Frequency Heating (LFH) Drying solution for wet transformers
Extend the life time of your transformers

The status of the oil-cellulose insulation system is one of the key parameters influencing lifetime expectancy and reliability. The ageing rate of insulating material depends on different parameters such as: original insulation material, oil temperature, water content, oxygen content and acids from oil and paper aging. ABB’s efficient LFH drying system delivers substantial benefits including low residual moisture, shorter downtime, reduced costs, on-site process, no transport time and costs.

Drying of Transformers
The origin of water in insulation can vary: quality of original drying, ingress through breathing system or gaskets, aging of cellulose. Reduced moisture allows a longer lifetime, higher reliability and overload capability (no bubbling). Impact of moisture on the lifetime of a transformer:
- The lifetime of a dry transformer is significantly longer.
- A dry transformer can withstand more load without a reduction of it's lifetime.
- A moisture increase in the paper insulation from 3% to 4% causes ageing comparable to a 6 to 8°C temperature rise.
- Indicative lifetime of insulation @ 80°C: 40 years if 1% moisture in paper insulation, 10 years if 3% moisture in paper insulation.

The following on-site drying solutions are available
Conventional
- Hot oil circulation if vacuum can not be applied
- Hot oil circulation and vacuum cycles (+ cold trap)
- Hot oil circulation and vacuum cycles with oil spray (plus cold trap) LFH
- Low Frequency Heating (LFH) under vacuum (plus oil spray)

Advantages of ABB’s LFH Drying Solution
- Short drying time, 30-50% shorter than conventional drying process with hot oil circulation and vacuum
- High drying efficiency, remaining moisture down to less than 1%
- On-site: no transportation risks, time and costs.

Drying process expertise is a must
Removing moisture from windings may cause a reduction of the clamping force, therefore any drying process (either online or offline) must be performed following a strict process by experienced transformer maintenance experts.

Customer Success Stories
Swiss Utility: 60 MVA 132 kV Power transformer
- Initial moisture: 2% – final moisture: 1%
- Drying duration: 2 days compared to 10 days with conventional hot oil circulation and vacuum system.
Canadain Utility: 750 MVA 500 kV Auto transformer
- Initial moisture: 1.5% – final moisture: 0.5%
- Drying duration: 2 weeks compared to 6 weeks with conventional hot oil circulation and vacuum system.
Significant benefits were reported by both customers:
- Shorter downtime of the unit
- Extended lifetime due to lower moisture in the insulation
- Labour savings.

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