sewage volume – 60 L / Man – Day
<b>Hot Water Set (Calorifier unit)</b>	No off	: 1 set – type : CFL-1002 S (HARISON)
<b>Steering Gear</b>	Type	: Electro hydraulic steering gear , RV22-013-H
	Duty Capacity	: 130 kN-M
	Hydraulic pump unit	: 2 sets – type : Bent axis type axial piston pump

## SPEED

About 13.0 knots up to Beaufort scale 4 and max significant wave height of 1.25m

## CONSUMPTION/ DAY

Main Engine : IFO abt 10.0 MT/day

Auxiliary Engine: MGO abt 1.0 MT/day

In Port Discharging : MGO abt 2.1 MT/day

In Port Idle /Loading: MGO abt 1.0 MT/day

Use IGG : MGO abt 2.5 MT/day

Use of Boiler : MGO abt 0.75 MT/day

All figures are about, defined as +/- 5% on consumption and speed respectively.

Notes:

1. Speed and consumption figures at sea, are best estimated basis daily weather conditions are up to Beaufort scale 4 - max. significant wave height

1.25 m, without effect of sea currents or swell, and vessel en route under a steady course, with a net sea passage duration of at least 24 hrs.

2. Consumption figures at port, are subject to port movements, port and/or harbor, terminal requirements, for the safe maneuvering, approach, inland navigation, and port stay of the vessel throughout her call.

### Permanent bunker capacity (100%)

HFO	: 520 m3
Diesel	: 105 m3
Fresh Water	: 179 m3

## (B) CARGO INSTALLATIONS

1. Transportable products and respective quantities, calculated in accordance with IMO – maximum filling formula. (Tonnes)

	100% (CBM)	98% (CBM)		
NO.1 CARGO TANK	2509.655	2459.462		
NO.2 CARGO TANK	2509.339	2459.152		
T O T A L	5018.994	4918.614		
	MARVS (Barg)	Ref. Temp. (deg. C.)	Density at (Ref. Temp.)	Corresponding Quantity (MT)
Propane	17.65	45.0	0.459	2248
Propylene	17.65	45.0	0.470	2302
B/P Mixture (1)	17.65/12.75(3)	45.0	0.487	2386
I-Butane	17.65/12.75(3)	45.0	0.526	2576
N-Butane	17.65/12.75(3)	45.0	0.548	2684
Butylene	17.65/12.75(3)	45.0	0.565	2768
Butadiene	17.65/12.75(3)	45.0	0.588	2880
V.C.M.	17.65/12.75(3)	45.0	0.872	3740 (2)
Isoprene	17.65/12.75(3)	45.0	0.656	3214
Pentanes	17.65/12.75(3)	45.0	0.600	2940
Pentene	17.65/12.75(3)	45.0	0.611	2992

Note (1): Mixing ratio of B/P mixture : Butane 35 wt% and propane 65 wt%.

Note (2): Loading capacity of VCM cargo to be about 3,740 MT, subject to Bunkers & Fresh Water adjustments.

Note (3): In USCG request, Propylene, Propane and B/P Mixture are not to be carried with pressure more than 12.75 Barg @ 45 degree C.

## 2. Other transportable products **N/A**

	SPSV	Ref. Temp. (°C.)	Density at Ref. Temp.	Corresponding Quantity (MT)

\* Figures are varied in accordance with the mixing proportion of the components and are to be determined on the basis of the characteristics of main component having the highest vapour pressure in the mixing products.

## 3. TANKS

3.1	Design pressure (Vapour) – IGC	:	<b>1.765 MPa</b>
	- USCG	:	<b>1.275 MPa</b>
3.2	Valve setting	:	<b>1.765 / 1.275 MPa</b>
3.3	Maximum vacuum obtainable	:	<b>Atmospheric</b>
3.5	Maximum temperature acceptable	:	<b>45 °C</b>
3.6	Minimum temperature acceptable	:	<b>-10 °C</b>
3.7	Hydrostatic Test Pressure	:	<b>2.648 MPa</b>

## 4. LOADING RATE (TONS/HOUR) – For Full Cargo Parcels

Ex-atmospheric storage with gas	:	1 tank	:	<b>450 m<sup>3</sup> / h (LPG), 320 m<sup>3</sup> / h (VCM)</b>
Return	:	2 tanks	:	<b>790 m<sup>3</sup> / h (LPG), 570 m<sup>3</sup> / h (VCM)</b>

Remarks:

\* Calculated based on 5.5m/sec. in velocity head at 150A of inlet pipe., 200A Manifold liquid line.

Except VCM, and 4.0 meters/sec for VCM in the liquid piping.

\* If cargo temperature is less than -10 °C, shore heater to be used. If ship cargo heater used, max rate is **250 m<sup>3</sup> /h.**

Inlet design temp. -48deg.C, outlet design temp. -10 °C.

## 5. CARGO PUMPS

5.1	Type	:	<b>Vertical multistage centrifugal Deep well</b>
	Make	:	<b>WARTSILA SVANEHOJ A/S</b>
	How many	:	<b>1 Set / Each Tank</b>
	Maximum specific gravity	:	<b>-10C, 0.965 VCM, 0.610 LPG</b>
5.2	Capacity (CMB/Hour)	:	<b>300m<sup>3</sup>/h (for LPG), 250m<sup>3</sup>/h (for VCM)</b>
	Two speed or variable speed	:	<b>FIXED SPEED @ 1780 rpm</b>
	Rated kW (each)	:	<b>130 KW</b>
	Working pressure maximum	:	<b>2.12 MPa g</b>
5.3	Location	:	<b>On the Cargo Tank</b>
	Removable	:	<b>Not removable</b>
5.4	Booster pumps	:	
	Type	:	<b>Horizontal, 1 Stage</b>
	Maker	:	<b>WARTSILA SVANEHOJ A/S</b>

- 5.5 Capacity (CMB/Hour) : **300 m<sup>3</sup>/h (for LPG), 200 m<sup>3</sup> / h (for VCM)**  
 Working pressure : **Discharge pressure Max 2.4 MPa**
- 5.6 Location : **On Upper Deck near Manifold**
- 5.7 Time to discharge a full liquid cargo using all pumps against back pressure at pump  
 1 bar : **about hours for LPG : 18 Hrs**  
 3 bars : **about hours for LPG : 24 Hrs**  
 Time will vary depending on shore tank condition
- 5.8 Nominal back pressure when working : **about 1 bar**  
 In series corresponding head : **N/A**  
 Maximum back pressure : **about 5 bar**  
 Nominal pressure at rail (propane) : **about 13 bar at 20 degree C of cargo temperature**
- 5.9 What amount of cargo remains in tanks after completion pumping before stripping:  
 - liquid : **about per one tank : 1.5 m<sup>3</sup>**  
 - vapour : **about per one tank : 30 ton**

## 6. STRIPPING

- 6.1 Stripping system, if any : **Not equipped**
- 6.2 Time required to remove all traces of liquid cargo as stated in 5.9 for:  
 - LPG : **about 3 hours**

## 7. CARGO COMPRESSORS

- 7.1 Type : **Vertical single stage double action fresh water cooled, oil less compressor  
LPGOS-97A**  
 Make : **Tanabe Pneumatic Machinery Co. Ltd.**  
 How many : **2 set**  
 Piston displacement : **460 m<sup>3</sup> / H**  
 Rated Kw : **75 kw**  
 Stroke : **177.8mm**  
 Max discharge pressure : **2 MPa g**  
 Pressure differential(Suction pressure) : **0.4 MPa at double action, 0.7 MPa at single action**  
 No of Revolutions : **540 rpm**
- 7.2 Are compressors oil free : **Yes**
- 7.3 Can they reliquefy VCM without risk : **N/A**
- 7.4 State time to bring full cargo of butane to atmospheric pressure from : **N/A**

## 8. N2 SYSTEM

- 8.1 Does the vessel use N2? : **Kashiwa**  
 If so, state utilization and quantities : **250 NM<sup>3</sup>/H @ 99.9%  
340 NM<sup>3</sup>/h @ 99.0%**
- 8.2 Can the vessel produce N2 gas? : **Yes**  
 If so, state type and composition of gas produce:
- Discharge pressure : **0.4MPa**
- 8.3 Maximum production obtainable :

NOTE:- Above quantities obtained at engine room temperature 45° C

- 8.4 State if there are storage facilities for inert gas onboard: **N/A**  
- Size : **N/A**  
- Pressure : **N/A**
- 8.5 State if any shore supply of nitrogen may be required: : **N/A**  
- for what purpose : **N/A**  
- what quantities : **N/A**

## 9. GAS FREEING

- 9.1 State method used giving all details : **Blow off remaining cargo vapour in cargo tank by N2 and thereafter gas free by dry air.**
- 9.2 State time required including stripping : **About 5-6days**

## 10. CHANGING GRADE

- 10.1 From completion discharge of cargo Propane, time required in hours and N2 in CBM required to reach a tank and gas installation atmosphere of less than 100 ppm of Propane in Vapour phase.  
**Time required: About 5 days (Base on 185m<sup>3</sup>/h of N2 capacity)**
- 10.2 Can this operation be carried out at sea? : **Yes**
- 10.3 Can the ship measure the number of ppm in vapour phase? : **Yes**
- 10.4 Has vessel deck tank for changing grade/cooling operations? : **No**
- 10.5 Deck tanks : **NIL**  
Capacity :  
Purpose :

11. **COOLING BEFORE LOADING** : **Not required**

## 12. CARGO HEATER

- 12.1 Type : **Horizontal Shell and Tube**
- 12.2 Inside Diameter : **700 mm**
- 12.3 Overall length : **5500 mm**
- 12.4 Cargo flow rate : **250 m<sup>3</sup>/H**
- 12.5 Min Inlet Temp : **-48 degrees C**
- 12.6 Min Outlet Temp : **-10 degrees C**
- 12.7 Required Sea water Capacity : **450 m<sup>3</sup>/H**
- 12.8 Design Pressure : **2 MPa g (cargo side), 0.5 MPa g (sea water side)**
- 12.9 Hydrostatic Test Pressure : **3.0 MPa g**
- 12.10 Tightness Test Pressure : **2.0 MPa g**

- 12.0 State discharging rate for propane to be brought from atmospheric pressure **NA**  
Loading rate for Propane – ° C / 0° C: M3/hr 250M3/Hr (Propane) -48C up to -10C Loading via cargo heater.

## 13. CARGO VAPORIZER

In case vapour gas is needed to feed compressors, can vessel produce its own if no shore available: No

## 14. REFRIGERATING APPARATUS **NA**

- 14.1 Is it independent of cargo? : **NA**

Is so, state cooling agents : **NA**

14.2 What minimum temperature can be maintained : **NA**

14.3 What time required at sea to lower by 1°C the full cargo of : **NA**

## 15. MEASURING APPARATUS

What gauges on board?

Type : **Float type level gauge**

Location : **2sets each cargo tank at tank dome**

## 16. SAMPLES

16.1 State how tank atmosphere samples can be taken and where from? From Slip tube and from drain line

: **Top**

: **Middle**

**Bottom**

Standard of fitting? : **ISO PF1/2**

16.2 Same question for cargo : **Closed loop sampling**

16.3 Are sample bottles available on board? : **No**

## 17. CARGO LINES

17.1 Is ship fitted with a port and starboard cargo manifold? : **Yes**

17.2 Position of cargo manifold

- distance from bow : **43.75 M**

- distance from Aft : **51.25 M**

- height above deck : **1.72 M**

- distance from ship's rail : **2.24 M**

- underside keel to manifold : **8.76 M**

- height above grating to center of manifold : **0.9X M (not fixed the height of cargo spill tank)**

17.3 Liquid line - diameter : **200 mm (OD)**  
- flange-size : **8 inches ANSI 300 lbs**  
- type : **Rise face ( RF)**

Gas line - : **125 mm (OD)**  
- flange-size : **5 inches ANSI 300 lbs**  
- type : **Rise face ANSI 300 lbs**

17.4 What reducers on board? : **ANSI 300 lb – 10"x8", 6"x8", 5"x8", 4"x8" 3"x8",  
ANSI 150 lb – 8"x8", 6"x8", 4"x8"  
JIS 20K – 8"x8", 6"x8", 4"x8"**

**For Vapor line (normal temp.) : ANSI 300 lb – 4"x 5", 3"x5", 2"x5"**

**ANSI 150 lb – 6"x5", 5"x5", 3"x5", 2"x5"**

**JIS 20K - 5"x5", 4"x5"**

17.5 Is ship fitted with stern discharge? **No**

- Liquid line - diameter : **N/A**

- flange – size : **N/A**

- type : **N/A**



## 18. HOSES

Are serviceable hoses available on board? : **None**

18.1 Two pieces, each : **N/A**  
Length : **N/A**  
Diameter : **N/A**  
Flange-size : **N/A**  
Type : **N/A**  
Bending radius : **N/A**

18.2 Minimum temperature acceptable : **N/A**  
Maximum pressure acceptable : **N/A**

18.3 For what products are hoses suitable? : **N/A**

## 19. DERRICKS

- Hose cranes : **Electric – Hydraulic**  
- Where situated : **Cargo manifold**  
- Lifting capacity : **5.0Ton at max distance from ship's side : 5.3 meter**  
- Working radius : **360 degrees**

## 20. SPECIAL FACILITIES

20.1 How many grades can be segregated? : **1 (one)**  
20.2 How many cooled? : **N/A**  
20.3 Can vessel sail with slack cargo tanks? : **Yes**