



PRODUCT NEWS

High Voltage Switchgear and Sulfur Hexafluoride

Background

Moisture in Sulfur Hexafluoride (SF₆) an insulating gas can cause rapid and severe deterioration of high-voltage switchgear. During electrical power distribution at transmission voltages (ranging typically from 100 to 400 kV), power switching or load current interruption is a major problem as a result of arcing between the two contact points. The insulation properties of SF₆, used to pressurize such switchgear enclosures, effectively control arc formation. However, the entry of moisture over time results in electrical discharge, causing the SF₆ to decompose into byproducts, such as hydrolysable fluorides. These fluorides are good dielectrics and their presence does not impair the operational efficiency of the respective equipment. However, this only applies when the moisture content of the gas or its enclosure is low. In the presence of water vapor, the byproducts include the highly corrosive HF, which accelerates switch contact corrosion to the point of physical breakdown. The aggressive nature of HF means that the damage may spread to the surrounding areas of the switchgear enclosure causing further damage. The moisture content of the gas must be maintained to a minimum to avoid the formation of this acid.

It is also important to maintain low moisture levels, to avoid condensation with the potential for leakage current across the surface of insulating parts.

Measuring Technique

Moisture measurements are important at the following stages:

- Checking the moisture content of new SF₆ in cylinders by industrial gas producers prior to supply and immediately prior to use by the switchgear manufacturer or transmission company. SF₆ cylinders appear to be particularly susceptible to moisture ingress in storage. SF₆ in good condition should have a moisture content of <10 ppmV equivalent to dew point <-75°F dew point (at atmospheric pressure).
- Dry gas purging of new switchgear enclosures during the final stage of manufacturer or following internal maintenance work prior to pressuring and sealing with SF₆. Most commonly, high purity nitrogen or another inert gas from cylinders is used, by repeated pressurization and venting to atmosphere, until the moisture content within the enclosure has been reduced to <10ppmV equivalent to dew point <-75 °F dew point (at atmospheric pressure).
- In service checks and continuous monitoring to ensure that moisture content in the SF₆ is maintained below the critical level of 100 ppmV, -40 °C dew point (at atmospheric pressure).

For all of these applications, use the **Hygroport Portable Hygrometer**. This portable, easy to use instrument responds rapidly and displays moisture content in a variety of engineering units, **including ppmV for SF₆**. Up to 320,000 measurement points can be stored with its built-in data logging facility and then quickly downloaded to a PC with a bluetooth wireless connection.

FOR MORE INFORMATION CONTACT:

Kahn Instruments, Inc.
885 Wells Road
Wethersfield, CT 06109

Tel: 860-529-8643 / Fax: 860-529-1895
Email: info@kahn.com
WEB: www.Kahn.com

KAHN IS PROUDLY REPRESENTED BY:

TALON Technical Sales, Inc
15702 W Hardy; Ste 200
Houston, TX 77060

Tel: 800-888-8263 / Fax: 281-999-6179
Email: sales@TALON.biz
WEB: www.TALON.biz

