### Working Group for Application of High-Temperature Materials IEEE P-1276 – Roger Wicks

Astor Crowne Plaza New Orleans – New Orleans, LA USA

Room – St. Charles AB

April 4, 2017, 3:15 - 4:30 pm

1. Welcome & Chairman's Remarks R. Wicks

Roger opened the meeting at 3:15pm with a brief description of the scope of the Working Group. The chair reviewed the patent topic and there were no essential patented described for work in the area of this standard.

1. Circulation of Attendance Rosters J. Arteaga

Circulated

1. Attendance for Quorum J. Arteaga

18 members were in attendance meeting the quorum requirement of 18 members. 77 guests were presented for a total attendance of 95.

1. Approval of Fall 2016 Meeting Minutes – Vancouver, Canada J. Arteaga

Patrick McShane objected to the approval of minutes indicating the comments made by John Luksich were not included in the minutes. Roger requested to Patrick to write the mentioned comments for their inclusion in the minutes, and then request approval by e-mail.

1. Patent Disclosure J. Arteaga

There were not issues related to Patent Assurance brought up by attendees in the meeting.

1. Status of PAR/Document R. Wicks

The PAR was extended for 2 additional years, to the end of 2018. The current standard expires on December 31, 2018. Roger commented that there is a need to now accelerate our work and complete a draft within the next couple of months to allow progress to be made prior to our next meeting in Louisville.

1. Assignments from last meeting R. Wicks

Volunteers have been solicited, and now work needs to progress in the following areas:

* + Section 5 – Insulation-system temperature ratings, test procedures, and material aging qualification. Volunteers – Mike Franchek, Roger Wicks, Ken McNeish, Tom Golner, Dave Stankes, Solomon Chiang, Joshua Verdell, Dave Sundin, and Jinesh Malde.
	+ Section 6 – Insulating Materials. Volunteers – Clair Claiborne, Javier Arteaga, Julio Calderia, Patrick McShane, Dave Sundine, Attila Gyore, Chuck Stevens, Shane Goydich, Jinesh Malde and Dustin Davis.
	+ Section 7 – Description of high-temperature transformers. Volunteers – Kurt Kaineder, Mike Franchek, Arup Chakraborty and Evan Langran.
	+ Section 8 – Loading guidelines for high-temperature transformers. Volunteers – Alan Sbravati, Arup Chakraborty
	+ Section 10 – Heat run test and average winding temperature. Volunteers – Juan Castallanos, and Mike Franchek.
1. Section 5 - Insulation System Testing R. Wicks

Some revisions to this section have been completed. More work is underway to provide more “guide-like” information related to how to set up an aging program and conduct such testing – independent of the combination of materials provided.

Plan would be to provide examples of how this would work for dual-temperature and sealed tube testing, with more detail than is provided in C57.100.

For thermal aging, materials are set up according to IEEE C57.100 Standard Test Procedure for Thermal Evaluation of Insulation Systems for Liquid-Immersed Distribution and Power Transformers (other test set ups are dependent on requirement for customers)

Two types of ratios of materials:

* + 1. Transformer power ratio: more board, less paper
		2. Transformer distribution ratio: less board, more paper

The guide can include the methods of how to make the test for ageing:

* Determination of EOL criteria
* Aging of candidate system
* Example of dual temperature aging method
* Example of sealed tube testing

Examples provide in current guide were made-up, but current information available can be provided and incorporated in this guide revision.

1. Section 7 - Description of High-Temperature Transformers K. Kaineder

Current guide has significant detail of hybrid insulation system in mineral oil for power transformer application. There is need for more details related to other combinations.

Kurt Kaineder made a presentation highlighting the benefits to include hybrid insulations and ester fluids as a high temperature transformer. Standard C57.154 outlines the temperature classes but does not address the hybrid and ester class, and this guide can include this.

Kurt made the motion to include the missing combination of hybrid insulation systems and ester fluids.in IEEE 1276 Annex. Marion Jaroszewski second the motion.

Roger commented that this could be included in the main body of the guide. Alan Sbravati commented that this could cause confusion because the guide would be different to standard C57.154, with synthetic ester limit at 90 C and natural ester limit at 120 C. In addition, synthetic and natural esters have a different operational temperature limits. To this Roger W. and Kurt K indicated that additional considerable work would need to be done to clarify the difference in temperature limits and it would jeopardize the completion of guide before it expires. Attila Gyore added two separating the two ester fluids would create confusion and that he would not recommend this.

Anastasia O’Malley was in favor the have the distinction between the two fluids.

The motion passed with 11 votes in favor, no opposition and 1 abstention.

Alan S. and Attila G. will prepare the document sections addressing this topic.

1. Section 8 - Loading Guide R. Wicks

A loading guide information has been presented to the working group for the use of natural esters. This is a very detailed work and provides the user with good information related to loading of such transformers.

This guide uses data provided in IEEE C57.154 as the basis for the guide information.

Still is not clear how to address aging data that does not meet criteria of IEEE C57.100 in total. To address the loading guide in general within this document it would be necessary to:

* Describe method vs. specifics of existing systems
* Allow for future high temperature materials to be covered.

 Alan S. will address this as responsible of section 8.

1. Additional remarks R. Wicks

Chair expects to receive the completed sections of the guide no later than the end of June.

No old or new business were brought.

Kurt Kaineder made a motion to adjourn the meeting, Craig Stiegemeier second the motion, all members approved it, and the meeting adjourned at 4:00 PM.

Roger Wicks – Chair Javier Arteaga - Secretary