

# Physical-Chemical Transformer Diagnostics Department



The analytical services performed by the Physical-Chemical Transformer Diagnostics Department provide you with the accurate information that you need to diagnose the condition of your high-voltage liquid-filled equipment.

Regularly scheduled oil testing is a cost-effective and sound maintenance practice that is used to ensure reliable operation and to extend the life of your transformers and other liquid-filled high-voltage equipment.

We rely on recognised state-of-the-art diagnostic methods and development of advanced non-destructive diagnostic methods for the early detection of transformer faults, preventive maintenance, prolongation of life span and assessment of the operational reliability of transformers.

## LABORATORY SERVICES AND RESEARCH ACTIVITIES

- ▶ IEC 17025-accredited physical and chemical transformer oil and paper insulation tests in accordance with IEC, DIN, ISO, ASTM standards,
- ▶ expert diagnostic evaluation of the operational reliability and remaining life span of new and old HV transformers,
- ▶ consultation on maintenance measures for prolonging transformer life span,
- ▶ research and development of physical and chemical diagnostic methods in HV transformers,
- ▶ applied studies on investment, maintenance and operational revitalisation of HV transformers,
- ▶ diagnostics of transformer thermal malfunctions in service operation by infrared thermography
- ▶ development and application of transformer dynamic thermal models and dynamic thermal ratings
- ▶ diagnostics and validation of moisture and dissolved gas in oil on-line monitoring sensors,
- ▶ active cooperation in international work groups (IEC TC 10 - insulation electro-technical liquids and TC 14 - transformers, CIGRE A2 - transformers and D 1.01 - new insulation materials and testing techniques),
- ▶ organisation and implementation of inter-laboratory efficiency tests (Round Robin tests),
- ▶ organisation of international conferences and work group meetings (CIGRE, IEC, ICDL, ISH).



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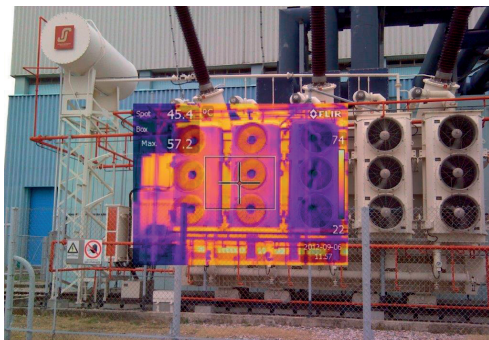
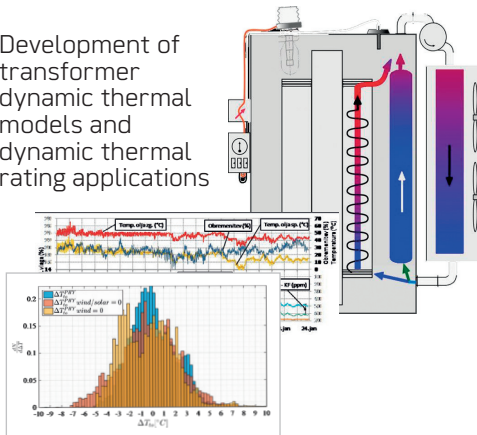


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SIST EN ISO/IEC 17025  
**LP-102**



Detection of electrical and thermal faults of operating transformers by DGA gas chromatography with vacuum extraction

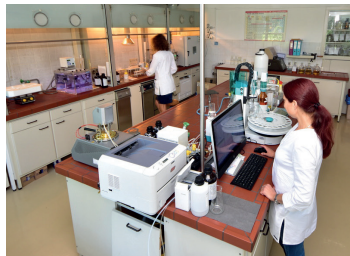
Development of transformer dynamic thermal models and dynamic thermal rating applications



Thermographic diagnostics and transformer cooling system optimisation



HPLC Furanic analyses for evaluation of paper insulation ageing



Laboratory for physical-chemical analyses of HV insulating liquids



On-site validation of moisture and dissolved-gases-in-oil on-line monitoring sensor

## THE IMPORTANCE AND ROLE OF PHYSICAL-CHEMICAL TRANSFORMER DIAGNOSTICS

Physical-chemical diagnostics is a fundamental tool for monitoring transformer operational reliability and optimisation of transformer asset management.

Transformer oil contains key information about a transformer's condition. Thermal and electrical faults produce by-products in the oil. These can be detected and measured with various diagnostic methods on oil samples taken from the transformer during regular operation, without the need to switch the transformer off the grid.

Dissolved gas analysis (DGA) in oil can detect abnormal electric and thermal faults in transformer operation. Furanic analysis of the thermal by-products of cellulose insulation (2FAL analysis) enable accurate and reliable assessment of the process of paper insulation ageing, which is the main indicator of transformer reliability.

Physical-chemical diagnostics provides timely and cost-effective maintenance, rehabilitation or replacement of a transformer.

## DO YOU WANT TO ASSESS THE CONDITION OF YOUR TRANSFORMER?

Do you need a spare transformer? Are there any maintenance measures required? How long will the transformer operate reliably? What is the expected remaining lifespan of the transformer? Is it possible to extend the lifespan of the transformer? How should the alarm limits on the online monitoring sensors be set? Can the transformer be put back into operation after a Buchholz alarm, or is there an internal damage? How much can the transformer be safely overloaded?

**Preventive physical and chemical diagnostics provides you the answers that you need.**

**For more information call +386 1 474-3660 or visit our website: [www.eimv.si/chem](http://www.eimv.si/chem)**



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