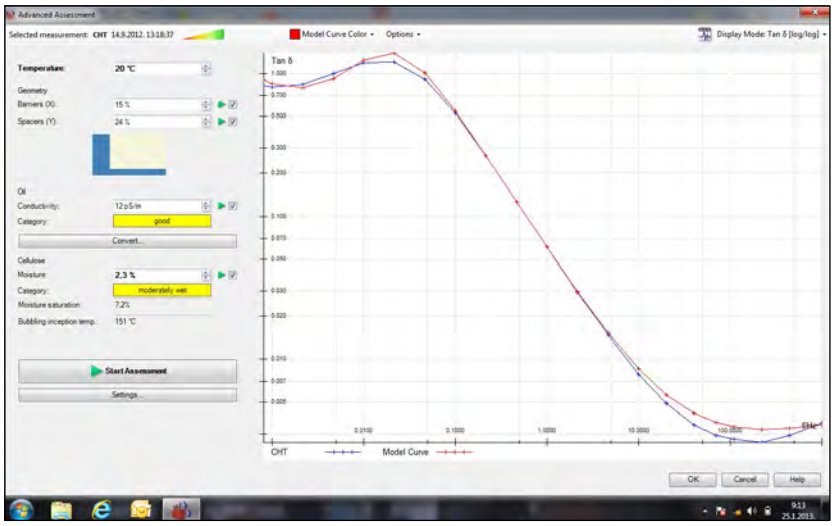
Dielectric response of a transformer



Why measure the dielectric response of a power transformer?

Measurement and analysis of the dielectric response of a power transformer are used to determine moisture content in paper-oil insulation. Moisture in insulation deteriorates the dielectric withstand strength, increases the rate of cellulose ageing, and in the case of excessive temperatures generates gas bubbles.

That is why moisture content in insulation of power transformers should be monitored.

What methods are used in measurement of dielectric response of transformers?

Two methods are combined to measure the dielectric response:

- polarization current measurement (PDC)
- frequency domain spectroscopy (FDS).

Combination of these two methods reduces significantly the measurement time. Measurement time is up to 3 hours per transformer.

How is moisture content determined on the basis of the dielectric response of a transformer?

Comparison of measured dielectric response and reference mathematical models of transformers yields moisture content and oil conductivity as the result.

When the measurement of dielectric response of a transformer should be used?

- In new transformers – as reference value for condition checks in service
- In condition assessment of old transformers in service
- In transformer drying – to assess the quality of drying.

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