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

(A) VESSEL’S CHARACTERISTICS

PREAMBLE

Name: LPG/C GAS EMPEROR (EX VEGA GAS)
Owner: EMPRESS ENTERPRISES LTD
Flag: MARSHALL ISLANDS
Build: Kitanihon Shipbuilding - JAPAN
Date on Service: 27 DEC. 1994
Class: BV + Liquid Gas Carrier Unrestricted Navigation
IMO Number: 9109316
GRT International: 5,087 T
NRT International: 1,527 T

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

Has vessel received
USCG approval?: N/A
RINA approval?: N/A

HULL

LOA: 105.0 M
LBP: 98.0 M
Breadth (Moulded): 19.8 M
Depth (Moulded): 8.6 M
Summer Draft: 6.014 M corresponding to Summer DWT = 5,599.44 T – TPC 11.60 MTS
Multiple Draft: M corresponding to Multiple DWT = N/A
Freeboard (summer): 2.624 M
Light Draft: 2.27 M
Full load displacement: 8514 T
Light displacement: 2914.67 T
Parallel Length: 46.5 mtrs @ 6.01 mtrs draft
: 32.0 mtrs @ 4.37 mtrs draft

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

<table>
<thead>
<tr>
<th>Product</th>
<th>Draft Fore’ (m)</th>
<th>Draft Aft’ (m)</th>
<th>Draft Mean (m)</th>
<th>Corresponding Deadweight (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propane (98%)</td>
<td>4.50 M</td>
<td>4.50 M</td>
<td>4.50 M</td>
<td>3266.83 tons</td>
</tr>
<tr>
<td>Butadiene (98%)</td>
<td>4.15 M</td>
<td>4.69 M</td>
<td>4.42 M</td>
<td>3728.40 tons</td>
</tr>
<tr>
<td>VCM (98%)</td>
<td>4.55 M</td>
<td>4.95 M</td>
<td>4.75 M</td>
<td>5589.79 tons</td>
</tr>
</tbody>
</table>

Propeller immersion:

At draft 3.95 m correspond. : 10.75 tons per centimeter
At draft 5.21 m correspond. : 11.60 tons per centimetre
**COMMUNICATION EQUIPMENT**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Call letter</td>
<td>V7UT2</td>
</tr>
<tr>
<td>Radio Station normally watched</td>
<td>IOR or POR</td>
</tr>
<tr>
<td>Radio MF/HF NBDP</td>
<td>538004021</td>
</tr>
<tr>
<td>Radio MF/HF TEL/DSC</td>
<td>MMSI 538004021</td>
</tr>
<tr>
<td>VHF</td>
<td>16/70</td>
</tr>
<tr>
<td>Satellite Communication</td>
<td>FURUNO FELCOM 15 – TLX NR: 453835333</td>
</tr>
<tr>
<td></td>
<td>FURUNO FELCOM 15 – TLX NR: 453835333</td>
</tr>
<tr>
<td>TELEPHONE NR</td>
<td>764838985 / 6</td>
</tr>
<tr>
<td>FAX NR</td>
<td>764838987</td>
</tr>
<tr>
<td>EMAIL</td>
<td><a href="mailto:gasemperor@stealth.gr">gasemperor@stealth.gr</a></td>
</tr>
</tbody>
</table>

**MACHINERY**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Engine x 1</td>
<td>Akasaka Diesel Ltd. 6UEC37LA, 2Cycle, Cross-Head</td>
</tr>
<tr>
<td></td>
<td>4200BHP @ 210RPM (MAXIMUM CONTINUOUS RATING)</td>
</tr>
<tr>
<td>No of Cylinders</td>
<td>6</td>
</tr>
<tr>
<td>Cyl Bore x Stroke</td>
<td>370mm X 880mm</td>
</tr>
<tr>
<td></td>
<td>380 CST</td>
</tr>
<tr>
<td></td>
<td>Yanmar Diesel Engine 165L-UN X 2 sets</td>
</tr>
<tr>
<td>(Electrical)</td>
<td>S 165L-UN x 400 KVA</td>
</tr>
<tr>
<td>(Mechanical)</td>
<td>RPM – 1200 = 480 PS</td>
</tr>
<tr>
<td>Grade of fuel used</td>
<td>Marine Gasoil DMA</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Maker</td>
<td>Mitsui Diesel Engine Co. Ltd.</td>
</tr>
<tr>
<td>Emergency Gen</td>
<td>F2L912 (24.5 PS) (10 KVA)</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Bow Thruster</td>
<td>N/A</td>
</tr>
<tr>
<td>Boiler</td>
<td>N/A (EGE)</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Exhaust Economiser</td>
<td>N/A</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Air Compressors</td>
<td>Maker – Yanmar Diesel Engine Co. Ltd.</td>
</tr>
<tr>
<td>(Main)</td>
<td>Type – SC 10 N – TK; Cap - (47 m3/h) (784 L/min)</td>
</tr>
<tr>
<td>No off</td>
<td>2</td>
</tr>
<tr>
<td>Air Compressors</td>
<td>Maker – Yanmar Diesel Engine Co. Ltd.</td>
</tr>
<tr>
<td>(Emergency)</td>
<td>Model – NC2 Emergency air compressor</td>
</tr>
<tr>
<td>No off</td>
<td>1 set</td>
</tr>
<tr>
<td>Fuel Oil Purifier</td>
<td>MOPX 205 Separator (Maker: ALFA LAVAL)</td>
</tr>
<tr>
<td>No off</td>
<td>2 sets</td>
</tr>
<tr>
<td>Capacity</td>
<td>1500 L / H at 98 deg. C for 380 CST / 50 deg. C</td>
</tr>
<tr>
<td>Lub Oil Purifier</td>
<td>RISO UNIT = MICRO separator 80K – 108 AW - X</td>
</tr>
<tr>
<td>No off</td>
<td>1 unit</td>
</tr>
</tbody>
</table>

Form ‘C’ – Gas Emperor
**Evaporator**
- Type: Fresh water generator (Maker: ALFA LAVAL)
- Model: JWP – 26 – C 80
- Capacity: 6 tons / 24 hrs

**Fresh Water Sterilizer**
- Type: N / A

**Fresh Water Mineraliser**
- Type / Capacity: Drinking chlorinator system
  - SCNP / 30 CC / Min

**Waste Oil Incinerator (IMO MEPC 76 (40))**
- Type: BGW – 10 (Maker: MIURA CO. LTD)
- Capacity: $9.8 \times 10^4$ KCAL/H

**Oily Water Separator**
- Type: USC – 10 (Maker: Taiko Kikai Industries Co. Ltd.)
- Capacity: 1 m³ / H

**Sewage Treatment plant**
- Type: SBT – 25 (Maker: Taiko Ship - Clean sewage treatment
  - Rated number of persons = 25 men / day unit
- Capacity:
  - Sewage BOD volume = 13.5 g / Man – Day
  - Sewage volume – 60 L / Man – Day

**Hot Water Set (Calorifier unit)**
- No off:
  - 1 set – type: CFT – 300 E
    - (Tank capacity = 300 Ltrs)
    - (Electric heater = 25 KW)

**Steering Gear**
- Type: TOKIMEC SP – W15 – 170 S
- Duty Capacity: 166.6 kN . m (17.0 t f . m )
- Hydraulic pump unit:
  - V20 – 2F6F- 1C11 – JA – S47
  - Electro-Hydraulic steering system

**Speed**
- Upto Beaufort scale 4, Douglas sea state 3
- About: 13.00 Knots @ CSR with 15% sea margin

**CONSUMPTION/ DAY**

<table>
<thead>
<tr>
<th>Engine Type</th>
<th>Fuel Type</th>
<th>At Sea</th>
<th>In Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Engine</td>
<td>HFO</td>
<td>About 12.0 Tons @ 85% Load (Loaded condition)</td>
<td>Nil</td>
</tr>
<tr>
<td></td>
<td></td>
<td>About 10.5 Tons @ 80% Load (Ballast condition)</td>
<td></td>
</tr>
<tr>
<td>Auxiliary Engine</td>
<td>MGO</td>
<td>1.2 MT</td>
<td>1.8 MT (With 2 GENS RUNNING)</td>
</tr>
</tbody>
</table>

**Permanent bunker capacity (100%)**
- HFO: 736.64 m³
- Diesel: 199.37 m³
- Fresh Water: 225.40 m³
## CARGO INSTALLATIONS

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

<table>
<thead>
<tr>
<th></th>
<th>100% (CBM)</th>
<th>98% (CBM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO.1 CARGO TANK</td>
<td>2502.42</td>
<td>2452.37</td>
</tr>
<tr>
<td>NO.2 CARGO TANK</td>
<td>2506.65</td>
<td>2456.52</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>5009.07</td>
<td>4908.89</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product</th>
<th>SPSV (bar g)</th>
<th>Ref. Temp. (deg. C.)</th>
<th>Density at Ref. Temp.</th>
<th>Corresponding Quantity (MT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propane</td>
<td>17.65</td>
<td>55.0</td>
<td>0.439</td>
<td>2.155</td>
</tr>
<tr>
<td>Propylene</td>
<td>17.65</td>
<td>46.0</td>
<td>0.468</td>
<td>2.297</td>
</tr>
<tr>
<td>B/P Mixture</td>
<td>17.65</td>
<td>90.0</td>
<td>0.451</td>
<td>2.214</td>
</tr>
<tr>
<td>I-Butane</td>
<td>17.65</td>
<td>51.0</td>
<td>0.515</td>
<td>2.528</td>
</tr>
<tr>
<td>N-Butane</td>
<td>17.65</td>
<td>64.0</td>
<td>0.525</td>
<td>2.577</td>
</tr>
<tr>
<td>Butylene</td>
<td>17.65</td>
<td>57.0</td>
<td>0.544</td>
<td>2.670</td>
</tr>
<tr>
<td>Butadiene</td>
<td>17.65</td>
<td>60.0</td>
<td>0.567</td>
<td>2.783</td>
</tr>
<tr>
<td>V.C.M.</td>
<td>17.65</td>
<td>46.0</td>
<td>0.870</td>
<td>4.270</td>
</tr>
<tr>
<td>Isoprene</td>
<td>17.65</td>
<td>109.0</td>
<td>0.574</td>
<td>2.818</td>
</tr>
</tbody>
</table>

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, 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 transportable products N/A

<table>
<thead>
<tr>
<th></th>
<th>SPSV</th>
<th>Ref. Temp. (°C.)</th>
<th>Density at Ref. Temp.</th>
<th>Corresponding Quantity (MT)</th>
</tr>
</thead>
</table>

3. TANKS

3.1 Design pressure (Vapour) – BV-IGC : 17.65 bar g (1.765 MPag)

- USCG : 12.75 bar g (1.275 MPag)

3.2 Valve setting : 17.6 / 12.5 / 5.8 kg/cm²

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

Ex-atmospheric storage with gas : 1 tank : Butane – 360 Tons / h
Return : 2 tanks : Propane – 300 Tons / h

Remarks:
* Based on maximum velocity of 6.5 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 : Deep well Vertical Centrifugal - 14M - 160 - 4 - I
          Make : NIIGATA WORTHINGTON
          How many : 1 Set / Tank
          Maximum specific gravity : 0.944 VCM, 0.647 LPG

5.2 Capacity (CMB/Hour) : 300m3/h (for LPG), 250m3/h (for VCM)
                          Two speed or variable speed : FIXED SPEED
                          Rated kW (each) : 120 KW
                          Working pressure maximum : 17.6 kg / cm²g (12.5kg/cm²g in US port)

5.3 Location : Submerged in the Cargo Tank
Removable : 

5.4 Booster pumps : N / A
Type : 
Maker : 

5.5 Capacity (CMB/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 hours for LPG : 15 Hrs
5 bars : about hours for LPG : 20 Hrs
10 bars : about hours for LPG : 30 Hrs
Time will vary depending on shore tank condition

5.8 Nominal back pressure when working : N/A
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 : No Liquid remain
- vapour : about ton per one tank for LPG : Depends on tank press.

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 : 36 hrs approx. to gas free for man entry.
7. CARGO COMPRESSORS
7.1 Type : Vertical single bore double action water cooled, DNL-710HB2GST21
Make : Mikuni Jukogyo Co. Ltd.
How many : 1 set
Piston displacement : 467 m³ / H
Rated Kw : 75 kw
Stroke : N/A
Max discharge pressure : Suction press.+4.0kg/cm²(max.7.0kg/cm² @ single action)
Pressure differential(Suction pressure) : 0.5 - 15.5kg / cm²g
No of Revolutions : 450 rpm

7.2 Are compressors oil free : Yes
7.3 Can they reliqyef VCM without risk : N/A
7.4 State time to bring full cargo of butane to atmospheric pressure from : 36 hrs approx. to gas free

8. INERT GAS SYSTEM
8.1 Does the vessel use inert gas? : KASHIWA CO.LTD
If so, state utilization and quantities : 412/330 NM³/H
8.2 Can the vessel produce inert gas? : Yes/ inoperative at this moment
If so, state type and composition of gas produce:
- Carbon dioxide : below 15%
- Carbon Monoxide : Below 0.1 vol%
- Hydrogen : Below 15%
- Sulphur dioxide : Below 10 ppm
- Oxygen : min 1.0 vol %
- Nitrogen and Trace gases : remainder of abt 83.8%
Discharge Capacity
8.3 Maximum production obtainable : 330M³ / HR

NOTE: Above quantities obtained at engine room temperature 45⁰ 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 : To be blown off by IG / N₂ for remaining cargo vapour in cargo tank.
9.2 State time required including stripping : At least 85 hrs 300m³ / hr

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 24hrs X 22,00m³ to 28,000m³

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 : 800 mm
12.3 Overall length : 4220 mm
12.4 Cargo flow rate : 150 m3/H
12.5 Min Inlet Temp : 0 degrees C
12.6 Min Outlet Temp : 0 degrees C
12.7 Required Sea water Capacity : 380 Tons/H
12.8 Design Pressure : 20.0 kg/cm2=1.961 N/mm2
12.9 Hydrostatic Test Pressure : 40 kg/cm2
12.10 Tightness Test Pressure : 20.0 kg/cm2=1.961 N/mm2

12.0 State discharging rate for propane to be brought from atmospheric pressure
Loading rate for Propane – °C / 0°C: about 250-300 Mt/hr

13. CARGO VAPORIZER
In case vapour gas is needed to feed compressors, can vessel produce its own if no shore available: No, if vessel have cargo vapour onboard.

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; Musasino M-LD1 (H76AC)
Location : At each cargo 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? : YES

16.2 Same question for cargo : YES

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 stern (AP) (S / P) : 54.0 M
- distance from stern (FP) (S / P) : 52.2 M
- height above deck : 0.90 M for Liquid manifold
- distance from ship's rail : 2.65 M
- underside keel to manifold : 8.24 M

17.3 Liquid line
- diameter : 216.3 mm (OD)
- flange-size : 8” inches ANSI 300 lbs
- type : Rise face (RF)

Gas line
- diameter : 139.8 mm (OD)
- flange-size : 5 inches ANSI 300 lbs
- type : Rise face ANSI 300 lbs

17.4 What reducers on board?
For Liquid line (low temperature) : ANSI 300 lbs – 8”x10”, 8”x6”, 8”x4”, 6”x5”(3pcs), 6”x4”, 6”x 3”, 5”x4”, 4”x2” (10 pcs)

For Vapor line (normal temp.) : 8”300 lbs x 8”JIS 20kg/cm2, 2”300 lbs x 4”JIS 20kg/cm2, 4”300 lbs x 3” JIS 20kg/cm2 (5 pcs)

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 : OIL HYDRAULIC
- Where situated : Both sides of Cargo manifold
- Lifting capacity : 0.9 Ton at max distance from ship’s side : 1.5 meter
- Working radius : 180 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