VESSEL PARTICULARS (FORM C)
LPG/C "GAS CATHAR"
(last updated 13-05-2019)

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

(A) VESSEL'S CHARACTERISTICS

PREAMBLE

Name	:	**GAS CATHAR**
Owner	:	**TIF04 LTD, MELITA STREET VALLETTA**
Flag	:	**MALTA**
Build	:	**WATANABE SHIPBUILDING CO., LTD.**
Date on Service	:	**10TH AUGUST '2001**
Class	:	**LR**

GRT International	:	**6423.71**	Suez	:
		5849	Panama	:
NRT International	:	**5334.56**	Suez	:
		2081	Panama	:
Is vessel build according to		N.A.	USCG regulations?	:
		N.A.	RINA regulations?	:
		YES	Japanese regulation?	:
Has vessel received		N.A.	USCG approval?	:
		N.A.	RINA approval?	:

HULL

LOA	:	**119.00 M**
LBP	:	**112.00 M**
Breadth	:	**18.80 M**
Depth	:	**8.80 M**
Summer Draft	:	**6.759 M corresponding to Summer DWT = 7124**
Multiple Draft		**M corresponding to Multiple DWT = N/A**

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%)	**4.30**	**6.67**	**5.49**	**4778**
Propylene (98%)	**4.38**	**6.70**	**5.54**	**4870**
Butane-propane mixture (98%)	**4.48**	**6.74**	**5.61**	**4995**
i-Butane (98%)	**4.72**	**6.81**	**5.77**	**5282**
n-Butane (98%)	**4.86**	**6.86**	**5.86**	**5444**
Butylene (98%)	**4.96**	**6.89**	**5.93**	**5570**
Butadiene (98%)	**5.11**	**6.93**	**6.02**	**5739**
VCM (80%)	**4.95**	**7.62**	**6.29**	**6255**

Propeller immersion :

At draft	**F4.30 A6.67 At 5.49m correspond.**	**: 103.63%**
At draft	**F4.38 A6.70 At 5.54m correspond.**	**: 104.35%**
At draft	**F4.48 A6.74 At 5.61m correspond.**	**: 105.30%**
At draft	**F4.72 A6.81 At 5.77m correspond.**	**: 106.96%**
At draft	**F4.86 A6.86 At 5.86m correspond.**	**: 108.15%**
At draft	**F4.96 A6.89 At 5.93m correspond.**	**: 108.87%**
At draft	**F5.11 A6.93 At 6.02m correspond.**	**: 109.82%**
At draft	**F4.95 A7.62 At 6.29m correspond.**	**: 126.25%**

COMMUNICATION EQUIPMENT

Call letter		:	**9 H G I 8**
Radio Station normally watched		:	**GMDSS**
Radio MF/HF NBDP		:	**16540.0**
Radio MF/HFTEL/DSC		:	**2187.5 Khz**
VHF		:	**Ch16 & 70**
Satellite Communication	**Inmarsat 'F250'**	:	**Tel 870 773131212**
	VSAT		**Tel +30 2111983817 / +30 2111983813**
			Fax 870 764838966
			Eml gascathar@stealth.gr
	Inmarsat 'C'	:	**Tlx 421595410**
		:	

MACHINERY

Main Engine x 1	Type and make	:	**6S 35MC (Mark-6) Hitachi Zosen-Man B&W**
	Service power	:	**3780 KW at 164 RPM**
	No of Cylinders		**6**
	Cyl Bore x Stroke		**350 mm x 1400 mm**
			3
	Grade of fuel used	:	**380mm^2/S (cSt) at 50°**
Auxiliaries	Type and make (Electrical)		**S165L-EN Yanmar**
			Marine AC Generator Brushless Excitation Output 500Kva
	(Mechanical)		
	Grade of fuel used		**Diesel Oil**
	No off		
Emergency Gen	Type		**F5L 912/Deutz Air cooled Diesel Engine 50Kva**
	No off		
Bow Thruster	Type : Power:		**308Kw 413HP**
Boiler	Type		**Vertical Water Tube Composite Boiler**
	Evaporation		**600kg/H**
	Max Design Pressure		**0.69MPA**
			0.49 – 0.59MPA
	Feed Water Temp		**80 – 100°C**
	No off		
Exhaust Economiser	Type		**NO**
	Evaporation		
	No off		

Air Compressors (Main)	Type / Capacity	**MH-114 / 98.9M^3/H**
	No off	
Air Compressors (Emergency)	Type	**MG78A**
	No off	
Fuel Oil Purifier	Type	**SJ15F**
	No off	
	Capacity	**1900L/H**
Lub Oil Purifier	Type	**SJ15F**
	No off	
	Capacity	**1900L/H**
Evaporator	Type	**WM-10M**
	Capacity	**10T/DAY**
Fresh Water Sterilizer	Type	**USS-1K**
	Capacity	**1KL/H**
Fresh Water Mineraliser	Type / Capacity	**NO**
Waste Oil Incinerator (IMO MEPC 76 (40))	Type	**BGW-20N**
	Capacity	**20KG/H of specified waste in MEPC 76(40) A1.4**
Oily Water Separator	Type	**HMS-700**
	Capacity	**1M^3/H**
Sewage Treatment plant	Type	**SBT-25**
	Capacity	**25 PERSONS/DAY**
Hot Water Set (Calorifier unit)	No off	**CFL-2000-S**
Steering Gear	Type	**ST 1 UAY & ST 2 UAS**
	Duty Capacity	**7.5Kw**
	Hydraulic pump unit	**ELECTRO HYDRAULIC GEAR**

Speed

Up to and Beaufort Scale 4 Douglas Sea state 3

About 12.5 kts Laden/Ballast

CONSUMPTION/ DAY

At Sea

Main Engine	HFO	**About 12.5 MT/Day**	**Laden/Ballast**
	HFO	**About 0.3 MT/Day**	**For Boiler**
Auxiliary Engine	MGO	**About 1.0MT/Day**	

In Port	MGO	**About 1.0 MT/Day**	**Idle**
	MGO	**About 2.0 MT/Day**	**Discharging**
	HFO	**About 1.0 MT/Day**	**For Boiler**

Permanent bunker capacity (100%)

HFO	:	**652.80m3**
Diesel	:	**159.71m3**
Fresh Water	:	**323.2cbm**

(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	3758.531M^3	3683.360 M^3
NO.2 CARGO TANK	3758.644 M^3	3683.471 M^3
T O T A L	7517.175 M^3	7366.831 M^3

	SPSV (bar g)	Ref. Temp. (deg. C.)	Density at (Ref. Temp.)	Corresponding Quantity (MT)
Propane	17.65	45.0	0.459	3381
Propylene	17.65	45.0	0.470	3462
B/P Mixture	17.65	45.0	0.487	3587
I-Butane	17.65	45.0	0.526	3874
N-Butane	17.65	45.0	0.548	4037
Butylene	17.65	45.0	0.565	4162
Butadiene	17.65	45.0	0.588	4331
V.C.M.	17.65	45.0	0.866	5200

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/cm^2 @ 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	**N/A**	**N/A**	**N/A**	**N/A**
Raffinate 2	**N/A**	**N/A**	**N/A**	**N/A**
C4	**N/A**	**N/A**	**N/A**	**N/A**

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	:	**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	:	**440** M^3/H based on velocity of 5m/sec
Return		2 tanks	:	**440** M^3/H based on velocity of 5m/sec

Remarks: Rate varies according to the temperature
And pressure to the temperature and pressure of
the cargo loading

***** 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 m^3** 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	:	**200-4VCW1-B Fixed Deepwell Pump**
	Make	:	**Teikoku Machinery Works, Ltd.**
	How many	:	**2**
	Maximum specific gravity	:	**LPG: 0.601 , VCM : 0.948**
5.2	Capacity (CMB/Hour)	:	**LPG : 450m3/hr , VCM : 300m3/hr**
	Two speed or variable speed	:	**One**
	Rated kW (each)		**450/300M^3/H**
	Working pressure maximum	:	**17.65 bar g**
5.3	Location	:	**ATOP CARGO TANK DOME**
	Removable	:	**No**
5.4	Booster pumps	:	**No**
	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 10hours for LPG**
	5 bars	:	**about 12hours for LPG**
	10 bars	:	**about 30hours for LPG**
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 00 per one tank**
	- vapour	:	**about 16 tons 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 0.5 hour**

7. CARGO COMPRESSORS

7.1	Type	:	**LPG OS-97A Vertical 1 Stage Water Cooled Double Action.**
	Make	:	**Tanabe Pneumatic Machinery Co. Ltd.**
	How many	:	**2**
	Piston displacement		**460 M^3/H**
	Rated Kw		**Max75**
	Stroke		**177.8mm**
	Max discharge pressure		**2.0MPa (20.4 kg/cm^2 . G)**
	Pressure differential		**Normal 0.4MPa (ab. 4.0 kg/ cm^2)**
			(Maximum 0.7MPa(ab. 7.0kg/cm^2)at single action)
	No of Revolutions		**540.0 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 or NITROGEN PLANT **N2 gas Generator 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**

If so, state type and composition of gas produce:

	NITROGEN Generator 1 Unit	**(2KT-360 type) Mayekawa Marine Engineering Co., LTD .**	
	Purity	**99.5%**	**99.9%** **99.99%**
	Capacity	**360Nm^3/H**	**250Nm^3/H** **150Nm^3/H**
8.3	**Pressure**	**0.39 Mpa**	
	Maximum production obtainable	**99.5%**	**360Nm^3/H**

NOTE:- Above quantities obtained at engine room temperature 45° C

8.4	State if there are storage facilities for inert gas onboard: **NO**		
	- 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 to replace cargo gas with Nitrogen gas.**
9.2	State time required including stripping	:	**99.5%= 4.5 days / 99.9%= 6 days / 99.99%= 9 days 9 hrs**

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 6 days @ 99.9%**

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 : **N.A.**
Capacity :
Purpose :

11. COOLING BEFORE LOADING : **N/A**

12. CARGO HEATER

12.1	Type	:	**CYLINDRICAL**
12.2	Inside Diameter		**244space area**
12.3	Overall length		**9.50M**
12.4	Cargo flow rate		**550** M^3/H
12.5	Min Inlet Temp		**0°C**
12.6	Min Outlet Temp		**45 °C**
12.7	Required Sea water Capacity		**800 M^3/h (min. 18.0 deg. Cel)**
12.8	Design Pressure		**2.00 MPaG (20.4 kg/cm2. G)**
12.9	Hydrostatic Test Pressure		**3.0 MPa (30.0 kg/cm2 . G)**
12.10	Tightness Test Pressure		**No Available Data**

12.0 State discharging rate for propane to be brought from atmospheric pressure
Loading rate for Propane – ° C / 0° C: **about 270** 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?
Three sampling nozzles are fitted up to the valve at the valve at the top of the tank and the sampling level of each as follows:

1.) 40mm from the tank bottom
2.) 6000mm from the tank bottom
3.) 10900mm from the tank bottom

16.2 Standard of fitting? : **25.0mm**
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)	:	**63.10m**
- distance form stem (FP)	(S / P)	:	**55.90m**
- height above deck		:	**1.55m for Liquid manifold**
- distance from ship's rail		:	**2.40m**
- underside keel to manifold		:	**10.32M**

17.3 Liquid line

- flange-size	:	**10.0 inch. ANSI 300LBS**
- type	:	**Carbon Steel Pipes**

Gas line

- flange-size	:	**6.0inch. ANSI 300LBS**
- type	:	**Carbon Steel Pipes**

17.4 What reducers on board? :

For Liquid line (low temperature) - 45.0 deg. Cel.

1pc 10"x 12"-300A(12B)xANSI 300lbs;
1pc 6"x 10"-150A(6B)xANSI 150lbs;
1pc 6"x 10"-150A(6B)xANSI 300lbs; **1pc 5"x 10"-125A(6B)xANSI 300lbs**
1pc 4"x 10"-100A(4B)xANSI 300lbs; **1pc 3"x 10"-80A(3B)xANSI 300lbs**
1pc 10"x 10"-250A(10B)xANSI 150lbs; **1pc 8"x 10"-200A(8B)xANSI 150lbs**
1pc 8"x 10"-200A(8B)xANSI 300lbs ; **1pc 5"x 10"-125A(6B)xANSI 150lbs**
1pc 8"x 10"-200A(8B)xANSI 150lbs **1 pc 10" x 12"- 300A(12B)x ANSI 150 lbs**

For Vapor line (normal temp.) 0.0 deg. Cel.

1pc 8"x 6"-200A(8B)xANSI 300lbs **1pc 3"x 6"-80A(3B)xANSI 300lbs**
1pc 4"x 6"-100A(4B)xANSI 300lbs **1pc 3"x 6"-80A(3B)xANSI 150lbs**
1pc 2"x 6"-50A(2B)xANSI 300lbs **1pc 6" x 8"-200A (8B)x ANSI 150 lbs**
1 pcs 6"x 6"-150A(6B)xANSI 150lbs **1pc 6" x 5"- 125A (5B) x ANSI 300 Lbs**
1pc 4"x 6"-100A(4B)xANSI 150lbs **1pc 6" x 5"- 125A (5B) x ANSI 150 Lbs**

17.5 Is ship fitted with stern discharge? **NO**

- Liquid line - diameter	:	**N/A**
- flange – size	:	**N/A**
- type	:	**N/A**

18. HOSES

18.1 Are serviceable hoses available on board? : **No**

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 : **Available**

- Where situated : **Center between cargo tank no. 1 and no. 2.**
- Lifting capacity : **5.0 T x 14.0m (1 set)**
- Working radius : **75 deg.**

20. SPECIAL FACILITIES

20.1 How many grades can be segregated? : **1**

20.2 How many cooled? : **N/A**

20.3 Can vessel sail with slack cargo tanks? : **Yes**