

WG PC57.162

Proposals: Table of Contents & Scope of Section 6

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S15 IEEE Transformers Committee Meeting
13 April 2015
San-Antonio TX, USA

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4. Measurement and evaluation of moisture-in-gas insulation parameters (TF2)
5. Measurement and evaluation of moisture-in-liquid insulation parameters (TF3)
6. Measurement and evaluation of moisture-in-solid insulation parameters (TF4, TF5 & TF6)
 1. Discussion of moisture migration and distribution in transformers/reactors (Motion made and approved to make new TF)
 - Major types of moisture migration in solid-liquid-gas insulating media
 - Addressing distribution of moisture in solid insulation
 2. Measurement of moisture in solid insulation using samples of insulation (TF4)
 3. Evaluation of moisture in solid insulation using dielectric response methods (TF5)
 4. Inferring of moisture in solid insulation from measurements conducted in liquid or gaseous medium (TF6)
7. Evaluation of aging and end of life of solid insulation parameters (TF7)
8. Factory/workshop application of knowledge on moisture; establishing baselines (TF8)
9. Field application of knowledge on moisture (TF9) Note: This section lists the risks associated with moisture
 - Annex A (informative): Bibliography (alternative option: bibliography in each section?)
 - Annex B (informative): Moisture equilibrium charts for solid-gas and solid-liquid dielectric media
 - B.1 Moisture equilibrium charts for solid-gas dielectric media
 - B.2 Moisture equilibrium charts for solid-liquid dielectric media
 - Annex C (informative) (if needed).

Annex B (informative): Moisture equilibrium charts for solid-gas and solid-liquid dielectric media

B1. Solid-Gas:

1. WCS (Water Content of Solid *Insulation*) vs Temperature (T) and Pressure (P); e.g.: a copy from IEEE C57.93
2. WCS vs T and Relative Humidity (RH) for new kraft ppr
3. WCS vs T and RH for aged kraft ppr (???)
4. WCS vs T and RH for other types of new ppr

B2. Solid-Liquid:

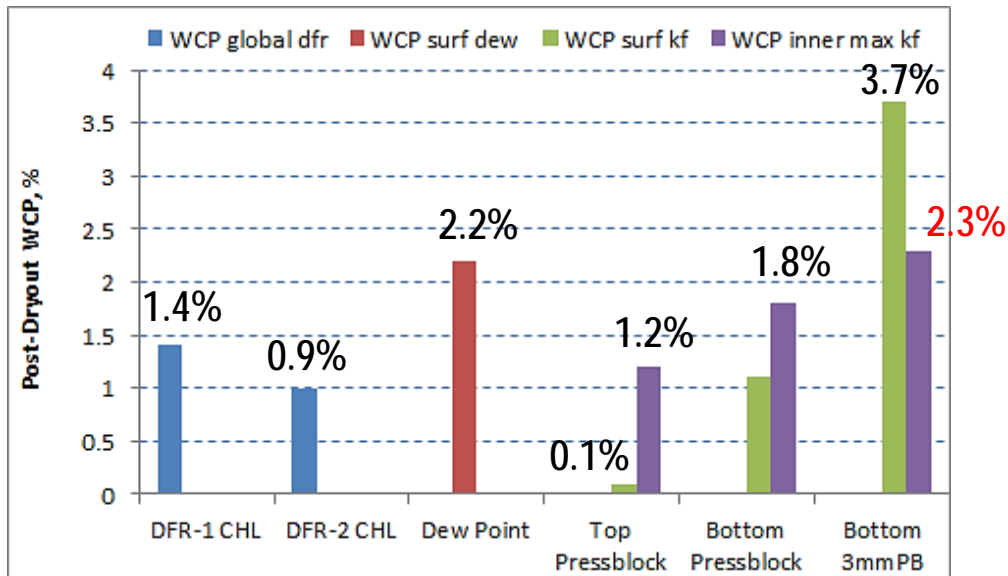
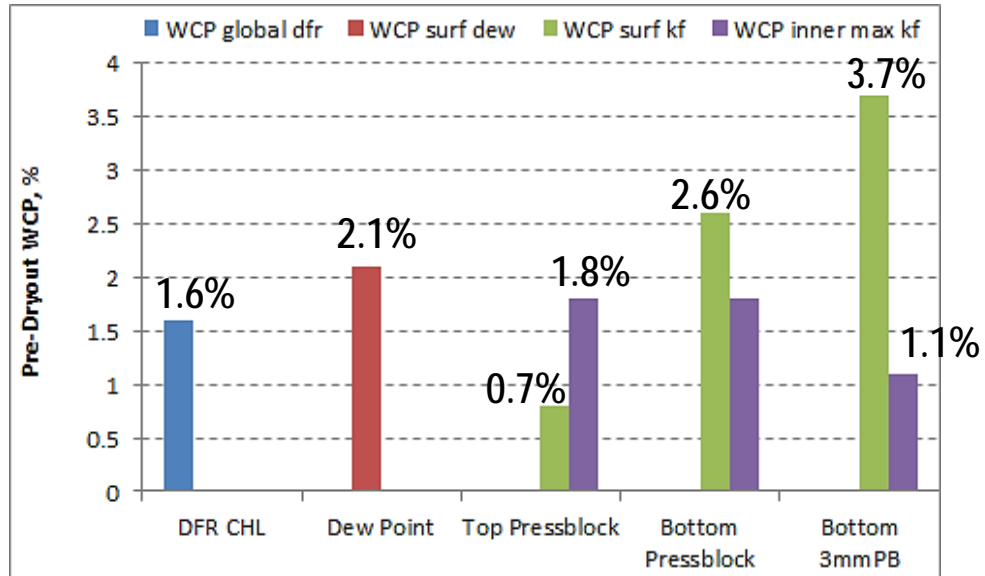
1. WCS vs T and WCL (Water Content of Liquid *Insulation*) for:
 - a. New MO (Mineral Oil)
 - b. Moderately deteriorated MO
 - c. Badly deteriorated MO
2. WCS vs T and WCL for:
 1. New Synthetic Ester
 2. New Natural Ester 1
 3. New Natural Ester 2
3. EPRI Color Chart
 - *Other moisture equilibrium charts?*

Scope of Section 6 (Proposed for Discussion)

- Background:
 - *The scope of Section 6 is of importance to TF1...TF9*
 - The moisture in insulation of a transformer/rector is always distributed unevenly
 - The moisture in insulation cannot be described by one single figure
 - It is logical to describe the moisture in insulation using a number of parameters

Example: Field Dryout of 30MVA 220/11kV Trf*

*Ref: Singh and Davydov, 2015 TechCon Asia-Pacific



WG PC57.162, IEEE TC S15 Meeting

Scope of Section 6 (Proposal)

This section describes the methods of evaluation of moisture in solid insulation of a transformer/reactor using the Karl Fischer titration, DFR, dew point and inferring techniques as complementing each other.

To address the uneven distribution of moisture in solid insulation, consideration will be given to an all-inclusive range of values describing the maximum and the minimum moisture contents of the surface and inner layers of insulation at the top, bottom and hottest spot of the transformer/reactor.

Thank you!