Oxygen Vacuum Swing Adsorption Plant #487

100 TPD X 2

Contact
Edward Zhang
edz@phxequip.com

1. Executive Summary

1.1 Plant History

- Plant commissioned in 2010.
- Plant shut down in September 2017.

1.2 Production Capacity

- Oxygen: 100 tons per day x Two Air Products VSAs.
- Each VSA is a separate line that shares common controls with each other.

2. Process Description

In the VSA process, air is fed via the Air Blower into an adsorbent bed where the nitrogen preferentially adheres to the adsorbent material and oxygen passes through freely. After approximately 20 seconds on feed, the adsorbent bed becomes saturated with nitrogen. Regeneration of the bed is accomplished by lowering bed pressure with a vacuum pump and by purging under vacuum with oxygen rich gas from another bed. Once regeneration is complete, the bed is re-pressurized, and its cycle is repeated. The process uses two adsorber beds and a GOX buffer tank so that one bed will be in the production stage while the other is at some phase of regeneration. In this way, product may be provided in a continuous stream to the customer.

3. Consumption Data

NO.	SYSTEM / EQUIPMENT	Q'TY	Q'TY PER OPERATION MODE		ELECTRICITY (KW)		INSTRUMENT AIR (Nm3/hr)		N2 GAS (m3/hr)		COOLING WATER (Ton/hr)		FILTERDED WATER (m3/hr)	REMARKS
			C	S	C	S	C	S	C	S	C	S	C	S
1	COMPRESSOR (MAIN MOTOR)	2	1	1	375	375					5.25	5.25		AC 4160V, 3PH, 60Hz
2	AUX. OIL PUMP	2	1	1	2.2	2.2								AC 460V, 3PH, 60Hz
3	CONTROL POWER	2	1	1	0.5	0.5								AC 120V, 1PH, 60Hz
4	OIL HEATER	2	1	1	0.3	0.3								AC 120V, 1PH, 60Hz
5	MOTOR SPACE HEATER	2	1	1	0.4	0.4								AC 120V, 1PH, 60Hz
5	INSTRUMENT AIR	2	1	1			1.0	1.0						
6	INTER COOLER	2	1	1							10.53	10.53		
7	AFTER COOLER	2	1	1							9.79	9.79		
8	LUBE OIL COOLER	2	1	1							2.84	2.84		
NOTE :	(T) : OPERATING HOURS PER 24 HOURS									* MOTOR : AC4160V 3PH 60HZ				
	C : CONTINUOUS OPERATION									* UPS : UNINTERRUPTED POWER SUPPLY				
	I : INTERMEDIATE OPERATION									* IPS : INTERRUPTED POWER SUPPLY				
S : STAND-BY	* INST. AIR INLET CONDITION : PRESS. : 5 ~ 7.0Kg/cm2.G													

4. Oxygen Output Specifications:

Oxygen production throughput, design t/h O 2	8.333	
Oxygen purity, design % O2	93	
Discharge pressure, kPa(g)	***700 kPa(g)***	
Discharge temperature, deg C	***Ambient +/-5 deg C, maximum 40 deg C***	
Calculated Product Requirements		
Total product throughput, t/h	9.0	
Volumetric flowrate, nominal Nm^3/h	6919.0	@ ambient conditions : 99.8 kPa(a) / 20°C
Corresponding flowrate, nominal Am^3/h	914.6	@ design conditions: i.e. 700 kPa(g) / 40°C

5. Highlights of Major Equipment

- Air Blower Skid (Drawing Available)
- Air Blower Motor (Datasheet & Drawings Available)
- Air Pressure Vessel (Drawing Available)
- Molecular Sieve Assemblies
- Vacuum Blower Skid (Drawing Available)
- Vacuum Blower Motors (Datasheets & Drawings Available)
- Oxygen Pressure Vessel (Quality Verification Documents Available)
- Oxygen Compressors (Datasheets & Drawings Available)
- Valve Skids (Datasheets & Drawings Available)
- Cooling System
- Feed Enclosure
- Vacuum Enclosure

6. Maintenance Data

Both VSA had major maintenance according to the following dates: Oxygen plant A 09/07/2017 and Oxygen plant B 09/14/2018. Minor maintenance done on Oxygen plant A on October 02, 2019 involving replacement of pistons rings, and minor maintenance done on Oxygen plant B involving replacement of piston rings on September 13, 2019.
According to the latest predictive report, there are no threats observed during inspections.