CLIENT & LOCATION :	GASSNOVA, NORWAY	EQUIPMENT No :	MC-103 (1ST STAGE)
PROJECT :	CO2 KARSTO	UNIT :	
SERVICE OF UNIT :	CO2 COMPRESSION		
PFD REFERENCE DRAWING :		P & ID REFERENCE DRAWING :	

DESIGN DATA

GAS CIRCULATED :	CO2
SERVICE (LETHAL / CORROSIVE / EROSIVE) :	N/A
CONTAMINANTS : SOLIDS (e.g. TYPE, SIZE, DISTRIBUTION, DESCRIPTION) :	NONE
OPERATION : CONTINUOUS	No. OF STARTS PER HOUR : N/A
PRELIM. COMP. SELECTION: (1)	DRIVER TYPE : MOTOR+GEAR

FLUID PROPERTIES (2)

DENSITY @ PT	kg/m³	2.86	MOLECULAR WEIGHT		42.31
SPECIFIC GRAVITY (S.G.) @ PT		1.46	Cp/Cv	VALUE @ PT INLET	1.28
COMPRESSIBILITY FACTOR		0.99			

FLOWRATE			TEMPERATURE		
NORMAL FLOW	kg/hr	131093	NORMAL FLUID TEMPERATURE	°C	49
NORMAL FLOW	Nm³/hr	74684	DESIGN TEMPERATURE	°C	205
DESIGN FLOW	kg/hr	144202	MAX OPERATING TEMPERATURE	°C	177
DESIGN FLOW	Nm³/hr	82152	MIN OPERATING TEMPERATURE	°C	20

HYDRAULIC CALCULATION (3)

SUCTION CONDITION			DISCHARGE CONDITION (4)		
DESIGN FLOWRATE	Nm³/hr	82152	DESIGN FLOWRATE	Nm³/hr	82152
ORIGIN PRESSURE	kPa a	179	DESTINATION PRESSURE	kPa a	535
- LINE LOSS	kPa	10	+ LINE LOSS	kPa	10
- P CONTROL VALVES	kPa	20	+ P CONTROL VALVES	kPa	
- P ORIFICES	kPa		+ P ORIFICES	kPa	
- P EXCHANGERS	kPa		+ P EXCHANGERS	kPa	100
- P FURNACES	kPa		+ P FURNACES	kPa	
- P FILTERS	kPa		+ P FILTERS	kPa	
- P SILENCERS	kPa		+ P SILENCERS	kPa	
- P PULSATION BOTTLES	kPa		+ P PULSATION BOTTLES	kPa	
- P OTHERS	kPa		+ P OTHERS	kPa	
- P CONTINGENCY	kPa	10	+ P CONTINGENCY	kPa	10
= COMPR. SUCTION PRESSURE	kPa a	139	= COMPR. DISCHARGE PRESSURE	kPa a	655
COMPR. FACTOR @ SUCTION			COMPR. FACTOR @ DISCHARGE		

DIFFERENTIAL PRESSURE		
DISCHARGE PRESSURE	kPa a	655
- SUCTION PRESSURE	kPa a	139
TOTAL COMPR. DIFFERENTIAL PRESS	kPa	516
COMPRESSION RATIO (Pd/Ps)		
COMPR. SUCTION TEMP	°C	49
COMPR. DISCHARGE TEMP.	°C	177
COMPR. POWER (5)	kW	4391

GAS COMPOSITION : MOL %			
Oxygen	0.0070	MEA	Trace
Nitrogen	0.0220	Argon	0.0005
Water	6.5375	NO	Trace
CO2	93.4330	NO2	Trace
SO2	Trace	NH3	Trace

NOTES

1. TO BE CONFIRMED BY FINAL MECHANICAL DESIGN
2. FLUID PROPERTIES LISTED AT SUCTION CONDITIONS
3. HYDRAULIC CALCULATION VALUES ARE PRELIMINARY AND SHOULD BE CONFIRMED WHEN FINAL SYSTEM DETAILS ARE KNOWN.
4. COMPRESSOR DISCHARGE CONDITIONS TAKEN AT INTERSTAGE KNOCK-OUT DRUM.
5. ESTIMATED VALUE FROM SIMULATION.
6. DESIGN FLOW ENCOMPASES ALL CASES. TURNDOWN IS 50% OF DESIGN FLOW.

REV.	ISSUE DATE	DESCRIPTION	ORIG.	ORIG. DATE	CHK'D/ LEAD	REVIEW/ ACCEPTED	REVIEW DATE
0	07-Oct-08	ISSUED FOR DELIVERABLE MILESTONE SCHEDULE M2	JS	07-Oct-08	MJC/DM	ADB/BR	09-Oct-08

BECHTEL

PROCESS DATA SHEET
COMPRESSORS

JOB No	25474
DRAWING No	REV
BECHTEL: 25474-000-M5D-QG-00011	
OWNER: 10112936-PB-P-DAS-0006	0
SHEET No. 1 OF 3	

CLIENT & LOCATION :	GASSNOVA, NORWAY	EQUIPMENT No :	MC-103 (2ND STAGE)
PROJECT :	CO2 KARSTO	UNIT :	
SERVICE OF UNIT :	CO2 COMPRESSION		
PFD REFERENCE DRAWING :		P & ID REFERENCE DRAWING :	

DESIGN DATA

GAS CIRCULATED : CO2

SERVICE (LETHAL / CORROSIVE / EROSIVE) : N/A

CONTAMINANTS : SOLIDS (e.g. TYPE, SIZE, DISTRIBUTION, DESCRIPTION) : NONE

OPERATION : CONTINUOUS — No. OF STARTS PER HOUR : N/A

PRELIM. COMP. SELECTION: (1) — DRIVER TYPE : MOTOR+GEAR

FLUID PROPERTIES (2)

DENSITY @ PT	kg/m³	9.71	MOLECULAR WEIGHT		43.83
SPECIFIC GRAVITY (S.G.) @ PT		1.510	Cp/Cv	VALUE @ PT INLET	1.28
COMPRESSIBILITY FACTOR		0.97			

FLOWRATE			TEMPERATURE		
NORMAL FLOW	kg/hr	127773	NORMAL FLUID TEMPERATURE	°C	26
NORMAL FLOW	Nm³/hr	70254	DESIGN TEMPERATURE	°C	205
DESIGN FLOW	kg/hr	140550	MAX OPERATING TEMPERATURE	°C	177
DESIGN FLOW	Nm³/hr	77279	MIN OPERATING TEMPERATURE	°C	20

HYDRAULIC CALCULATION (3)

SUCTION CONDITION			DISCHARGE CONDITION (4)		
DESIGN FLOWRATE	Nm³/hr	77279	DESIGN FLOWRATE	Nm³/hr	77279
ORIGIN PRESSURE	kPa a	535	DESTINATION PRESSURE	kPa a	2242
- LINE LOSS	kPa	10	+ LINE LOSS	kPa	10
- P CONTROL VALVES	kPa		+ P CONTROL VALVES	kPa	
- P ORIFICES	kPa		+ P ORIFICES	kPa	
- P EXCHANGERS	kPa		+ P EXCHANGERS	kPa	100
- P FURNACES	kPa		+ P FURNACES	kPa	
- P FILTERS	kPa		+ P FILTERS	kPa	
- P SILENCERS	kPa		+ P SILENCERS	kPa	
- P PULSATION BOTTLES	kPa		+ P PULSATION BOTTLES	kPa	
- P OTHERS	kPa		+ P OTHERS	kPa	
- P CONTINGENCY	kPa	10	+ P CONTINGENCY	kPa	10
= COMPR. SUCTION PRESSURE	kPa a	515	= COMPR. DISCHARGE PRESSURE	kPa a	2362
COMPR. FACTOR @ SUCTION			COMPR. FACTOR @ DISCHARGE		

DIFFERENTIAL PRESSURE			GAS COMPOSITION : MOL %			
DISCHARGE PRESSURE	kPa a	2362	Oxygen	0.0075	MEA	Trace
- SUCTION PRESSURE	kPa a	515	Nitrogen	0.0234	Argon	0.0005
TOTAL COMPR. DIFFERENTIAL PRESS	kPa	1847	Water	0.6580	NO	Trace
COMPRESSION RATIO (Pd/Ps)			CO2	99.3106	NO2	Trace
COMPR. SUCTION TEMP	°C	26	SO2	Trace	NH3	Trace
COMPR. DISCHARGE TEMP.	°C	177				
COMPR. POWER (5)	kW	4709				

NOTES

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4 COMPRESSOR DISCHARGE CONDITIONS TAKEN AT INTERSTAGE KNOCK-OUT DRUM.
5 ESTIMATED VALUE FROM SIMULATION.
6 DESIGN FLOW ENCOMPASES ALL CASES. TURNDOWN IS 50% OF DESIGN FLOW.

REV.	ISSUE DATE	DESCRIPTION	ORIG.	ORIG. DATE	CHK'D/ LEAD	REVIEW/ ACCEPTED	REVIEW DATE
0	07-Oct-08	ISSUED FOR DELIVERABLE MILESTONE SCHEDULE M2	JS	02-Oct-08	MJC/DM	ADB/BR	09-Oct-08

BECHTEL

PROCESS DATA SHEET
COMPRESSORS

JOB No	25474
DRAWING No	REV
BECHTEL: 25474-000-M5D-QG-00011	
OWNER: 10112936-PB-P-DAS-0006	0
SHEET No. 2 OF 3	

CLIENT & LOCATION :	GASSNOVA, NORWAY	EQUIPMENT No :	MC-103 (3RD STAGE)
PROJECT :	CO2 KARSTO	UNIT :	
SERVICE OF UNIT :	CO2 COMPRESSION		
PFD REFERENCE DRAWING :		P & ID REFERENCE DRAWING :	

DESIGN DATA

GAS CIRCULATED :	N/A
SERVICE (LETHAL / CORROSIVE / EROSIVE) :	N/A
CONTAMINANTS : SOLIDS (e.g. TYPE, SIZE, DISTRIBUTION, DESCRIPTION) :	NONE

OPERATION : CONTINUOUS		No. OF STARTS PER HOUR :	N/A
PRELIM. COMP. SELECTION:	(1)	DRIVER TYPE :	MOTOR+GEAR

FLUID PROPERTIES (2)

DENSITY @ PT	kg/m³	45.49	MOLECULAR WEIGHT		44.00
SPECIFIC GRAVITY (S.G.) @ PT		1.5199	Cp/Cv	VALUE @ PT INLET	1.29
COMPRESSIBILITY FACTOR		0.87			

FLOWRATE			TEMPERATURE		
NORMAL FLOW	kg/hr	127427	NORMAL FLUID TEMPERATURE	°C	26
NORMAL FLOW	Nm³/hr	69796	DESIGN TEMPERATURE	°C	205.00
DESIGN FLOW	kg/hr	140170	MAX OPERATING TEMPERATURE	°C	177.00
DESIGN FLOW	Nm³/hr	76776	MIN OPERATING TEMPERATURE	°C	20

HYDRAULIC CALCULATION

SUCTION CONDITION			DISCHARGE CONDITION		
DESIGN FLOWRATE	Nm³/hr	76776	DESIGN FLOWRATE	Nm³/hr	76776
ORIGIN PRESSURE	kPa a	2242	DESTINATION PRESSURE	kPa a	9289
- LINE LOSS	kPa	10	+ LINE LOSS	kPa	10
- P CONTROL VALVES	kPa		+ P CONTROL VALVES	kPa	
- P ORIFICES	kPa		+ P ORIFICES	kPa	
- P EXCHANGERS	kPa		+ P EXCHANGERS	kPa	100
- P FURNACES	kPa		+ P FURNACES	kPa	
- P FILTERS	kPa		+ P FILTERS	kPa	
- P SILENCERS	kPa		+ P SILENCERS	kPa	
- P PULSATION BOTTLES	kPa		+ P PULSATION BOTTLES	kPa	
- P OTHERS - DRIERS	kPa	100	+ P OTHERS	kPa	
- P CONTINGENCY	kPa	10	+ P CONTINGENCY	kPa	10
= COMPR. SUCTION PRESSURE	kPa a	**2122**	= COMPR. DISCHARGE PRESSURE	kPa a	9409
COMPR. FACTOR @ SUCTION			COMPR. FACTOR @ DISCHARGE		

DIFFERENTIAL PRESSURE			GAS COMPOSITION : MOL %				
DISCHARGE PRESSURE	kPa a	9409	Oxygen	0.0075	MEA	Trace	
- SUCTION PRESSURE	kPa a	2122	Nitrogen	0.0236	Argon	0.0005	
TOTAL COMPR. DIFFERENTIAL PRESS	kPa	7287	Water	0.0110	NO	Trace	
COMPRESSION RATIO (Pd/Ps)			CO2	99.9574	NO2	Trace	
COMPR. SUCTION TEMP	°C	26	SO2	Trace	NH3	Trace	
COMPR. DISCHARGE TEMP.	°C	177					
COMPR. POWER (5)	kW	4155					

NOTES

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4 COMPRESSOR DISCHARGE CONDITIONS TAKEN AT CO2 SURGE DRUM.
5 ESTIMATED VALUE FROM SIMULATION.
6 DESIGN FLOW ENCOMPASES ALL CASES. TURNDOWN IS 50% OF DESIGN FLOW.

REV.	ISSUE DATE	DESCRIPTION	ORIG.	ORIG. DATE	CHK'D/ LEAD	REVIEW/ ACCEPTED	REVIEW DATE
0	07-Oct-08	ISSUED FOR DELIVERABLE MILESTONE SCHEDULE M2	JS	02-Oct-08	MJC/DM	ADB/BR	09-Oct-08

BECHTEL

PROCESS DATA SHEET
COMPRESSORS

JOB No			25474
DRAWING No			REV
BECHTEL: 25474-000-M5D-QG-00011			
OWNER: 10112936-PB-P-DAS-0006			0
SHEET No.	3	OF	3