

**VESSEL PARTICULARS (FORM C)  
"GAS ESCO"**

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

**(A) VESSEL'S CHARACTERISTICS**

**PREAMBLE**

Name : **GAS ESCO**  
 Owner : **TATOOSH BEAUTY INC.**  
 Flag : **LIBERIA**  
 Build : **Kanrei Shipbuilding Co. Ltd., Japan**  
 Date Delivered : **June 22, 2012**  
 Class : **BUREAU VERITAS (BV)**

GRT International : **5,910 ton** Suez : **6,527.09 ton**  
 Panama : **20,651.350 m<sup>3</sup>**

NRT International : **2,081 ton** Suez : **5,385.31 ton**  
 Panama : **5,025 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 : **119.50 M**  
 LBP : **112.00 M**  
 Breadth : **19.00 M**  
 Depth : **9.00 M**  
 Summer Draft : **6.815 M corresponding to Summer DWT = 7,207 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%)	4.48	5.90	5.19	4,299
Butadiene ( 98%)	5.25	6.20	5.73	5,249
VCM ( 98%)	6.78	6.85	6.81	7,207

**Propeller immersion :**

At draft At **5.90 m correspond.** : **104.11%**  
 At draft At **6.20 m correspond.** : **112.33%**  
 At draft At **6.85 m correspond.** : **130.14%**

**COMMUNICATION EQUIPMENT**

Call letter : **A8YQ4**  
 Radio Station normally watched : **GMDSS**

Radio MF/HF NBDP	:	<b>FURUNO FS-5075</b>
Radio MF/HFTEL/DSC	:	<b>FURUNO FS-5075</b>
VHF	:	<b>FURUNO FM-8800D x 2 SETS</b>
Satellite Communication	<b>Inmarsat 'C'</b>	<b>: 463712568</b>
	<b>Inmarsat 'F'</b>	<b>: (Voice1) +870 773154228</b>
		<b>: (Fax) +870 783154337</b>
		<b>: (E-mail) gasesco@amosconnect.com</b>

## **MACHINERY**

<b>Main Engine x 1</b>	Type and make	:	<b>MAKITA CORPORATION 6L35MC</b>
	Service power	:	<b>3,510 Kw (4,472 ps) x 203 rpm (90%MCR)</b>
	No of Cylinders	:	<b>6</b>
	Cyl Bore x Stroke	:	<b>350 mm x 1050 mm</b>
	Grade of fuel used	:	<b>HFO having a viscosity of not more than 380cst @ 50°C</b>
<b>Auxiliaries</b>	Type and make (Electrical)	:	<b>Yanmar (6N165L-SN) - A.C. drip proof, self-ventilated 450 Kw x 445V x 3 phase x 60 Hz</b>
	(Mechanical)	:	<b>4 stroke x 485 Kw x 1,200 rpm</b>
	Grade of fuel used	:	<b>Diesel Oil - 6 Cst at 40°C / Marine Gas Oil -1.8 cst</b>
	No off	:	<b>2</b>
<b>Emergency Gen</b>	Type	:	<b>Deutz (F5L912) - 50Kw, AC 450V, 3 phase, 60 Hz</b>
	No off	:	<b>1</b>
<b>Fire &amp; Bilge pump</b>	Type	:	<b>Taiko Kikai Industries Co, Ltd (EMSE-150MD) Vert. Elect. M. Driven Centrifugal Mechanical seal</b>
	No off	:	<b>1</b>
	Capacity	:	<b>190/80 m<sup>3</sup> /hr at 20 / 75 m</b>
<b>Fire &amp; GS pump</b>	Type	:	<b>Taiko Kikai Industries Co, Ltd (EMSE-150MD) Vert. Elect. M. Driven Centrifugal Mechanical seal</b>
	No off	:	<b>1</b>
	Capacity	:	<b>190/80 m<sup>3</sup> /hr at 20 / 75 m</b>
<b>Boiler</b>	Type	:	<b>Miura Z Boiler (VWH-800E) Fully automatic water-tube boiler of natural circulating type</b>
	Evaporation	:	<b>717 Kg/Hr</b>
	Max Design Pressure	:	<b>0.7 Mpa Saturated</b>
	Feed Water Temp	:	<b>60°C</b>
	No off	:	<b>1</b>
<b>Exhaust Economiser</b>	Type	:	<b>Miura (KF-87-1F)</b>
	Evaporation	:	<b>470Kg/Hr actual @ continous service output of main engine</b>
	No off	:	<b>1</b>
<b>Air Compressors (Main)</b>	Type / Capacity	:	<b>Matsubara (MH-111) - Vertical, EMD driven, 2-stage, F.W cooled type / 53.0 m<sup>3</sup> / Hr</b>
	No off	:	<b>2</b>

<b>Air Compressors (Emergency)</b>	Type	:	<b>Sanwa Iron(GS2AR) - Horizontal, ENG driven, 2-stage, air cooled type 6.0 m<sup>3</sup> / Hr</b>
	No off	:	<b>1</b>
<b>Fuel Oil Purifier</b>	Type	:	<b>Mitsubishi SJ20G - Centrifugal</b>
	No off	:	<b>2</b>
	Capacity	:	<b>950 Ltrs / Hr at 98°C</b>
<b>Lub Oil Purifier</b>	Type	:	<b>Mitsubishi SJ10G - Centrifugal</b>
	No off	:	<b>1</b>
	Capacity	:	<b>920 Ltrs / Hr at 90°C</b>
<b>Evaporator</b>	Type	:	<b>Miura Co., Ltd (WM-10DK) – Waste heat recovery</b>
	Capacity	:	<b>1 x 10 t/day</b>
<b>Fresh Water Sterilizer</b>	Type	:	<b>Uzushio Electric Co., Ltd (USS-2K) – Electric Ultra Violet lamp with filter</b>
	Capacity	:	<b>1 x2,000 litre/h</b>
<b>Fresh Water Mineraliser</b>	Type / Capacity	:	<b>1 x 1000 litre/h / Nippon Controls Co Ltd (RF-1000S1) – Vertical. Welded stainless steel</b>
<b>Waste Oil Incinerator (IMO MEPC 76 (40))</b>	Type	:	<b>Miura Co Ltd (BGW-20N - Horizontal air atomizing type with aux burner</b>
	Capacity	:	<b>Oil @ 24.3 lit/h &amp; Solids @ 20 Kg/h</b>
<b>Oily Water Separator</b>	Type	:	<b>Taiko Kikai Industries Co, Ltd (USH-10) – automatic oil discharge type</b>
	Capacity	:	<b>1 x 1.0 m<sup>3</sup>/h</b>
<b>Sewage Treatment plant</b>	Type	:	<b>Taiko Kikai Industries Co, Ltd (SBH-25) Activated sludge aeration (Biological) – USCG certified</b>
	Capacity	:	<b>1 x 25 persons per day</b>
<b>Hot Water Set (Calorifier unit)</b>	No off	:	<b>Harison Co Ltd (CFT-400-E) 400L tank with 2 x 10Kw heaters (1 Stby) / 1 set</b>
<b>Steering Gear</b>	Type	:	<b>Electro-Hydraulic system with 2-pump units (dual system) – (one pump to be able to supply full power)</b>
	Duty Capacity	:	<b>26.3 t-m</b>
	Hydraulic pump unit	:	<b>Electric motor driven, 2 x 7.5 Kw</b>

### Speed

In Moderate weather:

**About:** 13.5 Knots @ CSR with 15% sea margin

### CONSUMPTION/ DAY

Main Engine	HFO	<b>177g / kw-hr (with +3%) at NOR</b>	<b>15.358 ton/day</b>
Auxiliary Engine	DO	<b>203g / kw-hr (with +3%) at MAX</b>	<b>2.258 ton/day</b>

Permanent bunker capacity (100%)

HFO	:	<b>617.16 m<sup>3</sup></b>
Diesel	:	<b>107.58 m<sup>3</sup></b>
Fresh Water	:	<b>154.42 m<sup>3</sup></b>



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

Ex-atmospheric storage with gas return	:	1 tank	:	<b>about 730 m<sup>3</sup> per hour for LPG</b> <b>about 570 m<sup>3</sup> per hour for VCM</b>
		2 tanks	:	<b>about 1150 m<sup>3</sup> per hour for LPG</b> <b>about 880 m<sup>3</sup> per hour for VCM</b>

Remarks:

- \* Based on maximum velocity of 6.5 metres/sec except VCM, and 5.0 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 **550 m<sup>3</sup>** 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	:	<b>Deepwell type of vertical centrifugal multistage design</b>
	Make	:	<b>Hamworthy Svanehoj A/S</b>
	How many	:	<b>1 set per tank (2 sets)</b>
	Maximum specific gravity	:	<b>0.601(LPG) / 0.948 (VCM)</b>
5.2	Capacity (CMB/Hour)	:	<b>400 m<sup>3</sup>/hr at 110 m (SG 0.601)</b> <b>200 m<sup>3</sup>/hr at 138 m (SG 0.948)</b>
	Two speed or variable speed	:	<b>Single Speed</b>
	Rated kW (each)	:	<b>150 kW</b>
	Working pressure maximum	:	<b>20 bar g</b>
5.3	Location	:	<b>At each cargo tank</b>
	Removable	:	<b>Yes</b>
5.4	Booster pumps	:	<b>N/A</b>
	Type	:	<b>N/A</b>
	Maker	:	<b>N/A</b>
5.5	Capacity (CMB/Hour)	:	<b>N/A</b>
	Working pressure	:	<b>N/A</b>
5.6	Location	:	<b>N/A</b>
5.7	Time to discharge a full liquid cargo using all pumps against back pressure at pump		
	1 bar	:	<b>about 19 hours for LPG</b>
	5 bars	:	<b>about 59 hours for LPG</b>
	10 bars	:	<b>-----</b>
5.8	Nominal back pressure when working	:	<b>about 1 bar</b>
	In series corresponding head	:	<b>N/A</b>
	Maximum back pressure	:	<b>about 5 bar</b>
	Nominal pressure at rail (propane)	:	<b>about 13 bar at 20 degree C of cargo temperature</b>
5.9	What amount of cargo remains in tanks after completion pumping before stripping:		
	- liquid	:	<b>about 1.5 m<sup>3</sup> per one tank</b>
	- vapour	:	<b>about 40 ton per one tank for LPG</b>

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

#### 6. STRIPPING

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

## 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: TBA**
- 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 : **N/A**  
Purpose : **N/A**

**11. COOLING BEFORE LOADING** :

**12. CARGO HEATER**

12.1 Type : **Shell and Tube**  
12.2 Inside Diameter : **900 mm**  
12.3 Overall length : **9300 mm**  
12.4 Cargo flow rate : **550 m3/h (Propane)**  
12.6 Min Outlet Temp : **0 °C**  
12.7 Required Sea water Capacity : **800 m3/h (Min 16°C)**  
12.8 Design Pressure : **20 bar g**  
12.9 Hydrostatic Test Pressure : **30.0 bar g**  
12.10 Tightness Test Pressure : **20.0 bar g with cargo piping**

12.0 State discharging rate for propane to be brought from atmospheric pressure : **NA**

**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**

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) : **60.55 m**  
- distance from stem (FP) : **51.45 m**  
- height above deck : **1.424 m for Liquid manifold**  
- distance from ship's rail : **2.300 m**

	- underside keel to manifold	:	10.439	m
17.3	Liquid line			
	- flange-size	:	10 in.	
	- type	:	ANSI300LB RF	
	Gas line			
	- flange-size	:	6 in.	
	- type	:	ANSI300LB RF	
17.4	What reducers on board?	:	21 carbon steel pieces	
	<b>For Liquid line (low temperature)</b>			
	10" ANSI 300LB to		12" ANSI 300LB, 10" ANSI 300LB, 6" ANSI 300LB	
			5" ANSI 300LB, 4" ANSI 300LB, 3" ANSI 300LB	
			10" ANSI 150LB, 8" ANSI 150LB, 6" ANSI 150LB	
			4" ANSI150LB	
	<b>For Vapor line (normal temp.)</b>			
	6" ANSI 300LB to		8" ANSI 300LB, 5" ANSI 300LB, 4" ANSI 300LB	
			3" ANSI 300LB, 2" ANSI 300LB,	
			8" ANSI 150LB, 6" ANSI 150LB, 5" ANSI 150LB	
			4" ANSI 150LB, 3" ANSI 150LB, 2" ANSI 150LB	
17.5	Is ship fitted with stern discharge?		No	
	- Liquid line - diameter	:	N/A	
	- flange – size	:	N/A	
	- type	:	N/A	
<b>18. HOSES</b>				
	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	
<b>19. DERRICKS</b>				
	- Hose cranes	:	1 set	
	- Where situated	:	Mid-ship(center)	
	- Lifting capacity	:	4.0 tons @ 10m/min	
	- Working radius	:	15m	
<b>20. SPECIAL FACILITIES</b>				
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	