

VESSEL PARTICULARS (FORM C)
LPG/C GAS ELIXIR
(Updated 25/09/2019)

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

(A) VESSEL'S CHARACTERISTICS

PREAMBLE

Name : **GAS ELIXIR**
 Owner : **RISING SUN INC.**
 Flag : **LIBERIA**
 Build : **Kanrei Shipbuilding Co. Ltd., Japan**
 Date on Service : **FEB. 28, 2011**
 Class : **AMERICAN BUREAU OF SHIPPING (ABS)**

GRT International	:	4,312 ton	Suez	:	4986.64 ton
			Panama	:	15,203.111 m³
NRT International	:	1,381 ton	Suez	:	4016.51 ton
			Panama	:	3682.35 ton

Is vessel build according to	USCG regulations?	:	Yes
	RINA regulations?	:	N/A
	Japanese regulation?	:	JIS

Has vessel received	USCG approval?	:	YES (for foreign vessel in US water)
	RINA approval?	:	N/A

HULL

LOA : **99.90 M**
 LBP : **93.50 M**
 Breadth : **17.60 M**
 Depth : **8.00 M**
 Summer Draft : **5.825 M corresponding to Summer DWT = 4,499.00 t**

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

Product	Draft Fore' (m)	Draft Aft' (m)	Draft Mean (m)	Corresponding Deadweight (t)
Propane (98%)	4.37	5.92	5.15	3,539.29
Butadiene (98%)	4.84	6.21	5.52	4,084.15
VCM (98%)	5.62	6.68	6.15	5,000.35

Propeller immersion :

At draft	At	5.92 m correspond.	:	106.67%
At draft	At	6.21 m correspond.	:	115.45%
At draft	At	6.68 m correspond.	:	129.70%

COMMUNICATION EQUIPMENT

Call letter		:	A8YP8
Radio Station normally watched		:	GMDSS
Radio MF/HF NBDP		:	FURUNO FS-5070
Radio MF/HFTEL/DSC		:	FURUNO FS-5070
VHF		:	FURUNO FM-8800D x 2 SETS
Satellite Communication	Inmarsat 'C'	:	463712695
	Inmarsat 'F'	:	(Voice1) +870773257470
		:	(Fax) +870783239221
		:	(E-mail) gaselixir@stealth.gr

MACHINERY

Main Engine x 1	Type and make	:	MAKITA CORPORATION 5L35MC
	Service power	:	2,925 Kw (3,977 ps) x 203 rpm (90%MCR)
	No of Cylinders	:	5
	Cyl Bore x Stroke	:	350 mm x 1050 mm
	Grade of fuel used	:	HFO having a viscosity of not more than 380cst @ 50°C
Auxiliaries	Type and make (Electrical)	:	Yanmar (6NY16L-SN) - A.C. drip proof, self-ventilated 360 Kw x 445V x 3 phase x 60 Hz
	(Mechanical)	:	4 stroke x 400 Kw x 1,200 rpm
	Grade of fuel used	:	Diesel Oil - 6 Cst at 40°C / Marine Gas Oil -1.8 cst
	No off	:	2
Emergency Gen	Type	:	Deutz (F5L912) - 50Kw, AC 450V, 3 phase, 60 Hz
	No off	:	1
Fire & Bilge pump	Type	:	Taiko Kikai Industries Co, Ltd (EMSE-150MD) Vert. Elect. M. Driven Centrifugal Mechanical seal
	No off	:	1
	Capacity	:	190/80 m³ /hr at 20 / 75 m
Fire & GS pump	Type	:	Taiko Kikai Industries Co, Ltd (EMSE-150MD) Vert. Elect. M. Driven Centrifugal Mechanical seal
	No off	:	1
	Capacity	:	190/80 m³ /hr at 20 / 75 m
Boiler	Type	:	Miura Z Boiler (VWH-600E) Fully automatic water-tube boiler of natural circulating type
	Evaporation	:	538 Kg/Hr
	Max Design Pressure	:	0.7 Mpa Saturated
	Feed Water Temp	:	60°C
	No off	:	1

Exhaust Economiser	Type	: Miura (KF-91F)
	Evaporation	: 400Kg/Hr actual @ continous service output of main engine
	No off	: 1
Air Compressors (Main)	Type / Capacity	: Matsubara (MH-108) - Vertical, EMD driven, 2-stage, F.W cooled type / 45.0 m³ / Hr
	No off	: 2
Air Compressors (Emergency)	Type	: Sanwa Iron(GS2AR) - Horizontal, ENG driven, 2-stage, air cooled type 6.0 m³ / Hr
	No off	: 1
Fuel Oil Purifier	Type	: Mitsubishi SJ20G - Centrifugal
	No off	: 2
	Capacity	: 800 Ltrs / Hr at 98°C
Lub Oil Purifier	Type	: Mitsubishi SJ10G - Centrifugal
	No off	: 1
	Capacity	: 800 Ltrs / Hr at 90°C
Evaporator	Type	: Miura Co., Ltd (WM-10DK) – Waste heat recovery
	Capacity	: 1 x 10 t/day
Fresh Water Sterilizer	Type	: Uzushio Electric Co., Ltd (USS-2K) – Electric Ultra Violet lamp with filter
	Capacity	: 1 x2,000 litre/h
Fresh Water Mineraliser	Type / Capacity	: 1 x 1000 litre/h / Nippon Controls Co Ltd (RF-1000S1) – Vertical. Welded stainless steel
Waste Oil Incinerator (IMO MEPC 76 (40))	Type	: Miura Co Ltd (BGW-20N - Horizontal air atomizing type with aux burner
	Capacity	: Oil @ 24.3 lit/h & Solids @ 20 Kg/h
Oily Water Separator	Type	: Taiko Kikai Industries Co, Ltd (USH-10) – automatic oil discharge type
	Capacity	: 1 x 1.0 m3/h
Sewage Treatment plant	Type	: Taiko Kikai Industries Co, Ltd (SBH-25) Activated sludge aeration (Biological) – USCG certified
	Capacity	: 1 x 25 persons per day
Hot Water Set (Calorifier unit)	No off	: Harison Co Ltd (CFT-400-E) 400L tank with 2 x 10Kw heaters (1 Stby) / 1 set
Steering Gear	Type	: Electro-Hydraulic system with 2-pump units (dual system) – (one pump to be able to supply full power)
	Duty Capacity	: 18.5 t-m
	Hydraulic pump unit	: Electric motor driven, 2 x 5.5 Kw
Bow Thruster		Yes

SPEED

About 12.0 knots up to Beaufort scale 4 and max significant wave height of 1.25m

CONSUMPTION/ DAY

Main Engine : IFO abt 11.5 MT/day
Auxiliary Engine : MGO abt 1.0 MT/day
In Port Discharging : MGO abt 1.6 MT/day
In Port Idle / Loading : MGO abt 0.9 MT/day
Use IGG : MGO abt 1.5 MT/day
Use of Boiler : MGO abt 0.5 MT/day
Use of Reliq.Plant : MGO abt N/A 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 harbour, terminal requirements, for the safe manoeuvring, approach, inland navigation, and port stay of the vessel throughout her call.

Permanent bunker capacity (100%)

HFO : 467.44 m3
Diesel : 116.30 m3
Fresh Water: 212.38 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	2,507.988	2,457.828		
NO.2 CARGO TANK	2,508.225	2,458.060		
TOTAL	5,016.213	4,915.888		
	SPSV (bar g)	Ref. Temp. (deg. C.)	Density at (Ref. Temp.)	Corresponding Quantity (MT)
Propane	17.65	45.0	0.459	2,256
Propylene	17.65	45.0	0.470	2,310
B/P Mixture	17.65	45.0	0.487	2,394
I-Butane	17.65	45.0	0.526	2,585
N-Butane	17.65	45.0	0.548	2,693
Butylene	17.65	45.0	0.565	2,777
Butadiene	17.65	45.0	0.588	2,890
V.C.M.	17.65	45.0	0.872	4,286
Isoprene	17.65	45.0	0.656	3,224
Pentane	17.65	45.0	0.600	2,949
Pentene	17.65	45.0	0.611	3,003
B/P Mixtures	12.75	45.0	0.487	2,394
N-Butane	12.75	45.0	0.548	2,693
I-Butane	12.75	45.0	0.526	2,585
Butadiene	12.75	45.0	0.588	2,890
Butylene	12.75	45.0	0.565	2,777
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Pentane	12.75	45.0	0.600	2,949
Pentene	12.75	45.0	0.611	3,003

Note(1): In case of USCG, propylene, propane and B/P mixtures are not to be carried except the vapour pressure of B/P mixtures is not more than 12.75 bar g, 1.275 MPa g @ 45 °C

Note(2): On and after, the pressure value in parentheses is shown as a conversion value Mixing ratio of above mentioned B/P mixtures is as follows:

Butane 35 wt% and propane 65 wt%

2. Other transportable products N/A

	SPSV	Ref. Temp. (°C.)	Density at Ref. Temp.	Corresponding Quantity (MT)
Raffinate 1	TBA	TBA	TBA	TBA
Raffinate 2	TBA	TBA	TBA	TBA
C4	TBA	TBA	TBA	TBA

3. TANKS

- 3.1 Design pressure (Vapour) – BV-IGC : 17.65 bar g (1.765 MPa g)
- USCG : 12.75 bar g (1.275 MPa g)
- 3.2 Valve setting : 17.65 bar g (1.765 MPa g) /
12.75 bar g (1.275 MPa g)
- 3.3 Maximum vacuum obtainable : Atmospheric
- 3.5 Maximum temperature acceptable : 45 °C

- 3.6 Minimum temperature acceptable : **0 °C**
 3.7 Hydrostatic Test Pressure : **26.48 bar g (2.648 MPa g)**

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

- Ex-atmospheric storage with gas : 1 tank : **about 320 m³ per hour for LPG**
 : **about 250 m³ per hour for VCM**
 return : 2 tanks : **about 570 m³ per hour for LPG**
 : **about 450 m³ per hour for VCM**

Remarks:

- * Based on maximum velocity of 5.0 metres/sec except VCM, and 4.0 meters/sec for VCM in the liquid piping.
- * If cargo temperature is less than 0 °C, shore heater to be used. If ship heater used, max rate is **250 m³ per hour**.
- * Loading by shore pump only, proper size gas return line to be connected
- * Subject to both ship and shore tanks being under favourable conditions

5. CARGO PUMPS

- 5.1 Type : **Deepwell type of vertical centrifugal multistage design with inducer**
 Make How : **Hamworthy Svanehoj A/S**
 many : **1 set per tank (2 sets)**
 Maximum specific gravity : **0.601(LPG) / 0.948 (VCM)**
- 5.2 Capacity (CMB/Hour) : **300 m³/hr at 110 m (SG 0.601)**
 : **250 m³/hr at 132 m (SG 0.948)**
 Two speed or variable speed : **Single Speed**
 Rated kW (each) : **130 kW**
 Working pressure maximum : **20 bar g**
- 5.3 Location : **At each cargo tank**
 Removable : **Yes**
- 5.4 Booster : **N/A**
 pumps Type : **N/A**
 Maker : **N/A**
- 5.5 Capacity (CMB/Hour) : **N/A**
 Working pressure : **N/A**
- 5.6 Location : **N/A**
- 5.7 Time to discharge a full liquid cargo using all pumps against back pressure at pump
 1 bar : **about 19 hours for LPG**
 5 bars : **about 53 hours for LPG**
 10 bars : **-----**
- 5.8 Nominal back pressure when : **about 1 bar**
 working In series corresponding : **N/A**
 head 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 1.5 m³ per one tank**
- vapour : **about 40 ton per one tank for LPG**

NOTE: To reduce pressure by 1 bar/tank:- 3.8 hrs.

6. STRIPPING

- 6.1 Stripping system, if any : **Nil**
- 6.2 Time required to remove all traces of liquid cargo as stated in 5.9 for:
- LPG : **about 2 hours**

7. CARGO COMPRESSORS

- 7.1 Type : **Vertical water cooled 1 stage double acting**
 Make : **Tanabe pneumatic machinery Co Ltd**
 How many : **2 sets**
 Piston displacement : **460m³/h**
 Rated Kw : **75 kW**
 Stroke : **177.8 mm**
 Max discharge pressure : **20 bar g**
 Pressure differential : **4 bar**
 : **Max 7 bar 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. INERT GAS SYSTEM

- 8.1 Does the vessel use inert gas? : **Yes (N2)**
 If so, state utilization and quantities : **TBA**
- 8.2 Can the vessel produce inert gas? : **Yes (N2)**
 If so, state type and composition of gas produce:
Nitrogen: 99 % to 99.95% : **Capacity (discharge) @ 99.00% N2 is 280 Nm³/h**
 : **Capacity (discharge) @ 99.90% N2 is 180 Nm³/h**
 : **Capacity (discharge) @ 99.95% N2 is 140 Nm³/h**
- Oxygen: 1.0 % to 0.05%**
 Discharge Capacity : **TBA**
- 8.3 Maximum production obtainable : **TBA**

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 : **Nitrogen Plant / Fans**
9.2 State time required including stripping : **TBA**

10. CHANGING GRADE

- 10.1 From completion discharge of cargo Propane, time required in hours and inert gas in CBM required to reach a tank and gas installation atmosphere of less than 100 ppm of Propane in Vapour phase.
Time required: About 3.5 days
- 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 :

12. CARGO HEATER

- 12.1 Type : **Shell and Tube**
12.2 Inside Diameter **600 mm**
12.3 Overall length **5600 mm**
12.4 Cargo flow rate **250 m3/h (Propane)**
12.5 Min Inlet Temp **-48 °C**
12.6 Min Outlet Temp **0 °C**
12.7 Required Sea water Capacity **450 m3/h (Min 16°C)**
12.8 Design Pressure **25 bar g**
12.9 Hydrostatic Test Pressure **37.5 bar g**
12.10 Tightness Test Pressure **19.8 bar g with cargo piping**

- 12.0 State discharging rate for propane to be brought from atmospheric pressure **NA**
Loading rate for Propane – **minus 42 ° C / 0° C: about 145 Mt/hr**

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 : **At each cargo tank dome**

16. SAMPLES

16.1 State how tank atmosphere samples can be taken and where from?

Sample points at tank bottom, mid and top

Standard of fitting? : **JIS PT1/4 thread**

16.2 Same question for cargo : **TBA Close sampling system**

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

17. CARGO LINES

Position of cargo manifold -
distance from stern (AP) -
distance from stem (FP) -
height above deck
- height above deck
- distance from ship's rail
- underside keel to manifold

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

17.2
: **50.85 m**
: **42.65 m**
: **1.072 m for Liquid manifold**
: **1.034 m for vapour manifold**
: **2.60 m**
: **9.133 m**

17.3 Liquid line

- flange-size : **8 in.**
- type : **ANSI300LB RF**

Gas line

- flange-size : **5 in.**
- type : **ANSI300LB RF**

17.4 What reducers on board? : **20 carbon steel pieces supplied**

For Liquid line (low temperature)

8" ANSI 300LB to

**10" ANSI 300LB, 6" ANSI 300LB, 5" ANSI 300LB
4" ANSI 300LB, 3" ANSI 300LB
8" ANSI 150LB, 6" ANSI 150LB, 4" ANSI 150LB
8" JIS20K, 6" JIS20K, 4" JIS20K**

For Vapor line (normal temp.)

5" ANSI 300LB to

**4" ANSI 300LB, 4" ANSI 150LB 3" ANSI 300LB,
2" ANSI 300LB,
6" ANSI 150LB, 5" ANSI 150LB, 3" ANSI 150LB
2" ANSI 150LB
5" JIS20K, 4" JIS20K**

17.5 Is ship fitted with stern discharge? **No**
- Liquid line - diameter : **N/A**
- flange – size : **N/A**
- type : **N/A**

Form 'C' – TBA

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18. HOSES

- Are serviceable hoses available on board? : **None**
- 18.1 Two pieces, each : **TBA - Owners**
Length : **TBA - Owners**
Diameter : **TBA - Owners**
Flange-size : **TBA - Owners**
Type : **TBA - Owners**
Bending radius : **TBA - Owners**
- 18.2 Minimum temperature acceptable : **TBA - Owners**
Maximum pressure acceptable : **TBA - Owners**
- 18.3 For what products are hoses suitable? : **TBA - Owners**

19. DERRICKS

- Hose cranes : **1 set**
- Where situated : **Mid-ship(center)**
- Lifting capacity : **4.0 tons @ 10m/min**
- Working radius : **15m**

20. SPECIAL FACILITIES

- 20.1 How many grades can be segregated? : **Single Grade**
- 20.2 How many cooled? : **N/A**
- 20.3 Can vessel sail with slack cargo tanks? : **Yes**