



Title: Operation and Cleaning of Air Compressor and Air Dryer

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1.0 OBJECTIVE:

To lay down a procedure for Operation & Cleaning of Air Compressor & Air Dryer.

2.0 SCOPE:

This SOP is applicable for Operation & Cleaning of Air Compressor & Air dryer.

3.0 RESPONSIBILITY:

Operating Person – Engineering

4.0 ACCOUNTABILITY:

Head – Engineering

5.0 ABBREVIATIONS:

MMI	Man Machine Interface
°C	Degree Celsius
μ	Micron
ΔP	Differential Pressure
Kg/cm ²	Kilogram per centimeter square
Pvt.	Private
SOP	Standard Operating Procedure

6.0 PROCEDURE:

6.1 Operation:

6.1.1 Starting Procedure for Air Ccompressor:

6.1.1.1 Check the crank case oil level on the oil level indicator. If the level is below the minimum mark add fresh oil of 20 w 40 grade.

6.1.1.2 Switch 'ON' the mains supply.

6.1.1.3 Ensure that the air outlet valve is open position.

6.1.1.4 Press the "Auto" button to start the Air Compressor in Auto mode.

6.1.1.5 Check and ensure that Outlet Pressure of Air Compressor is NMT- 7.0 Kg/cm². When air pressure reached 7.0 Kg/cm² then air compressors unload automatically & when air pressure reaches 6.7 Kg/cm² then air compressors load automatically.

6.1.1.6 Unloading and loading condition of Air compressor shall be verified during preventive maintenance. Refer SOP no.



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6.1.1.7 Check and ensure that outlet air temperature of Compressed air should not be more than 45°C.

6.1.1.8 Oil pressure of Air compressor should be in between 1.5 Kg/cm² -2.5 kg/cm².

6.1.1.9 Check and ensure that Element 1 pressure is NLT 1.5 Kg/cm².

6.1.1.10 Check and ensure that Element 2 air temperature should be in between 100 °C -180 °C.

6.1.1.11 Check and ensure that air pressure in main air receiver tank should be more than 6.0 kg /cm².

6.1.1.12 If any one of the air compressor goes under break down than standby air compressor shall be started to meet the compressed air pressure requirement.

6.1.1.13 If any excursion is observed in all above operational / monitoring parameter, than first stop the power supply of the air compressor and immediate action shall be taken with duly information to the head of department & QA.

6.1.2 Stopping Procedure of Air Ccompressor:

6.1.2.1 Press the “STOP” button to stop the air compressor from the HMI.

6.1.2.2 Close the Air outlet valve of the concerned air compressor.

6.1.2.3 Switch ‘OFF’ the mains supply from the HMI.

6.1.2.4 Record the operational detail as per **Annexure-I**, Titled as “Operational Log for Air Compressor” at after every hours.

6.2 Cleaning of Filter and Air Compressor:

6.2.1 Check and ensure that respective air compressor is in “OFF” condition.

6.2.2 Open the nuts and dismantle the filter.

6.2.3 Take out the suction Filter and clean with dry air.

6.2.4 Officer / Executive – Engineering shall verify the cleaning of filter by visual inspection.

6.2.5 Re-assemble the Filter at its respective place and record the same in prescribed Annexure- II.

6.2.6 FREQUENCY: Cleaning of Filters shall be done at every approx. 500±50 running hours & whenever required. Filter shall be replaced at every 2000 ±200 running hours and when required and same shall be recorded in annexure III “Filter Cleaning & Replacement Record”.

6.3 Starting & Stopping Procedure of Air Dryer (Refrigerant Type) :

6.3.1 Make sure that the Air Compressor is in operation.

6.3.2 Open the in-coming valve of Air Dryer from outlet header of air receiver tank no. 1 (Capacity – 4 m³).

6.3.3 Press I/O button for one second to Switch on the Air Dryer from the operating panel on the dryer.



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- 6.3.4 Ensure that inlet temperature of Air is not more than 45°C from air receiver tank no. 1 (Capacity - 4m³).
- 6.3.5 Ensure that inlet pressure of air is NLT 6 Kg/cm² from air receiver tank no. 1 (Capacity-4m³).
- 6.3.6 Ensure that the power of Auto drain solenoid valve is on.
- 6.3.7 Ensure that all the outlet valves of air dryers are in open condition.
- 6.3.8 Air dryer dew point temperature is displayed in degree Celsius. Dew point of Air Dryer should be in between 3°C - 7°C.
- 6.3.9 Compressed air filters (5.0μ, 1.0μ & 0.01μ) replacement shall be done in case if the pressure drops across the filter observed more than 0.7 kg/cm² or if the needle of indicator shows the red zone. Indicator provision is available on the filter assembly for monitoring the health of the filter along with the pressure gauge. If the indicator show green zone than the filter is healthy and if the needle lies in yellow region of differential pressure gauge then it means that filter is dirty or if it shown in red zone then it indicates that filter is clogged by impurities i.e. dust/dirt and need to replace on immediate basis. Filter shall be replaced in case of any one out of two specification found out of limit or whenever required and same shall be recorded in remark column of Operation record.
- 6.3.10 Record the log in Annexure III “OPERATIONAL LOG FOR AIR DRYER” at every four hours.
- 6.3.11 Press I/O button for one second to Switch Off the Air Dryer.
- 6.3.12 Close the inlet & outlet valves of Air Dryers.

6.4 Operation of Heatless Air Dryer:

- 6.4.1 Check and ensure that air compressor is on and supply compressed air at a pressure of 6.0 kg/cm² and same shall be recorded in annexure-VII from inlet pressure gauge of air dryer.
- 6.4.2 Check and ensure that all the compressed air distribution valve i.e. inlet and outlet are in open condition of air dryer and receiver.
- 6.4.3 Check and ensure the health condition of filter (Pre filter-5.0μ & Fine Filter-1.0μ) through dial gauge installed over filter (refer point no 6.4.11) before disbursing compressed air to dryer.
- 6.4.4 Dual tower desiccant dryers offer a continuous supply of dry compressed air by using two identical towers each containing a bed of desiccant beads (Alumina Silica). While one tower is on stream drying the compressed air, the other tower is off stream so the desiccant in that tower can be regenerated and alternately.
- 6.4.5 The sequence of tower operation is from tower 1 to tower 2 i.e. when tower 1 is in operation then at that time tower 2 is in regeneration and after this tower 2 is in operation and tower 1 is in regeneration mode and vice versa.



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- 6.4.6** Check and ensure that power supply is available at dew point meter and ensure that dew point meter is in on condition.
- 6.4.7** Check and ensure that dew point should not be more than - 40°C and record the same in Annexure –IV with a frequency of 04 Hour ± 30 minutes.
- 6.4.8** Dew point meter / Alarm indication shall be checked during preventive maintenance.
- 6.4.9** Check and ensure the health condition of super fine filter (0.01μ) before disbursing compressed air into receiver tank.
- 6.4.10** Start the system from switch button and verify that the needle of the differential pressure gauge located at filters (5.0μ, 1.0μ & 0.01μ) it should lies within green region of the dial which indicates that filter is clean.
- 6.4.11** If the needle lies in green region of differential pressure gauge it means that filter is healthy and if the needle lies in yellow region of differential pressure gauge then it means that filter is dirty and if the needle lies in red region of differential pressure gauge then it indicates that filter is clogged and need to be replaced immediately.
- 6.4.12** Filter shall be replaced whenever needle of the differential pressure gauge located at filters (5.0μ, 1.0μ & 0.01μ) lies in red region.
- 6.4.13** During filter replacement activity make sure that one by one filter replacement shall be carried out.
- 6.4.14** Check and ensure the pressure of receiver tank from pressure gauge located at receiver tank, it should not be less than 6.0 Kg/cm².
- 6.4.15** Check and ensure the outlet pressure, it should not be less than 6.0 Kg/cm².
- 6.4.16** Record all the parameter as per Annexure –IV titled as operation record of heatless air dryer with a frequency of 04 hours ± 30 Minutes.
- 6.4.17** Check and ensure the condition of activated carbon filter (0.01μ) before disbursing the air into user point, it should be in limit and if in any case needle of differential pressure gauge observed beyond limit i.e. lies in red region then standby filter shall be used for distribution of compressed air to user point.



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6.5 Capacity and serving area details of air compressor and air dryer:

S.No.	Equipment Name	Equipment ID	Make	Capacity	Serving Area
1.	Air Compressor		Chicago pneumatic	644 CFM	
2.	Air Compressor		Chicago pneumatic	644 CFM	
3.	Refrigerated Air Dryer		Trident	1250 CFM	
4.	Refrigerated Air Dryer		Trident	1000 CFM	
5.	Heatless Air Dryer		Trident	850 CFM	
6.	Heatless Air Dryer		Trident	500CFM	

7.0 ANNEXURES:

ANNEXURE No.	TITLE OF ANNEXURE	FORMAT No.
Annexure – I	Operational Log For Air Compressor & Receiver tank	
Annexure – II	Filter Cleaning & Replacement Record	
Annexure – III	Operational Log For Air Dryer	
Annexure – IV	Operation Record of Heatless Air Dryer	

ENCLOSURES: SOP Training Record

8.0 DISTRIBUTION:

- Controlled Copy No. 01 Quality Assurance
- Controlled Copy No. 02 Engineering
- Master Copy Quality Assurance

9.0 REFERENCES:

Manual Instructions.

10.0 REVISION HISTORY:

CHANGE HISTORY LOG

Revision No.	Change Control No.	Details of Changes	Reason for Change	Effective Date	Updated By



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**ANNEXURE – I
OPERATIONAL LOG FOR AIR COMPRESSOR & RECEIVER TANK**

Air Compressor ID.:

Date:

Shift:

Operation Time		OBSERVATIONS					Loading Hours	Unloading Hours	Total Running hours	Operator Sign & Date
Start Time	Stop Time	Reading Time	Receiver Tank Air Pressure (NLT-6 Kg/Cm ²)	Air Temp. (NMT- 45°C)	Oil Pressure (1.5-2.5 Kg/cm ²)	Coolant level(OK/ Not Ok)				

**Review By:
Sign & Date**



PHARMA DEVILS

ENGINEERING DEPARTMENT

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ANNEXURE – III OPERATIONAL LOG FOR AIR DRYER

Air Dryer ID. :

Reading Frequency – 04 Hours ± 30 Minutes

Date	Start Time	Stop Time	Reading Time	Receiver Tank Air Pressure (NLT:6 Kg/cm ²)	Inlet Air Temp. (NMT: 45°C)	Dew Point (3°C to 7°C)	Outlet Air Temp. NMT: 45 °C	Pressure Across Filter				ΔP Across filter			Done By Sign & Date	Remark
								Before 5.0 μ	After 5.0μ	After 1.0μ	After 0.01μ	5.0μ	1.0μ	0.01μ		

**Review by
Sign & Date**



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**ANNEXURE – IV
OPERATION RECORD OF HEATLESS AIR DRYER**

Air Dryer ID. :

Reading Frequency – 04 Hours ± 30 Min

Date	Start Time	Stop Time	Reading Time	Inlet Air Pressure (NLT:6 Kg/cm ²)	Filter Status (Green/Yellow/Red)				Dew Point	Outlet Air Pressure NLT: 6.0 Kg/cm ²	Done By Sign & Date	Remark
					Pre Filter	Fine Filter	Super Fine Filter	Activated Carbon Filter	NMT: -40°C			

**Review by
Sign & Date**