

Case study Insulating oil test in the ABB Sécheron AG laboratory

“Like a Swiss watch”

Many network providers in Switzerland and abroad send samples of their transformer insulating oils to ABB Sécheron AG in Dättwil (Switzerland) for testing. On the one hand, customers would like to be reassured that they can continue operating their transformers without the risk of a breakdown. On the other hand, they would also like to know how long the oil can still be used for and if the oil condition indicates possible faults in the transformer.

What at first glance might seem like “reading tea leaves” actually proves to be scientifically reliable. Eric Killer from the Dättwil oil laboratory says “a standard analysis involves conducting seven measurements on the insulating oil. This tells us a lot, even about the operating states.” In addition to the breakdown voltage and dissipation factor, the laboratory team measures the oil colour, the contact surface voltage, the acid and water content and - in mineral oils - the antioxidant content. If the electric and thermal stress that the transformer has been exposed to needs to be evaluated, decomposition gases will be analysed, too. With the help of the so-called Furan analysis, it is also possible to determine to what extent the paper insulation in the transformer has aged.

The customer determines the order volume, but the breakdown voltage and the dissipation factor are always measured. For this, ABB Sécheron relies on devices from BAUR Prüf- und Messtechnik. “The devices are easy to operate and extremely reliable.” When Killer joined the laboratory over ten years ago, two BAUR devices were being used for the breakdown voltage test and two for measuring the dissipation factor, the specific resistance and the relative permittivity. Of these, one was replaced only after 20 years, while another device developed faults and was repaired. However, the precision of the measurement results remained unaffected.

Reliable and precise

What Killer appreciates the most is the precision of the BAUR devices. Measurements on one can be repeated on the other - with the same results. Even the comparison of current measured values with past data is no problem, as the measured values do not drift thanks to the yearly onsite calibration by the BAUR Service Team. Killer can thus detect reliable trends with repetitive tests. Even when different people operate the devices, which can lead to deviations, they deliver comparable results. “We obviously can’t take this for granted,” explains Killer, “however, we trust our BAUR devices.” Therefore, his verdict is that they are “as precise as a Swiss watch.”

The user



ABB Sécheron AG in Dättwil in the Swiss Canton of Aargau offers various laboratory services, including the testing of insulating oil. At the customer’s request, the laboratory prepares brief or extensive analyses of the sent oils. If needed, the service includes sampling or onsite consultation.



Eric Killer from ABB Sécheron AG (left – during sampling, above – in the laboratory) uses BAUR devices to determine the breakdown strength of the

insulating oil as well as the laboratory values that allow conclusions to be drawn regarding the oil condition. The ABB Sécheron AG laboratory uses two BAUR devices of similar design for the breakdown voltage test and two more devices for measuring the dissipation factor, the specific resistance and the relative permittivity (description overleaf).



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Oil tester BAUR DTL C

The BAUR DTL C oil tester provides precise information for efficient oil management in plants in the electricity and other industries. It measures the dissipation factor, the specific resistance and the relative permittivity of insulating oils in a fully automatic manner. The device comes with eight different test sequences corresponding to the standards (including IEC 61620) for quick, comprehensive analysis results. It is also possible to programme up to ten individual test sequences.



The most important features at a glance:

- Precise dissipation factor measurement ($\tan \delta$) with a level of accuracy of up to 1×10^{-6}
- Measurement of the specific resistance ρ with both polarities up to 100 T Ω m
- Measurement of the relative permittivity ϵ_r
- Suitable for mineral or silicone oils and ester liquids
- Induction heating of the cell for very precise temperature control for a result independent of the temperature
- Temperature measurement in the measuring electrode
- automatische Kalibrierung der Leerzelle für schnelle Prüf-abläufe
- Automatic calibration of the empty cell for quick test sequences
- User interface in 13 languages
- Optional: BAUR ITS Lite software for efficient measurement data management

Oil tester BAUR DTA 100 C

The BAUR DTA 100 C oil tester is designed for the fully automatic measurement of the break-down voltage in liquid insulating materials up to 100 kV in the laboratory during continuous use. As a high-performance unit, it provides clear breakdown detection and reliable, reproducible measurement results, even across several test sequences. It is equally suitable for demanding users in test institutes, and the electricity and other industries.



The most important features at a glance:

- Breakdown measurement for mineral and silicon oils as well as ester liquids
- Switch-off time below 10 μ s for reliable measurement results across several measurements
- Clear breakdown detection (directly on high voltage unit)
- Automatic self-test with output voltage test each time you start
- Fully automatic measurement sequence: implemented test sequences for 18 test standards common around the world; ten freely definable, user-specific test sequences
- High quality test vessels
- Ergonomic operating unit, integrated printer
- Built-in sensor for measuring the temperature of the insulating liquid
- User interface in 13 languages
- optional: PC-Schnittstelle und Prüfsoftware ITS
- Optional: BAUR ITS Lite software for efficient measurement data management



You can find data sheets and further details on these products on our website:
www.baur.at/insulationfluidstesting