Distribution Transformer Subcommittee
Task force / Working Group Report

Document #:	**PC57.19.02**
Document Title:	**Standard for Design and Performance Requirements for Bushings Applied to Liquid Immersed Distribution Transformers**

Chair:	**Steve Shull**	**Vice-Chair**	**Ed Smith**
Secretary	**Rhett Chrysler**	**Percent Complete**	**70**

Current Draft Being Worked On: **D1.4** **Dated:** **October 09, 2019**

Meeting Date: **October 29, 2019** **Time:** **11:00 am – 12:15 pm**

Attendance:	**Members**	**27**
	Guests	**40**
	Total*	**67**

*** For details of attendance, please refer to AMS system of the Transformers Committee**

Meeting Minutes:

Meeting was called to order by the Chair at 11:00am, the roster was circulated followed by introduction of members and guests.

Quorum was verified with 27 members.

Motion to approve the meeting agenda by Jerry Murphy, second by Marty Rave with unanimous approval.

Motion to approve Spring 2019 meeting minutes (Anaheim, CA) by Jerry Murphy, second by Eric Weatherbee with unanimous approval.

Chair made a call for any Essential Patent Claims and Copyright materials with none brought forward.

Old Business

Taskforce report – Figure 4 – Luis Osorio

Task force presented test results comparing tri-clamp bushing orientation. The single hole was located at the 6 o'clock position and 12 o'clock position.

Test 1 (Carlos Gaytan) and 2 (Luis Osorio) was completed for 1" stud LV bushing in both orientations. Conclusion determined that either orientation passed proposed PC57.19.02 cantilever requirements. However, the failure point did vary between the two orientations.

Task force recommendation was that either 6 o'clock or 12 o'clock positions could be used and would fulfill standard requirements and some type of comment be added that the 6 o'clock position has better cantilever performance. It was suggested a note be placed in the standard document to highlight this. Steve Shull compose the note and place it in the next revision of the document.

Taskforce report – Section 5.3.1 – Barry Beaster

Task force presented draft proposal for Section 5.3.1. Task force determined that stud diameter was not appropriate for rating requirements and should reference thermal performance instead. Proposed section was tabled for approval pending completion of short circuit temperature rise section 5.2.X. This was discussed later in the meeting.

Taskforce report – Two Hole Spade Figure – Al Traut

Task force presented proposed Figure 8 – "G" Pad Termination Configuration.

Barry Beaster motioned to accept Figure 8 as presented, second by Al Traut. Discussion followed for whether proposed physical dimensions represented minimum or specific values. Jerry Murphy proposed a friendly amendment to revise the title of the A/B/C/E dimensions to be minimum requirements keeping D and the hole diameter specific. Amendment was accepted by Barry. Further discussion expressed concerns with interchangeability and potential for variation between dimensions that would violate other dimensional requirements (Dave Geibel and Zane Kornowski). Gary King referenced similar requirements in C57.12.34 where all dimensions represent minimum requirements. Jerry Murphy proposed additional friendly amendment to change proposed A/B/C/D/E dimensions to minimum requirements, keep hole diameter specific, denoting it with a diameter symbol, and adding another D dimension to show that the holes would be equidistant on the pad. Barry accepted this friendly amendment. The motion was called to vote and passed with unanimous approval. The group noted that similar revisions would be required for Figure 7. Steve Shull would incorporate these in the next revision.

Taskforce report – Table 5 – Lee Tyler

Task force presented proposal for Table 5 – Performance Characteristics.

A column for Maximum Line to Ground was included. Lee noted that it was previously included in prior revisions to C57.12.00 but is no longer included in current revision.

Rows with footnote "a" represent values pulled from Class 1 Power performance requirements and vary from distribution requirements.

Wet withstand column requirements proposed for 1 min duration for consistency with IEEE Std4 requirements.

Further discussion for Table 5 was tabled for offline discussion to preserve time. This table would be circulated as an inclusion in the next revision and comments would be solicited from the group between now and the next meeting for discussion at the spring meeting.

New Business

Quick tutorial on Short Circuit Bushing Ratings (Section 5.2.X) – Barry Beaster

Barry presented a general background discussion of IEC 60137 (2017) methodology for calculation of terminal temperature of bushings under short-circuit conditions. Comments included that the α factor is assumed to be 0.8 per IEC methodology where copper alloy CDA110 should actually be 0.78.

Two alternatives were proposed to IEC methodology with a comparison of variable values vs. final temperature. With this information, Steve Shull, Chair, created a taskforce to be chaired by Barry Beaster and having the following members: Dave Geibel, Lee Tyler, Carlos Gaytan, Larry Dix, and Marek Kornowski. They will develop a section on short circuit bushing testing.

Due to lack of time the meeting was adjourned at 12:17 pm. The next meeting will be held in Charlotte, NC during the Spring 2020 meeting.

Submitted by: Rhett Chrysler

Date: 10/29/2019