VESSEL PARTICULARS (FORM C)
LPG/C GAS ETHEREAL
(last updated 08/05/2019)

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

(A) VESSEL’S CHARACTERISTICS

PREAMBLE
Name: GAS ETHEREAL
Owner: ARABIAN OIL SERVICES INC
Flag: MARSHALL ISLANDS
Build: Sanuki Shipbuilding and Iron Works Co., Ltd
Date on Service: Sep 25, 2006
Class: NIPPON KAIJI KYOKAI (NK)
NS(LIQUIFIED GAS CARRIER TYPE 2 PG), MNS
DESIGN MAX PRESSURE: 1.77 Mpa / MINIMUM TEMP -10 C

GRT International: 4306
Suez: 4669.76
Panama: 3541.77

NRT International: 1374
Suez: 
Panama:

Is vessel build according to
USCG regulations?: YES
RINA regulations?: NO
Japanese regulation?: YES

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

HULL
LOA: 99.90 M
LBP: 93.50 M
Breadth: 17.0 M
Depth: 8.20 M
Summer Draft: 6.214 M corresponding to Summer DWT = 4770.90 MT
Multiple Draft: M corresponding to Multiple DWT =

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>4.81</td>
<td>6.50</td>
<td>5.66</td>
<td>4031</td>
</tr>
<tr>
<td>BP Mixture (98%)</td>
<td>4.98</td>
<td>6.54</td>
<td>5.76</td>
<td>4183</td>
</tr>
<tr>
<td>Butane (98%)</td>
<td>5.33</td>
<td>6.62</td>
<td>5.98</td>
<td>4489</td>
</tr>
<tr>
<td>Butadiene (98%)</td>
<td>5.30</td>
<td>6.92</td>
<td>6.11</td>
<td>4702</td>
</tr>
<tr>
<td>VCM (68%)</td>
<td>5.13</td>
<td>7.17</td>
<td>6.15</td>
<td>4789</td>
</tr>
</tbody>
</table>
Propeller immersion:

- At draft F 4.81 A 6.50 M 5.66 correspond. : 131 %
- At draft F 4.98 A 6.54 M 5.76 correspond. : 132 %
- At draft F 5.33 A 6.62 M 5.98 correspond. : 135 %
- At draft F 5.30 A 6.92 M 6.11 correspond. : 143 %
- At draft F 5.13 A 7.17 M 6.15 correspond. : 151 %

COMMUNICATION EQUIPMENT

- Call letter: V7BV6
- IMO Number: 9388429
- Radio Station normally watched: AOR W & IOR
- Radio MF/HF NBDP: 538002925
- Radio MF/HF TEL/DSC: MMSI - 371793000
- VHF: 16/70
- Satellite Communication VSAT: +30 2119902508

MACHINERY

Main Engine x 1
- Type and make: MAKITA B&W 5L35MC
- Service power: 2762 kW @ 198 RPM
- No of Cylinders
- Cyl Bore x Stroke
- Grade of fuel used: IFO 380CST @ 50 ºC

Auxiliaries
- Nishishiba NTAKL-VE
  - Type and make (Electrical): Marine drip-proof, Brushless type
  - Grade of fuel used: Marine Gasoil DMA
  - No off: 2

- DAIHATSU 6DL-16A
  - Type and make (Mechanical): Vertical In-line 4-cycle
  - Grade of fuel used: Marine Gasoil DMA
  - No off: 2

Emergency Gen
- Type: Mitusi Zosen
  - Grade of fuel used: Marine Gasoil DMA
  - No off: 1

Bow Thruster
- Nakashima Propeller TCT 120
<table>
<thead>
<tr>
<th>Component</th>
<th>Details</th>
</tr>
</thead>
</table>
| **Boiler**                      | **Type**: Tortoise Engineering Co. Ltd (Cylindrical, Oil fired, Horizontal smoke tube, Model MKSC 16-500/500)  
|                                 | Evaporation: 500 kg/h, Exh gas side 500 kg/h  
|                                 | Max Design Pressure: Design press 0.69 MPa, Safety valve set 0.59 MPa  
|                                 | Feed Water Temp: 60 °C  
|                                 | **No off**  
| **Exhaust Economiser**          | **Type**: Vertical, Cylindrical Oil fires, Composite Type  
|                                 | Evaporation: Oil fire side 500 kg/h, Exh gas side 500 kg/h  
| **Air Compressors (Main)**      | **Type / Capacity**: Matsubara Iron Works MH 120k / 45.0 m3/hr  
|                                 | **No off**  
| **Air Compressors (Emergency)** | **Type**: Matsubara Iron Works MH 120k / 45.0 m3/hr  
|                                 | **No off**: 1 (No 2 Main Air Compressor)  
| **Fuel Oil Purifier**           | **Type**: Mitsubishi SJ-20G  
|                                 | **No off**  
|                                 | **Capacity**: 1750 ltr/hr  
| **Lub Oil Purifier**            | **Type**: Mitsubishi SJ-20G  
|                                 | **No off**  
|                                 | **Capacity**: 1650 ltr/hr  
| **Evaporator**                  | **Type**: Alfa Laval JWP-26-C80  
|                                 | **Capacity**: 10 T/ Day on Main engine jacket cooling water  
| **Fresh Water Sterilizer**      | **Type**: Uzushio electronic USS-2k  
|                                 | **Capacity**: 2kl/hr  
| **Fresh Water Mineraliser**     | **Type / Capacity**: N/A  
| **Waste Oil Incinerator (IMO MEPC 76 (40))** | **Type**: Sunflame Co. Ltd. OSV-360SAI / 360 kW  
|                                 | **Capacity**: 45 kg/hr  
| **Oily Water Separator**        | **Type**: TAIKO KIKAI USC-10  
|                                 | **Capacity**: 1 M3/H, 15ppm  

Form ‘C’ – TBA
<table>
<thead>
<tr>
<th>Sewage Treatment plant</th>
<th>Type</th>
<th>Taiko Kikai Industries Co. Ltd.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SBT – 25 x 1 set</td>
</tr>
<tr>
<td></td>
<td>Capacity</td>
<td>1500 LPD - 25 PERSONS/DAY</td>
</tr>
</tbody>
</table>

| Hot Water Set (Calorifier unit) | NO Off | EX-PK-40 |

<table>
<thead>
<tr>
<th>Steering Gear</th>
<th>Type</th>
<th>Kawasaki Precision Machinery RV21 – 013</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Duty Capacity</td>
<td>Electro-Hydraulic, 1-ram 2-cylinder, Rapson slide</td>
</tr>
<tr>
<td></td>
<td>Torque</td>
<td>130 kN-m @ 35°</td>
</tr>
</tbody>
</table>

| Speed | up to weather | About: 13.5 Knots @ CSR with 15% sea margin |

<table>
<thead>
<tr>
<th>CONSUMPTION/ DAY</th>
<th>At Sea</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Main Engine</td>
<td>IFO</td>
</tr>
<tr>
<td></td>
<td>Auxiliary Engine</td>
<td>MGO</td>
</tr>
<tr>
<td></td>
<td>At Port</td>
<td>IFO</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MGO</td>
</tr>
<tr>
<td></td>
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<td>MGO</td>
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<tr>
<td></td>
<td></td>
<td>MGO</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Permanent bunker capacity (100%)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>HFO</td>
<td>587.5 m3</td>
</tr>
<tr>
<td>Diesel</td>
<td>151.68 m3</td>
</tr>
<tr>
<td>Fresh Water</td>
<td>205.24 m3</td>
</tr>
</tbody>
</table>
(B) 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>2517.797</td>
<td>2467.441</td>
</tr>
<tr>
<td>NO.2 CARGO TANK</td>
<td>2518.112</td>
<td>2467.749</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>5035.909</strong></td>
<td><strong>4935.191</strong></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>45.0</td>
<td>0.459</td>
<td>2265.252</td>
</tr>
<tr>
<td>Propylene</td>
<td>17.65</td>
<td>45.0</td>
<td>0.470</td>
<td>2320.949</td>
</tr>
<tr>
<td>B/P Mixture</td>
<td>17.65</td>
<td>45.0</td>
<td>0.487</td>
<td>2403.437</td>
</tr>
<tr>
<td>i-Butane</td>
<td>17.65</td>
<td>45.0</td>
<td>0.526</td>
<td>2595.909</td>
</tr>
<tr>
<td>N-Butane</td>
<td>17.65</td>
<td>45.0</td>
<td>0.548</td>
<td>2704.484</td>
</tr>
<tr>
<td>Butylene</td>
<td>17.65</td>
<td>45.0</td>
<td>0.565</td>
<td>2780.382</td>
</tr>
<tr>
<td>Butadiene</td>
<td>17.65</td>
<td>45.0</td>
<td>0.588</td>
<td>2901.891</td>
</tr>
<tr>
<td>V.C.M.</td>
<td>17.65</td>
<td>45.0</td>
<td>0.872</td>
<td>4200.000</td>
</tr>
<tr>
<td>Isoprene</td>
<td>17.65</td>
<td>45.0</td>
<td>0.656</td>
<td>3237.484</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%

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: 17.65 bar g (1.765 MPag) / 12.75 bar g (1.275 MPag)

3.3 Maximum vacuum obtainable: Atmospheric

3.5 Maximum temperature acceptable: 45 °C

3.6 Minimum temperature acceptable: -10 °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: 700 m³/hrr
Return: 2 tanks

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 : DW 150/150-4-K+I Electric Motor Driven Deepwell Pump

Make : Hamworthy
How many : 2
Maximum specific gravity : 0.949 kg/m³

5.2 Capacity (CMB/Hour) : 300 LPG / 250 VCM m³/hr
Two speed or variable speed : Fix, 1785 rpm
Rated kW (each) : 125 kw
Working pressure maximum : -

5.3 Location : Cargo Tank Aft Dome
Removable : NO

5.4 Booster pumps : N/A
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 hours for LPG
5 bars : about 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 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
- vapour : about 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 hours
7. CARGO COMPRESSORS

7.1 Type
Make: Mikuni Jukogyo
How many: 2
Piston displacement: 467m³/hr
Rated Kw: 75kw
Stroke: -
Max discharge pressure: 1.96 MpaG (19.6 bars)
Pressure differential:
Double Action: suction pressure (+1.9 to 4 bars)
Single Action: suction pressure (+6.8 bars)

No of Revolutions: 450 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: 72 hrs approx. to gas free

8. INERT GAS SYSTEM

8.1 Does the vessel use inert gas?: NO
If so, state utilization and quantities:

8.2 Can the vessel produce inert gas?: YES / N2 Generator System
If so, state type and composition of gas produce: NITROGEN GENERATOR 1 UNIT (MYCOM 2K5T-270S
Discharge Capacity: 99.5VOL% 270Nm²/h, 99.9vol% 200Nm²/h

8.3 Maximum production obtainable: 0.5MPA

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: TBA
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: TBA

10.2 Can this operation be carried out at sea?

10.3 Can the ship measure the number of ppm in vapour phase?

10.4 Has vessel deck tank for changing grade/cooling operations?

10.5 Deck tanks: N/A
   Capacity: N/A
   Purpose: N/A

11. COOLING BEFORE LOADING: N/A

12. CARGO HEATER
12.1 Type: Horizontal shell and tube
12.2 Inside Diameter: 0.70 m
12.3 Overall length: 5.00 m
12.4 Cargo flow rate: 300 m3/hr
12.5 Min Inlet Temp: -10 deg C
12.6 Min Outlet Temp: 18 deg C
12.7 Required Sea water Capacity: 500 m3/hr
12.8 Design Pressure: 20 kg/cm2
12.9 Hydrostatic Test Pressure: 2.94 MpaG
12.10 Tightness Test Pressure: 2.16 MpaG

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

Form ‘C’ – TBA
16. SAMPLES

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

Top, Middle, Bottom sampling line at tank dome

Standard of fitting? : YES

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
- distance from stern (AP) (S / P) : 52.95 M
- distance from stem (FP) (S / P) : 46.95 M
- height above deck : 1.200 m for Liquid manifold
- distance from ship’s rail : 2.750 M
- underside keel to manifold : 9.40 M

17.3 Liquid line
- flange-size : 8 inches
- type : 300ANSA

Gas line
- flange-size : 5 inches
- type : A300 ANSA

17.4 What reducers on board? :

**For Liquid line (low temperature)**
- 8 x 10 / 300x300
- 8 x 6 / 300x300
- 8 x 6 / 300x150
- 8 x 5 / 300x300
- 8 x 4 / 300x300
- 8 x 3 / 300x300
- 6 x 5 / 300x300

**For Vapor line (normal temp.)**
- 5 x 4 / 300x300
- 6 x 5 / 300x150
- 5 x 3 / 300x300
- 6 x 4 / 300x150
- 5 x 2 / 300x300
- 5 x 6 / 300x150
- 5 x 5 / 300x150
- 5 x 4 / 300x150
- 5 x 3 / 300x150
- 5 x 2 / 300x150

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 : Kyoritsu kikai
   5 t x 14 r x 1 no
- Where situated : MIDSHIPS
- Lifting capacity : 5 T SWL
- Working radius : 14.0 Meters

20. SPECIAL FACILITIES

20.1 How many grades can be segregated? : None (one grade only)

20.2 How many cooled? : N/A

20.3 Can vessel sail with slack cargo tanks? : Yes