Annex C Distribution Subcommittee – Chair: Jerry Murphy

March 13, 2024
Vancouver, B.C. CANADA

Chair: Jerry Murphy
Vice-Chair: Josh Verdell
Secretary: Martin Rave

C.1 General Opening

Jerry opened the meeting welcoming everyone to the meeting and provided a Standards Report. To establish a quorum, a list of members was displayed, and a count of members was taken. We did have a quorum with 53 members in attendance by count of those identified on a slide presented in the meeting. Recorded attendance gave 147 in attendance and 58 members. List of attendees and affiliation attached below.

The agenda was reviewed and a change was proposed. Dan Sauer made a motion to approve the agenda with the addition of the below:

"Add New Business PAR Study for Pad-mounted Voltage Regulators"

This motion was seconded by Steve Shull

The Fall 2023 meeting minutes were reviewed, a motion was made to approve by Rhett Chrysler, seconded by Steve Shull, and approved by unanimous acclamation of the members in attendance.

At this time, Josh Verdell reviewed the membership changes. A slide was presented welcoming the new member of the subcommittee before proceeding with the working group and task force reports.

C.2 Working Group and Task Force Reports

[redacted]C57.12.20 – Overhead Distribution Transformers – Al Traut

This working group did not meet.

[redacted]C57.12.28, .29, .30, .31 & C57.12.32 – Enclosure Integrity – Dan Mulkey

Dan Mulkey presented the following minutes from the working group meeting on March 12, 2024 at 8:00 a.m. in with 65 in attendance.

1. Dan Mulkey called the meeting to order at 8:00 AM PST. Group introductions were made.

2. Opening remarks and announcements
    a. AMS system has been discontinued. Paper rosters were circulated.

3. Dan Mulkey reviewed IEEE SA Copyright Policy and Essential Patent Claims. No issues were raised.

4. Membership changes were noted:

    a. **Added: Alex Ayala, Timothy Menter, Martin Munoz, Jaber Shalabi**
    b. **Removed: none**

5. Quorum was verified. The working group consisted of **69** members, requiring **35** for quorum. Over **35** members were counted at the start of the meeting. Attendance records later confirmed **45** members attended.

6. Dan Mulkey requested approval of the Spring 2024 Agenda. Igor Simonov made a motion, second by Jerry Murphy. Agenda was unanimously approved.

7. Dan Mulkey requested approval of the Fall 2023 Minutes. Al Traut made a motion, second by Shelby Walters for approval of the minutes. Minutes were unanimously approved.

8. Status of Standards:
    a. C57.12.28 Standard for Pad-Mounted Equipment – Enclosure Integrity, Approved 2014
        i. Expires: 12/31/2024
        ii. PAR expiration: 12/31/2024
        iii. Status: Approved by RevCom Dec 5, 2023
    b. C57.12.29 Standard for Pad-Mounted Equipment – Enclosure Integrity for Coastal Environments, Approved 2014
        i. Expires: 12/31/2024
        ii. PAR expiration: 12/31/2024
        iii. Status: Approved by RevCom Dec 5, 2023
    c. C57.12.30 Standard for Pole-Mounted Equipment – Enclosure Integrity for Coastal Environments, Approved 2020
        i. Expires: 12/31/2030
        ii. Status: Plan to request PAR Dec 2026
    d. C57.12.31 Standard for Pole-Mounted Equipment – Enclosure Integrity, Approved 2020
        i. Expires: 12/31/2030
        ii. Status: Plan to request PAR Dec 2026
    e. C57.12.32 Standard for Submersible Equipment – Enclosure Integrity, Approved 2019
        i. Expires: 12/31/2029
        ii. PAR expiration: 12/31/2027
        iii. Status: PAR Approved by NesCom Dec 6, 2023

9. Old business:

    a. Justin Minikel reviewed C57.12.32 Draft 1.4 which included updates based on the recently updated C57.12.28 and C57.12.29 standard. A summary of the changes are listed below.
        i. Updated content order to match the other standards.
        ii. Added Section 4.2.9 Fire resistance as it appears in C57.12.29. Group discussed if this section was applicable. Fire resistance applies to non-metallic enclosures, listed UL requirements UL 94 or UL 746C means the substrate will stop burning when you take the flame away.

iii. Added Section 5.3 Enclosure color even though no specific color is specified for submersibles. The group discussed that black, grey and green are all used. Dan Mulkey commented that black submersibles are not very visible and grey is better for visibility while installed in typically dark areas.
iv. Modified Section 5.5 Test specimens. Simplified and added gauge thickness.
v. Section 5.6.2 Adhesion test. Simplified and removed test details as it is captured in the ASTM method.
vi. Section 5.6.3 Soak test. Changed duration to 1008 hours from 1000 hours. This makes it easier for the test labs as the sample comes out at the same time it goes in.
vii. Section 5.6.4 Impact Test. Simplified and clarified pass / fail criteria. Also included wrinkling as a fail criteria. Group discussed that wrinkling is not defined by ASTM but bubbling is. Justin Minikel commented that bubbling is not the same failure mode as wrinkling. Group agreed that further work should be done to define wrinkling as a failure criteria.
viii. Section 5.6.5 Insulating liquid resistance test. Removed references to gasses, as the intent of this test is to look at insulating liquids. Suggested that if the group wants to keep testing with gasses it should be broken into a separate section.
    1. Dan Mulkey later commented that as switchgear has been removed from the document scope so testing related to insulating gasses may no longer need to be included in this document.
ix. Section 5.6.6 Ultraviolet accelerated weathering test. Removed acronym of QUV as it is a trade name. Changed duration to 504 from 500 hours (again to make it easier for the test labs).
x. Section 5.6.7 SCAB test. Updated to be in align with the wording in the other standards, no change to requirements.
xi. Section 5.6.8 Abrasion resistance. Cleaned up pass / fail wording to be more concise.
xii. Section 5.6.9 Chipping resistance test. Cleaned up pass / fail wording to be more concise.
xiii. Annex B SCAB procedure. No change in content but the layout and formatting has shifted.

b. Dan Mulkey stated that this draft with the proposed changes will be circulated to the group for review. He asked all member to please read the document before the next meeting. If any questions arise, please reach out to Dan Mulkey or bring them to the next meeting for discussion.

10. New business:
    a. Dan Mulkey asked the group if there are any additional coating tests that should be considered.
    b. A question was asked why chip resistance is included in submersible standard as once installed there is generally low risk of impacts that could cause chips on these transformers. Dan Mulkey responded that chip resistance is required as these transformers are still exposed to risks during shipping, storage, and installation. For this reason, this clause has also been added to the overhead standard.

c. Jane Hall asked the group how 80 in-lbs was determined for the impact test. She commented this is very high as in the pipeline industry much lower forces are used.
    i. Carlos Gaytan commented that in the 90's the requirement used to be 160 in-lbs in pad type transformers and 80 in-lbs in pole type transformers. This specification was chosen as to pass it the coating needs to have a specific thickness and softness to absorb the impact.
    ii. A post meeting comment by Petra Labbe. They have the impact go through the coating and the substrate. This failure mode is currently not captured in standards and the group should consider adding it as it is a failure of both the substrate and the coating.
    iii. A post meeting conversation – Justin Minikel is going to investigate using the Holiday test for past/fail evaluation of panels possibly in lieu of the salt spray test.
    iv. Post meeting observation – While the standards require that the test panels be of the actual substrates being used to construct the applicable equipment, it appears that thinner substrates are sometimes being tested. The WG should discuss this topic.

11. Next meeting: October 29, 2024 in St. Louis, Missouri, USA.
    a. The following attendees requested membership and will be added to membership for the Fall 2024 meeting: **Jeffrey Brooks, Noah Chesser, Miguel Plascencia, Daniel Posadas.**

12. The meeting was adjourned at 8:39 AM PST.

Submitted by: Audrey Siebert-Timmer

Date: March 12, 2024

List of Members:

Daniel Mulkey (Mulkey Engineering Inc.)
Jeremy Van Horn (IFD Technologies)
Audrey Siebert-Timmer (IFD Technologies)
Nabi Almeida (Prolec GE)
Alex Ayala (Power Partners)
Martin Bachand (Cloverdale Paint Inc.)
Darren Brown (Howard Industries)
Thomas Callsen (Weldy-Lamont Associates)
Rhett Chrysler (ERMCO)
Douglas Craig (Richards Manufacturing Co.)
Benjamin Garcia (Southern California Edison)
James Gardner (Prolec GE)
Carlos Gaytan (Prolec GE)
Ali Ghafourian (H-J Enterprises, Inc.)
Jane Hall (Cloverdale Paint Inc.)
Kenneth Hampton (Baltimore Gas & Electric)

Ramadan Issack (American Electric Power)
Brian Klaponski (Carte International Inc.)
Gilbert Kozer (Northeast Transformer Services, LLC)
Patrick Kozer (Northeast Transformer Services, LLC)
Andrew Larison (Hitachi Energy)
Tiffany Lucas, P.E. (Prolec GE)
Alejandro Macias (CenterPoint Energy)
Justin Minikel (EATON Corporation)
Michael Morgan (Duke Energy)
Jerry Murphy (Reedy Creek Energy Services)
Dwight Parkinson (EATON Corporation)
Vinay Patel (Consolidated Edison Co. of NY)
Ion Radu (Hitachi Energy)
James Ratty (Electronic Technology Inc.)
Robert Reepe (Georgia Power Co.)
Mason Rush (Central Moloney Inc)
Fernando Salinas (Power Partners)
Pugal Selvaraj (Virginia Transformer Corp.)
Stephen Shull (BBC Electrical Services, Inc.)
Igor Simonov (Toronto Hydro)
Travis Spoone (EATON Corporation)
Michael Thibault (Pacific Gas & Electric)
Alan Traut (Howard Industries)
Reinaldo Valentin (Duke Energy)
John Vartanian (National Grid)
Joshua Verdell (ERMCO)
Shelby Walters (Howard Industries)
Alan Wilks (Consultant)
Michael Zarnowski (Carte International)

List of Guests:

Jeffrey Brooks (POWER Engineers)
Noah Chesser (Oncor Electric Delivery)
Miguel Plascencia (Pacific Gas & Electric)
Daniel Posadas (Prolec-Celeco)
Jared Bates (Oncor Electric Delivery)
Andrew Berman (S&C Electric)
Duane Brown (Measurements International)
Janet Crocket (Fayetteville PWC)
Rohrer David (First Energy)
Luke Grandbois (IFD Technologies)
Petra Labbe (Sherwin Williams)
Steve Lesch (PPR)
David Lin (IFD Technologies)
Loiselle Luc (Teta Tech)
Nicholas Manske (Oncor Electric Delivery)
Ismael Naja (EATON Corporation)

Fernando Tirado (Prolec)
Steve Tsai (JST Power Equipment)
Bruce Webb (Knoxville Utilities Board)
Paul Weyandt (Schneider Electric)

[redacted]C57.12.34 – Three Phase Pad-Mount Transformers – Steve Shull

Steve Shull presented the following minutes from the working group meeting on March 11, 2024 at 3:15 p.m. in with 80 in attendance.

The Chair called the meeting to order at 3:15 P.M. PDT on March 11, 2024. Attendees verbally identified themselves by name and affiliation.

1. IEEE Privacy Policy
   The Chair verbally stated and explained in detail all the information according to IEEE Privacy Policy.
2. Meeting Quorum
   The Chair displayed the members of the WG and a quorum was established.
3. Agenda Approval
   The Chair displayed the agenda for this meeting. A motion was made by Dan Mulkey and seconded by Rhett Chrysler to "Approve the Agenda as displayed". The Chair asked any opposition to the displayed Agenda to which no opposition was observed. The Agenda was approved as displayed.
4. Minutes Approval
   The Chair stated the Last Meeting Minutes were available online. A motion was made by Jerry Murphy and seconded by Bruce Webb to "approve the Last Meeting Minutes as shown online". The Chair asked any opposition to approved these minutes as posted to which no opposition was observed. The Last Meeting Minutes were approved.
5. Confirmation of IEEE SA Essential Patent Statement
   The patent information request was displayed. The chair provided an opportunity for participants to identify patent claim(s)/patent application claim(s) and/or if a participant is personally aware of patent claim(s)/patent application claim(s) that may be essential for the use of this standard. There were no responses to this request so no patent claim(s)/patent application claim(s) were identified.
6. IEEE SA Copyright Policy Statement
   IEEE-SA's copyright policy is described in Clause 7 of the *IEEE-SA Standards Board Bylaws* and Clause 6.1 of the *IEEE-SA Standards Board Operations Manual*. The Chair stated that any material submitted during standards development, whether verbal, recorded, or in written form, is a Contribution and shall comply with the IEEE-SA Copyright Policy. The Chair displayed this copyright policy.
7. IEEE SA Participant Behavior
   All participants in IEEE-SA activities are expected to adhere to the core principles of the IEEE Code of Ethics, IEEE Code of Conduct and the Standards Board Bylaws.
8. Old Business
   Task Force Reports
   - TF #1 – reported they reviewed the document and provided a report of all the locations where these references need to be updated. Chair stated he would update all references in the new draft document.
     Members include Weijun Li (Chair), Jared Bates, and Bruce Webb.
   - TF #2 – gathered data from three vendors on pad-mount transformer inquiries & orders from last 12 months and sorted them by low voltage configurations requests.

There were a total of 41 configurations including both WYE and DELTA. They determined the average usage percentage for each voltage configuration which resulted in only 7 being greater than a 1% average. This resulted in the recommendations of two new voltage configurations. These were:

- 415Y/240 V – for digital currency applications (bit coin, blockchain, etc.) and
- 690Y/398 V – for solar and BESS applications.

After reviewing the document, the task group recommends both of these configurations to be added to Table 3 – Range of kVA and voltage rating and Table 4 – Electrical characteristics and minimum electrical clearances of high-voltage bushings and low-voltage terminals. This recommendation was presented to the working group. The consensus was that the Working Group Chair should would update all references in the new draft document.
Members include Joshua Yun (Chair), Zack Weiss, and Dwight Parkinson.

- TF #3 – was able to provide an overview of the application of this device and methods of application. After a Working Group discussion, it was discovered that the transformers covered in this standard do not use this device. The consensus of the working group was to remove this section. The Working Group Chair would modify the new draft document to remove this section.
  Members include Jeremy Van Horn (Chair), Martin Rave, and Leon White.
- TF #4 - reviewed the values and methods for the Induced Voltage Test. There was a lot of discussion but no conclusions. This was returned to the task force for further work. A recommendation would be brought back to the working group in the fall.
  Members include Michael Zarnowski (Chair), Gary King, and Andrew Larison.
- TF #5 – did not have a report due to a request received by the Chair. This was to be discussed in new business.
  Members include Stephen Shull (Chair), Jose Gamboa, and Jared Bates.
- TF #6 – Steve Shull stated that references to Photovoltaic and Wind Power transformers will be added in the Bibliography. An informative note may be necessary to qualify this reference. Steve Shull is the only member of this task force.

In the new business, there were two items that were brought forth. The first was the discussion of an email from Glenn Anderson concerning the possible inadvertent elimination of the 30 kV BIL clearances in the drawings for insulated separatable connectors, both for specific and minimum dimensions. The working group voted to expand the scope of TF#5 to review this request. The motion was made by Jerry Murphy and seconded by Dan Mulkey. The working group approved this unanimously. The task force will report on this at the next meeting.

The second item in new business was a discovery by Task force #2 of the possible expansion of the kVA size ranges. This was discovered when they were researching the new voltages. The discussion that followed raised the question concerning of how this would affect the Maximum Available Fault Current (MAFC) with the impedance ranges shown in the standard. The Working Group Chair reminded the group that these impedance values had been set these to limit the MAFC to 65kA. The Task Force Chair volunteered to take this topic back to the group and provide a report back to the Working Group in the fall meeting.

The meeting adjourned at 4:30 P.M. PDT.

Submitted by: Alan Wilks

Date: 3/11/2024

Attendance:

Full Name	Company	Role		Full Name	Company	Role
Rehan Ali	Siemens Energy	Member		Alejandro Macias	CenterPoint Energy	Member
Thomas Callsen	Weldy-Lamont Associates	Member		Rhea Montpool	Schneider Electric	Member
Rhett Chrysler	ERMCO	Member		Daniel Mulkey	Mulkey Engineering Inc.	Member
Benjamin Garcia	Southern California Edison	Member		Jerry Murphy	Reedy Creek Energy Services	Member
Miguel Garcia	Hitachi Energy	Member		Dwight Parkinson	EATON Corporation	Member
Carlos Gaytan	Prolec GE	Member		Robert Reepe	Georgia Power Co.	Member
Ali Ghafourian	H-J Enterprises, Inc.	Member		Mason Rush	Central Moloney, Inc.	Member
Kenneth Hampton	Baltimore Gas & Electric	Member		Michael Shannon	Rea Magnet Wire	Member
Giovanni Hernandez	Virginia Transformer Corp.	Member		Stephen Shull	BBC Electrical Services, Inc.	Member
Ramadan Issack	American Electric Power	Member		Michael Thibault	Pacific Gas & Electric	Member
Brian Klaponski	Carte International Inc.	Member		John Vartanian	National Grid	Member
Gilbert Kozer	Northeast Transformer Services, LLC	Member		Pragnesh Vyas	Sunbelt-Solomon Solutions	Member
Patrick Kozer	Northeast Transformer Services, LLC	Member		Bruce Webb	Knoxville Utilities Board	Member
Andrew Larison	Hitachi Energy	Member		Zachery Weiss	WEG Transformers USA Inc.	Member
Weijun Li	Braintree Electric Light Dept.	Member		Alan Wilks	Consultant	Member
Parry Lively	Tempel	Member		Joshua Yun	Virginia Transformer Corp.	Member
				Michael Zarnowski	Carte International	Member
Javier Arteaga	Hitachi Energy	Guest		Justin Minikel	EATON Corporation	Guest
Alejandro Ayala	Power Partners	Guest		Michael Morgan	Duke Energy	Guest
Cheryl Basel	WEG Transformers USA Inc.	Guest		Martin Munoz	Orto de Mexico	Guest
Paulo Bautista	Enmax	Guest		Stephen Oakes	WEG Transformers USA Inc.	Guest
Andrew Berman	S&C Electric	Guest		Miguel Plascencia	Pacific Gas & Electric	Guest
Kevin Biggie	Weidmann Electrical Technology	Guest		Pedro Puente	Prolec GE	Guest
Jeffrey Brooks	Power Engineers	Guest		David Rohrer	First Energy	Guest
Jim Cai	JSHP Transformer	Guest		Audrey Siebert-Timmer	IFD Technologies	Guest
Noah Chesser	Oncor Electric Delivery	Guest		Igor Simonov	Toronto Hydro	Guest
Janet Crockett	Fayetteville PWC	Guest		Jimmy Smith	Howard Industries	Guest
Antonio Di Biase	Tempel	Guest		David Stockton	Stockton Business Consulting	Guest
Miguel Fernandez	Braintree Electric Light Dept.	Guest		Craig Tennant	H-J Family of Companies	Guest
Kevin Frye	Central Moloney, Inc.	Guest		Tim Tillery	Howard Industries	Guest
Stephen Gilbert	IFD Technologies	Guest		Fernando Tirado	Prolec GE	Guest
Luke Grandbois	IFD Technologies	Guest		Alan Traut	Howard Industries	Guest
Mohammad Iman	MGM Transformer Co.	Guest		Steve Tsai	JST Power Equipment	Guest
Adam Klaponski	Carte International Inc.	Guest		Reinaldo Valentin	Duke Energy	Guest
Petra Labbe	Sherwin-Williams	Guest		Jeremy Van Horn	IFD Technologies Inc.	Guest
Steve Lesch	PPR	Guest		Joshua Verdell	ERMCO	Guest
Nicholas Manske	Oncor Electric Delivery	Guest		David Walker	MGM Transformer Co.	Guest
Fernando Meza	Power Partners	Guest		Shelby Walters	Howard Industries	Guest
				Paul Weyandt	Schneider Electric	Guest

[redacted]C57.12.36 – Distribution Substation Transformers – Jerry Murphy

Jerry Murphy presented the following minutes from the working group meeting on March 12, 2024 at 9:30 a.m. with 50 in attendance.

Jerry Murphy called the meeting to order at 9:30 AM. Introductions were made. By a show of hands, the quorum was reached by having 17 out of the 29 members present.

A motion for approval of the agenda was made by Dan Mulkey and seconded by Dwight Parkinson, and the motion was approved without opposition. A motion for approval of the past meeting in Kansas City was made by Steve Shull, seconded by Gary Hoffman and it was approved with no opposition.

On the topic in the agenda of consistency in Induced Potential requirements for Distribution Transformer Types, Andrew Larison made a comment about some issues related with the effects of the current test requirements on some transformer components and said that it would be addressed in the WG C57.12.34 three phase pad mounted transformers, so that the resolution could be incorporated into this 12.36 standard.

On the question of whether requirements for 50 Hz should be considered in the scope of the standard, Jerry confirmed that 50 Hz was part of the scope of the approved PAR. After some discussion, Steve Shull made a motion, seconded by Gary Hoffman, to leave the 50 Hz requirements in the scope, and it was unanimously approved.

Note of Table 1, Kilovoltampere Ratings, Dwight Parkinson made a motion to reword the note to read ““If specified, an additional percent increase in kilovolt-ampere rating can be achieved by adding fan capacity. Single-phase and three-phase ONAF kilovolt-ampere values 2500 and above have a 25% increase over the ONAN rating. All other kilovolt-ampere ratings are increased by 15%.” It was seconded by Steve Shull, and it was approved unanimously.

The first paragraph of Sect. 4.5 Taps, was reviewed. A proposal to modify the wording for better clarity to read: “Taps shall be provided unless otherwise specified. The standard high-voltage taps shall be two above the high-voltage nominal rating at 2.5% each, and two below the high-voltage nominal rating at 2.5% each”. A motion was made by Al Traut, seconded by Gary Hoffman, and after some discussion, the question was called, and it was approved unanimously.

Sect. 5.7.3 Unit substation grounding, was then reviewed. A clarification of the term “electrically bonded” was sought. Steve Shull suggested to use a reference from the NEC which referred to this term as “to establish electrical continuity and conductivity”. Steve Shull made a motion to include this wording, replacing the current term of “electrically bonded”. Dan Mulkey seconded, and the motion passed with no opposition.

The sect. 5.11.2 Fans was reviewed. There was some discussion of whether the fan motor voltage for 60 Hz should continue to be 240 V, recognizing that the present practice indicated a larger use of 120 V motors. After some discussion a motion to change from 240 V to 120 V in 60 Hz motors was made by Dan Mulkey and seconded by Dwight Parkinson, and it carried.

There was a discussion of whether the 400 V motor requirements for 50 Hz should be modified, but it was decided to leave it as it was.

Under new business, Javier Arteaga made a motion to modify Table 1, to use the term ONAN/KNAN instead of just ONAN, as the standard included insulating liquids other than mineral oil. Steve Shull seconded, and the motion carried.

Javier Arteaga was assigned the task to propose the necessary changes to standardize the use of ONAN/KNAN as applicable in the document and send a proposal of changes to Jerry.

The meeting adjourned at 10:27 am. 5.11.2 Fans

Submitted by: J. Murphy/C. Gaytan

Date: 03/12/2024

Attendance

Name	Last Name	Company	Member/Guest
Rehan	Ali	Siemens Energy Inc	Guest
Javier	Arteaga	Hitachi Energy	Member
Alex	Ayala	Power Partners	Guest
Cheryl	Basel	WEG Transformers	Guest
Kevin	Biggie	Weidmann	Guest
Jeffrey	Brooks	Power Engineers	Guest
Noah	Chesser	Oncor Electric Delivery	Guest
Rhett	Chrysler	ERMCO	Guest
Janet	Crockett	Fayetteville PWC	Guest
Tony	DiBiase	Tempel	Guest
Arnu	Dumke	Brockhaus Measurements	Guest
Salinas	Fernando	Power Partners/ERMCO	Guest
Kevin	Frye	Central Moloney Inc	Guest
Miguel	Garcia	Hitachi Energy	Member
Hector	Garza	Orto de Mexico	Guest
Carlos	Gaytan	Prolec GE	Vice-Chair
Gary	Hoffman	Advanced Power Technologies	Guest
Dave	Komm	Hammond Power Solutions	Guest
Gilbert	Kozer	Northeast Transformer	Guest
Andrew	Larison	Hitachi Energy	Member
Angela	Leigl	Eaton Corp	Guest
Parry	Lively	Tempel	Member
Bryan	Marquardt	Cleveland Cliffs	Guest
Fernando	Meza	Power Partners	Guest
Justin	Minikel	Eaton Corp	Guest
Rhea	Montpool	Schneider Electric	Member
Tyler	Morgan	Duke Energy	Guest
Dan	Mulkey	Mulkey Engineering Inc.	Member
Martin	Muñoz	Orto de Mexico	Member
Jerry	Murphy	Reedy Creek Energy Services	Chair
Dwight	Parkinson	Eaton Corp	Member
Besjan	Pojaziti	Brockhaus Measurements	Guest
Ion	Radu	Hitachi Energy	Member
Robert	Reepe	Georgia Power Co	Guest
Robert	Rohrer	First Energy	Guest
Mason	Rush	Central Moloney Inc	Guest
Jaber	Shalabi	Vantran Transformers	Member
Mike	Shannon	REA Magnet Wire	Member
Stephen	Shull	BBC Electrical Services Inc.	Member

Jimmy	Smith	Howard Industries	Member
Erik	Tarango	Olsun Electrics	Guest
Tim	Tillery	Howard Industries	Guest
Fernando	Tirado	Prolec GE	Guest
Alan	Traut	Howard Industries	Member
Steve	Tsai	JST Power Transformers	Guest
Reinaldo	Valentin	Duke Energy	Guest
Jeremy	Van Horn	IFD Technologies	Guest
Josh	Verdell	ERMCO	Guest
Bruce	Webb	Knoxville Utilities Board	Member
Zach	Weiss	WEG Transformers	Guest

[redacted]C57.12.38 – Single-Phase Pad-Mounted Transformers – Ali Ghafourian

Ali Ghafourian presented the following minutes from the working group meeting on March 11, 2024 at 1:45 p.m. with 65 in attendance. Ali noted that they would not need to meet in the fall.

1. **Presiding Officer and Secretary responsible for Meeting Minutes**
   Ali Ghafourian (Chair) – Presiding Officer
   Jarrod Prince (Secretary) is responsible for Meeting Minutes.

2. **Call to order, Verification of Quorum, and Chair's remarks**
   The meeting was called to order by the Chair, Ali Ghafourian, at 1:46 p.m. PDT on Monday, March 11th, 2024, held at the Hyatt Regency Vancouver in room, Oxford/Prince of Wales (3rd Floor).

   Quorum was established with 24 out of 38 (~63%) Working Group members present by a show of hands counted at beginning of the meeting. Per paper rosters, we had 27 (~71%) of members accounted for as being present during the meeting. Quorum was established.

   The Chair announced to the Working Group that the PAR extension was approved through the end of 2025.

   The Chair informed the Work Group that the editorial and general comments not resolved from during Fall 2023 meeting that was deemed to be technical was resolved amongst the Ballot Comment Resolution Committee would be reviewed during this meeting. In all there were a total of eight proposed comments/changes to review with the Working Group.

   The chair recognized and thanked the following Ballot Comment Resolution Committee Members:

Ali Ghafourian (Chair)	H-J Enterprises, Inc.
Martin Rave (Vice-Chair)	ComEd
Jarrod Prince (Secretary)	ERMCO
Joshua (Josh) Verdell	ERMCO
Ramadan Issack	American Electric Power

Robert Reepe	Georgia Power Co.
Andrew Larison	Hitachi Energy
Jerry Murphy	Reedy Creek Energy Services

3. **Presented required IEEE SA Patent and Copyright Policies Slides, Call for Patents**
The essential Patent and Copyright presentation slides were shown as required. During the review of the Patent and Copyright Policy slides, the Chair called for all essential Patents and Copyrights amongst the Working Group. No essential Patent or Copyright claims were brought forth to the Chair.

4. **Approval of agenda**
The agenda (AGENDA C57.12.38_ 2024_Vancouver(R0).pdf) was issued to the Working Group by email for review and posted to the Distribution Subcommittee website on Monday, March 4th, 2024, one week prior to the meeting.
The Chair asked the Working Group members for the unanimous approval of the agenda.
Shelby Walters made the first Motion to unanimously approve the agenda.
Stephen Shull (Steve) seconded the Motion.
The agenda was unanimously approved.

5. **Approval of minutes of previous meeting**
The Fall 2023 meeting minutes (F23-C57.12.38-UnapprovedMinutesR1.pdf) were posted to the Distribution Subcommittee website on Wednesday, November 1st, 2023, for the Working Group members to review before this meeting, nine days after the meeting.
The Chair asked the Working Group members for the unanimous approval of the Fall 2023 meeting minutes.
Daniel Mulkey (Dan) made the first Motion to unanimously approve the Fall 2023 meeting minutes.
Benjamin Garcia (Ben) seconded the Motion.
The Fall 2023 meeting minutes were unanimously approved.

6. **Meeting Discussion Topics**

Editorial and general comments resolved/discussed from original Ballot on Draft 2.8 October 2022 that was incorporated into Draft 2.9 January 2024 before the Spring 2024 meeting in Vancouver.

- **Comment ID (310431) and # (I-77) on Clause 4.4.1, Line 11**

  Proposed Change:
  1. add the word "NOTE - " to the beginning of the paragraph.
  2. delete "may" and replace with "can"
  3. delete "greater than" and replace with "that might exceed"
  4. add second sentence: "Users should take care to check for adequate ratings of other existing equipment when specifying or making replacements."

  Disposition Status: Accepted.

  Disposition Detail: None needed, if accepted.

- **Comment ID (310254) and # (I-52) on Clause A.5, Lines 3 and 4**

Comment: “Food for thought…do we want to mention in this section that a fluid level gauge is "strongly recommend" to be incorporated into the transformer design in conjunction with a load-break switch and dual-voltage switch? I only mention this because these devices called it out in A.3 and A.5 respectively.”

Disposition Status: Revised due to no proposed change.

Disposition Detail: Remove these two sentences from A.5 but keep in A.3 to match recent publication of C57.12.34-2022. A4 and A.4.8.

- **Comment ID (310443) and # (I-86) on Clause 8.4, Note 2 (Figure 7)**

  Proposed Change: “Revise the last sentence of NOTE 2 to read "Stud thread sizes are trade sizes which indicate the thread major diameter in inches followed by thread pitch in number of threads per inch."
  Revise the numbers in table to fractions (instead of decimals) per normal trade practice.”

  Disposition Status: Revised

  Disposition Detail: WG accepted to revise the numbers in table to fractions (instead of decimals) per normal trade practice but not explaining trade sizes.

- **Comment ID (310071) and # (I-36) on Clause A.4, Lines 27 and 28**

  Proposed Change: “The switch operating handle shall require a two-step action such as cap/wrench removal and reversal or removal of a set-screw to prevent inadvertent operations.”

  Disposition Status: Accepted.

  Disposition Detail: None needed, if accepted.

- **Comment ID (310253) and # (I-51) on Clause A.5, Lines 3 and 4**

  Proposed Change: “Should read: “To that extent, a means shall be provided to externally verify the switch is sufficiently immersed under liquid before operation takes place.”

  Disposition Status: Revised.

  Disposition Detail: Since Comment ID# 310254 I-52 is approved as revised, then make this change to A.3 (3rd paragraph, last sentence) except it will state "To that extent, a means should be provided to verify that these switches are sufficiently immersed." due to Annex being informative the word “shall” was replaced with the word “should”.
- **Comment IDs (309963, 310077, 310110, and 310276) and # (I-23, I-42, I-45, and I-62) on Clause A.6.1.1, Lines 18, 19, 20, and 21**

Proposed Change: Remove and replace with sight-type liquid level indicators as shown in A.5.1 of C57.12.34-2022. (I-23 and I-42)
Remove content on face type liquid level indicators (section A.6.1.1) from the Annex. (I-45 and I-62)

Disposition Status: Accepted.

Disposition Detail: None needed, if accepted.

- **Comment IDs (309964 and 310075) and # (I-24 and I-40) on Clause A.6.2.2, Lines 1, 2, 3, 4, 5, and 6**

  Proposed Change: Remove this subclause A.6.2.2.

  Disposition Status: Accepted.

  Disposition Detail: None needed, if accepted.

- **Comment IDs (309965 and 310076) and # (I-25 and I-41) on Clause A.7.2.1, Lines 20, 21, 22, 23, 24, and 25**

  Proposed Change: Remove this subclause A.7.2.1.

  Disposition Status: Accepted.

  Disposition Detail: None needed, if accepted.

Motion was made by Stephen Shull (Steve) to accept all changes presented during the meeting except to compare Figure 7 in the current Draft to recently published standard C57.19.02 and modify Figure 7, if deem necessary before proceeding with re-circulation ballot process.
Motion was seconded by Daniel Mulkey (Dan).
The motion was unanimously approved.

The Chair stated to the Working Group that he would proceed with the re-circulation ballot process for the latest draft and the Working Group might not meet in the Fall providing that there are no comments that need to be address by the Working Group from the re-circulation ballot.

7. Old Business
Continued to resolve Technical Comments from Draft 2.8 October 2022.

8. New Business
No new business items were brought forth to the Working Group during the meeting.

9. Next meeting – Date and Location
The Chair announced the next meeting for Fall 2024 will be held in St. Louis, Missouri, USA.
Dates: October 27th – 31st, 2024

10. Adjournment

The Chair adjourned the meeting at approximately 2:15 p.m. PDT.

Submitted by: Ali Ghafourian (Chair) and Jarrod Prince (Secretary)

Date: Tuesday, March 19th, 2024

List of Attendees, Affiliations, Membership Status

No New Members were introduced to the Working Group.
13 Members were changed to Guest status.
* A total of 16 guests requested Working Group membership.
Note – No Guest will be considered for membership at the Fall 2024 meeting due to the standard being in the ballot process.

1	Jared Bates	Oncor Electric Delivery	Member
2	Thomas Callsen	Weldy-Lamont Associates	Member
3	Benjamin Garcia	Southern California Edison	Member
4	Carlos Gaytan	Prolec GE	Member
5	Ali Ghafourian (Chair)	H-J Enterprises, Inc.	Member
6	Kenneth Hampton	Baltimore Gas & Electric	Member
7	Ramadan Issack	American Electric Power	Member
8	Andrew Larison	Hitachi Energy	Member
9	Angela Leigl	EATON Corporation	Member
10	Michael Morgan	Duke Energy	Member
11	Daniel Mulkey	Mulkey Engineering Inc.	Member
12	Jerry Murphy	Reedy Creek Energy Services	Member
13	Dwight Parkinson	EATON Corporation	Member
14	Jarrod Prince (Secretary)	ERMCO	Member
15	Robert Reepe	Georgia Power Co.	Member
16	Stephen Shull	BBC Electrical Services, Inc.	Member
17	Audrey Siebert-Timmer	IFD Technologies	Member
18	Igor Simonov	Toronto Hydro	Member
19	Michael Thibault	Pacific Gas & Electric (PG&E)	Member
20	Reinaldo Valentin	Duke Energy	Member
21	Jeremy Van Horn	IFD Technologies	Member
22	John Vartanian	National Grid	Member
23	Joshua Verdell	ERMCO	Member
24	Pragnesh Vyas	Sunbelt-Solomon Solutions	Member
25	Shelby Walters	Howard Industries	Member
26	Bruce Webb	Knoxville Utilities Board	Member
27	Alan Wilks	Consultant	Member
28	Rehan Ali	Siemens Energy	Guest
29	Javier Arteaga*	Hitachi Energy	Guest
30	Steve Ashcraft	Hitachi Energy	Guest
31	Alejandro Ayala*	Power Partners	Guest
32	Paulo Bautista	ENMAX	Guest
33	Andrew Berman	S&C Electric	Guest
34	Jeffrey Brooks	Power Engineers	Guest
35	Duane Brown*	Measurements International	Guest
36	Jim Cai*	JSHP Transformer USA	Guest
37	Noah Chesser*	Oncor Electric Delivery	Guest
38	Janet Crockett	Fayetteville PWC	Guest

39	Antonio Di Biase	Tempel	Guest
40	Kevin Frye	Central Moloney, INC	Guest
41	Hector Garza	Orto de Mexico	Guest
42	Luke Grandbois	IFD Technologies	Guest
43	Guy Halbrooks	TCI Sales, INC	Guest
44	Corey Hanson	Flex-Core	Guest
45	Jean Hernandez-Mejia	NEETRAC - Georgia Tech	Guest
46	Patrycja Jarosz	IEEE SA	Guest
47	Gilbert Kozer*	Northeast Transformer Services, LLC	Guest
48	Patrick Kozer*	Northeast Transformer Services, LLC	Guest
49	Petra L'Abbe*	Sherwin-Williams	Guest
50	Parry Lively	Tempel	Guest
51	Nicholas Manske*	Oncor Electric Delivery	Guest
52	Bryan Marquardt	Cleveland-Cliffs	Guest
53	Martin Munoz*	Orto de Mexico	Guest
54	Ismael Naja*	EATON Corporation	Guest
55	Miguel Plascencia*	Pacific Gas & Electric (PG&E)	Guest
56	Daniel Posadas*	Prolec S.A. DE C.V.	Guest
57	David Rohrer*	First Energy	Guest
58	Mason Rush*	Central Moloney Inc.	Guest
59	Fernando Salinas*	Power Partners	Guest
60	Steve Snyder	Hitachi Energy	Guest
61	David Stockton	Stockton Consulting	Guest
62	Craig Tennant	H-J Enterprises, Inc.	Guest
63	Fernando Tirado	Prolec GE	Guest
64	Alan Traut	Howard Industries	Guest
65	Steve Tsai	JST Power Equipment	Guest

[redacted]C57.12.39 – Tank Pressure Coordination – Carlos Gaytan

Carlos Gaytan presented the following minutes from the working group meeting on March 12, 2024 at 3:15 p.m. with 45 in attendance.

1. Carlos Gaytan called the meeting to order at 3:15 PM PST. Group introductions were made.
2. Carlos Gaytan reviewed IEEE SA Copyright Policy and Essential Patent Claims. No issues were raised.
3. Attendees were informed that since this is the first meeting of the working group, all attendees requesting membership will be granted. As such, Quorum was automatic. The meeting was attended by **45** attendees, and **38** requested membership and make up the initial membership of the working group.
4. Carlos Gaytan requested approval of the Spring 2024 Agenda. Steve Shull made a motion to accept the agenda with the removal of section 5 (past minutes approval), second by Nabi Almeida. Agenda was unanimously approved.
5. Old Business – Status of Standards:
    a. C57.12.39 – Carlos informed the WG that the PAR was approved on Feb 15 2024, and expires Dec 31 2028.
6. New business –

a. *Negative pressure requirements* – Carlos Gaytan introduced comments he had received regarding the requirements of negative pressure.

Dwight Parkinson suggested the following change to section 4.1 to prevent confusion with the sealing requirement of pressure relief valves in 4.2.2.3.

"The sealed-tank system shall be designed so that the tank will remain effectively sealed for internal gas pressures between 49 kPa (gauge) (7 psig) and −35 kPa (gauge) (−5 psig)."

Carlos Gaytan introduced a comment from Igor Simonov relating to clause 5.1.2 to address both the "oil preservation" and "tank strength" topics into a single clause.

Carlos Gaytan introduced a proposal to include the negative pressure withstand clause from C5712.34-2022 Clause 8.10.1 into C57.12.39.

A **motion was made** by Steve Shull and Seconded by Nabi Almeida to form a task force to address clarifying and coordinating negative pressure requirements, including:

- Sealing of tank and pressure relief devices
- Design for tank integrity (mechanical strength)
  - Tank deformation

The motion passed unanimously, and a **task force was formed.** The task force includes: Luke Grandbois (leader), Steve Shull, Nabi Almeida, Dwight Parkinson, Dan Mulkey, Brian Klapsonski, Ismael Naja.

b. *Clarification of applicability of fault current capability test* – Carlos Gaytan introduced a comment he had received from Ben Garcia regarding the need for clarity regarding the applicability of the fault current capability test for rectangular tanks.

Jerry Murphy suggested drafting an informative note describing the inherent increased strength of rectangular tanks to withstand tank rupture. Carlos Gaytan will draft a note to propose to the group at the next meeting.

c. *Review overall structure of the sections of the document for clarification* – Carlos introduced a comment relating to the differences between static and dynamic pressures for round and rectangular tanks.

Carlos and Jeremy will propose a change to the structure of the document to address the comment for review at the next working group meeting.

Dan Mulkey presented images comparing failures of round and rectangular tank transformers.

A brief discussion around the impact of CLFs on tank rupture occurred with no proposals or suggested changes to the standard.

d. *Tank touch temperatures* – Ali Ghafourian asked if the topic of tank touch temperature should be addressed in the C57.12.39 standard. The group discussed and agreed it would be best not to include in this standard. No motion was put forward.

e. Jim Cai suggested that the transformer fault current capability test be expanded in scope to include larger transformers. This item will be discussed at future meetings.

Next meeting: October 29, 2024 in St. Louis, Missouri, USA

7. The meeting was adjourned at 4:15 PM PST.

Submitted by: Jeremy Van Horn

Date: March 12, 2024

Attendance:

List of Members:

Gaytan	Carlos	Grandbois	Luke	Posadas	Daniel
Van Horn	Jeremy	Hamoir	Didier	Reepe	Robert
Almeida	Nabi	Issack	Ramadan	Rohrer	David
Arteaga	Javier	Klaponski	Brian	Rush	Mason
Ayala	Alejandro	Larison	Andrew	Salinas	Fernando
Brodeur	Samuel	Macias	Alejandro	Shull	Stephen
Brooks	Jeffrey	Manske	Nicholas	Siebert-Timmer	Audrey
Brown	Darren	Meza	Fernando	Stockton	David
Cai	Jim	Mulkey	Daniel	Tirado	Fernando
Chesser	Noah	Munoz	Molina	Traut	Alan
Garcia	Ben	Murphy	Jerry	Verdell	Joshua
Ghafourian	Ali	Naja	Ismael	Wilks	Alan
Gonzales	Michael	Parkinson	Dwight		

List of Guests:

Ali	Rehan	Garza	Hector	Walters	Shelby
Crockett	Janet	Nunn	Tommy		
Dinh	Huan	Ortega	Agustin		

[redacted]Task Force on Transformer Efficiency and Loss Evaluation – Phil Hopkinson

Phil presented the following minutes from the task force meeting on March 11, 2024 at 9:30 a.m. with 115 in attendance.

1. Welcome- Phil Hopkinson welcomed the members. He remarked 1972 was his first IEEE meeting.
2. Roster

Over 115 were in attendance here in Vancouver. Attendance list embedded below:

3. Approval of Agenda – The agenda was approved as submitted.
4. Approval of the Minutes of the Last Meeting – October 23, 2023, Kansas City

Fall 2023 Task Force on Transformer Efficiency and Loss Evaluation

On Monday, October 2023 at 9:30am the Task Force met for the Fall 2023 meeting. There were 151 people in attendance according to a count of the circulated rosters. Phil Hopkinson, task force chairman, chaired the meeting. Minutes from the previous meeting were approved at the beginning of the session.

The meeting began with a discussion around the letters that attending persons had sent to the DOE regarding their proposed transformer efficiency increase from current 2016 DOE limits. The chairman remarked on the overall lack of response from the DOE to these letters. Jose ____ (NEETRAC) then addressed the task force and commented on his own personal experience from writing the DOE a letter back in July. Jose….

The chairman then asked Alan Traut (Howard Industries) to address the group. Mr. Traut presented several slides comparing load loss for amorphous and GOES core transformers as a function of loading. A key takeaway is that while amorphous core transformers may be the only viable option if the DOE goes ahead with their proposed increases for efficiency, their performance drops below that of GOES at around 50% load. This coupled with the fact that power consumption (and therefore loading) is trending ever upwards means that in many applications GOES may still be the better option, although the DOE proposed changes would essentially eliminate their use. Mr. Traut also showed a chart plotting core weight vs. efficiency for GOES and amorphous; of interest was that in both cases the core weight begins to rapidly skew upwards at the new efficiencies that the DOE has proposed. This increase in core material weight represents a substantial increase in transformer cost.

Next to address the task force was Bryan Markhart (Cleveland Cliffs). Cleveland Cliffs is the top steel sheet producer in the US, and electrical steel makes up 5% of their portfolio since the acquisition of AK Steel. This amounts to 200,000 tonnes of GOES annually. Bryan showed how the 2016 DOE changes had resulted in several products being essentially eliminated, and forecasts that if the 2022 DOE changes go ahead it will result in the elimination of their remaining products as well. The chairman then called upon Jerry Alan (Metglas) to speak, as Metglas are one of the largest amorphous steel producers in the United States. Jerry stated that currently Metglas produces 27,000 tonnes of amorphous annually and can get another caster up and running if demand dictates it. He expressed optimism that Metglas can meet an increase in demand, although he thinks it is unlikely that full 200,000 annual tonnes of GOES currently provided by Cleveland Cliffs will need to be substituted with 200,000 tonnes of amorphous. What followed was some discussion about the use of amorphous core transformers in Asia (particularly China) and the use of triplex cores. The discussion continued until the meeting time was up.

Luke Grandbois, Secretary

The Oct. 2023 minutes are Approved.

5. Status of the DOE NOPR - Peter Ferrell, Director, Government Relations & Public Affairs, NEMA

Q&A

Overview of NEMAs expansion into more than Standards.

Shining some perspective on what the White House is thinking Congress is thinking and DOE is thinking.

NEMA responded to NOPR with 3 main points in response to the declaration focus on Workforce, availaibability of GOES, do not change efficiency standards as they are. Four months after that DOE issued the NOPR.

DOE has to review the standards every 7 years - don't have to change anything but have to review. DOE was petitioned by environmental groups because they did not review.

NEMA formed a transformer coalition to push back against the NOPR because it isn't practical to achieve due to supply chain etc. Not really about efficiency but lack of amorphous steel, transformers not standardized too many use cases, workforce issues, etc. (DOE hasn't issued a NOPR in 14 years (efficiency rules were changed).

Anything above TSL2 would need to get Congressional approval. Above TSL 2 would require Amorphous Steel.

Current status. Introduced, public comments, NEMA provided comments, NEMA formed coalitions to respond.

Rule within OMB office of information and reg affairs (OIRA). Court ordered to come out with something by June 1, 2024. DOE likely used the old EIA data of 2016 anticipating future loading which showed a decrease in loading, which is not the case. Bruce Webb noted at least 2 members of the IEEE committee participated in the coalition through APPA.

6. Technical Topics (Phil Hopkinson and Dan Mulkey) and Bruce Webb for Q&A
    a. EEI Update - WSB Presentation

Phil shared Steven Rosenstock's (EEI's presentation) Americas Electric Companies Delivering the Future of Energy. Focused on 2024 industry priorities and leading on clean energy.

Wildfires - anything utilities can do to keep discharges down is good.

Over a 2yr period EEI has seen a move from 2.2 percent growth rate to a 4.4 percent growth rate.

b. EV Market Update

7. Assignments for next meeting
8. Next meeting date Mon. Oct 28, 2024, and location St. Louis, MO.
9. Adjourn The meeting was adjourned at 9:45 am.

[redacted]PC57.167 – Guide for Monitoring Distribution Transformers – Gary Hoffman

This working group did not meet.

[redacted]C57.12.35 – Bar Coding for Transformers and Regulators– Rhett Chrysler

Rhett Chrysler presented the following minutes from the working group meeting on March 12, 2024 at 1:45 p.m. with 40 in attendance. Rhett noted that the document is expired, the comment resolution group has completed its work, and that the ballot is currently recirculating.

1. Chair called the meeting to order at 1:45pm PDT. Members introduced themselves with their affiliation. Paper rosters were circulated to record attendance.

2. Chair called for identification of essential patents pertaining to the work of this WG. None brought forward. Copyright policy presented. No issues identified.

3. Chair Report
   a. A two year PAR extension was approved. The PAR now expires 12/31/2025.
   b. The current published document C57.12.35-2013 expired 12/31/2023.

4. Total attendance of 39 is listed below. 11 of 21 members present and quorum was verified (52%). Five guests requested membership, however, the Chair stated that new members are not added after the document enters the ballot phase.

Alejandro	Ayada	Power Partners	Guest	Jerry	Murphy	Reedy Creek Energy Services	Vice-Chair
Paulo	Batista	Enmax	Guest	Ismael	Naja	Eaton	Guest (R)
Chris	Brown	SDG&E	Guest	Dwight	Parkinson	EATON Corporation	Guest
Darren	Brown	Howard Industries	Member	Daniel	Posadas	Prolec Celeco	Guest (R)
Noah	Chesser	ONCOR Electric Delivery	Guest (R)	Robert	Reepe	Georgia Power Co.	Member
Rhett	Chrysler	ERMCO	Chair	David	Rohrer	First Energy	Guest (R)
Janet	Crockett	Fayetteville PWC	Guest	Sherif	Salem	Eversource Energy	Guest
Hector	Garza	Orto	Guest	Fernando	Salinas	Power Partners	Guest
Stephen	Gilbert	IFD Technologies	Guest	Stephen	Shull	BBC Electrical Services, Inc.	Member
Kenneth	Hampton	Baltimore Gas & Electric	Member	Craig	Tennant	H-J	Guest
Ramadan	Issack	American Electric Power	Member	Fernando	Tirado	Prolec GE	Guest
Patrycja	Jarosz	IEEE SA	Guest	Alan	Traut	Howard Industries	Secretary
Angela	Leigl	EATON Corporation	Guest	Steve	Tsai	JST Power Equipment	Guest
Alejandro	Macias	CenterPoint Energy	Member	Reinaldo	Valentin	Duke Energy	Guest
Nicholas	Manske	ONCOR Electric Delivery	Guest	Jeremy	Van Horn	IFD Corporation	Guest
Fernando	Meza	Power Partners	Guest	Joshua	Verdell	ERMCO	Member
Justin	Minikel	Eaton	Guest	Shelby	Walters	Howard Industries	Guest
Michael (Tyle	Morgan	Duke Energy	Guest (R)	Bruce	Webb	Knoxville Utilities Board	Guest
Daniel	Mulkey	Mulkey Engineering Inc.	Member	Paul	Weyandt	Schneider Electric	Guest
Martin	Munoz	Orto	Guest				

5.

Guest (R) = Requesting Membership\

6. Motion to approve meeting agenda (Josh Verdell/Steve Shull). Approved unanimously.

7. Motion to approve Fall 2023 meeting minutes (Josh Verdell/Jerry Murphy). Approved unanimously.

8. Status of SA ballot.

    a. Ballot opened 8/1/2023 and closed 9/19/2023 with 75% return rate, 97% approval rate with 42 comments to resolve.
    b. Comment resolution group (CRG) met to resolve the comments. 25 comments were accepted, 13 comments were accepted as revised, 0 comments were rejected.
    c. The comments were all resolved by the CRG and do not required WG action.
    d. A recirculation ballot was opened 3-6-2024 and closes 3-16-2024.

9. The Chair presented the following SCATE (Supply Chain and Asset Traceability for Energy) update:

    EPM committee (external proposal management)
    - Proposal ID Number - P0163
    - Project Type - INDIVIDUAL
    - Title of Proposal/project - Unique IDs and Smart Tags for Supply Chain and Asset Traceability for the Electric Grid
    - Status/TCR - PENDING CONSIDERATION DISTRIBUTION SUBCOMMITTEE AS CO-SPONSOR

    3/11/24 - Release of SCATE specifications for distribution transformers for IEEE industry Connections SA IC22-009 project
    - Specification for Unique IDs and Smart Tags for Supply Chain and Asset Traceability for Energy - v1.0
    - SCATE Unique ID Encoding Model - Distribution Transformers - v1.0
    - https://ieee-sa.imeetcentral.com/scate/home (available in April)

10. The chair presented the following list of manufacturers requesting a manufacturer two character ID codes.

    Hitatchi Energy (??), Fall 2021 WG meeting, Meeting Minutes, Andre Lainson
    SETI, Shinseong E&T, Inc. (SH), 6/01/2023, Email from Bruce Webb (KUB)
    WEG Transformers USA (WU), 7/03/2023, Email from Zach Weiss
    JST Power Equipment (JS), 11/10/2023, Email from Chris Talbert
    Emirates Transformers and Switchgear Ltd (ET), 2/15/2024, Email from Unmesh Kawale

    A motion was made to accept SETI, WEG, JST, and Emirates. The motion passed unanimously.
    Hitachi Energy was tabled pending identification of the new two character code.

11. Next meeting – St. Louis, MO USA October 27-31, 2024

    Note – pending ballot recirculation status, if recirculation is successful then the WG will be removed from the Fall 2024 schedule

12. Meeting adjourned at 2:03 PDT.

Submitted by: Alan Traut, Secretary
Date: 3/12/2024

Task Force Tank Touch Temperature – Bruce Webb

Bruce Webb presented the following minutes (this TF did not meet):

- There was no in person meeting this week in Vancouver, BC
- As next steps from our F23 meeting, a DRAFT report of the TF results was prepared for presentation to this SC. The report was completed in January 2024 with the assistance of Messrs. Ryan Hogg U.S. Bureau of Reclamation and J.C. Hernandez-Mejia of NEETRAC. Thank you.
- Following the completion this DRAFT report, it was peer reviewed by volunteers from our F23 meeting. This TF Review Team consisted of (Dan Mulkey of Mulkey Engineering, Ryan Hogg, Jeremy Van Horn with IFD and Jim Spaulding of the City of Fort Collins – Light & Power). The DRAFT report was APPROVED in early February. Again, my thanks to this Team.
- Afterwards and following our F23 next steps, the completed DRAFT was submitted to the Standards Administration (SA) and the Administrative Committee (Adcom) for their review, consideration, and approval.
- SA/Adcom has responded to our submittal by requesting that the report be reformatted into an official IEEE SA White Paper.
- Once reformatted, the Chair will again have the paper peer reviewed and later sent out to the TF Members for approval, disapproval with comment or abstention prior to the F24 meeting in St. Louis.
- No in-person meeting is expected to take place at the F24 St. Louis, MO meeting.

C57.15 – Step-Voltage Regulators – Dan Sauer

Dan submitted the below minutes from the working group that met following the Transformer Committee Meeting.

1) Welcome and Chair's Remarks

2) Circulation of Attendance Sheets

   a. A total of 20 attendees were present in person, with one additional attendee joining via Teams. 15 attendees requested membership, which was granted due to this being the first WG meeting. Three individuals requested membership after the meeting had concluded. Therefore, a total count is as follows:
   i.18 Members
   ii. 6 Guests

3) Presentation and approval of meeting Agenda (motion by Craig Colopy / Seconded by Kyle Heiden) – approved without opposition.

4) Reviewed Approved PAR with WG – Dan Sauer

5) Review of topics to be addressed in next revision:

a. Universal Interface (UI)

i. Kyle Heiden stated that the main point of contention is that Section 11 does not explicitly describe the connection type/style between control cable and control enclosure – causing OEMs to make their own interpretations.

ii. General agreement that the cable shall:

1. Have male pins on the Regulator end

2. Have female sockets at the Control end iii. Question to address is around mounting style on Control end.

What level of cable security do users require?

iv. Photos of Eaton's and Siemens' solutions were presented for discussion purposes

v. **Action** - SAE AS50151, referenced in section 11, latest release is "Version E". Verify cross references of A31021 and AS31061 remain unchanged – Steve Shull vi. Informal poll was taken amongst users present and 5 of 6 preferred the connection at the control end of the cable be inside the control enclosure

vii. **Action** – Steve Shull to take Dan Sauer's working copy of changes and work on updating section 11.

viii. **Action** – OEMs to survey their users to understand their preference on where the connection point between the control cable and control enclosure should be (inside vs. outside cabinet). Feedback due to WG chair by end of May.

b. IEC Changes in Short Circuit (SC) Testing

i. Lee Matthews identified that IEC SC requirements changed in 2019 (editorial)

1. Always was a single 2 second test – "2s (+/- 1 10%)"

2. Changed to two 1 second tests – "2 (1s +/1 10%)"

3. All agreed to fix error to original wording

c. Change in Defining Rated Temps

i. Thermally upgraded Kraft paper – max 110 °C

1. IEEE includes avg. ambient of 30 °C, 65 °C rise, and 15 °C hot spot rise

2. IEC has 110 °C max, but has several pages stating how average winding rise can be determined ii. Group discussed and is leaning towards not adopting the IEC language

iii. Tabled for now

d. Table 12 – K-Factor 6.8.1

i. PowerTech requested WG looked at this section

ii. If X/R of system is such that the K-factor described in table 12 can't be obtained then the RMS short circuit current shall be raised to obtain the required peak current value.

iii. PowerTech wants to know if it is ok that the resulting K-factor is lower than described by Table 12?

iv. Group agreed that by definition the K-factor would have to be lower in above scenario

e. DGA in Step-Voltage Regulators

i. C57.139 is looking for data to include guidance for DGA of Step-Voltage Regulators ii. Action – Dan Sauer to reach out to Insulation Life SC Chair (Scott Reed) to add new business item for addressing DGA in Voltage Regulators

f. Equation E1 in Annex E

i. Uses I_{r1} in numerator but it is not defined. Change to add a definition of I_{r1}

6) Members were assigned sections to review and recommend updates/changes. All chained references shall be checked to make sure they are updated

a. Section 2 - Kyle Heiden/Guang Yuan/Samragui Datta Roy

b. Sections 3 & 4 – Dan Sauer

c. Section 5 – Lee Matthews

d. Section 6 – Miguel Plascencia

e. Section 7 – Michael Gonzales/Sherif Salem

f. Section 9 – Dan Sauer/Rich Frye/Samragui Datta Roy

g. Section 10 – Kyle Heiden/Sebastian Rehkopf

h. Section 11 – Steve Shull

i. Annexes – Craig Colopy/Lee Matthews 7) New Business for next WG meeting:

a. Can we standardize ratings on 65 °C AWR?

b. UL94 – Should we include requirement for jacketed cable – more common standard for wire/jacketed cable is UL 1581

8) Action – Dan Sauer to coordinate next WG meeting for July 2024 (virtual)

9) Motion to Adjourn (motion by Steve Shull / Seconded by Kyle Heiden) – approved without opposition.

Attendance:

Dan	Sauer	Chair	Eaton Corp	USA
Stephen	Shull	Member	BBC Electrical Services Inc.	USA
Kyle	Heiden	Member	Eaton Corp	USA
Janet	Crockett	Guest	Fayetteville PWC	USA
Samragui	Datta Roy	Member	Siemens Energy Inc.	USA
Wilson	Tranum	Member	Siemens Energy Inc.	USA
Rehan	Ali	Member	Siemens Energy Inc.	USA
Patrycja	Jarosz	Guest	IEEE SA	USA
Miguel	Garcia	Guest	Not stated	USA
Yeounsoo	Kim	Member	Not stated	USA
Sherif	Salem	Member	Eversource Energy	USA
Sebastian	Rehkopf	Member	Reinhausen	GER
Jimmy	Smith	Mamber	Howard Industries	USA
Tim	Tillery	Guest	Howard Industries	USA
Guang	Yuan	Guest	Hitachi Energyu	USA
Miguel	Plascencia	Member	PG&E	USA
Dwight	Parkinson	Guest	Eaton Corp	USA
Richard	Frye	Member	Eaton Corp	USA
David	Rohrer	Member	First Energy	USA
Chris	Slattery	Member	First Energy	USA
Michael	Gonzales	Member	Southern California Energy	USA
Lee	Matthews	Vice Chair	Howard Industries	USA
Nabi	Almeida	Secretary	Prolec GE	USA

Ismael	Naja	Member	Eaton Corp	USA
Alex	Macias	Member	CenterPoint Energy	USA

C.3 Old Business

- No old business was discussed

C.4 New Business

PC57.12.210

Vote was brought to submit PC57.12.210 to an Entity Ballot

Dan Sauer mad the motion

Steve Shull provided a 2nd

This motion was unanimously approved.

SCATE

Steve Shull gave an explanation of what SCATE is.

We are being asked to co-sponsor this project by providing input but not stewardship.

Steve Shull made a motion to co-sponser ths project.

Rhett Chrysler provided a 2nd

This motion was unanimously approved.

English Errors – Dan Mulkey

Dan noted several inconsistencies in the language used in various documents

Incorrect use of immersed

Non vs not-non being used in the same exclusion

Primary vs Secondary

Pad mounted Step Voltage Regulators

The Subcommittee unanimously voted to create a PAR for pad mount voltage regulators. This motion came from a task force that was formed with 7 members.

C.5 Chairman's Closing Remarks and Announcements

Jerry had no closing comments to the SC.

C.6 Adjournment

Jerry adjourned the meeting as provided in the meeting agenda at 10:45am.

List of Attendees and Affiliations:

Last Name	First Name	Role	Company
Ali	Rehan	Guest	Siemens Energy
Almeida	Nabi	Member	Prolec GE
Amin	Mihir	Guest	EATON
Arteaga	Javier	Member	Hitachi Energy
Ayala	Alex	Member	Power Partners
Ayers	Donald	Member	Ayers Transformer Consulting
Bautista	Paulo	Guest	Enmax
Berman	Andrew	Guest	S&C Electric Company
Berube	Jean-Noel	Guest	Rugged Monitoring Inc.
Biggie	Kevin	Member	Weidmann Electrical Technology
Blackwell	Zack	Guest	TCI
Blaszczyk	Piotr	Member	Specialty Transformer Components LLC
Blew	David	Member	Retired (PSE&G)
Britton	Jeffrey	Guest	Phenix Technologies, Inc.
Brooks	Jeffrey	Guest	Power Engineers
Brown	Duane	Guest	Measurements International Ltd.
Callsen	Thomas	Member	Weldy-Lamont Associates
Chesser	Noah	Guest	Oncor Electric Delivery
Chisholm	Matthew	Guest	IFD Technologies
Cho	Eunyoung	Guest	HICO America
Chrysler	Rhett	Member	ERMCO
Colopy	Craig	Member	Retired (Eaton)
Coughlan	William	Guest	Metglas, Inc.
Crockett	Janet	Guest	Fayetteville PWC
Currizales	Juan Alfredo	Guest	Prolec
Dulac	Hakim	Member	APT
Dutta Roy	Samragni	Member	Siemens Energy
Espindola	Marco	Guest	Hitachi Energy
Fernandez	Miguel	Guest	Braintree Electric Light Dept.
Ferreira	Marcos	Member	Quanta Technology
Forsyth	Bruce	Guest	Cargill
Frye	Rich	Guest	EATON
Garcia	Benjamin	Member	Southern California Edison
Garcia	Miguel	Guest	Hitachi Energy
Gaytan	Carlos	Member	Prolec GE
Ghafourian	Ali	Member	H-J Enterprises, Inc.
Ghosh	Rob	Member	General Electric
Giraldo	Orlando	Guest	H-J Family of Companies
Gonzales	Michael	Guest	Southern California Edison
Gonzalez	Luis	Guest	Canduct Industries Limited

Grandbois	Luke	Guest	IFD Technologies
Greaves	Brad	Guest	Weidmann Electrical Technology Inc.
Gupta	Ravi	Guest	Megger
Gyore	Attila	Guest	MIDEL & MIVOLT FLUIDS
Hampton	Kenneth	Member	Baltimore Gas & Electric
Hanoir	Didier	Guest	Transformer Protector Corp
Heiden	Kyle	Member	EATON Corporation
Heineig	Peter	Guest	Weidmann
Hernandez	Jean	Guest	Georgia Tech NEETRAC
Hernandez Cano	Sergio	Member	Hammond Power Solutions
Hoffman	Saramma	Guest	PPL Electric Utilities
Hogg	Ryan	Guest	Bureau of Reclamation
Hopkinson	Philip	Member	HVOLT Inc.
Issack	Ramadan	Member	American Electric Power
Jacob	Nathan	Guest	Camlia Energy
Jarosz	Patricia	Guest	IEEE
John	John	Member	Virginia Transformer Corp.
Kim	Yeounsoo	Guest	MEPPI
Klaponski	Brian	Member	Carte International Inc.
Klaponski	Adam	Guest	Carte International
Knapp	Evan	Guest	EATON
Komm	Dave	Guest	Hammond Power Solutions
Laidse	Peeva	Guest	Sherwin-Williams
Larison	Andrew	Member	Hitachi Energy
Leal	Fernando	Guest	Prolec GE
Lee	Moonhee	Member	Hammond Power Solutions
Leigl	Angela	Guest	EATON
Levin	Aleksandr	Guest	Weidmann Electrical Technology
Li	Weijun	Member	Braintree Electric Light Dept.
Lin	David	Guest	IFD Corporation
Lizcano	Cesar	Guest	Shell USA, Inc.
Loiselle	Wes	Guest	TetraTech
Lopes	Ricardo	Guest	Efacec Energia, SA
Lopez-Fernandez	Xose	Guest	Universidade de Vigo
Lovins	Colby	Guest	Federal Pacific
Lugge	Andrew	Guest	Hitachi Energy
Macias	Alejandro	Member	CenterPoint Energy
Mai	Tim-Felix	Member	Siemens Energy
Malde	Jinesh	Guest	M&I Materials Inc.
Manske	Nicholas	Guest	Oncor Electric Delivery
Martinez	Daniel	Guest	JFE
McBride	Brian	Member	Cargill, Inc.

Mellin	Toni	Guest	Vaisala
Meza	Fernando	Guest	Power Partners
Minikel	Justin	Member	EATON Corporation
Montpool	Rhea	Member	Schneider Electric
Morgan	Michael	Guest	Duke Energy
Murphy	Jerry	Chair	Reedy Creek Energy Services
Naderian	Ali	Guest	METSCO Energy Solutions Inc. BBA
Naja	Ismael	Guest	Eaton
Narawane	Aniruddha	Member	EATON Corporation
Neild	Kristopher	Guest	Megger
Nunn	Tommy	Guest	JST Power
Oakes	Stephen	Member	WEG Transformers USA Inc.
Ogajanov	Rudolf	Guest	Hitachi Energy
Ortega	Asustin	Guest	Siemens Energy
Panesar	Parminder	Guest	Virginia Transformer
Parkinson	Dwight	Member	EATON Corporation
Patel	Vinay	Guest	Consolidated Edison Co. of NY
Patel	Dipesh	Guest	EATON
Payerle	George	Member	Carte
Pepe	Harry	Guest	Phenix Technologies, Inc.
Plascencia	Miguel	Guest	PG&E
Prince	Jarrod	Member	ERMCO
Puente	Pedro	Guest	Prolec GE
Radu	Ion	Member	Hitachi Energy
Reepe	Robert	Member	Georgia Power Co.
Rohrer	David	Guest	First Energy
Ronchi	Rodrigo	Guest	WEG-Voltran
Salem	Sherif	Guest	Eversource Energy
Salinas	Fernando	Member	Power Partners
Saraf	Manish	Guest	Hammond Power Solutions
Sarkar	Amitabh	Guest	Virginia Transformer Corp
Sauer	Daniel	Member	EATON Corporation
Sbravati	Alan	Guest	Hitachi Energy
Shalabi	Jaber	Guest	VanTran Industries, Inc.
Shull	Stephen	Member	BBC Electrical Services, Inc.
Siebert-Timmer	Audrey	Member	IFD Technologies
Simonov	Igor	Guest	Toronto Hydro
Slattery	Christopher	Guest	FirstEnergy Corp.
Smith	Jimmy	Guest	Howard Industries
Snyder	Steven	Member	Hitachi Energy
Soeller	Markus	Guest	Power Diagnostix
Sparling	Brian	Guest	Kinectrics

Tarengo	Erik	Guest	Olsun Electrics
Taylor	Marc	Guest	JFE Shoji Power Canada Inc.
Tendulkar	Vijay	Member	EATON Corp.
Tennant	Craig	Guest	H-J
Thibault	Michael	Member	Pacific Gas & Electric
Thiede	Andreas	Guest	Highvolt Dresden
Tillery	Timothy	Member	Howard Industries
Tostrud	Mark	Guest	Dynamic Ratings, Inc.
Traut	Alan	Member	Howard Industries
Van Horn	Jeremy	Member	IFD Technologies
Vandermaar	John	Guest	BC Hydro
Vartanian	John	Member	National Grid
Verdell	Joshua	Vice-Chair	ERMCO
Verdolin	Rogerio	Member	Verdolin Solutions Inc.
Vyas	Pragnesh	Member	Sunbelt-Solomon
Washburn	Alan	Guest	Burns & McDonnell
Webb	Bruce	Member	Knoxville Utilities Board
Weiss	Zachery	Member	WEG Transformers USA Inc.
Wexamdt	Paul	Guest	Schneider Electric
Wilks	Alan	Member	Consultant
Yuan	Guang	Guest	Hitachi Energy
Yun	Joshua	Member	Virginia Transformer Corp.
Zuiderveen	Thomas	Guest	IFD Corporation