

Sealing Solution

For GIS SF₆ Gas

SF₆ leakages in Gas-Insulated Substations (GIS) represent about 40 % of minor failures, according to CIGRE A3.06*. This presents a major concern for energy companies in regard to meeting Environment, Health & Safety (EHS) responsibilities and regulatory compliance requirements.

The most common factors leading to leakage include aging equipment, weather conditions and sealing technology.

GE has developed a solution to cease the SF₆ leakages on the main GIS flanges. This solution is easy to install, reversible, re-usable and applicable to any GIS type and brand. The installation of this solution does not require a long outage or a GIS opening and gas treatment.

*CIGRE A3.06 - 2004-2007 International Inquiry on reliability of High Voltage Equipment A3.06

Easy installation

The GE solution design principle is based on a metallic sealed collar with special plugs for bolts and nuts. This operation is done without opening the GIS. No gas treatment is necessary, reducing gas handling risks including the potential releases. The collar size is adaptable to the flange diameter reducing the requirement for additional onsite customization.

Short intervention

The solution requires a very limited outage – only during surface preparation and final assembly. The outage can be planned in advance, with shifts not exceeding a few hours during low peaks of power and with lesser impact than traditional sealing solutions.

Applicable to any GIS

This solution is applicable to any type of GIS main flanges, up to 1200 kV, with a diameter from 200 mm to over 1 meter. The solution is suitable for any width and joint material including aluminum or steel, flange-to-flange connection, or flange assembly with intermediate gas barrier.

Reversible & re-usable

The GE solution provides a long term mitigation of leaks until the next scheduled maintenance cycle. It is a mechanical design that does not require the use of chemicals or silicon. As a result, it can be easily removed and leaves no residue or damage to the GIS flanges. The sealed collar solution can then be reused for another leakage or GIS.



Advanced Solution for Solving SF₆ Leakages

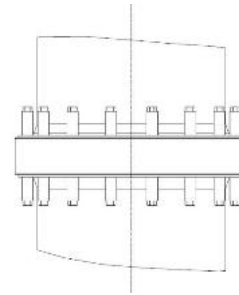
GE provides a full turnkey solution encompassing a preliminary GIS assessment, a rugged stainless steel belt kit supply, and it's fully installed by a certified field technician who will conduct all final tests.

Additional Features

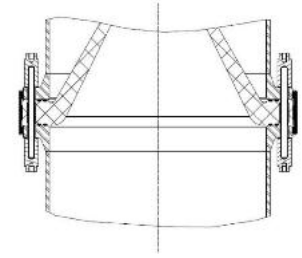
- Turnkey service solution
- Proven effectiveness
- No need to open the GIS

Proven Technical Solution

Use Conditions	
GIS type	All OEM Up to 1200 kV
Flange diameter	From 200 mm to over 1 meter
Temperature	From -25°C to + 70°C
Application	Indoor and outdoor
Standard compliance	IEC 62271-1 F-gas

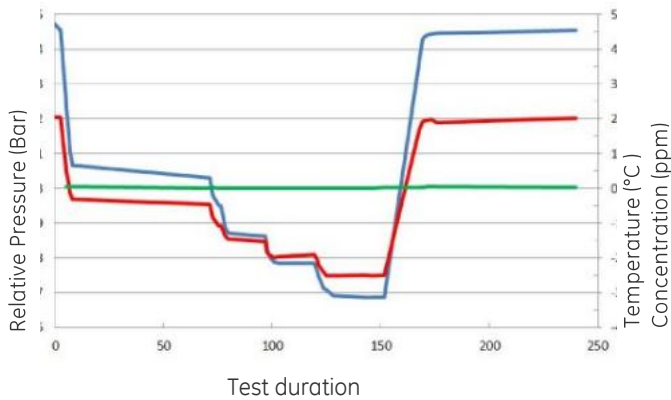


Section-view of GE sealing solution installed on a GIS flange



Side-view of GE sealing solution installed on a GIS flange

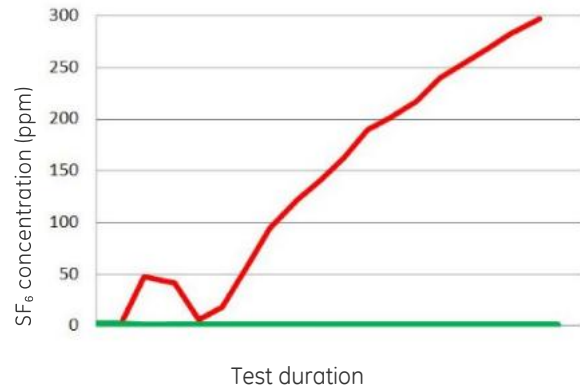
Figure 1 - Thermal cycling test in lab



— Pressure
— Temperature
— Concentration

Figure 1 highlights the pressure evolution during a thermal cycling test. After the test, the filling pressure inside the GIS is back to the original state. There is no leakage recorded during the test. During the same period of time, the SF₆ concentration in the control volume surrounding the tested flange is stable at 0 ppm.

Figure 2 - Tightness test at customer site



— Leaking GIS
— GIS with GE sealing solution

Figure 2 shows the evolution of the leakage of the GIS compartment before and after the application of GE' sealing solution. Before the application, the leakage rate is 1,29E-2 bar*cm³/s. After the application of GE's sealing solution, the leakage rate is 0 bar*cm³/s.

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