

# **Annex L Standards Subcommittee – Unapproved Minutes**

**November 1, 2017**  
**Louisville, KY**  
**USA**

**Chair: Jerry Murphy**  
**Vice Chair: Kipp Yule**  
**Secretary: Daniel Sauer**  
**Standards Coordinator: Jim Graham**

The Secretary, Daniel Sauer opened the meeting calling for a show of members to establish quorum which was met.

## **L.1 Meeting Attendance**

The Standards Subcommittee met on Wednesday, November 1st, 2017, at 4:30 PM EDT. A show of hands indicated 23 of 46 members in attendance at the beginning of the meeting which met the quorum requirement. Overall the attendance roll showed there were 84 attendees, 26 members, 58 guests, including 10 that requested membership upon tabulation of the circulated rosters and will be reviewed for eligibility. Gary Hoffman moved to approve the agenda with second by Marcos Ferreira; motion was carried in the affirmative via viva voce. Daniel then requested a review of the New Orleans minutes; motion was made by Sanjib Som and seconded by Marcos Ferreira; motion was carried in the affirmative via viva voce.

## **L.2 Chair's Remarks**

Daniel stated that both Jerry and Kipp were not able to make this meeting, but we look forward to their return at the Pittsburgh meeting. Additionally, Daniel mentioned that the RFID system appeared to be working, so please make sure you tap-in, but for the present also make sure you sign the paper rosters.

## **L.3 Working group reports**

### **L.3.1 Continuous Revision of C57.12.00-2015 – Steve Snyder**

The purpose of this WG is to compile all the work being done in various TF/WG/SC's for inclusion in the continuous revision of C57.12.00 in a consistent manner. This WG coordinates efforts with the companion Standard C57.12.90 so that they publish together.

The current standard was approved by the IEEE-SA Standards Board on December 5, 2015, with an official publication date of May 12, 2016. The standard is good for 10 years, but is under continuous revision and will be next balloted when sufficient new material is available. The PAR which covers the ongoing continuous work on the document is good through December 31, 2021.

As agreed at the Fall 2016 Standards Subcommittee meeting, any new material provide to me for inclusion in the next revision, will first be presented to this subcommittee for the "official" vote of approval. One such topic has been addressed by the appropriate subcommittee and is presented here:

#### **Clause 6.6.1 Insulating Liquids**

"Standard needs to maintain the sentence "There are other insulating fluids that may be suitable and are commercially available...". From the *Insulating Fluids Subcommittee* the following response was

received: “Support C57.12.00 BRG decision to *continue* limiting inclusion of insulating liquids to those that have a published ASTM Acceptance Standard.”

Therefore no change is recommended to the published standard.

Respectfully submitted by Steven L. Snyder, WG Chair, on November 1<sup>st</sup>, 2017.

### **L.3.2 Continuous Revision of C57.12.90-2015 & Cor. corrections – Steve Antosz**

This is a working group by committee of task forces, for continuous revision of C57.12.90. The purpose of the WG is to keep track of the work being done in various TF/WG/SC’s for inclusion in the continuous revision of C57.12.90 in a consistent manner.

#### **Summary**

The revised document was published in March 2016 as IEEE Std C57.12.90-2015. Shortly after the document was published, one error and one omission was discovered, so a Corrigendum was done and published on March 23, 2017. It is *IEEE Std C57.12.90<sup>TM</sup>-2015/Cor 1-2017 (Corrigendum to IEEE Std C57.12.90-2015) Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers Corrigendum 1: Editorial and Technical Corrections.*

#### **Status**

A new PAR was submitted by me in October 2017 and it is on the agenda for NESCOM’s next meeting in December.

#### **FUTURE REVISIONS AND PENDING WORK**

Since this is a continuous revision document, there continues to be ongoing work in the various Task Forces.

Changes *already approved* for the next revision:

Changes to 9.3.1 Wattmeter-voltmeter-ammeter method from Mark Perkins’ PCS TF for Revision of C57.12.90. Final survey approved in Nov 2015 in both the TF and PCS. The following text is to be added just prior to Figure 18 for three-phase transformers:

An alternate method for either single phase or three phase transformers is to provide capacitive compensation for the transformer impedance at the terminals of the transformer so that the AC source need only supply the real power for the test. Figure 18 shows the apparatus and connections for a single phase transformer for this alternate method and the method can also be used in a three phase configuration. In this case, the wattmeter will measure the real power of the transformer under test plus the power of the capacitors, which will be very small compared to the power in the transformer. The load loss in the transformer is determined by subtracting the loss in the capacitors from the measured loss. For modern oil film capacitors, a loss of 0.2 watts per actual kVAR may be used unless a specific capacitor bank loss is known. This method requires a separate CT or set of CTs at the transformer for setting the current and measuring the transformer impedance. The advantage of this alternate method is that the phase angle between the voltage and current at the wattmeter is low (closer to zero degrees) due to the capacitor compensation, so any phase angle errors in the loss measurement circuit are much less significant.

Add in subclause 10.3.1 and 10.3.1.1 Lightning Impulse, the following words in red; by Pierre Riffon’s WG Revision to Impulse Test in Dielectric Test Subcommittee. Submitted on 11/4/2016. These

subjects have been surveyed within the Dielectric Tests SC and within the TF. The 4<sup>th</sup> survey got a 100% approval rate.

10.3.1 Impulse tests shall be made without excitation. The impulse waveshape parameters such as peak voltage, front time and tail time are determined on the test voltage curve which is obtained after having processed the recorded curve using the test voltage function method, as defined in IEEE Std. 4.

#### 10.3.1.1 Full-wave test

The test wave rises to crest in 1.2  $\mu$ s and decays to half of crest value in 50  $\mu$ s from the virtual time zero. The crest value shall be in accordance with the assigned basic impulse insulation level (BIL), subject to a tolerance of  $\pm 3\%$ ; and no flashover of the bushing or test gap shall occur. The tolerance on virtual front time should be  $\pm 30\%$ , and the tolerance on time to half of crest should be  $\pm 20\%$ . However, as a practical matter, once the manufacturer has proven that they have test equipment limitations, the following shall be considered:

a) If the standard impulse shape cannot reasonably be obtained because of low winding inductance or high capacitance to earth and the resulting impulse shape is oscillatory so that the relative overshoot magnitude exceeds 5 % then the front time may be increased to reduce the overshoot amplitude. In all cases, the front time shall not exceed 2.5  $\mu$ s regardless of the overshoot amplitude.

Note 1: The overshoot can be reduced by increasing the front resistor value of the impulse generator. The use of low inductance connections between the impulse generator and the tested transformer are also recommended.

#### pending work

Possible future addition of a new clause for a Load Tap Changer Performance Test, from Hakan Sahid (formerly Mark Perkins) PCS TF for Revision of C57.12.90.

This TF also is considering to add a clause that a transformer be tested with the same insulation liquid that it will use in service. For example, a unit to be filled with ester liquid should (or shall?) not be tested with mineral oil in the factory.

Possible future revision to subclause 10.8.2 from Bertrand Poulin's TF regarding a limit of pressure applied inside a transformer tank during induced voltage test. Ongoing work continues.

Other possible revisions to subclauses 10.2 to 10.4 from Pierre Riffon's TF for revision of impulse tests. Ongoing work continues.

Other possible revisions to subclauses 10.5 to 10.10 from Bill Griesacker's TF (formerly Bertrand Poulin) for revision of low frequency tests. Ongoing work continues. A TF has been formed to look at reducing the limit for PD level Failure Detection in 10.8.5.

Respectfully submitted by Stephen Antosz, WG Chair, on November 11, 2017

### **L.3.3 Corrigenda for C57.12.70 – Steve Shull**

Steve Shull called the meeting to order and introductions were made. Dan Mulkey substituted for Jerry in the capacity of secretary as Jerry was not able to attend. The roster was circulated. The names of those in attendance are recorded in the AM system. To establish a quorum, a members list was displayed on the screen and those who saw their names were asked to hold up their hand. From this count of hands, it was determined that a quorum was established. A motion was made by Charles Sweetser and seconded by Lee Mathews to accept the agenda as shown. The motion passed unanimously. The Patent Slide statement calling for Essential Patent Claims was read and no patents were brought up. A motion was made by Charles Sweetser to accept the minutes of the Spring 2017 meeting. This was seconded by Lee Matthews. The motion passed unanimously.

Steve told group that the corrections had been made on the document as there had been a number of correct shared at the last meeting. This new draft will be posted on the website. A comment was

received from Tyler Morgan concerning clause A.6. Steve asked Jason Varnell to discuss the comment. He explained that there is confusion in this table as sometimes the reference is winding to winding, while other times it is terminal to terminal. A task force was formed with Jason Varnell as the lead and Charles Sweetser volunteered, and Tyler Morgan was appointed. The task force is to recommend a revision of this table to address the raised concern and provide a suggested solution so that it could be reviewed by the WG prior to the Philadelphia meeting.

Lee Matthews raised a question over whether the “+” sign shown in A.5.3 is correct. It was determined that this was addressed in the main document and this was believed to be correct. Steve asked the TF to review Fig A.74 through A.77 with this in mind. All of this will be considered in the TF recommendations back to the working group.

Respectfully submitted by Dan Mulkey, on October 31st, 2017.

### **L.3.4 WG Standard Transformer Terminology C57.12.80**

The Chair opened the meeting at 4:45 p.m. on Tuesday, 28 November 2017

5 Guest members attended the Spring 2017 meeting. There was no quorum then and no quorum at the Fall 2017 meeting so no agenda or meeting minutes could be accepted as final.

One suggestion was received at the Spring 2017 meeting for a definition for wind turbine transformers. The chair asked for input for ideas from the Fall 2017 meeting group to cover other terms that may not be in C27.12.80.

The group made suggestions of dry type terms, load tap changers (LTC), dissolved gas analysis, insulating liquids and a base kVa 12.01 base rated power, bushings and the list went on.

The chair had not received any input for terms that were not listed after the minutes were sent out.

One of the members asked when the PAR expires and was told 2020.

Gary Hoffman suggested that we ask Ms. Malia Zaman for checking all of the standards for consistency.

Possible starting point look at definitions that are in standards such as C57.12 base standards. What is a key standard? The terms in the standards prevail over what was in 12.80.

Gary suggested that we ask Ms. Zaman if we need permission for the WG to use IEEE standards collection for terminology checking. Another idea was proposed to use the IEEE dictionary and to ask Ms. Zaman for a word document.

Gary Hoffman stated that this is an important standard, that all subcommittee chairs or delegates should be obliged to participate. He proposed that we bring it up at Subcommittee standards meeting tomorrow.

The meeting was adjourned at 4:30 p.m. and Mr. McShane and Mr. Claiborne talked with Ms. Zaman about the results of the meeting.

Respectfully submitted by C. Clair Claiborne, Claiborne Consulting, LLC and Charles Patrick McShane

### **L.4 Old Business**

There was no old business discussed.

### **L.5 New Business**

No new business was brought before the Standards Sub-Committee.

### **L.6 Adjournment**

The meeting and was adjourned by motion at 4:46 PM EDT, moved by Donald Platts and seconded by Stephen Shull; motion was carried in the affirmative via viva voce.

Respectfully submitted by Daniel M Sauer, Standards SC Secretary