

Influential factors on temperature rise performance of SF₆ alternatives

Study Committee A3 – PS2 – Q9

There are conflicting reports on temperature rise performance of SF₆ alternatives. Report 10658 reports an issue, 10657 reports high values at 2500 A whereas authors of 10126 show results like SF₆. Can specialists shed some light on the various influential factors and how they are controlled?



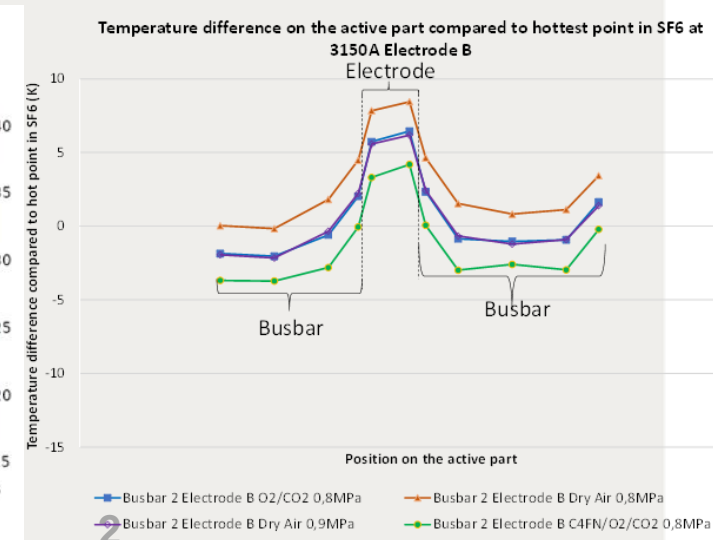
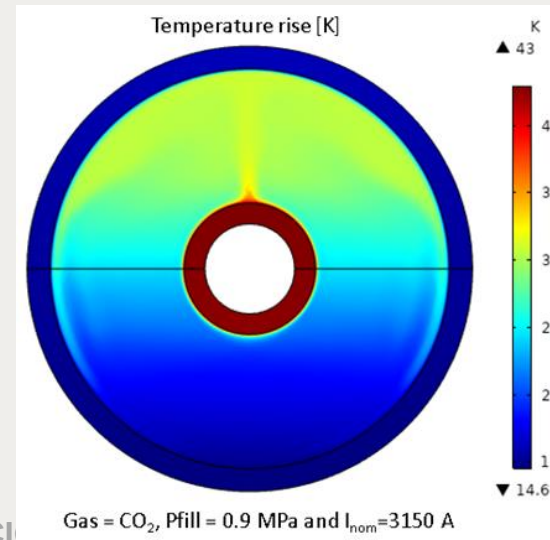
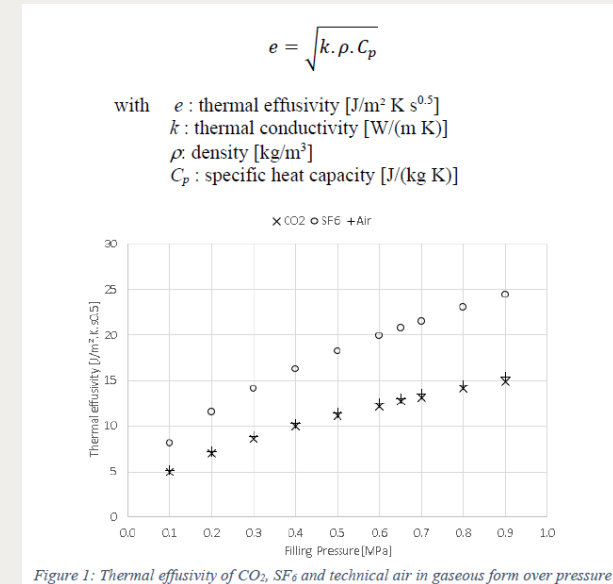
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Influential factors on temperature rise performance of SF6 alternatives

• Influence of changing the gas: thermal effusivity

- Effusivity is much higher in SF6 than in natural origin gas at a given pressure
- Technical air and CO₂ have similar effusivity
- C4FN slightly enhances the performance
- Higher pressure partly compensates the reduced effusivity

Group Discussion Meeting



Influential factors on temperature rise performance of SF₆ alternatives

- *Overall temperature rise increases by 10-15% between SF₆ and its alternatives*
- The influential factors are mainly:
 - Gas type and filling pressure
 - Conductor design and material (impact on heat source, convective and radiative heat transfer)
 - Contacts design (impacts on heat sources)
- **The same nominal current ratings and footprint can be achieved with C₄F_n/O₂/CO₂ by implementing small design adaptations.**