

UNAPPROVED MINUTES

WORKING GROUP ON THERMAL EVALUATION OF POWER AND DISTRIBUTION TRANSFORMERS (C57.100)

October 26, 2009

Lombard, Illinois

Roger Wicks, Chairman

1.0 Introduction and Rosters

The working group met on Monday, October 26, 2009 at 11:00 AM with 28 members and 88 guests attending, with 5 guests requesting membership. At this time, we will not add these guests to our membership (see note below related to survey/questionnaire). So, at this time the membership will stay at 84 members.

2.0 Approval of minutes from April 20, 2009 meeting

The minutes of the April 20, 2009 meeting in Miami, Florida were approved as written.

3.0 Patent Disclosure

The chairman asked if anyone knew of any patents that could pertain to this project. There were none.

4.0 Questionnaire Results and Revisions C57.100 in Draft 1

The chairmen spent the bulk of the meeting describing a questionnaire circulated to working group members and the results from that questionnaire. These were discussed sequentially, and the corresponding changes to document to create Draft 1 were discussed. The chairman noted that only 17 questionnaires were returned (16 from working group members (less than 20%).

Time/Temperature Decision

Extrapolation beyond 20C

- Keep existing method (5X life requirement for three points) – define range of data (how many degrees apart - **YES/NO**)
- Add capability for longer extrapolation with more points – **YES/NO**
- Add capability for longer extrapolation with more points (but less than above) and 2X safety margin) – **YES/NO**
- Other Input on this requirement?

Life Curves Decision

- Add finite new life curves – each a 5X multiplier from prior curve (to enable an adjustment to the loading guides to be easier) – **YES/NO**
- Is C57.100 the place for these life curves or a different location – **YES/NO** (where?)
- Other input on life curves? **Location for new curves (if agreed to) would be C57.91. This document is method of test.**

Materials Decision

- Should we specify that the tests be conducted with “minimum allowable” products if adjustable (such as nitrogen content?) – **YES/NO** (if not – how to deal with this issue)

Test Duration Decision

- Do we need to deal with the accuracy of the test by detailing minimum number of cycles (thermo/electrical tests) – **YES/NO** (if minimum not met – what is the recourse?)
- Do we need to deal with the accuracy of the test by detailing the minimum number of tests to determine a “end of life test” for the thermal only tests – **YES/NO**

Oil Decision

- Should the top oil temperature be controlled in all tests (other than sealed tube test), and does this then dictate the top oil temperature of the approved system? **YES/NO**.
- If yes, should the temperature limit of the system be equal to the tested value, or 5C or 10C below the tested value (for safety margin). Select a value 0, 5, 10
Mixed

Other Issues Decision

- Should we define an Industry Proven System which by definition meets our 65C rise (110C hot spot) life curve? **YES/NO**
- If Yes – is the outline on the earlier slide the right starting point? **YES/NO**
- What conditions require a full aging curve to be validated? **New Insulation system – new temperature class**
- What conditions allow a single/two point test to be used for validation? **NO**
- What conditions allow sealed tube tests to be used for validation? **Screening of new systems, Change of materials – no change of system/life curve.**

Major changes to the document include a definition of an industry proven system, specification of moisture content for all testing, adding the dual-temperature test, adding the concept of a relative test (vs. a control) to allow shorter duration testing, movement of the 5X multiplier to Annex B (informative) and changing sealed tube tests (Annex A) to informative (from Normative).

Discussion related to this presentation was good, with much of the questions related to how to determine end of life in the non-model tests (dual-temperature test and sealed tube test). John Luksich and others pointed out that in C57.91 there are different evaluation methods (200 Dp, 35% tensile and 50% tensile). Sam Mehta noted that some materials have higher start values and even at 50% tensile are stronger than some kraft materials currently used. The Chairman (and Secretary) noted that we need a method that is standard and applicable for all materials. Since our dual-temperature test shows reasonable correlation to the current life curve (in C57.100) using 50% retained tensile, this is what was selected as the criteria for the first draft. Also noted was that other

materials (such as wire enamels) will require other criteria (80% dielectric strength retention) which the draft also covers.

Another area of spirited discussion led by Jin Sim, included the moisture content at the start of the test (draft states 0.25 to 0.50%) or to control the moisture at a given level. Valery Davydov noted they have conducted testing with a constant moisture level with good effect. The chair responded that the initial moisture content would be easier to control (for all methods) and seemed to give similar life to our existing curve. So for this first draft, that will be what is proposed.

Finally – Figure1 (our life curve) needs to be referenced to the correct document, and Tom Prevost will help the chair with this.

- 5.0 The chair then finished up the discussion offering clemency to the member of the working groups who did not respond to the questionnaire. He will allow working group members to stay on the list IF they respond the chairman with comments related to the draft 1. Guests will also be solicited for comment. These comments are requested by the end of the year, and the chair will then look for help in resolving major issues so a draft 2 can be completed by the end of the first quarter (and potentially balloted).
- 6.0 The meeting adjourned at 12:16 PM.