

## Prequalification testing under variable environments

B1 Insulated Cables – PS2 – Q3

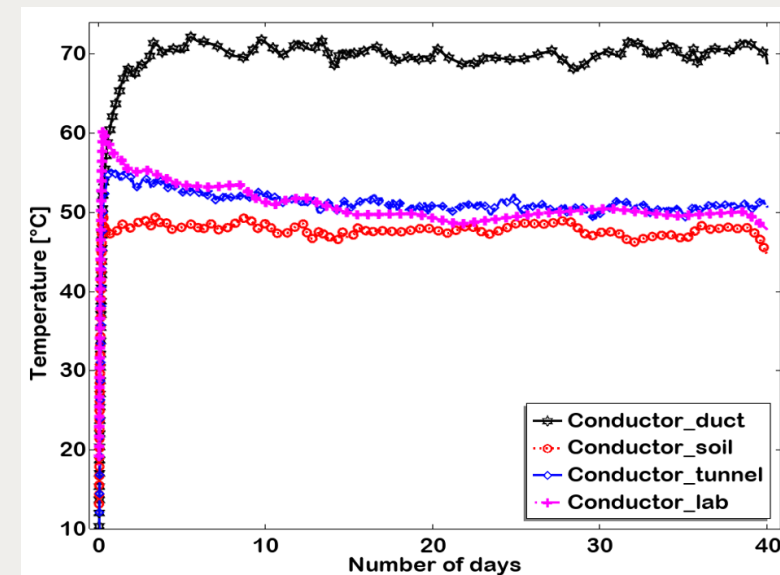
To what extent tests including more variable  
environmental scenarios offer  
enhanced reliability and system integrity?

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## PQ testing with sections of different environments

- Significant temperature difference between different sections
- **Only the hottest section will be maximally stressed.**
- The **volume/length** of cable under test is **important** since the probability of **failure** in a cable circuit **increases** with the cable length.



Reference: Abbasi et al, Cigré Session 2022, paper B1-10513

TB852: approx. 100 m shall be tested in PQ.

Approximately 100 m of cable including complete accessories (at least one of each type) with a dielectric design suitable for practical applications shall be tested. Where appropriate, mechanical preconditioning may be considered before starting the Prequalification Test.

# PQ testing with sections of different environments

- The total length of testing loop is limited by equipment and testing facilities.
  - To accommodate several testing environment in one loop, the length of hottest section might become shorter than 100 m, and hence the probability of failure decreases.
- In a PQ with variable environment, the hottest spot of the section/loop may change in both position and duration, and temperature regulation point needs to be adapted.
  - Therefore, the accumulated ageing of the loop may become lower.
  - Certainly, the temperature control becomes very challenging.

# PQ testing with sections of different environments

- The testing philosophy should be based on simulating failure modes/mechanisms.
  - No evidence of enhanced capturing of failure modes when variable environment is utilized.

**PQ testing of the entire cable length in nearly identical and thermally well controlled environments, will maximally stress the whole length to ensure the system reliability.**