

IEEE/PES Transformers Committee Working Group
Three-Phase Submersible Transformers (C57.12.24)

Meeting Minutes

Hyatt Regency Hotel, Milwaukee, WI
Monday, March 20, 2023

Members Present

Nabi	Almeida	Prolec GE
Piotr	Blaszczyk	Specialty Transformer Comp.
David	Blew	Retired
John	Chisholm	IFD Corporation
Douglas	Craig	Richards Manufacturing Co.
Thomas	Dauzat	AEP Swepco
William	Elliott	AEP Swepco
Benjamin	Garcia	Southern California Edison
John	Harley	FirstPower Group LLC
Ramadan	Issack	American Electric Power
Alejandro	Macias	CenterPoint Energy
Kent	Miller	T&R Electric Supply Co.
Daniel	Mulkey	Mulkey Engineering Inc.
Vinay	Patel	Consolidated Edison Co. of NY
George	Payerle	Carte International Inc.
Jarrod	Prince	ERMCO
James	Ratty	Electronic Technology Inc.
Pedro	Salgado	Electronic Technology Inc.
Avijit	Shingari	Pepco Holdings Inc.
James	Spaulding	Fort Collins Utilities
Christopher	Sullivan	Westmark Partners
Alan	Traut	Howard Industries
John	Vartanian	National Grid
Michael	Zarnowski	Carte International
Guests Present		
Brian	Baumann	Cargill, Inc.
Sanford	Fong	Georgia Power Co.
Miguel	Garda	Hitachi Energy
Hector	Garza	Orto de Mexico
Michael	Gonzalez	Southern California Edison
Carlos	Hernandez	Delta Star

Traci	Hopkins	H2Scan
Jason	Lambert	JST Power
Martin	Munoz Molina	Orto de Mexico
Hugo	Murillo	H-J Enterprises
Tyler	Parenti	Cargill, Inc.
Daniel	Posadas	Prolec-Celeco
Clemens	Reiss IV	Custom Materials, Inc.
Christopher	Rutledge	Dynamic Ratings, Inc.
Fernando	Salinas	Power Partners
Stefan	Schindler	Maschinenfabrik Reinhausen
Jeremy	Sewell	Quality Switch, Inc.
Russell	Sewell	Quality Switch, Inc.

The S23 meeting for C57.12.24 was called to order at 4:45 pm in the Milwaukee room of the Hyatt Regency in Milwaukee. Introductions were made. The meeting achieved quorum with 24 of 39 members present plus 18 guests.

The chair presented the meeting's agenda. Mike Zarnowski made a motion to accept the agenda and Alex Macias seconded; approval was unanimous.

The chair presented the minutes for the Fall 2022 meeting in Charlotte. Tom Dauzat made a motion to accept the minutes as presented and Nabi Almeida seconded; approval was unanimous.

The chair presented the patent and copyright slides. No patent issues were brought up.

The chair thanked the comment resolution team for their help. Then proceeded to review comments made on the standard, starting with editorial comments. While reviewing an editorial change on lines 215 and 216, the IEEE Liaison advised the Chair that if column T is being "ACCEPTED" that column U should be blanked out. The WG also advised the chair that only non-editorial comments needed to be reviewed.

The following technical changes from Draft 11 were discussed and accepted by the WG.

- **Line 321:** The sentence *"Except as modified in this standard, transformer terminology found in IEEE Std C57.12.80 shall apply"* was requested by the reviewer to be removed from the document since no definitions were being modified. The chair asked the WG if they wanted to keep or delete it. The WG decided to keep the language in lines 321/322 just in case it was needed in the future. The WG rejected this comment.
- **Line 339:** A comment was made by a reviewer to consider revising wording from section "5.2 Kilovolt-ampere ratings" of C57.12.24 to be more consistent with published wording from section "5.2 Kilovolt-ampere ratings" of C57.12.23. The WG decided to stick with the wording in C57.12.24 from Draft 11 and not make any changes to this section. The WG rejected this comment.

- **Line 346:** C57.105 was referenced on line 346 (Section 5.2 of Draft 11) but was not listed in the Normative Reference section. The WG will add C57.105 to the Normative Reference section between lines 313 and 314. The standard will be listed as follows: *"IEEE Std C57.105™, IEEE Guide for Application of Transformer Connections in Three-Phase Electrical Systems."* The WG accepted this comment.
- **Line 350:** Draft 11 showed footnote "4" at the end of Note 1, Table 1. However, no corresponding footnote description was detailed at the bottom of the page. Footnote "4" from the published 2016 revision stated, *"Notes in text, tables, and figures are given for information only and do not contain requirements needed to implement the standard."* After reviewing this statement with the WG, it was decided to just delete footnote "4". The WG accepted a revised version of this comment.
- **Line 350:** A commenter suggested that the WG add phase-to-neutral voltages for each grounded-wye voltage listed in Table 1/Column 1 for consistency within the document. The WG discussed changing e.g. 22 860 to 22 860GrdY/13 200 but decided that for clarity purposes not make that change. The WG rejected this comment but suggested to revisit it during the next PAR revision.
- **Line 368:** During balloting, a comment was made to consider revising wording from "6.2 Reference Temperature" in C57.12.24 to match "5.5 Reference Temperature" published in C57.12.23. The WG decided to leave Section 6.2 as shown in Draft 11 as-is; no changes will be made at this time. The WG rejected this comment but suggested to revisit it during the next PAR revision.
- **Line 370:** A commenter suggested that only SS 316 be called for in 7.0 Construction. The group felt manufacturers/users should be given flexibility on material selection based on needs of the customer. The WG rejected this comment, the chair will work with D. Mulkey to revise wording on the spreadsheet.
- **Line 458:** Commenter suggested that the WG add the word "de-energized" before "tap changer." Line 458 will now read *"If a **de-energized** tap changer is specified, each tap changer position and the associated tap voltage shall be clearly identifiable by reference to nameplate information."* The WG accepted this comment.
- **Line 464:** Commenter suggested that the WG add the word "de-energized" before "primary taps" in the heading of Table 6. The group decided this was an unnecessary change since the heading of Section 7.3.1, where Table 1 resides is titled "De-energized Tap Changer." The WG rejected this comment.
- **Line 567:** Commenter suggested that the WG add the word "rectangular" between the words "long axis of the" and "transformer." The entire sentence will now read *"The transformer base structure shall consist of bars parallel to the long axis of the **rectangular** transformer."* The WG accepted this comment.
- **Line 645:** The commenter suggested that the WG remove the reference to IEEE 386 in the bibliography (lines 645 and 646) since this information already resides in the Normative reference section (lines 300 and 301). The WG accepted this comment.

- **Line 543:** The commenter suggested that the WG consider revising wording in section “7.5.2 Tank Integrity” from Draft 11 to wording published in C57.12.39 section “4.2.1 Tank Integrity.” The WG decided to delete all wording from section 7.5.2 in Draft 11 and replace it with *“Requirements for nominal pressure, tank integrity, and rapid transient pressure, including design tests for fault current capability, are defined and shall be in accordance with IEEE Std C57.12.39.”* The WG accepted a revised version of this comment. This wording was provided to the WG by the chair of C57.12.20 and is consistent with is published in their standard.
- **Line 622:** The commenter suggested that the WG consider replacing wording in C57.12.24 Annex A with wording from C57.12.39 Annex B.3. The WG decided to maintain wording from C57.12.24 Draft 11. The WG rejected this comment.
- **Line 552:** Based on the change from line 543 above, the entire text from section 7.5.2 will be deleted except for *“Requirements for nominal pressure, tank integrity, and rapid transient pressure, including design tests for fault current capability, are defined and shall be in accordance with IEEE Std C57.12.39.”* The WG accepted a revised version of this comment.

The following general changes from Draft 11 were discussed and accepted by the WG.

- **Line 220:** The reviewer requested that 2009 revision information be placed back into the standards introduction section. The chair said he will add that information back, but a comment from the WG suggested that the old information could be and should be deleted. The WG agreed to not restore the old information. The WG rejected this comment.
- **Line 273:** The chair discussed the use of the terms “High Voltage” and “Low Voltage” as opposed to “Primary Voltage” and “Secondary Voltage” in the title and scope of C57.12.24. For the purposes of this publication cycle, the WG decided to leave the wording as-is. The WG rejected this comment, however they suggested that a task force be created between the Distribution Transformer and STNP sub-committees to harmonize wording across all impacted standards.
- **Line 442:** A reviewer asked whether Table 5 should include stud size along with the number of spade holes for kVA sizes 750-3750kVA. The WG rejected this comment.
- **Line 611:** A reviewer asked why line 611 includes a reference to C57.12.90 when line 612 is Table 8 which lists “Audible Sound Levels.” The WG stated that the mention of C57.12.90 was the reference that details how to do these tests and is required. The WG rejected this comment.
- **Line 611:** A reviewer asked the WG to add “...and in accordance with C57.12.00” into the draft. The WG agreed with the proposed change. Line 611 will not read *“Sound levels shall not exceed values detailed in Table 8, the transformer shall be connected and energized in accordance with IEEE Std. C57.12.00 and tested in accordance to IEEE Std. C57.12.90.”* The WG accepted a revised version of this comment.

Dan Mulkey moved to accept all technical and general changes discussed at this meeting. Paul Chisholm seconded the motion. The motion was approved unanimously by the WG.

The chair will update the redline and send the ballot out for recirculation ASAP.

The chair asked the WG to allow the comment resolution team permission to resolve non-technical comments in the future re-balloting. There were no objections.

The WG suggested the chair request a 2-year PAR extension for safety. The chair agreed and will do so.

The chair stated that if things go well, we probably won't meet in Kansas City. Meeting was adjourned at 5:45 pm.

Respectfully Submitted by: Ben Garcia, Chairman C57.12.24 Working Group