



# Insulation materials

Enhance electrical insulation reliability & accelerate your innovation cycle

SuperGrid Institute's material laboratory brings together a unique set of prototyping and testing assets, from state-of-the-art analysis capabilities to advanced in-house set-ups dedicated for advanced electrical characterisation.



## OVERVIEW

Drawing on a team of experts in dielectrics for AC and DC applications, we offer a full range of services to tackle dielectric material investigation, characterisation and qualification of solid, liquid and gaseous as well as insulation design and testing.

Where needed our high voltage test platforms are made available to push the limits of material investigation.



## INSULATION MATERIALS SERVICES INCLUDE

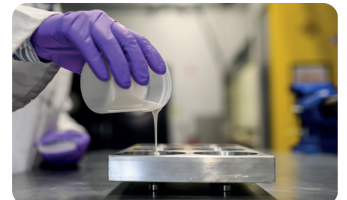
- **Material sampling and prototyping**  
*Casting and preparation of samples in our chemical laboratory.*
- **Physicochemical & mechanical analysis**  
*Characterisation of chemical, thermal and mechanical properties using advanced methods.*
- **Advanced electrical characterisation**  
*Measurement of electrical parameters for solid, liquid and gaseous insulation to support material selection and CAD design.*
- **Tailor-made dielectric & ageing tests**  
*Tailor-made tests on samples and prototypes to define final design criteria.*

## PHYSICOCHEMICAL & MECHANICAL ANALYSIS

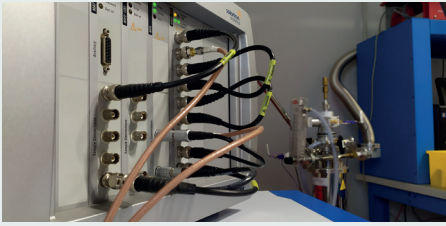
- Infra-red spectroscopy (FTIR)
- Differential scanning calorimetry (DSC)
- Thermal conductivity
- Dilatometry
- Viscometry
- State-of-the-art mechanical test benches: tension, compression, bending...

## MATERIAL PROTOTYPING & SAMPLING

- Sample and prototype preparation in our chemical laboratory
- High-quality insulating materials ensured
- Expertise in design and shaping (CAD validation)
- Advanced production processes: gravitational injection, impregnation



## ADVANCED ELECTRICAL CHARACTERISATION



### Dielectric spectroscopy analysis

Extract the main dielectric properties (dielectric constant,  $\tan\delta$ ) of a material, as a function of frequency.



### DC conductivity (bulk & surface)

A range of in-house set-ups to measure DC conductivity and its dependency on electrical field stress, temperature, pressure, humidity conditions and solid/gas interfaces.



### Space charges (PEA)

The pulsed electro-acoustic (PEA) method is a non-destructive space charge measurement method used to characterise space charge behaviour inside solid insulation materials...

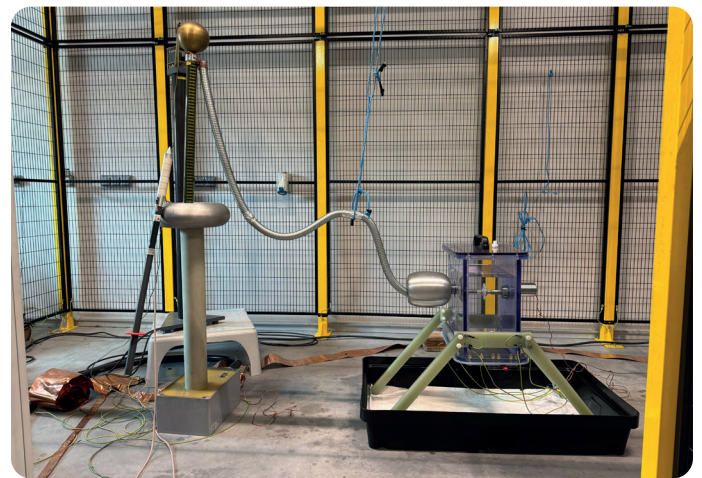
## DIELECTRIC & AGEING TESTING

We perform dielectric and ageing tests on material samples and reduced-scale prototypes to ensure reliable insulation performance throughout the equipment lifecycle and to define design criteria.

These tests include:

- thermal and electrical ageing tests,
- various DC and AC tests (up to 100kHz),
- breakdown tests in various conditions,
- partial discharge tests.

Custom test benches and adapted monitoring are developed for complex insulation challenges.



## OUR REFERENCES

### Advanced epoxy solutions for low-power instrument transformers

G&W Electric partnered with SuperGrid Institute to assess the ageing and reliability of next-generation voltage and current sensors designed for future electricity grids. Using our advanced testing platform, sensor materials were evaluated by our experts under accelerated hygrothermal ageing conditions representative of real-world environments.

The trials identified a high-performance epoxy system with superior resistance to environmental stresses, supporting improved sensor reliability and faster material validation for grid equipment manufacturers.



### Evaluating 640 kV DC SF6-free cable terminations with Prysmian

Prysmian, a global leader in cable solutions for energy transition and digital transformation, needed to select the best material combination for its brand new HVDC epoxy-insulated cable terminations. These terminations are a complex arrangement of materials that ensure the safe connection of HVDC cables to GIS.

Multiple epoxy samples were tested simultaneously by our material testing department under different conditions including humidity, temperature & voltage stresses.



## CONTACT

For additional information or to ask for a quote, please contact: [sales@supergrid-institute.com](mailto:sales@supergrid-institute.com)

## Shaping power transmission

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