

Moisture Measurement in SF₆ – A Permanent, Environmentally Safe Solution

Most electric utilities and independent power producers use Sulfur Hexafluoride (SF₆) as an arc quenching and insulating gas in high voltage circuit breakers and switchgear installed in their electrical transmission and distribution systems. These circuit breakers require periodic maintenance, including a check of the moisture content of the SF₆ gas – typically in the range of 50 to 100 PPMv (-50 to -40°F dewpoint). Historically, customers have used portable hygrometers to measure the moisture content of SF₆ by shutting down the circuit breaker, extracting a sample of the gas from the breaker, flowing the sample through the hygrometer and venting the gas to atmosphere during the measurement process.

SF₆ has been used in high voltage circuit breakers and switchgear in the US for more than 40 years. Recently, however, the U.S. Environmental Protection Agency (EPA) has designated SF₆ as a greenhouse gas and has imposed regulations to limit the amount of SF₆ that is released into the atmosphere. This presents a problem for power companies that vent SF₆ during moisture measurement tests.

In anticipation of these regulations and in an effort to reduce SF₆ emissions, improve worker safety (less frequent breaker shutdowns), minimize circuit breaker outages and lower maintenance costs, a forward-thinking mid-Atlantic electric utility developed a method to measure the moisture content of SF₆ circuit breakers without venting the gas to atmosphere. This power company permanently installed Kahn Easidew 2-Wire Transmitters into single-phase and 3-phase SF₆ circuit breakers to provide an on-line measurement of moisture content. (Note the red covers on the transmitters in the photograph.) The company's maintenance technician uses a Fluke meter, which he normally carries for multiple measurement tasks, to periodically measure the current output of the Easidew 2-Wire Transmitter. From the measured milliamp output current, the technician determines the moisture content of the SF₆ by using a milliamp to PPMv conversion chart.



This utility company recently purchased and is now installing the first 24 Easidew 2-Wire Transmitters. Their plan is to purchase and install a total of 200 Easidew 2-Wire Transmitters for moisture measurement in SF₆ circuit breakers installed in their electrical transmission and distribution network. The current output from the Easidew 2-Wire Transmitters is being measured with a Fluke meter and Kahn provided a power supply kit with cables. As an alternative, Kahn can supply a display kit consisting of a display meter in a NEMA 4 enclosure.

Electric utilities that utilize SF₆ circuit breakers in their electric power systems, and most do, face a similar moisture measurement challenge. They will benefit from a more environmentally friendly measurement method that uses Easidew 2-Wire Transmitters, which are permanently installed in the SF₆ circuit breakers.

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