

APPLICATION NOTE

Utility Power Generation Dewpoint Application



Featured Product
XTR-65

Instrument: Portable and In-Line Dewpoint

Description

Generator windings are cooled with hydrogen gas (H₂). Hydrogen is used due to the large heat absorption capacity, approximately 2.7 times that of ambient air. This gas must be kept moderately dry for several reasons. First, generators with a steel retaining ring having a composition of 18% Chromium (Cr) and 5% Manganese (Mn), are susceptible to stress failure in a high moisture environment. In this case, the problem can be solved by an expensive ring replacement* or by monitoring and drying the gas. Second, high moisture levels are suspected in the formation of lead carbonate. The lead is present in solder joints in the generator.

Lead carbonate is hygroscopic and may provide a potential for arcing.

* The new rings are 18% Cr and 18% Mn, and are claimed to be resistant to high moisture levels.

Problem

First, H₂ gas is potentially explosive when mixed with O₂ (air is 21% O₂). Second, due to the presence of lubricating oil, the H₂ gas may be oily. Depending on the system, this can be severe.

Points to Consider

First, the SADP portable is intrinsically safe and factory mutual (FM) approved for potentially explosive applications (Class 1, Division 1, Groups B, C, D, D – H₂ is Group B). All in-line instruments can be made intrinsically safe with the use of our approved zener barrier and sensor. The instrument and zener must be in a safe area, with only the coaxial cable and sensor in the explosion-proof area. Many plants consider only the inside of the H₂ lines to be potentially explosive, and any area exposed to outside air is considered safe. Some plants divide the "SAFE" and explosion-proof areas by painting yellow lines on the floor. Check with your customer. Second, due to the potential for oil carryover, all in-line, continuous systems should be filtered with a good coalescer. In the event of significant oil vapor, an activated carbon bed should be installed after the filter and before the sensor. In the case of the SADP portable, a filter mounted on the unit is recommended. Oil carry-over can be minimized by selecting a sample point high in the system.

Sensor Range

XTR-100 (-149 - +68°F) or XT-65 (-85 - +68°F)

Contact Person(s)

Generator Engineering/Maintenance
Results Engineer
Performance Engineer
Plant Chemist
Technical Services

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