

Benefits of Testing Sulfur Hexafluoride (SF₆)

Reduced Maintenance Expenses:

The Gas Sampling System (GSS) developed by Weidmann Diagnostic Solutions, allows quick and easy sampling of your SF₆ filled electrical equipment. Laboratory testing of SF₆ allows one to minimize the number of internal inspections. Breakers containing contaminants and/or decomposition products should be considered for inspection.

Reduced Catastrophic Failures:

Avoiding a major failure is the ultimate goal of any preventive maintenance program. SF₆ tests detect potential and existing problems as early as possible, thus reducing the risk of downtime and lost revenue due to a failure.

Diagnosing Problem Units:

Weidmann Diagnostic Solutions is involved in research to determine diagnostic threshold limits for SF₆ decomposition products. These flag points are being developed with the use of an extensive database and our clients' involvement. Using this research, Weidmann is identifying those units with possible decomposition and contamination problems.

Establishing of Baseline Data:

Initial analysis of the SF₆ will provide baseline data for each breaker. This allows a benchmark value to be established which can assist in deciding when a breaker should be inspected.

Determining Tank or Gas Cart Purity Prior to Filling/Immediately Prior to Energizing

Prior to filling any gas filled equipment, the purity of the gas from a tank or gas cart should be established. Determining the purity of gas can reduce the possibility of contaminating multiple units.

A Unique Dielectric

Fluids, either gases or liquids, that are used as dielectrics in electrical equipment must possess certain basic properties. The selected fluid must provide thermal conductivity in order to dissipate heat generated within the equipment. It must also have excellent insulating properties and must be able to quench arcs. Additional desirable physical and chemical properties include low viscosity, chemical stability and low toxicity. Sulfur hexafluoride, SF₆, is a unique gas that meets all of these requirements.

A very unique property of SF₆ is its ability to "self heal." The absorption of arcing within electrical equipment can cause partial decomposition of the SF₆. Most other insulators, such as oil or cellulose, are irreversibly decomposed in an arc, whereas SF₆ gas recombines to regenerate SF₆ after a fault. This ability to self heal is a major reason for the widespread utilization of SF₆ as an insulating gas.



Regeneration of SF₆, as is the case with most chemical reactions, is less than 100% complete. After arcing occurs, some SF₆ may deteriorate. The intermediate products caused by this deterioration can react with moisture or oxygen to create decomposition products.

Environmental Concerns

Classified as a “Greenhouse Gas”, the EPA is evaluating the regulations concerning SF₆. Utilities and other owners of SF₆ filled equipment are becoming more concerned with the proper use, storage, and release of the gas. Weidmann Diagnostic Solutions is building an informational library and database for collecting and disseminating SF₆ information.

SF₆ Assessment Program

Weidmann’s SF₆ Assessment Program evaluates chemical decomposition products, moisture content, air contamination, and dielectric breakdown of SF₆ from equipment charged during normal operation.

Contaminants that are often found in gas insulating material include toxic decomposition products. These decomposition products occur from intermediate compounds that react with oxygen and moisture. Moisture and air introduced from impure gas, leaks, or inadequate filtering from a gas cart are determined at the part-per-million level. In cases where nitrogen is added to SF₆ to maintain the gas phase, Weidmann Diagnostic Solutions can determine the ratio of SF₆ to nitrogen.



The moisture content and dielectric breakdown can be determined from the same gas sample. Weidmann Diagnostic Solutions will calculate and report the dielectric breakdown at 1/10” gap at 1 atm.

To ensure samples are not contaminated during sampling, Weidmann Diagnostic Solutions has developed a portable field Gas Sampling System (GSS). Use of the GSS minimizes gas releases to the environment. Sampling equipment is available for loan or purchase.

For more information about our Diagnostic Services and Monitoring Products, contact Weidmann Diagnostic Solutions at 916-455-2284 or 800-811-2284, by e-mail to diagnostics.wds@wicor.com or visit our website at www.weidmann-diagnostics.com