Paris Session 2022

Long term stability of SF6-free HV equipment

Study Committee D1 – PS2 – Q2.03

Is there any experience concerning decomposition of low-GWP gases available?

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Long term stability of C4FN equipment

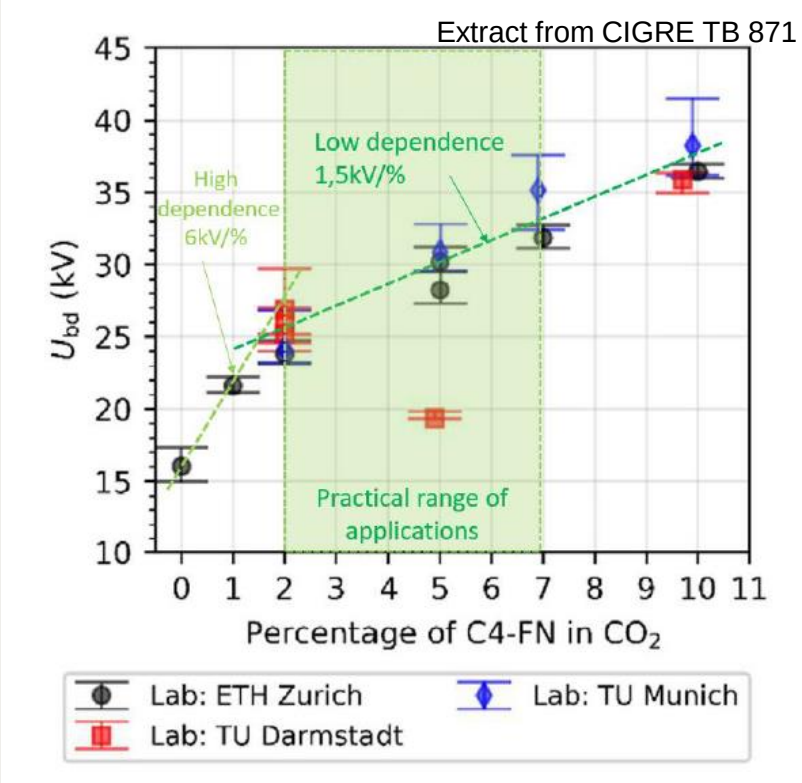
- C4-FN associated with CO_2 & O_2 is the most efficient SF6 alternative solution for the High voltage switchgear with very low-GWP and the best LCA, the stability of this new gas and the reliability of the equipment using this gas are being continuously studied and monitored

- Long term behaviour of the SF6-free gas depends on potential gas composition variation in the long term. Several parameters could be considered as the :
  - Gas composition evolution due to switching and interruption of short circuit current.
  - Gas mixture homogenisation under gravity in the long term
  - Gas composition evolution in outdoor condition
  - Real equipment at site energised since 2018

Long term stability of C4FN equipment

- 1/ Gas composition due to switching :
  - Limited impact on the dielectric withstand

Extract from CIGRE TB 871



As in SF_6, electrical Lifetime always determined by nozzle ablation and contact erosion

- 2/ Gas stability under gravity :

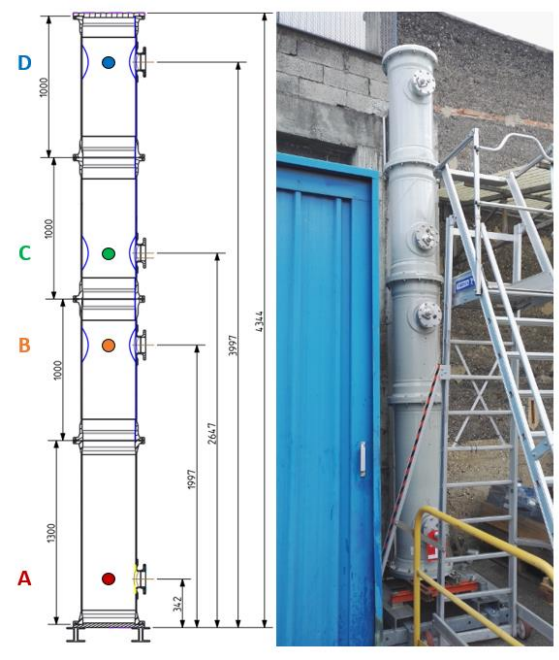


Figure 2 - Experimental setup to investigate effect of gravity

C4-FN measurement =same at all measurement points & stable in 3 years analysis

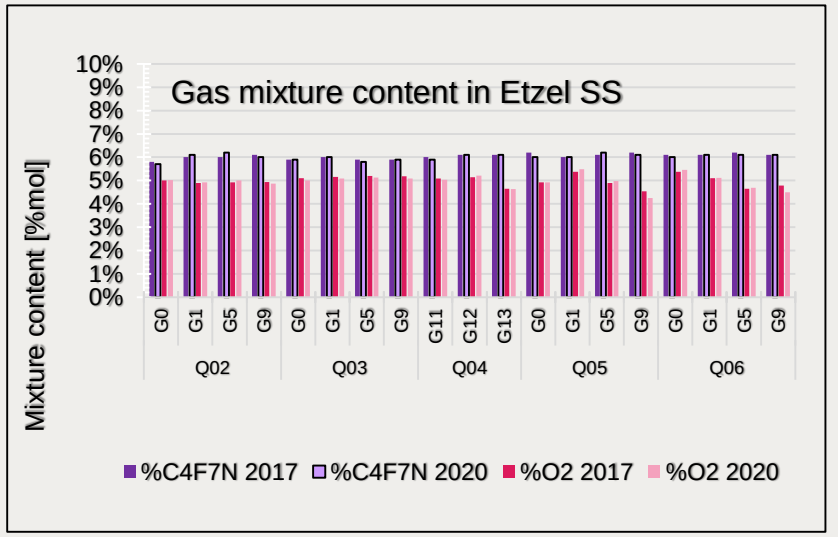
C4-FN gas mixture remains homogeneous overtime

Long term stability of C4FN equipment

3/Gas composition in outdoor & site condition :

VT setup used for long term tests between 2015 and 2021

4/ Gas composition indoor & site conditions :



No deviations for the C4FN and O_2 concentrations are visible over a service period of three years