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Technical Notification 04-17

Subject: Inspection & Maintenance schedule for Small and Medium Capacity PRISM® Membrane Nitrogen Generator Systems

Cabinet designed N2 Generators with capacity from 10m3/h up to 1500m3/h

Introduction:

As a part of our continual improvement program and our customers feedback over the years, we have performed an assessment of the Inspection and Maintenance Schedules of the PRISM® Membrane Nitrogen Generator Systems and associated Feed Air Compressors.
The result of the assessment is the improved Inspection & Maintenance Schedule following in this Technical Notification.

We recommend that the improved Inspection & Maintenance Schedule are adopted to older systems also, as a good maintenance routine is vital to protect the PRISM® Membranes for contamination and for a problem-free operation of the system.

In addition to the following Inspection & Maintenance Schedule for the N2 Generator, please also see attached Inspection & Maintenance Schedules for the N2 System Feed Air Compressors.

References:

- *TN 05-17, Standard Inspection & Maintenance schedule for TMC Feed Air Compressors*
- *TN 06-17, Inspection & Maintenance schedule for TMC Feed Air Compressors with yearly running time below 700 hours*
- *TN 07-17, Inspection & Maintenance schedule for TMC 7-27 Feed Air Compressors*
- *TN 08-17, Inspection & Maintenance schedule for TMC 86-124 Feed Air Compressors*

N2 Generator Inspection Schedule

These instructions shall be used for routine maintenance and inspection only. Overhaul maintenance instructions for specific components, are given in their respective vendor manuals.

Item	Prior to / during Start	Weekly	Every 3rd month	Every 6th month	Every 12 months	Notes
Check sample flow to analyzers		X				1)
Check Oxygen content		X				2)
Check pressure drops across the filter package.		X				3)
Check function of drain system	X	X				4)
Visual check of filter elements			X			5)
Check system for leakage			X			6)
Open drain valve at heater shell, check for oil/condensate			X			7)
Check Performance				X		8)
Check that electrical connections are proper tightened					X	9)
Visual check inside electric heater					X	9) 10)

NOTES:

1. Check sample flow indicator for positive flow.
2. Check O2 level is according to design.
3. Check the pressure drop across filters vessels. Alarm limit is 0,6 Bar.

   Note: *Sudden change in pressure drop (high or low) indicates abnormal condition and must be checked*
4. Check that drain water/oil is drained and flows to the bilge system.

   Note: *Remember that the draining frequency is higher in warmer areas than cold areas. This is due to increased temperature and relative humidity.*

5. Open the filter housing and check condition of filter elements.
   a. Check filter element for rupture
   b. Turn filter element upside down and check for loose particles
   c. Check filter elements wet band. In case the wet band is higher than 50%, replace filter element.

   In case a), b) or c) above is detected, the filter elements must be changed

Picture 1: Illustration of typical Filter wet band, on the left hand a used filter element and on the right hand a new filter element.

6. Check system for leaking, check instrument tubing/plastic hoses and connections for leakages. By use of “leak finder” spray.
7. Only applicable for horizontal mounted heaters.
   Remark: *Valve is optional*
8. For the purpose of verifying N2 capacity, performance testing of membrane banks is recommended. Check N2 flow rate and Oxygen content.
9. After inspection, restart the unit, and check all data/parameters. Also check that drain system is working properly.
10. Open the heater and take out the heater element. Clean the elements and heater shell for liquid oil if any. Check/clean piping lines upstream/downstream the heater.

N2 Generator Maintenance Schedule

Item	Monthly	*Every 6th month*	Every 12 months	Notes
Calibration check of O_2-Analyser • Tag AT-8.50	*X*			***1)4)***
Replace filter elements – 3 stage filter packages • Tag F-8.11, F-8.12 and F-8.13		*X*		***2) 3)***
Service Drain valves- Service kit 1. Year • Tag LCV 8.36, LCV 8.37, LCV 8.38			*X*	***3)6)***
Replace O2 cell • AT-8.50/2			*X*	***3)4)***
Replace Filter Elements – Pressure Control Valves • Tag PCV-8.50A and PCV-8.54			*X*	***3)5)***
Re-Calibration of Dew Point-Analyser **(Optional Equipment)** • Tag MT-8.49				***7)***
System Health Check			*X*	***8)***

NOTES:

1. Check the span point calibration of the oxygen analyzer weekly (see specific vendor manual for the oxygen analyzer).
2. Oil carry over may contaminate the membranes and hence, reduce the system capacity and membranes lifetime. Change filters according to the maintenance schedule at the latest, or according to the notes given in the Inspection Schedule described in this document.
3. Only use original parts.
4. In case O2 Cells are supplied as loose items i.e. for monitoring in N2 room, the same requirement will apply for these units.
5. Applicable for NC1 only.
6. In case slug catchers and air receiver is supplied/installed, service kits for these drains will also have to be changed.
7. Maker of Analyzer recommends instrument calibration approximately every 24 months. (see specific vendor manual for the dew point analyzer).
8. Air Product AS recommend an annual Health Check of the system to be performed by an Air Products factory trained service engineer.