DOC NUMBER: **569-DB7A-PRO-500-005**	CLIENT NUMBER: **PRD-MEC-MDE-010**
CLIENT: **TAKEDA**	
PROJECT **BURITI EPCMV PROJECT**	

FINAL DRUG PRODUCT
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

1. REVISION HISTORY

Rev	Reason For Change
A	90% DD ISSUE
0	ISSUED FOR CONSTRUCTION
1	AS PER N+1 UPDATE

2. PURPOSE

This document is intended to describe the Compressed Air Generation System, Building 7A – Final Drug Product - FDP, intended to Buriti Project, located at Hermobrás site in Goiania – Pernambuco state, Brazil.

3. REFERENCE

The following documents were used as reference:

Item	Number	Title
01	7A-M-05-81	P&I DIAGRAM - DRUG PRODUCT- COMPRESSED AIR GENERATION SYSTEM
02	7A-Z-0-2-36	P&I DIAGRAM - CLEAN COMPRESSED AIR DISTRIBUTION
03	7A-Z-0-2-37	P&I DIAGRAM - INSTRUMENT AIR DISTRIBUTION

4. PROCESS DESCRIPTION

The building 7A has a Compressed Air Generation System, located on the utilities room (7A-1043) 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 850 Nm3/h @ 9.0 bar(g) (design condition) to be supplied with the equipment indicated below:

- 1 Rotary Compressor - COMP-7A-1 (one operating).
- 1 Particulate Coalescing Filter – F-COMP-7A-1.
- 1 Twin adsorption Dryer – AD-7A-1.
- 1 Particulate Coalescing Filter – F-AD-7A-1.
- 1 Receiver – AR-7A-1 (capacity of 2.000 L).
- 1 Particulate Filter – F-AR-7A-1(installed after the receiver).
- 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 1.1/2"-CA-840014-SS6-NI) with the maximum flow rate of 4,908.3 NLPM (294.5 NM3/HR) @ 6.0 bar(g) and another to supply Clean Compressed Air for Process (line 2.1/2"-CA-840015-SS6-NI) with the maximum flow rate of 5,373.3 NLPM (322.4 NM3/HR) @ 6.0 barG. 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-7A-1) type of rotary screw, oil-free and water-cooled with panel located near the equipment, work with variable speed, controlled by PIC- 840009. The set point pressure to be adjusted during startup. At the outlet of the compressor there is a Particulate Coalescing Filter (F-COMP-7A-1) for oil removal (0,01 ppm) and particle removal (0,01 µm).

The compressor has the following characteristics:

ROTARY COMPRESSOR	
Capacity - NM3/H	850
Material	Carbon Steel / Cast Iron
Process gas	AIR
Cooling medium	Water
Size - Height x Lenght x Width (mm)	2184 x 2180 x 1450

MODEL PERFORMANCE	Operating point	Min Flow at Pressure	Max Flow at Pressure
Discharge Pressure – bar(g)	6	6	6
Delivered flow (Nm³/h)	850	237,09	933,11
Power: Shaft - kW	86,53	27,9	96,08
Power: Package - kW	96,84	32,95	106,56
Motor Speed - rpm	2976	1000	3250
Stage isentropic eff.: Shaft - %	80,63	69,77	79,71
Stage isentropic eff.: Package - %	72,05	59,08	71,87
Air outlet temperature - °C	34	29	36

The compressor is a water-cooled with cooling water from the Cooling Towers through a 2” line (line 2"-TWS-840016-CS1-NI) and it returns to the Cooling Towers through a 2” line (line 2"-TWR-840021-CS1-NI). The flow rate to feed this equipment at the same time is 180LPM (10.8 m3/hr), an inlet pressure of 3.2 barG and a differential of temperature of 15°C. The cooling water passes through the compressors 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- 840017 for compressor COMP-7A-1).

4.2 TWIN ADSORPTION DRYER

The twin adsorption Dryer with hot regeneration (AD-7A-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 850 Nm3/h to meet the flow rate compressor.

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

4.3 RECEIVER

After the Particulate Coalescing Filter (F-AD-7A-1) there is a receiver (AR-7A-1) with capacity of 2,000 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-840010) on top of the receiver preserving the receiver.

After the receiver there is another Particulate Filter (F-AR-7A-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-7A-1 - Water Inlet line	PIT-840021	Pressure Indication Transmitter
COMP-7A-1 - Water Inlet line	FSL-840017	Low Flow Switch
M-COMP-7A-1 - Motor	SC-840001	Control Speed
F-COMP-7A-1 - Inlet line	PI-840001	Pressure indication
F-COMP-7A-1 - Outlet line	PI-840003	Pressure indication
AD-7A-1 - Inlet line	TIT-840004	Temperature Indication Transmitter
AD-7A-1 - Inlet line	XV-840004 / XV-840014	On-off Valve
AD-7A-1 - Vent line	XV-840006 / XV-840007	On-off Valve
AD-7A-1 - Inlet line	PIT-840024 / PIT-840014	Pressure Indication Transmitter
AD-7A-1	PSV-840004 / PSV-840014	Pressure Safety Valve
AD-7A-1 - air blower Motor	SC-840005	Control Speed
AD-7A-1 - Outlet Line air blower	PIT-840019	Pressure Indication Transmitter
AD-7A-1 - Outlet Line air blower	TIT-840014	Temperature Indication Transmitter
F-AD-7A-1 - Inlet line	PI-840005	Pressure Indication
F-AD-7A-1 - Outlet line	PI-840007	Pressure Indication

EQUIPMENT	INSTRUMENT	FUNCTION
AR-7A-1	PI-840010	Pressure Indication
	PSV-840010	Pressure Safety Valve
F-AR-7A-1 - Inlet line	PI-840011	Pressure Indication
F-AR-7A-1 - Outlet line	PI-840012	Pressure Indication
Outlet Compressed Air Generation System	AIT-840001	Dew Point Analyzer
	PIT-840009	Pressure Indication Transmitter

4.5 CONSUMERS

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

- Clean Compressed Air

EQUIPMENT	FLOW RATE (Nm³/h)
PARTS WASHER, LV-4601	25.5
CIP/SIP STATION, STA-4701	6.84
AUTOCLAVE, AT-9001	60.0
LYO N°2, LYO-1106	27.6
LYO N°1, LYO-1105	27.6
AUTO LOAD-UNLOAD, ALS 1105/6	0.18
VIAL WASHER, ML-1101	228.0
AREA UTIL. STATION, UP-3801	1.8
AREA UTIL. STATIONS UP-3903	1.8
AREA UTIL. STATIONS UP-3902	1.8
AREA UTIL. STATIONS UP-3901	1.8
STERILE FILT. SKID, FIL-3901	1.8
CIP SKID, CIP-7701	16.98

- Instrument Air

EQUIPMENT	FLOW RATE (Nm³/h)
PARTS WASHER, LV-4601	3.6
AUTOCLAVE, AT-9001	3.6
LYOPHILIZER N°1, LYO-1105	3.6
LYOPHILIZER N°2, LYO-1106	3.6

EQUIPMENT	FLOW RATE (Nm³/h)
DECON AUTOCLAVE, AT-9002	63.6
FORMULATION TCU, TCU-3903	3.6
CIP SYS. N°1, CIP-7701	3.6
STERILE FILT. SKID, FIL-3901	3.6
FILLING MACHINE, EV-1103	3.6
DEPYRO. TUNNEL, TE-1102	54.0
VIAL WASHER, ML-1101	0.6
CAPPER, CTM-1104	6.0
WFI DIST. HEAT EXCHANGER, TC-6402	3.6
WFI DIST. HEAT EXCHANGER, TC-6403	3.6
CIP CHEM. TOTE DIST., BD-4301	36.0
PRETREATMENT SYSTEM, RO-6301	3.6
WFI STILL, MES-6401	3.6
HOT WFI SKID, SK-6401	3.6
CLEAN STEAM GEN., CSG-6501	3.6
PROC. WASTE SUMP, SK-8001	3.6