

Swiss voluntary agreement for the use of SF₆ in electrical switching devices and switchgear

Guidelines for reducing emissions from electrical systems

Being aware that SF₆ is classified as a very stable and effective greenhouse gas, Swiss switchgear manufacturers and users and the manufacturers of other electrical installations, SF₆ manufacturers and SF₆ distributors act according to the following principles: Emissions of SF₆ shall be avoided if possible.

From 2021, manufacturers and users aim at limiting SF₆ – emissions in Switzerland to less than 1 ton per year from manufacturing and operation of medium, high and extra high voltage plants.

The companies endorsing this declaration subscribe to the following measures:

- During manufacturing, installation, operation and maintenance of switchgear containing SF₆, measures in line with the most recent techniques are implemented in order to avoid emissions of SF₆.
- The same applies to manufacturing, transportation and storage of SF₆, as well as to all arrangements in connection with re-use, recycling or disposal of SF₆.
- When purchasing new or replacing old equipment SF₆-free technologies will be used wherever technically possible.
- To the extent possible, gas-filled compartments are permanently monitored in order to detect and quickly repair any leakage of SF₆.
- Manufacturers of high voltage plants guarantee a leakage rate of less than 0.5 per cent per year, and should not exceed the value shown by experience of 0.3 per cent per year. Manufacturers of medium voltage plants guarantee a leakage rate of less than 0.1 per cent per year.
- Used SF₆ is either directly re-used or recovered and re-used in a closed cycle process.
- Manufacturers of equipment containing SF₆, SF₆ distributors, SF₆ users and SF₆ disposal companies are committed to ensure that used SF₆ is re-used. For SF₆ that cannot be re-used, environmentally correct disposal is assured. SF₆ manufacturers and distributors will provide partners with the information required to ensure proper disposal.

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- SF₆-handling staff is trained on a regular basis.
- Maintenance is carried out by qualified staff only.
- For exports, the same quality standards and services apply - this includes the handling of SF₆.
- In the event of an accident, the following information will be recorded in writing and submitted to Swissmem as part of the annual reporting: a description of the incident, a calculation or estimate of the SF₆ gas losses, the results of the investigation to establish the cause, and a list of the improvement measures to be implemented. An exchange of experiences between the bodies responsible for the voluntary agreement and with the Federal Office for the Environment (FOEN), while respecting company and trade secrets, should contribute to avoiding similar occurrences in future, including for other businesses participating in the SF₆ voluntary agreement.
- Manufacturers and distributors of SF₆ keep a statistical record of SF₆ quantities produced and delivered. Manufacturers and users of SF₆ switching devices and switchgear keep a record of SF₆ consumption and stocks.
- Manufacturers and distributors of SF₆ and manufacturers and users of switching devices and switchgear containing SF₆ report these quantities to Swissmem. Swissmem will treat this information as confidential, except for the data it is permitted to provide to the FOEN.
- Swissmem will use the above-mentioned data to compile an annual SF₆ assessment which will provide information about the use of SF₆ in switching devices and switchgear in Switzerland. Swissmem notifies the FOEN of the quantities present in installed systems and equipment as well as the SF₆ emissions in the two subcategories of “high/extra high voltage” and “medium voltage”. Figures are reported subject to the proviso that the FOEN shall treat the information as confidential within the scope of the statutory requirements.
- In the event that the annual emissions target is exceeded, an investigation into the causes for this will be carried out within the voluntary agreement.

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Use of SF₆ as an insulating and arc quenching gas¹ for power transmission and distribution switchgear

SF₆ turnover and stock in Switzerland (2022):

Turnover: Approximately 214 t per year in Switzerland (usually < 10 per cent domestic and 80 per cent export, rest stockbuilding)

Stock: About 591t in electrical plants of Swiss utilities and industries. Refill quantities (leakage and handling loss) < 1 per cent per year.

Application: In sealed, monitored systems, a leakage rate of less than 0.5 per cent per year is guaranteed for high voltage plants. In practice it is found to be less than 0.3 per cent per year. A leakage rate of less than 0.1 per cent is guaranteed for medium voltage plants.

Lifetime of switchgear: At least 30 years, in practice usually 40 – 50 years.

Emissions: Quantities emitted today are limited. Emissions in the past were mainly due to improper handling during production, testing and maintenance; minor emissions are observed due to leakage and disturbances in service.

Re-use: SF₆ gas is routinely reclaimed and re-used.

Removal: SF₆ will be safely and properly removed in an environmentally compatible manner.

New technologies without SF₆: In the short and medium term technologies which do not use SF₆ are not available for all application areas. Taking into account the technical, economic and ecological point of view, better alternatives to SF₆ as an insulating and arc quenching gas are currently not ready for the market in all areas, but are known and in development. Manufacturers of switching devices and switchgear are actively continuing their research for better solutions.

This declaration is part of a voluntary agreement, which is recognised by the FOEN in accordance with Art. 41a of the Environmental Protection Law (USG).

The voluntary agreement, with regard to the section on “electrical switching devices and switchgear”, consists of the present declaration from switchgear manufacturers and handlers and the guideline for users provided by the Swiss Electric Utility Association (VSE).

¹ The term “quenching gas” here signifies the use of SF₆ for the purpose of arc quenching.

Voluntary agreement for the use of SF₆, updated August 11, 2023

