

VESSEL PARTICULARS (FORM C)

LPG/C GAS MONARCH

(Last updated: 4-1-2021)

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

(A) VESSEL'S CHARACTERISTICS PREAMBLE

Name : **GAS MONARCH**
Owner : **EMPIRE SPIRIT LTD**
Flag : **MARSHALL ISLANDS**
Build : **FUKUOKA SHIPBUILDING CO. LTD JAPAN**
Date on Service : **16TH JULY 1997**
Class : **LLOYDS REGISTER, 100A1, LIQUIFIED GAS CARRIER, SHIP TYPE 2 PG, LPG INDEPENDENT TANK TYPE C, MAX PRESSURE 18.0KG/CM2 AND MINIMUM TEMPERATURE ZERO DEGREES CENTIGRADE**

GT International : **4402 mt** Suez: **5062.76 mt**
Panama: **3758.00 mt**

NT International : **1321 mt** Suez: **4099.67 mt**
Panama: **3758.00 mt**

Is vessel built according to USCG Regulations: **YES**
RINA Regulations: **no**
Japanese regulations: **YES**

Has vessel received USCG approval: **NO**
RINA approval: **NO**

HULL

LOA : **99.00 M**
LBP : **92.90 M**
Breadth : **18.20 M**
Depth : **7.80 M**
Summer DWT : **3800 MT**
Summer Draft : **5.064 M**
IMO : **9151149**

OFFICIAL NR: **7565**

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%)	3.81	5.07	4.44	2933
Butadiene (98%)	4.25	5.19	4.72	3329
VCM (bss on ship's stability, summer deadweight & draft)	4.77	5.33	5.05	3796

Propeller immersion:

At draft 5.07 At m correspond : **98.30%**
At draft 5.19 At m correspond : **102.30%**
At draft 5.33 At m correspond : **106.80%**

COMMUNICATION EQUIPMENT

Call letter	: V7UY3
Radio Station normally watched	: Ch.16 and DSC Ch. 70
Radio MF/HF NBDP	: JRC, JSS 720
Radio MF/HFTEL/DSC	: JRC, NCU-247A
VHF	: JRC, JHS-32A
Satellite Communication Inmarsat 'C'	: 431179611
Phone	: +870-773256158
Email	: gasmonarch@brave.gr

MACHINERY

Main Engine x 1	Type and make Service power No. Of Cylinders Cyl Bore x Stroke Grade of fuel used	: MAKITA MITSUI MAN B+W 7526MC : 3242PS AT 237 RPM 2 Stroke single acting crosshead type direct reversible Marine diesel engine with exc. Turbocharger : 380cst
Auxiliaries	Type and make (Electrical) (Mechanical) Grade of fuel used No off	YANMAR 6LAAL-UTN 240KW/300KVA @ 1200RPM MDO 2
Emergency Generator	Type No off	F6L912/W, MITSUI-DEUTZ 1 x 60KVA/47KW
Bow Thruster	Type: Power:	N/A
Boiler	Type Evaporation Max Design Pressure Feed Water Temp No off	MKSC 14-600/350 OIL FIRED SIDE: 600 KG/HR 10.5 KG/CM2 60°C 1
Exhaust Economiser	Type Evaporation No off	
Air Compressors (Main)	Type / Capacity No off	VERTICAL 2 STAGE WATER-COOLED / 32.5 M3/HR MODEL: MS92-A 1
Air Compressors (Emergency)	Type / Capacity No off	
Fuel Oil Purifier	Type No off Capacity	MMPX304SGP-11-60, ALFA LAVAL 2
Lub Oil Purifier	Type No off Capacity	MMPX304SGP-11-60, ALFA LAVAL 1

Evaporator	Type Capacity	JWP-26-C80/100, ALFA LAVAL 6.0 T/Day
Fresh Water Sterilizer	Type	L-N10F
	Capacity	1000 L/H
Fresh Water Mineraliser	Type / Capacity	
Waster Oil Incinerator (IMO MEPC 76 (40))	Type	BGW-10
	Capacity	98,000 KCLA/H
Oily Water Separator	Type	HMS-100
	Capacity	1 M3/HR
Sewage Treatment plant	Type	SBT-25
	Capacity	1.0 m3
Hot Water Set (Calorifier unit)	No off	1
Steering Gear	Type	R21-140V TO
	Duty Capacity	19.6 Mpa / 200 kgf/cm2
	Hydraulic pump unit	KAWASAKI TYPE RV712-HS

SPEED in Ballast / Laden

Upto Beaufort scale 4 and max significant wave height of 1.25m (all details "about" defined as 0.5knot less and +/-5% consumption respectively)

- 1.Normal service speed : **About 11.5 KTS**
2.Eco speed (min RPM Blower will not start) : **About 10.5 KTS**

CONSUMPTION / DAY

1.NORMAL SERVICE SPEED	Ballast	Laden
Main Engine	HFO : About 9.0 MT	/ HFO About 9.5 MT
Auxiliary Engine	MGO : About 0.7 MT	/ MGO About 0.7 MT
2.ECO SPEED (min RPM Blower will not start)		
Main Engine	HFO : About 6.5 MT	/ HFO About 7.0 MT
Auxiliary Engine	MGO : About 0.7 MT	/ MGO About 0.7 MT
At Sea - with N2 Generator operation	: N/A	
In port - idle/Loading (including Boiler)	: HFO About 0.5 MT	/ MGO About 1.2 MT
In port - discharging with 2 cargo pumps	: HFO About 0.5 MT	/ MGO About 1.7 MT

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%)	10% expansion margin	HFO - ABT 408MTS bss SG 0.98	DO - ABT 126MTS basis SG 0.86
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Fresh Water	: 158.62 CBM
Sludge Tank Capacity	: 7.60 m³
Bildge Tank Capacity	: 7.08 m³
	3

(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	2508.440	2458.271		
NO.2 CARGO TANK	2509.909	2459.711		
TOTAL	5018.349	4917.982		
	SPSV (KG/CM2)	Ref. Temp. (deg.C)	Density (bss on interpolated value taken from cargo handling manual) at (Ref. Temp.)	Corresponding Quantity (MT - In Air)
Propane	17.65	45.0	0.4670	2296.70
Propylene	17.65	45.0	0.4694	2308.50
Butane/Propane Mixture	17.65	45.0	0.4924	2421.61
I-Butane	7.0	45.0	0.5233	2573.58
N-Butane	7.0	45.0	0.5491	2700.46
Butylene	7.0	45.0	0.5552	2730.46
Butadiene	7.0	45.0	0.5859	2881.45
V.C.M.	7.0	45.0	0.8608	3160**

*tanks weight limitation of 1700 mts per tank, subject to complying with criteria (ship stability, deadweight, etc.)

**VCM quantity according to cargo manual/loadicator allowance and basis maximum bunkers, fw and no ballast

Note(1): In case of USCG, propylene, propane and B/P mixtures are not to be carried except the vapor pressure of B/P mixtures is not more than 12.75 bar g, 13.0 kg/cm² @ 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 tranportable products N/A

	SPSV	Ref. Temp. (deg.C)	Density at (Ref.	Corresponding Quantity
Raffinate 1				
Raffinate 2				

3. TANKS

- 3.1 Design pressure (Vapour) - LR-IGC : 18.0KG/CM2
 - USCG :
- 3.2 Valve setting : 7.0/18.0KG/CM2
- 3.3 Maximum vacuum obtainable : Atmospheric
- 3.4 Maximum temperature acceptable : 45°C
- 3.5 Minimum temperature acceptable : 0°C
- 3.6 Hydrostatic Test Pressure : 20 bar g (2.648 Mpa)

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

- Ex-atmospheric storage with gas : 1 tank : 300 CBM/HR
 Return : 2 tanks : 600 CBM/HR

Remarks: SG AT 0 DEG C

* Based on maximum velocity of 6.5 meters/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.

* 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 PUMP - 4 STAGE ELECTRIC
Make : SHINKO IND. LTD
How many : 2 (1 EACH TANK)
Maximum specific gravity : 0.946 (VCM AT 0°C)
- 5.2 Capacity (CBM/Hour) : 300M3/HR AT 110 METERS WATER COLUMN AT BUTANE
250M3/HR AT 120 METERS WATER COLUMN AT VCM
- Two speed or variable speed : 120 KW
Rated kW (each)
Working pressure maximum : 22.0 kg/cm2
- 5.3 Location : Near aft end each tank by shore crane when gas free
- 5.4 Booster pumps : N/A
Type :
Maker :
- 5.5 Capacity (CBM/Hour) : N/A
Working pressure :
- 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 12.8 hours for LPG
5 bars : about 18.1 hours for LPG
10 bars : ----
- 5.8 Nominal back pressure when working : about 1 bar
In series corresponding head : N/A
Maximum back pressure : about 5 bars
Nominal pressure at rail (propane) : about 13 bar at 20 deg.C of cargo temperature
- 5.9 What amount of cargo remains in tanks after completion pumping before stripping:
- liquid : about 0.1 per one tank
- vapour : about 0.01 ton per one tank for LPG

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 0.2 hours

7. CARGO COMPRESSORS

- 7.1 Type : Vertical single stage, water cooled, double acting driven
by electric motor, oil free.
Make : TANABE PNEUMATIC MACHINERY CO. LTD
How many : 2
Piston displacement : 460 M3/HR
Rated Kw : 75 kw
Stroke : 177.8 mm
Max discharge pressure : 20 KG/CM2
Pressure differential : 7 KG/CM2
No of Revolutions : 540 RPM
- 7.2 Are compressors oil free : YES
7.3 Can they reliquefy VCM without risk : NO
7.4 State time to bring full cargo of butane
to atmospheric pressure from : N/A

8. INERT GAS SYSTEM

NONE

- 8.1 Does the vessel use inert gas ? : N/A
If so, state utilization and quantities :
- 8.2 Can the vessel produce inert gas ? : N/A
If so, state type and composition of gas produce
Discharge Capacity : N/A
- 8.3 Maximum production obtainable
- 8.4 NOTE: Above quantities obtained at engine room temperature 45°C 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 : After discharge of liquid cargo in tank, nitrogen to be pumped to the tank through vapor line. Mixed gas inside the tanks to be sent to the flare stack through liquid line, after gas freeing, gas analysis should be done through upper and lower sample points.
- 9.2 State time required including stripping : about 12 hours

10. CHANGING GRADE

- 10.1 Butadiene, Propylene and VCM all require shore nitrogen in tanks before loading, replacing either previous cargo, ship inert gas or air according to Charterers.
In case of Butadiene and VCM, the instruction given by the authorised person of the port should be followed. **Time required: about 48 hours**
- 10.2 Can this operation be carried out at sea ? : NO
- 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 : N/A

12. CARGO HEATER NONE

- 12.1 Type :
12.2 Inside Diameter :
12.3 Overall length :
12.4 Cargo flow rate :
12.5 Min inlet temp :
12.6 Min Outlet Temp :
12.7 Required Sea water capacity :
12.8 Design Pressure :
12.9 Hydrostatic Test pressure :
12.10 Tightness test pressure :
- 12.11 State discharging rate for propane to be brought from atmospheric pressure
Loading rate for Propane - °C / 0°C : **about 200 Mt/hr**

13. CARGO VAPORIZER

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

14. REFRIGERATING APPARATUS

14.1 Is it independent of cargo ? : N/A
If so, state cooling agents : N/A

14.2 What minimum temperature can be maintained : N/A

14.3 What time required at sea to lower by 1 C the full cargo of : N/A

15. MEASURING APPARATUS

What gauges on board ?

Type : Float type level gauge
Location : At each on cargo tank dome

16. SAMPLES

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

GAS SAMPLING IN TANK (VAPOR ZONE) CAN BE DONE BY OPENING THE 1/2 NEEDLE VALVE CONNECTED TO THE PRESSURE GAUGE NOZZLE ON THE TANK DOME.

Standard of fitting ? : YES 1/2 NEEDLE

16.2 Same question for cargo : TBA

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

- bow to manifold no.1 : 44.00 M
- bow to manifold no.2 : 46.50 M
- bow to mid-point manifold : 45.30 M
- stern to mid-point manifold : 53.70 M
- main deck to center of manifold : 0.90 M
- main deck to top of rail : 0.63 M
- manifold to ship's rail : 2.20 M
- cargo manifold to cargo manifold : 2.50 M
- cargo manifold to vapour manifold : 1.25 M
- distance from ship side : 2.40 M

17.3 Liquid line - flange-size : 6 Inch
- Type : 150 MM ANSI 300
Gas line - flange-size : 5 Inch
- Type : 125 MM ANSI 300

17.4 What reducers on board ?

For liquid line (low temperature) : 1 pc 6x8x300 / 2 pcs 6x5x300 / 2 pcs 6x4x300
1 pc 6x4x150

For vapour line (normal temperature) : 1 pc 5x6x150 / 1 pc 5x5x150 / 1 pc 5x4x150
1 pc 5x4x300 / 1 pc 5x3x150 / 1 pc 5x2x150
1 pc 5x3x300

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 Length :
Diameter :
Flange-size :
Type :
Bending radius :

18.2 Minimum temperature acceptable :
Maximum pressure acceptable :

18.3 For what products are hoses suitable :

19. DERRICKS

- Hose cranes : DAVIT ARM ONLY
- Where situated : NEAR MANIFOLD
- Lifting capacity : PORT 2.0 TONS / STBD 0.9TON
- Working radius : 2 METERS

20. SPECIAL FACILITIES

20.1 How many grades can be segregated : No segregation - only 2 grades can be carried

20.2 How many cooled : : N/A

20.3 Can vessel sail with slack cargo tanks : YES