





<b>AgipGas BV</b> LIBYAN BRANCH		<b>WESTERN LIBYA GAS PROJECT</b>		AGBV Job No. <b>0177/NC/02</b>		AGBV Doc. No. 00500-65-X-L-58PA02	
Snamprogetti Lummus Gas Ltd  <b>Snamprogetti</b>  ABB Lummus Malta  <b>HYUNDAI</b> ENGINEERING & CONSTRUCTION CO., LTD.		Plant <b>MELLITAH PLANT</b>		CTR Job No. 04095		CTR Doc. No. 0050065XL58PA02	
Location <b>GSPLAJ</b>		Sh. 2 of 10		Rev.		P1 P2 P3 P4 A1 A2	

HORIZONTAL CENTRIFUGAL PUMP DATA SHEET								Rev.	
GENERAL DATA									
1									
2	ITEM	51-581-PA-002A/B (1)		No. OF MAIN / STAND-BY UNITS	1 (Note 1)	/	1		
3	SERVICE	LEAN MDEA PUMPS		INSTALLATION: indoor - outdoor - other		outdoor			
4	OPERATION: (continuous-discontinuous-other)	Continuous		(parallel-single-other)		single			
5	TYPE OF DRIVER	electric motor	FOR UNITS	main	DATA SHEET No.		See Sheet 6		
6	TYPE OF DRIVER	electric motor	FOR UNITS	stand-by	DATA SHEET No.		See Sheet 6		
7	ELECTRICAL SUPPLY:	VOLTAGE	V	6600	FREQUENCY	Hz	50	PHASES No.	
8								3	
CHARACTERISTICS OF HANDLED LIQUID									
9	TYPE OF HANDLED LIQUID							LEAN MDEA	
10	PUMPING TEMPERATURE:	MIN / NORM / MAX		°C	/		79	/	
11	DENSITY AT TEMPERATURE	MIN / NORM / MAX		kg/m³	/		1006	/	
12	VISCOSITY AT TEMPERATURE	MIN / NORM / MAX		cP	/		1,8	/	
13	VAPOUR PRESSURE AT MAX PUMPING TEMPERATURE			bar (a)			0,5		
14	FREEZING POINT / POUR POINT			°C			/		
15	DISSOLVED GAS			(yes-no)					
16	CORROSIVE / EROSION / HAZARDOUS AGENTS			(yes-no)	/		/	yes (2)	
17	SUSPENDED SOLIDS:	TYPE / DIMENSIONS / VOLUME %		mm	/		/		
18	OPERATING CONDITIONS								
19	SUCTION PRESSURE:	MIN / NORM / MAX		bar (g)	/		0,7	/ 4,5	
20	DISCHARGE PRESSURE AT RATED CAPACITY			bar (g)			7,9		
21	DIFFERENTIAL PRESSURE AT RATED CAPACITY			bar			7,2		
22	CAPACITY:	MIN / NORM / RATED		m³/h	/		1206	/ 1327	
23	HEAD AT RATED CAPACITY			m			73		
24	NPSH AVAILABLE			m			> 10		
25	MAX ALLOWABLE PRESSURE AT SHUT-OFF			bar (g)			14		
26	ESTIMATED ABSORBED POWER AT PUMP SHAFT			kW			350		
27	FLOW CONTROLLED BY (pressure controller-level controller-flow controller-other)			flow controller					
28	REACCELERATION / AUTOMATIC START-UP			(yes-no)	no		/	no	
29	START-UP WITH DELIVERY VALVE (open - closed)			closed					
30	MECHANICAL DESIGN PRESSURE			bar (g)			14		
31	MECHANICAL DESIGN TEMPERATURE			°C			150		
32									
33	MECHANICAL DATA								
34	SEAL TYPE			Double					
35	CONTAMINATION OF LIQUID HANDLED ALLOWED			(yes-no)	no				
36	AIR ENTRAINMENT ALLOWED			(yes-no)	no				
37	LEAKS ALLOWED			(yes-no)	no				
38	ANTIFREEZING PROTECTION			(yes-no)	no				
39	ELECTRICAL AREA CLASSIFICATION			Cl 1, Zone 2, Gr IIB T3					
40	TROPICALIZATION REQUIRED			yes					
41	DUST, SAND MARINE ENVIRONMENT			yes					
42									
A2	18-10-2004	Issued for construction		SM	DM	GA			
A1	08-09-2004	Issued for construction		SM	DM	GA			
P4	13-02-2004	Issued for review		SM	DM	MR			
P3	07-01-2004	Issued for review		SM	DM	MR			
P2	23-06-2003	Issued for review		SM	DM	MR			
P1	24-01-2003	Issued for review		SM	DM	MR			
Rev.	Date	Description		Prep.	Check.	Appr.	PMS Review	AGBV Appr.	

Form code: DAT.MA.POC.1001 Sh. 01 / Rev. 3.01

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 <b>Snamprogetti</b> ABB Lummus Malta <b>HYUNDAI</b> <small>ENGINEERING &amp; CONSTRUCTION CO., LTD.</small>		Plant <b>MELLITAH PLANT</b>		CTR Job No. 04095		CTR Doc. No. 0050065XL58PA02									
Location <b>GSPLAJ</b>		Sh. 3 of 10		Rev.		<table border="1"> <tr> <td>P1</td> <td>P2</td> <td>P3</td> <td>P4</td> </tr> <tr> <td>A1</td> <td>A2</td> <td></td> <td></td> </tr> </table>		P1	P2	P3	P4	A1	A2		
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A1	A2														

HORIZONTAL CENTRIFUGAL PUMP DATA SHEET								Rev.
1	MECHANICAL DATA							
2	SUCTION LINE:	DIAMETER / RATING / FACING	ANSI	<input checked="" type="checkbox"/>	NPS	24"	/ 150#	/ RF
3	DISCHARGE LINE	DIAMETER / RATING / FACING	ANSI	<input checked="" type="checkbox"/>	NPS	20"	/ 150#	/ RF
4	VENT / DRAIN REQUIRED	(yes-no)			Yes, flanged	/	Yes, flanged	
5	MATERIAL IN CONTACT WITH LIQUID HANDLED (minimum requirement)				See Note 4			
6	PUMP CASING MATERIAL (minimum requirement)				CS (PWHT)			
7	PUMP IMPELLER MATERIAL (minimum requirement)				SS 316			
8	PUMP INTERNAL PARTS MATERIAL (minimum requirement)				SS 316			
9	CASING CORROSION ALLOWANCE				mm			
10	MINIMUM DESIGN METAL TEMP. / AT A PRESSURE OF		°C	/	bar(g)	-	/	-
11	COOLING FLUID: TYPE / DESIGN PRES. / OPER. TEMP.		bar (g)	/	°C	Cooling water	/	- / -
12	HEATING FLUID: TYPE / DESIGN PRES. / OPER. TEMP.		bar (g)	/	°C	-	/	- / -
13								
14	FLUSHING FLUID							
15	TYPE				-			
16	PRESSURE:		MIN / NORM / MAX	bar (g)	-	/	- /	-
17	TEMPERATURE:		MIN / NORM / MAX	°C	-	/	- /	-
18	DENSITY AT TEMPERATURE:		MIN / NORM / MAX	kg/m³	-	/	- /	-
19	VAPOUR PRESSURE AT MAX TEMPERATURE				bar (a)			
20	FREEZING POINT / POUR POINT				°C			
21	HAZARDOUS AGENTS				(yes-no)			
22								
23	NOTES							
24	(1) This datasheet is also valid for items 52-581-PA-002 and 53-581-PA-002							
25	(2) H2S concentration 0.07 mole%							
26	(3) Deleted							
27	(4) No copper or copper alloys allowed							
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Form code: DAT.MA.POC.1001 Sh. 02 / Rev. 3.01

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Snamprogetti Lummus Gas Ltd  <b>Snamprogetti</b>  ABB Lummus Malta  <b>HYUNDAI</b> ENGINEERING & CONSTRUCTION CO., LTD.		Plant <b>MELLITAH PLANT</b>		CTR Job No. 04095		CTR Doc. No. 0050065XL58PA02									
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HORIZONTAL CENTRIFUGAL PUMP DATA SHEET							Rev.
1	MFR	Pompe Gabbioneta		MODEL	SA 500/300 G		
2	PURCHASE ORDER	No.	REV.	DATE			
3	OFFER	No.	REV.	DATE			
4	CODES AND STD FOR CONSTRUCTION				G-00-S-L-0001-00 , API 610 VIII & API 682 I		
5	PERFORMANCE		REQUIRED DATA		SUPPLIER DATA		
6	CHARACTERISTIC CURVE No.				SA500300GA		
7	RATED CAPACITY (line 22 sh. 1)		m³/h	1327	1327		
8	CAPACITY AT BEST EFFICIENCY POINT		m³/h		1505		
9	MINIMUM CONTINUOUS CAPACITY		m³/h		450		
10	HEAD AT RATED CAPACITY (line 23 sh. 1)		m	73	73		
11	MAXIMUM HEAD AT RATED IMPELLER		m		80,5		
12	HEAD WITH MAXIMUM IMPELLER DIAMETER		m	at rated flow / shut-off	80	/	88
13							
14							
15	PUMP SPEED		r/min		1480		
16	NPSH REQUIRED AT RATED CAPACITY		m		7,6		
17	EFFICIENCY AT RATED CAPACITY		%		72,9		
18	ABSORBED POWER AT RATED CAPACITY		kW		383		
19	MAX ABSOR. POWER WITH IMPELLER DES. / MAX DIAM.		kW	/	480	/	530
20	ABSORBED POWER BY OIL PUMP/ HEATER		kW	/	0	/	0
21	DIFFERENCE: (NPSH AVAILABLE-NPSH REQUIRED)		m	min 0.5	2,4		
22	MAX OPERATION TIME AT SHUT-OFF		s		1,5		
23	RATIO: IMPELLER DIAM./ IMPELLER EYE AREA				1,43		
24	SPECIFIC SPEED				40		
25	SUCTION SPECIFIC SPEED			max. 230 (SI)	205		
26	CAPACITY RATIO: RATED / AT B.E.P.			0.8-1.0	0,88		
27	HEAD RATIO: MAX / AT RATED CAPACITY			max. 1.2	1,10		
28	HEAD RATIO: WITH MAX / DESIGN DIAMETER OF IMPELLER			at rated flow	1,10		
29	CONSTRUCTION FEATURES						
30	MAX ALLOWABLE TEMPERATURE		°C	150	150		
31	MAX ALLOWABLE PRES. AT MAX ALLOWABLE TEMP.		bar (g)	14	16		
32	HYDROSTATIC TEST PRESSURE		bar (g)		24		
33	ALLOWABLE LOADS ON FLANGES AS PER API 610		(yes-no)		Yes, 2 times API-610		
34	LATERAL CRITICAL SPEED		r/min		4882		
35	MOMENT OF INERTIA		kg.m²		3,6		
36	AXIAL THRUST ON SHAFT (+ = to driver; - = oppos. to driver)		N		0		
37	MAX TORQUE AT 100% OF PUMP SPEED		N-m	at rated / max imp diameter	3097	/	3419
38	MASSES: PUMP / GEARBOX / BASEPLATE		kg	/ /	822	/ - /	1400
39	DRIVER / TOTAL		kg	/	4010	/	6232
40	UNIT OUTLINE DIMENSIONS: LENGTH / WIDTH / HEIGHT		m	/ /	3,2	/ 1,545 /	1,4
41	NOISE LEVEL OF COMPL. UNIT: SPLAT 1 m / PWL		dB(A)	/	82	/	
42	NOTES						
43	E-motor nominal rating [ @ max. 40 °C]: 530 kW, 2930 rpm..						
44							
45							
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Location <b>GSPLAJ</b>		Sh. 5 of 10		Rev.		<table border="1"> <tr> <td>P1</td> <td>P2</td> <td>P3</td> <td>P4</td> </tr> <tr> <td>A1</td> <td>A2</td> <td></td> <td></td> </tr> </table>		P1	P2	P3	P4	A1	A2		
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HORIZONTAL CENTRIFUGAL PUMP DATA SHEET								Rev.
1	CONSTRUCTION FEATURES			REQUIRED DATA		SUPPLIER DATA		
2	CASING:	MOUNTING	(centerline-foot-near centerline)			centerline		
3		SPLIT	(axial-radial-barrel)			radial		
4		TYPE	(single volute-double volute-diffuser)			double volute		
5		THICKNESS / CORROSION ALLOWANCE	mm			15 / 3		
6	IMPELLERS:	NUMBER				1		
7		TYPE	(open-closed)			closed		
8		DIAMETER:	MIN / DESIGN / MAX mm			420 / 482 / 500		
9		MOUNTING	(overhung-between bearings)			overhung		
10		CONFIGURATION	(one way-opposed)			one way		
11		1st STAGE SUCTION	(single-double)			single		
12	ROTATION VIEWED FROM COUPLING END (CW - CCW)					CW		
13	CASING WEAR RINGS:	SUCTION / REAR	(yes-no)	/		yes / yes		
14	IMPELLER WEAR RINGS:	SUCTION / REAR	(yes-no)	/		yes / yes		
15	RADIAL / THRUST BEARING TYPE			/		n°1 NJ 221 3 n°2 7222 BG		A3
16	LUBRICATION TYPE (grease-oil ring-forced)					oil ring		
17	SUCTION NOZZLE:	SIZE / RATING / FACING	NPS	/ /		14" / 300# / RF		
18		FINISHING / LOCATION		/		smooth / END		
19	DISCHARGE NOZZLE:	SIZE / RATING / FACING	NPS	/ /		12" / 300# / RF		
20		FINISHING / LOCATION		/		smooth / TOP		
21	SEAL:	TYPE		Double Pressurized		Double Pressurized		
22	MANUFACTURER / MODEL			/		Flowserve / QBB-QBW		
23	API CODE					BDA/FN		
24	API FLUSHING PLAN			53		53+61 3)		
25	STUFFING BOX PRESSURE			bar (g)		1,2-5		A1
26	SHAFT DIAMETER AT SEAL			mm		90		A1
27	EXTERNAL FLUSHING CONSUMPTION			m³/h		0		
28	PUMP COOLING API PLAN / CONSUMPTION			m³/h		Plan K 2) / 0.6		
29	HEATING FLUID CONSUMPTION			kg/s		0		
30	COUPLING MANUFACTURER / MODEL			r/min		METASTREAM TSKS /		
31	GEARBOX:	TYPE / MANUFACTURER		N/A /		N/A /		
32	AGMA SERVICE FACTOR							
33	INLET / OUTLET ROTATIONAL SPEED			/		/		
34	DATA SHEET No.							
35	MATERIALS							
36	API 610 CODE			S-8 1)		A-8 1)		
37	CASING / COVER			/		A351-CF3M / A182-F316L		A1
38	IMPELLER					A351-CF3M		
39	SHAFT SLEEVE					A479-316L		
40	SHAFT					A479-316L		
41	CASING / IMPELLER WEAR RINGS			/		A182-F316L-HF/A182F-316L-HF		
42	INTERNAL PARTS					A276-316L		
43	FLUSHING / COOLING / OIL PIPING			/ /		SS / CS / -		
44	BASEPLATE					CS		
45	NOTES							
46	1) Casing and cover: CS: normalized ; 316L SS : solution annealed.							
47	2) According API 610 fig D-4B, FG included, without block valves at vendor's connections. Vendor connections 3/4" 150# RF smooth finish.							
48	3) Barrier liquid for plan 53 : Demin water							
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		Location <b>GSPLAJ</b>		Sh. 6 of 10	<table border="1" style="border-collapse: collapse; width: 100%;"> <tr> <th style="text-align: left;">Rev.</th> <th>P1</th> <th>P2</th> <th>P3</th> <th>P4</th> </tr> <tr> <td>A1</td> <td>A2</td> <td></td> <td></td> <td></td> </tr> </table>	Rev.	P1	P2	P3	P4	A1	A2	
Rev.	P1	P2	P3	P4									
A1	A2												

HORIZONTAL CENTRIFUGAL PUMP DATA SHEET		Rev.
1	EXTENSION OF SUPPLY( <input checked="" type="checkbox"/> INCLUSIONS)	
2	<input checked="" type="checkbox"/> DRIVERS <input type="checkbox"/> GEARBOXES <input checked="" type="checkbox"/> COMMON BASEPLATES FOR PUMP / DRIVER / GEARBOX 1)	
3	<input checked="" type="checkbox"/> COUPLINGS <input checked="" type="checkbox"/> COUP. GUARDS <input checked="" type="checkbox"/> NOT-SPARKING <input type="checkbox"/> FOUNDATION BOLTS <input checked="" type="checkbox"/> BOLTS FOR DRIVERS AND GEARBOXES	
4	<input checked="" type="checkbox"/> UNITS ASSEMBLY AT FACTORY 1) <input checked="" type="checkbox"/> CASING DRAINS <input type="checkbox"/> WITH VALVES 6)	
5	<input checked="" type="checkbox"/> MECHANICAL SEALS <input checked="" type="checkbox"/> CASING VENTS <input type="checkbox"/> WITH VALVES 6)	
6	<input checked="" type="checkbox"/> MECHANICAL SEAL ACCESSORIES <input checked="" type="checkbox"/> SHOP TESTS 3) 4)	
7	<input checked="" type="checkbox"/> COOLING AND FLUSHING PIPING <input checked="" type="checkbox"/> SPARE PARTS FOR START-UP / COMMISSIONING	
8	<input type="checkbox"/> LUBRICATION SYSTEM <input type="checkbox"/> SPARE PARTS FOR 2 YEARS OF OPERATION	
9	<input type="checkbox"/> SHOP FABRIC. OF PIPING FROM OIL CONSOLE TO PUMP <input checked="" type="checkbox"/> SPECIAL TOOLS AND WRENCHES (IF APPLICABLE)	
10	<input checked="" type="checkbox"/> SHOP FABRIC. OF (INTERCONNECTING) SEAL PIPING <input checked="" type="checkbox"/> INSTRUCTION MANUALS NO. 2) COPIES (IN ENGLISH)	
11	<input type="checkbox"/>	
12	<input type="checkbox"/>	
13	<input type="checkbox"/>	
14	NOTES	
15	1) INCLUDING SEAL SUPPORT SYSTEM (S).	
16	2) SEE RDDS G-64-S-L-4001 00.	
17	3) SEE IDS G-64-S-L-4002 00.	
18	4) Complete unit test in vendor's shop required	
19	5) Vent & drain with flanged 3/4" 300# RF smooth finish customer connection.	
20	E-motors shall be supplied from ASI Robicon in accordance with the frame contract.	
21	Seal support systems shall be supplied from Flowserve	
22	6) Supply of casing vent and drain valves by Contractor	
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