



	
DOC NUMBER: 569-DB7B-PRO-500-005		CLIENT NUMBER: PRD-MEC-MDE-011	
CLIENT: TAKEDA			
PROJECT BURITI EPCMV PROJECT			

BULK DRUG SUBSTANCE COMPRESSED AIR GENERATION SYSTEM DESCRIPTION REPORT

1	25MAY2022	ISSUED FOR CONSTRUCTION AS PER N+1 UPDATE	PTC	MPA	MSS
0	30JUL2021	ISSUED FOR CONSTRUCTION	JRM	LFF	MSS
A	22JUN2021	90% DD ISSUE	MSN	CCO	MSS
RE	DATE	DESCRIPTION	EXEC	CHECK	APPROV

 		 	
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1. REVISION HISTORY

Rev	Reason For Change
A	90% DD ISSUE
0	ISSUED FOR CONSTRUCTION COMPRESSED AIR GENERATION SYSTEM PRESSURE AND MAX FLOW AT PRESSURE HAVE BEEN UPDATED
1	AS PER N+1 UPDATE

2. PURPOSE

This document is intended to describe the Compressed Air Generation System, Building 7B – Bulk Drug Substance – BDS, intended to Takeda unit - Buriti Project, located at Hemobrás site in Goiania – Pernambuco state, Brazil.

3. REFERENCE

The following documents were used as reference:

Item	Number	Title
01	7B-M-05-81	P&I DIAGRAM - DRUG SUBSTANCE - COMPRESSED AIR GENERATION SYSTEM
02	7B-Z-0-2-71	P&I DIAGRAM - CLEAN COMPRESSED AIR DISTRIBUTION
03	7B-Z-0-2-72	P&I DIAGRAM - INSTRUMENT AIR DISTRIBUTION

4. PROCESS DESCRIPTION





The building 7B has a Compressed Air Generation System, located on the utilities room (7B-1031) at the Ground floor to supply the demand of Instrument Air and Clean Compressed Air.

The Compressed Air Quality required shall be in accordance with ISO-8573-1 considering the following characteristics:

- Class 1 – Particles
- Class 2 – Dew Point (-40°C)
- Class 3 -Oil Free

The Compressed Air Generation System is a vendor package to produce 1,200 NM3/HR @ 8.6 bar(g) (design condition) to be supplied with the equipment indicated below:

- 1 Rotary Compressor - COMP-7B-1 (one operating).
- 1 Particulate Coalescing Filter – F-COMP-7B-1.
- 1 Twin adsorption Dryer – AD-7B-1.
- 1 Particulate Coalescing Filter – F-AD-7B-1.
- 1 Receiver – AR-7B-1 (capacity of 3.000 L)
- 1 Particulate Filter – F-AR-7B-1 (installed after the receiver)

 		 	
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- 1 Main Control Panel

After the compressed air generation, out of the vendor package, there are two different distribution headers, one to supply compressed air for instrumentation (line 2"-CA-840001-SS6-NI) with the maximum flow rate of 4,098.3 NLPM (245.9 NM3/HR) @ 6.0 bar(g) and another to supply Clean Compressed Air for Process (line 2"-CA-8400115-SS6-NI) with the maximum flow rate of 10,660 NLPM (639.6 NM3/HR) @ 6.0 bar(g). The header for Process has two T-Style sanitary Filters (FGA-7000-1 / FGA-7000-2) before the consumers.

4.1 COMPRESSOR





The compressor (COMP-7B-1) type of rotary screw, oil-free and water-cooled with panel located near the equipment, work with variable speed, controlled by PIC- 8400109. The set point pressure to be adjusted during startup. At the outlet of each compressor there is a Particulate Coalescing Filter (F-COMP-7B-1) for oil removal (0,01 ppm) and particle removal (0,01 µm).

The compressor has the following characteristics:

ROTARY COMPRESSOR	
Capacity - NM3/H	1200
Material	Carbon Steel / Cast Iron
Process gas	AIR
Cooling medium	Water
Size - Height x Length x Width (mm)	2000 x 2540 x 1650

MODEL PERFORMANCE	Operating point	Min Flow at Pressure	Max Flow at Pressure
Discharge Pressure – bar(g)	6	6	6
Delivered flow (Nm ³ /h)	1200	390,22	1291
Power: Shaft - kW	125,8	40,39	137,38
Power: Package - kW	137,86	46,67	150,49
Motor Speed - rpm	3102	1120	3328
Stage isentropic eff.: Shaft - %	78,68	79,7	77,52
Stage isentropic eff.: Package - %	71,8	68,98	70,76
Air outlet temperature - °C	34	31	34

The compressor is a water-cooled with cooling water from the Cooling Towers through a 2" line (line 2"-TWS-8400116-CS1-NI) and it returns to the Cooling Towers through a 2" line (line 2"-TWR-8400121-CS1-NI). The flow rate to feed this equipment at the same time is 240LPM (14.4M3/HR), an inlet pressure of 3.4 barG and a differential of temperature of 15°C. The cooling water passes through the compressor even when they are not working. There is a static balancing valve to regulate the cooling water flow rate and a low flow switch at the inlet of the compressor (FSL- 8400117 for compressor COMP-7B-1).

 		 	
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4.2 TWIN ADSORPTION DRYER

The twin adsorption Dryer with hot regeneration (AD-7B-1), consists of two towers that contain activated alumina to remove moisture compresses air by adsorption.

The Twin Adsorption Dryer has a capacity to produce 1,200 NM³/HR to meet the flow rate compressor.

At the outlet of the twin adsorption dryer there is a Particulate Coalescing Filter (F-AD-7B-1) for particle removal (0,1 µm).

4.3 RECEIVER

After the Particulate Coalescing Filter (F-AD-7B-1) there is a receiver (AR-7B-1) with capacity of 3,000 L. The receiver has the function of control pressure system. Therefore, the pressure variation in the air system is equalized and the load and relief cycles in the compressor are minimized, they lower the compressed air temperature. The receiver also collect residual condense if necessary.

There is a pressure safety valve (PSV-8400110) on top of the receiver preserving the receiver.





After the receiver there is another Particulate Filter (F-AR-7B-1) for particle removal (0,01 µm).

4.4 MAIN CONTROL PANEL

The panel located near the equipment has the function of controlling the pressure and temperature of all system, as well as the outlet dew point.

The vendor package has the following instruments:

EQUIPMENT	INSTRUMENT	FUNCTION
COMP-7B-1 - Water Inlet line	PIT-8400121	Pressure Indication Transmitter
COMP-7B-1 - Water Inlet line	FSL-8400117	Low Flow Switch
M-COMP-7B-1 - Motor	SC-840003	Control Speed
F-COMP-7B-1 - Inlet line	PI-8400101	Pressure indication
F-COMP-7B-1 - Outlet line	PI-8400103	Pressure indication
AD-7B-1 - Inlet line	TIT-8400104	Temperature Indication Transmitter
AD-7B-1 - Inlet line	XV-8400104 / XV-8400114	On-off Valve
AD-7B-1 - Vent line	XV-8400106 / XV-8400107	On-off Valve
AD-7B-1 - Inlet line	PIT-8400124 / PIT-8400114	Pressure Indication Transmitter
AD-7B-1	PSV-8400104 / PSV-8400114	Pressure Safety Valve
AD-7B-1 - air blower Motor	SC-840007	Control Speed
AD-7B-1 - Outlet Line air blower	PIT-8400119	Pressure Indication Transmitter
AD-7B-1 - Outlet Line air blower	TIT-8400114	Temperature Indication Transmitter
F-AD-7B-1 - Inlet line	PI-8400105	Pressure Indication
F-AD-7B-1 - Outlet line	PI-8400107	Pressure Indication

 		 	
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EQUIPMENT	INSTRUMENT	FUNCTION
AR-7B-1	PI-8400110	Pressure Indication
	PSV-8400110	Pressure Safety Valve
F-AR-7B-1 - Inlet line	PI-8400111	Pressure Indication
F-AR-7B-1 - Outlet line	PI-8400112	Pressure Indication
Outlet Compressed Air Generation System	AIT-8400101	Dew Point Analyzer
	PIT-8400109	Pressure Indication Transmitter

4.5 CONSUMERS

The compressed air generation system has the following consumers in the Building 7B:

- Clean Compressed Air





EQUIPMENT	FLOW RATE (Nm ³ /h)
COLLECT TK. N°1, TQ-5701	204
COLLECT TK. N°2, TQ-5702	204
HARVEST FILT. SKID - SK-5800	16.8
HARVEST TK. N°1, TQ-5901	252
HARVEST TK. N°2, TQ-5902	252
BIOREACTOR SKID - BRE-5401	2.4
BIOR. GAS MIX RACK - BRE-5501-GM	19.2
BIOR. GAS MIX RACK - BRE-5601-GM	150
BIOR. GAS MIX RACK - BRE-5602-GM	150
BIOR. GAS MIX RACK - BRE-5603-GM	150
BUFFER PREP. TANK N°1, TQ-3701	3.6
BUFFER PREP. TANK N°2, TQ-3702	3.6
BUFFER PREP. TANK N°3, TQ-3703	3.6
MEDIA PREP TANK N°2, TQ- 5102	270
MEDIA PREP TANK N°1, TQ- 5101	15
MEDIA HOLD TANK N°3, TQ-5203	228
MEDIA HOLD TANK N°2, TQ-5202	228
MEDIA HOLD TANK N°1, TQ-5201	228
CIP SYS. N°1, CIP-7701	16.8
CIP SYS. N°2, CIP-7702	16.8

 		 	
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EQUIPMENT	FLOW RATE (Nm ³ /h)
CIP SYS. N°3, CIP-7703	16.8
AEX COLUMN PACKING	16.8
PARTS WASHER LV-4601	25.2
AUTOCLAVE AT-9001	84
CIP/SIP STATION	16.8
LOAD FILT. SKID, CFIL-3300	16.8

- Instrument Air

EQUIPMENT	FLOW RATE (Nm ³ /h)
PIPING SKID SK-5701/2	3.6
FILTER SKID SK-5901/2	3.6
HARV. FILT. SKID SK-5800	3.6
40L BIOREACTOR SKID, BRE-5401-JL	3.6
320L BIOREACTOR PIPING SKID, SK-5501	3.6
2500L BIOREACTOR PIPING SKID, SK-5601	3.6
2500L BIOREACTOR PIPING SKID, SK-5602	3.6
2500L BIOREACTOR PIPING SKID, SK-5603	3.6
PARTS WASHER, LV-4601	3.6
AUTOCLAVE, AT-9001	3.6
BIOKILL SYSTEM, BKS-7501	3.6
CIP CHEM. TOTE DIST., BD-4301	36
PURIFIED WATER SYSTEM, RO-6302	3.6
PURIFIED WATER SKID, SK-6302	3.6
WFI STILL, MES-6401	3.6
WFI SKID, SK-6401	3.6
CLEAN STEAM GEN., CSG-6501	3.6
BUFFER PREP DOCKING STATIONS	3.6
MAB LOAD FILT. SKID, CFIL-3300	3.6
MAB CHROM. SKID N°1, CRM-3401	3.6
MAB CHROM. SKID N°2, CRM-3402	3.6
CATION EXC. CHROM. SKID, CRM-3501	3.6

 		 	
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EQUIPMENT	FLOW RATE (Nm ³ /h)
ANION EXC. CHROM. SKID, CRM-3601	3.6
BUFFER PREP. SKID, SK-3701	3.6
BUFFER PREP FILTER SKID, SK-3702/3	3.6
MEDIA PREP FILTER SKID, SK- 5102	3.6
MEDIA PREP FILTER SKID, SK-5101	3.6
MEDIA HOLD FILTER SKID, SK-5203	3.6
MEDIA HOLD FILTER SKID, SK-5202	3.6
MEDIA HOLD FILTER SKID, SK-5201	3.6
320L BIOREACTOR SKID, BRE-5501-JL	3.6
2500L BIOREACTOR SKID, BRE-5601-JL	3.6
2500L BIOREACTOR SKID, BRE-5602-JL	3.6
2500L BIOREACTOR SKID, BRE-5603-JL	3.6
TO CIP SYS. N°1, CIP-7701	3.6