Annex C Distribution Subcommittee – Chair: Ed Smith

October 19, 2022
Charlotte, North Carolina

Chair: Ed Smith
Vice-Chair: Jerry Murphy
Secretary: Josh Verdell

C.1 General Opening

Ed opened the meeting welcoming everyone to the meeting. To establish a quorum, a list of members was displayed, and a quorum poll was made. We did have a quorum with 50 members in attendance by count of those identified on a slide presented in the meeting. Recorded attendance gave 124 in attendance and 60 members. List of attendees and affiliation attached below.

The agenda was reviewed, a motion was made to approve by Dan Sauer, seconded by Al Traut, and approved by unanimous acclamation of the members in attendance.

The Spring 2022 meeting minutes were reviewed, a motion was made to approve by Gale Kennedy, seconded by Dan Sauer, 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 Ed Smith reminded the group about the working group chair training.

C.2 Working Group and Task Force Reports

C57.12.20 – Overhead Distribution Transformers – Al Traut

Al presented the following minutes from the working group meeting on October 17, 2022 at 11:00 a.m. with 72 in attendance. This working group voted to move Draft 9 of their document to ballot and this motion was brought to the Subcommittee. The motion received unanimous approval.

1. Call to order
   The meeting was called to order by the Chair (Al Traut) at 11:00AM EDT on Monday, October 17, 2022.

2. Essential patent statement and copyright slides.
   There was a call for essential patent claims by the Chair. There were none brought forward. The IEEE copyright slides were shown to the WG.

3. Attendance and Quorum
   The list of current members list was displayed, and members were counted. **30** of **42** members were present. A Quorum was declared. 6 of the 42 guests in attendance requested membership. The total attendance is recorded below. Guests requesting membership are shown as Guest-R.

Last Name	First Name	Role	Company
Almeida	Nabi	Guest	Prolec
Ante	Gregory	Guest	Southern California Edison
Arevalo	Edmundo	Guest	Bonneville Power Administration
Armstrong	James K.	Guest	Trench
Arora	Kush	Guest	Reinhausen
Bates	Jared	Guest	ONCOR
Biggie	Kevin	Guest	Weidmann Electrical Technology
Blew	David	Guest	Retired (PSE&G)
Brown	Darren	Member	Howard Industries
Callsen	Thomas	Guest-R	Weldy-Lamont Associates
Chesser	Noah	Guest	ONCOR
Chisholm	John	Guest	IFD Corporation
Cho	Eunyonng	Guest	HWO-America
Chrysler	Rhett	Member	ERMCO
Da Silva	Roberto	Guest	Cargill, Inc.
Dahlke	Michael	Member	Central Moloney, Inc.
Dauzat	Thomas	Member	General Electric
DeRouen	Craig	Member	ERMCO
Dinh	Huan	Guest	Hitachi Energy
Garcia	Benjamin	Member	Southern California Edison
Gaytan	Carlos	Member	Prolec GE
Ghafourian	Ali	Member	H-J Family of Companies
Glenn	Andersen	Guest	Fayetteville PWC
Grandbois	Richard	Guest	IFD Technologies
Hall	Zach	Guest	Fayetteville PWC
Hamilton	Kendrick	Secretary	United Standard Electric
Hardin	Michael	Guest	H-J Family of Companies
Henault	Paul	Guest	IFD Corporation
Issack	Ramadan	Member	American Electric Power
Jakob	Karl	Guest	Cargill, Inc.
Kennedy	Gael	Member	GR Kennedy & Associates LLC
Kozer	Patrick	Guest	Northeast Transformer Services, LLC
Kozer	Gilbert	Guest	Northeast Transformer Services, LLC
Larison	Andrew	Guest	Hitachi Energy
Lively	Parry	Member	Tempel
Macias	Alejandro	Guest	Centerpoint Energy

Last Name	First Name	Role	Company
Mai	Tim-Felix	Guest-R	Siemens Energy
Martinez	Joaquin	Guest	Siemens Energy
Menter	Tim	Guest	Lincoln Electric System
Miller	Kent	Guest	T&R Electric Supply Co.
Minikel	Justin	Guest	EATON Corporation
Morgan	Michael	Member	Duke Energy
Morris	Tim	Guest	Walton EMC
Munoz Molina	Martin	Guest	Orto de Mexico
Murillo	Hugo	Guest	H-J Family of Companies
Parkinson	Dwight	Member	EATON Corporation
Posadas	Daniel	Guest-R	Prolec
Radu	Ion	Guest	Hitachi Energy
Reepe	Robert	Member	Georgia Power Co.
Salinas	Fernando	Guest	Power Partners
Sampat	Mahesh	Guest	EMS Consulting Inc.
Sanchez	Albert	Member	Knoxville Utilities Board
Schneider	Jeffrey	Guest-R	Power Partners/Spire Power Solutions
Shannon	Michael	Member	Rea Magnet Wire
Shingari	Avijit	Guest-R	Pepco Holdings Inc.
Shull	Stephen	Member	BBC Electrical Services, Inc.
Siebert-Timmer	Audrey	Member	IFD Technologies
Silgardo	Adrian	Guest	IFD Technologies
Smith	Edward	Vice-Chair	H-J Family of Companies
Stank	Markus	Guest-R	Maschinenfabrik Reinhausen
Tennant	Craig	Guest	H-J Family of Companies
Theisen	Eric	Member	Metglas, Inc.
Thibault	Michael	Member	Pacific Gas & Electric
Traut	Alan	Chair	Howard Industries
Valentin	Reinaldo	Member	Duke Energy
Van Horn	Jeremy	Member	IFD Technologies
Vartanian	John	Member	National Grid
Verdell	Joshua	Member	ERMCO
Vyas	Pragnesh	Member	Sunbelt-Solomon Solutions
Webb	Bruce	Member	Knoxville Utilities Board
Wilks	Alan	Member	Consultant
Zaman	Malia	Guest	IEEE SA

4. Approval of agenda for this meeting
   The Chair sent out the agenda prior to the meeting for review. Agenda was approved without any opposition.

5. Approval of minutes of the previous meeting
   The Chair sent out the minutes of the Spring 2022 Denver unapproved minutes prior to the meeting for review. Minutes were approved without any opposition.

6. Chair Report
   The active PAR expires 12/31/2023. The present 2017 document expires 12/31/2027.

7. Old Business – Review of Draft 8.
   a. Discussion – Clause 1.1 Scope.
      i. Proposal made to change 34 500V to 19 920/34 500Y V. Since this is the maximum high-voltage rating in the scope, the WG felt that 34 500V was more appropriate.
      ii. Steve Shull motions to leave primary and secondary voltages as-is in the scope. Seconded by Josh Verdell. Motion passed unanimously.
   b. Discussion - Clause 1.3 Word Usage
      i. This new clause was added to meet IEEE style guide requirements.
      ii. The document was corrected for instances of “must” or “will” and changed to “shall” or “should” as appropriate (editorial).

c. Discussion – Section 5.1 Basic lightning impulse levels
   i. Proposal made to re-word the second sentence for clarity. WG agreed. Editorial change so no motion required.
d. Discussion - Section 6.2 Dielectric tests
   i. Editorial change from "will" to "shall". No motion necessary
e. Discussion – Section 7.4.1 Insulating liquid
   i. Proposal made to change "mineral oil" to "insulating liquid".
   ii. Motion by Steve Shull to change "mineral oil" to "insulating liquid". After discussion Steve withdraws his motion.
   iii. WG felt that leaving "mineral oil" clearly establishes miner oil as the standard insulating liquid. The clause further allows users to specify other insulating liquids shown in C57.12.00.
   iv. Josh Verdell motions to leave statement as-is. Steve Shull seconds. Motion passes unanimously.
f. Discussion – Section 7.5.7 Tank ground connector
   i. Proposal made to add "support short-circuit current" to the first sentence. *The tank grounding connector shall be a solderless connector that shall support short-circuit current and accommodate conductor size Number 8 AWG solid to Number 2 AWG stranded…*
   ii. WG decided to leave as-is because we do not have any information supporting the short circuit capability of the tank ground connector.
g. Discussion – Figure 4
   i. Proposal to add a column for vector group i.e. "Dd0", "Dy1", etc.
   ii. WG agreed. A. Traut will add to Figure 4 to draft 9.
h. Discussion – Annex B
   i. Table 2 - Footnote on voltage requirements will be changed to an informative note

8. New Business
   a. Gail Kennedy motions to send Draft 9 to ballot. Seconded by Steve Shull. Motion passes unanimously.
   b. Comment Resolution Group was formed. Al Traut (chair), Josh Verdell, Carlos Gaytan, Bruce Webb, and Steve Shull. The CRG will determine which comments need to be brought back to the WG for approval.

9. Next meeting--date and location

   SPRING 2023 MEETING
   MILWAUKEE, WISCONSIN, USA
   MARCH 19 – 23, 2023

10. **Adjournment**
    The meeting was adjourned at 12:10 PM EDT.

Submitted by: Kendrick Hamilton

Date: October 21, 2022

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

Jeremy Van Horn, for Dan Mulkey, presented the following minutes from the working group meeting on October 18, 2022, at 8:00 a.m. in with 67 in attendance. The working group voted to take draft 5 of the C57.12.28 and C57.12.29 documents to ballot. This motion was brought to the subcommittee and was approved unanimously.

List of Members:
Martin Bachand (Cloverdale Paint Inc.)
David Blew (Retired (PSE&G))
Darren Brown (Howard Industries)
John Chisholm (IFD Technologies)
Rhett Chrysler (ERMCO)
Douglas Craig (Richards Manufacturing Co.)
Michael Dahlke (Central Moloney, Inc.)
Thomas Dauzat (General Electric)
Benjamin Garcia (Southern California Edison)
Carlos Gaytan (Prolec GE)
Ali Ghafourian (H-J Enterprises, Inc.)
Chris Guertin (Cloverdale Paint Inc.)
Jane Hall (Cloverdale Paint Inc.)
Ramadan Issack (American Electric Power)
Gary King (Howard Industries)
Brian Klaponski (Carte International Inc.)
Andrew Larison (Hitachi Energy)
Alejandro Macias (CenterPoint Energy)
Justin Minikel (EATON Corporation)
Michael Morgan (Duke Energy)
Jerry Murphy (Reedy Creek Energy Services)
Dwight Parkinson (EATON Corporation)
James Ratty (Electronic Technology Inc.)
Robert Reepe (Georgia Power Co.)
Jeffrey Schneider (Power Partners/Spire Power Solutions)
Pugal Selvaraj (Virginia Transformer Corp.)
Avijit Shingari (Pepco Holdings Inc.)
Stephen Shull (BBC Electrical Services, Inc.)
Audrey Siebert-Timmer (IFD Technologies)
Edward Smith (H-J Family of Companies)
Travis Spoone (EATON Corporation)
Michael Thibault (Pacific Gas & Electric)
Alan Traut (Howard Industries)
Reinaldo Valentin (Duke Energy)
Jeremy Van Horn (IFD Technologies)
John Vartanian (National Grid)
Joshua Verdell (ERMCO)
Alan Wilks (Consultant)
Michael Zarnowski (Carte International)

List of Guests:
Nabi Almeida (Prolec GE)

Glenn Andersen (Fayetteville PWC)
Gregory Ante (Southern California Edison)
Alex Ayala (Power Partners)
Thomas Callsen (Weldy-Lamont Associates)
Noah Chesser (Oncor Electric Delivery)
Eun Young Cho (HIW-America)
Craig Derouen (ERMCO)
Antonio Dibiase (Tempel Steel)
Jeffrey Door (H-J Family of Companies)
Mark Faulkner (EATON Corporation)
Luke Grandbois (IFD Technologies)
Zach Hall (Fayettteville PWC)
Garza Hector (Orto de Mexico)
Javier Hernandez (Orto de Mexico)
Gilbert Kozer (Northeast Transformer Services, LLC)
Patrick Kozer (Northeast Transformer Services, LLC)
Parry Lively (Tempel Steel)
Timothy Menter (Lincoln Electric System)
Kent Miller (T&R Electric Supply Co.)
Tim Morris (Walton EMC)
Daniel Posadas (Prolec CELECO)
Mason Rush (Central Moloney Inc)
Fernando Salinas (Power Partners)
Albert Sanchez (Knoxville Utilities Board)
Adrian Silgardo (IFD Technologies)
Bruce Webb (Knoxville Utilities Board)
Zachery Weiss (WEG Transformers USA Inc.)

Meeting Minutes:

1) Jeremy Van Horn called the meeting to order at 8:01 AM EST. Group introductions were made.
2) Opening remarks and announcements
    a) Dan Mulkey asked Jeremy Van Horn to run this meeting as he was unable to attend.
    b) AMS system has been discontinued. Paper rosters were circulated.
3) Jeremy Van Horn reviewed IEEE SA Copyright Policy and Essential Patent Claims. No issues were raised.
4) Membership changes were noted:
    a) Added: Pugal Selvaraj, Vinay Patel
    b) Changed to Guest: Thomas Callsen, Israel Barrientos
5) Quorum was verified. The working group consisted of 58 members, requiring 30 for quorum. 33 members were counted at the start of the meeting. Attendance records later confirmed 39 members attended.
6) Jeremy Van Horn requested approval of the Fall 2022 Agenda as amended to review Draft 4 of the standards rather than Draft 3. Jerry Murphy made a motion, second by Steve Shull. Agenda was unanimously approved.
7) Jeremy Van Horn requested approval of the Spring 2022 Minutes. Steve Shull made a motion, second by Al Traut for approval of the minutes. Minutes were unanimously approved.
8) Status of Standards:

a) C57.12.28 Standard for Pad-Mounted Equipment – Enclosure Integrity, Published July 15, 2014
   i) Expires: 12/31/2024
   ii) PAR expiration: 12/31/2024
   iii) Status: in progress, Draft 4
b) C57.12.29 Standard for Pad-Mounted Equipment – Enclosure Integrity for Coastal Environments, Published August 8, 2014
   i) Expires: 12/31/2024
   ii) PAR expiration: 12/31/2024
   iii) Status: in progress, Draft 4
c) C57.12.30 Standard for Pole-Mounted Equipment – Enclosure Integrity for Coastal Environments, Published March 4, 2021
   i) Expires: 12/31/2030
d) C57.12.31 Standard for Pole Mounted Equipment – Enclosure Integrity, Published February 26, 2021
   i) Expires: 12/31/2030
e) C57.12.32 Standard for Submersible Equipment – Enclosure Integrity, Published Aug 8, 2019
   i) Expires: 12/31/2029

9) Old business:
   a) Jeremy Van Horn reviewed status of standards.
      i) There is one meeting left to finish current drafts for C57.12.28 and C57.12.29.
      ii) The PAR modifications with previously approved scope changes are on the Nescom agenda for Oct 25, 2022.
   b) Jeremy Van Horn reviewed changes proposed by Dan Mulkey for C57.12.28 and C57.12.29 including:
      i) Participants list: updated to reflect current working group membership list
      ii) Introduction: updated to include summary of significant changes
      iii) Acronyms: updated to include AWG, SCAB and removed QUV
      iv) Footnotes in Section 4.1.10 and 4.1.1.1: added footnote referring to Annex C, commonly used substate steels
      v) Footnotes in Section 5.3: added footnote referring to Annex D, substrate surface preparation
      vi) Temperature warning: add approved warning in Section 5.4.4
         (1) Group discussed if that is the right placement in the document.
         (2) Mike Thibault made a motion to move the warning to Section 6.2. Second by Martin Bachand. The group voted on the motion: 6 members for, 25 members opposed, 0 members abstained. Motion did not pass.
         (3) Jerry Murphy made a motion to move the warning to Section 4.1.3. Seconded by Steve Shull. The group voted on the motion: 30 members for, 1 member opposed, 0 members abstained. Motion passed.
      vii) Figure 5 and 6 edits: split figures so they were no longer side by side and changed normative note numbering from “#1” to “a”, etc.
         (1) Justin Minikel pointed out ASTM 1654-08 is referred to in Figure 5 and that the group had previously discussed referencing ASTM 1654-05 due to more strict test requirements.

(2) Justin Minikel made a motion to change the ASTM reference from 1654-08 to 1654-05. Second by Steve Shull. Motion passed unanimously.

viii) Jerry Murphy made a motion to accept recommended changes including participant list, introduction, acronyms and footnotes (see points athrough to e above). Second by Mike Thibault. Motion passed unanimously.

c) Justin Minikel asked the group for feedback on changing Section 5.2 to reference CIELAB rather than Hunter as CIELAB is more commonly used.
   i) Justin Minikel made a motion to change the reference from Hunter to CIELAB in both C57.12.28 and C57.12.29 in Section 5.2. Seconded by Jerry Murphy.
   ii) Group discussed and drafted an informative note to include under Section 5.2 as follows: "Note: CIELABS uses ΔE* to distinguish CIE 1976 L*a*b* scale in 1976 (Supplement No.2 to CIE Publication No. 15, Colorimetry) from previous versions. CIELAB is more commonly used that than Hunter."
   iii) Just Minikel amended his motion to include the above informative note that described the reason for using an asterisk as well as the reason for removing the Hunter reference. Second by Jerry Murphy. Motion passed unanimously.

d) Jeremy Van Horn brought up that the Tank Touch Temperatures Task Force met at 4:45 on Monday, Oct 18th and encouraged members to participate in future meetings.

10) New business:
   a) Martin Bachand asked the group if we could evaluate bulb / lamp selection. Group discussed that there is not enough time to include these changes in this draft but is something we should start looking at in C57.12.32.
      i) A taskforce was formed review lamp choices and to present findings to the group in the Spring 2023 meeting. Taskforce members include Justin Minikel, Martin Bachand, Jane Hall. Other paint manufacturers are encouraged to join.
   b) Josh Verdell made a motion to go to ballot for Draft 5 of C57.12.28 and C57.12.29which includes all discussed changes. Seconded by Ed Smith. The group voted on the motion: 33 members were for, 0 opposed, 0 abstained. Motion passed unanimously.
11) Next meeting: is planned for March 21, 2023 in Milwaukee, WI, USA
   a) The following attendees requested membership and will be added to membership for the Spring 2023 meeting: Craig Derouen
12) The meeting was adjourned at 9:13 AM EST.

Submitted by: Audrey Siebert-Timmer
Date: October 18, 2022

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

Scott Dhalke, for Steve Shull, presented the following minutes from the PAR study meeting on October 17, 2022 at 3:15 p.m. with 69 in attendance. The consensus of the PAR study group was to seek a motion to apply for a new PAR. Scott Dhalke made this motion and it was seconded by Dan Saur. During discussion, it was clarified that this would be a full revision PAR. This motion was approved unanimously by the subcommittee.

Attendance:

NAME	Company
Glenn Andersen	Fayetteville PWC
Jhala Anirudhdhsinh	Transformers & Rectifiers Co. LTD.
Gregory Ante	Southern California Edison
Jared Bates	Oncor Electric Delivery
Kevin Biggie	Weidmann Electrical Technology
Thomas Callsen	Weldy-Lamont Associates
Raymundo Chapa	WEG Transformers USA Inc.
Noah Chesser	Oncor Electric Delivery
John Chisholm	IFD Corporation
Eunyoung Cho	HICO-America
Rhett Chrysler	ERMCO
Michael Cook	Dominion Energy
Michael Dahlke	Central Moloney, Inc.
Thomas Dauzat	General Electric
Craig DeRouen	ERMCO
William Elliot	Crescent Power Systems
Benjamin Garcia	Southern California Edison
Carlos Gaytan	Prolec GE
Ali Ghafourian	H-J Enterprises, Inc.
Richard Grandbois	IFD Corporation
Zach Hall	Fayetteville PWC
Kendrick Hamilton	Power Partners, Inc.
Giovanni Hernandez	Virginia Transformer Corp.

NAME	Company
Ramadan Issack	American Electric Power
Gael Kennedy	GR Kennedy & Associates LLC
Gary King	Howard Industries
Patrick Kozer	Northeast Transformer
Gilbert Kozer	Northeast Transformer Services, LLC
Andrew Larison	Hitachi Energy
Weijun Li	Braintree Electric Light Dept.
Alejandro Macias	CenterPoint Energy
Lee Matthews	Howard Industries
Tim Menter	Lincoln Electric System
Kent Miller	T&R Electric Supply Co.
Justin Minikel	EATON Corporation
Rhea Montpool	Schneider Electric
Michael Morgan	Duke Energy
Tim Morris	Walton EMC
Hugo Murillo	H-J Family of Companies
Jerry Murphy	Reedy Creek Energy Services
Stephen Oakes	WEG Transformers USA Inc.
Tyler Parenti	Cargill, Inc.
Dwight Parkinson	EATON Corporation
George Payerle	Carte International Inc.
Robert Reepe	Georgia Power Co.
Kevin Riordan	WEG Transformers USA Inc.

NAME	Company
Mason Rush	Central Moloney, Inc.
Fernando Salinas	Power Partners
Albert Sanchez	Knoxville Utilities Board
Jeffrey Schneider	Power Partners/Spire Power Sol.
Michael Shannon	Rea Magnet Wire
Avijit Shingari	Pepco Holdings Inc.
Stephen Shull	BBC Electrical Services, Inc.
Audrey Siebert-Timmer	IFD Corporation
Edward Smith	H-J Family of Companies
Craig Tennant	H-J Family of Companies
Eric Theisen	Metglas, Inc.
Michael Thibault	Pacific Gas & Electric
Timothy Tillery	Howard Industries
Reinaldo Valentin	Duke Energy
Jeremy Van Horn	IFD Corporation
John Vartanian	National Grid
Joshua Verdell	ERMCO
Pragnesh Vyas	Sunbelt-Solomon Solutions
Bruce Webb	Knoxville Utilities Board
Zachery Weiss	WEG Transformers USA Inc.
Alan Wilks	Consultant
Joshua Yun	Virginia Transformer Corp.
Michael Zarnowski	Carte International

Meeting Minutes:

The Chair called the meeting to order at 3:15 P.M. EST on October 17, 2022. Attendees identified themselves by name and affiliation verbally.

1. Agenda Review
   The Chair displayed the agenda for this meeting.
2. 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.

3. 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.

4. Old Business
   The Chair stated that the IEEE C57.12.34 Working Group document had been approved by the SAB and has been sent to editorial for review. This should be in print next year.
   The Chair stated that permission was given to make this meeting a PAR Study Group, therefore all attendees have voting privileges at this meeting.
   The Chair presented a table displaying four major bullets that were brought forward from the ballot comments.
   a) Update all references to latest revision of IEEE 386.
   b) Update secondary voltages to include > 600V. Many renewables are at 690Y/398 and they are constructed like 480Y/277 ratings.
   c) Revise A.10.2 Hot spot thermal sensor-Resistor temperature detector (RTD) to add more detail.
   d) Is it beneficial to add references to Wind Power (IEEE/IEC 60076-16) and Distributed Photovoltaic (IEEE Std.C57.159) transformers to Annex B. Both of these applications often use pad-mount transformers. A reference to these standards would provide guidance for their application.

   The Chair asked for any other items that would need to be considered. Gary King suggested we review the values for the Induced voltage test using a three phase testing system. Joshua Yun added that many data center specializing in Bitcoin Mining request secondary voltages of 415Y/240. He suggested that this might be added when item b was investigated. Jeff Schneider suggested that in conjunction Gary's suggestion that we add a review of the impulse testing procedure of all secondary voltages above the 600 volt threshold. The thought was that we need to make sure that these testing values conform to any values in IEEE Std. C57.12.00 particularly as they might pertain to this standard.

5. New Business
   The Chair asked the Par Study Group if a motion to create a PAR for the revision of IEEE Std. C57.12.34 be prepared to address these issues. Jeremy Van Horn made a motion to this effect. The motion was seconded by Jerry Murphy. There was much discussion pertaining to PAR Title and Scope as well as the need for this. In the end the title, scope and purpose stayed the same and a vote was taken and it was unanimous to pursue a new PAR.
   The Chair stated he would introduce a motion in the Distribution Transformers Subcommittee to create a PAR with same title scope and purpose as the present document.
6. The meeting adjourned at 3:45 P.M. EST.

Submitted by: Scott Dahlke.

Date: 10/18/2022

C57.12.36 – Distribution Substation Transformers – Jerry Murphy

This working group did not meet.

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

Ali Ghafourian presented the following minutes from the working group meeting on October 17, 2022, at 1:45 p.m. with 42 in attendance. It was reported that the current draft of the standard has gone through MEC review and that the WG had voted to move draft 2.8 of the document to ballot. This motion was approved unanimously by the subcommittee.

1. **Presiding Officer and Secretary responsible for Meeting Minutes**
   Ali Ghafourian (Chair) – Presiding Officer and Jarrod Prince (Secretary) are 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 1:47 p.m. EDT on Monday, October 17th, 2022, held at the Sheraton/Le Méridien Hotel in room, Mecklenburg III.
   Quorum was established with 29 out of 53 Working Group members present by a show of hands counted at beginning of the meeting. Per paper rosters, we had 31 members accounted for as being present during the meeting.
   The Chair announced that a two-year PAR extension expires at the end of 2023. The current Draft is ready for the Working Group to vote on to go to ballot based on all the corrections that were brought forth during the Spring 2022 Meeting in Denver, CO including the recent changes required by MEC. After the Draft review of the corrections made during the meeting a vote will be taken which requires 2/3 majority of Members present (minimum of 21 voting Members' approval to pass).

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 October 17-2022 Charlotte NC (R1).pdf) was issued to the Working Group prior to the meeting for review.
   Jerry Murphy made the first Motion to approve the agenda.
   Kent Miller seconded the Motion.
   The Chair asked the Working Group members for the unanimous approval of the agenda and the agenda was unanimously approved.

5. **Approval of minutes of previous meeting**
   The Spring 2022 meeting minutes (S22-C57.12.38-UnapprovedMinutesR0.pdf) were posted to the Distribution Subcommittee website after the meeting for the Working Group members to review.
   Kent Miller made the first Motion to approve the Spring 2022 meeting minutes.
   Stephen (Steve) Shull seconded the Motion.
   The Chair asked the Working Group members for the unanimous approval of the Spring 2022 meeting minutes and the meeting minutes were unanimously approved.

6. **Draft review (MEC and Annex A)**

Within the MEC document (PC57.12.38_D2.7_MEC.pdf) two topics were addressed during the meeting. The first topic of concern was the Scope and Purpose of the Draft being swapped from PAR. Documentation was submitted back to MEC by email (External Re MEC Review of IEEE PC57.12.38 - Scope and Purpose.msg) showing that the Scope and the Purpose has not changed from the last publication of the Standard in 2014, in the current PAR, or in the current Draft 2.7 – June 2022. MEC noted this to be a mistake and the Scope and Purpose was approved "as is". The second topic was concerning the usage of the words "minimize" and "prevent". A document (PC57.12.38 D2.7 (MECReview).docx) concerning these findings by MEC was provided to the WG before the meeting. The proposed changes within the document were reviewed and the changes were made and incorporated into D2.8 (C57 12 38 D2.8 June 2022(Comments-Old Format-MEC).docm) during the meeting.

The following are the changes that were made within Draft 2.8:

Clause 7.4 (line 31) "prevent" – Stephen (Steve) Shull made motion to remove wording "prevent accidental" and replace with "inhibit". Jerry Murphy seconded the motion. The motion passed by unanimous approval of the WG Members.

Clause A.2.2.1 (line 7) "prevent" – No change made. WG Members unanimously agreed to no change. No motion required.

Clause A.2.3.1.1 (line 24) "Spill Prevention" – No change made to the title of this Annex clause. WG Members unanimously agreed to no change.

Clause A.2.3.1.1 (line 26) "minimize" – Jerry Murphy made motion to change the word "minimize" to "reduce". Joshua (Josh) Verdell seconded the motion. The motion passed by unanimous approval of the WG Members.

Clause A.2.4 (line 14) "preventing" – No change made. WG Members unanimously agreed to no change. No motion required.

Clause A.5 (line 28) "prevent" – Joshua (Josh) Verdell made motion to change the wording "to prevent" to "to reduce the chance of". Jerry Murphy seconded the motion. The motion passed by unanimous approval of the WG Members.

Clause A.8 (line 33) "prevent" – WG changed entire sentence concerning the word "prevent" to "Arrester shall be incorporated in the design with over current protection to reduce the possibility of tank rupture." Benjamin (Ben) Garcia made motion to accept entire sentence as written. Jerry Murphy seconded the motion. The motion passed by unanimous approval of the WG Members.

Clause A.10.2 (line 26) "prevent" – Joshua (Josh) Verdell made motion to change the wording "to prevent" to "to reduce". Benjamin (Ben) Garcia seconded the motion. The motion passed by unanimous approval of the WG Members.

Chair asked amongst the WG Members to entertain a motion for D2.8 to go to Ballot and that 2/3 Majority of WG Members (21 required) presented was required to pass. Jerry Murphy made the motion. Stephen (Steve) Shull seconded the motion with 31 out of 31 WG Members voting approval of D2.8 to go to ballot with no objections, no abstentions, and no discussion recorded.

Chair asked the WG for volunteers for the Ballot Resolution Committee. The Chair will lead the Ballot Resolution Committee along with the Vice-Chair and Secretary.
Volunteers are listed as follows:

Joshua (Josh) Verdell	ERMCO
Ramadan Issack	American Electric Power
Robert Reepe	Georgia Power Co.
Andrew Larison	Hitachi Energy

Chair stated that the WG's request for approval to go to ballot will be brought forth to the Distribution Subcommittee meeting on Wednesday, October 19th.

7. **Old Business**
   No old business items were brought forth to the Working Group during the meeting.

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 Spring 2023 will be held at the Hyatt Regency in Milwaukee, Wisconsin (USA).
   Dates: March 19th – 23rd, 2023

10. **Adjournment**
    The Chair adjourned the meeting at approximately 2:45 p.m. EDT.

List of Attendees, Affiliations, Membership Status:

** 2 New Members were introduced to the Working Group.
* A total of 4 guests requested Working Group membership which will be reviewed to determine who is eligible for membership before the Spring 2023 meeting.

1	Jared Bates**	Oncor Electric Delivery	Member
2	Thomas Callsen	Weldy-Lamont Associates	Member
3	Michael Dahlke	Central Moloney, Inc.	Member
4	Craig DeRouen	ERMCO	Member
5	Benjamin Garcia	Southern California Edison	Member
6	Carlos Gaytan	Prolec GE	Member
7	Ali Ghafourian (Chair)	H-J Enterprises, Inc.	Member
8	Kendrick Hamilton	Power Partners, Inc.	Member
9	Michael Hardin	H-J Enterprises, Inc.	Member
10	Ramadan Issack	American Electric Power	Member
11	Andrew Larison	Hitachi Energy	Member
12	Kent Miller	T&R Electric Supply Co.	Member
13	Jerry Murphy	Reedy Creek Energy Services	Member
14	Dwight Parkinson	EATON Corporation	Member
15	Jarrod Prince (Secretary)	ERMCO	Member
16	Robert Reepe	Georgia Power Co.	Member
17	Albert Sanchez**	Knoxville Utilities Board	Member
18	Jeffrey Schneider	Power Partners/Spire Power Solutions	Member
19	Avijit Shingari	Pepco Holdings Inc.	Member
20	Stephen Shull	BBC Electrical Services, Inc.	Member
21	Audrey Siebert-Timmer	IFD Corporation	Member
22	Edward Smith	H-J Family of Companies	Member

23	Michael Thibault	Pacific Gas & Electric	Member
24	Alan Traut	Howard Industries	Member
25	Reinaldo Valentin	Duke Energy	Member
26	Jeremy Van Horn	IFD Corporation	Member
27	John Vartanian	National Grid	Member
28	Joshua Verdell	ERMCO	Member
29	Pragnesh Vyas	Sunbelt-Solomon Solutions	Member
30	Bruce Webb	Knoxville Utilities Board	Member
31	Alan Wilks	Consultant	Member
32	Glenn Andersen	Fayetteville PWC	Guest
33	Gregory Ante	Southern California Edison	Guest
34	Kush Arora	Reinhausen Mfg.	Guest
35	Alex Ayala	Power Partners, Inc.	Guest
36	Jim Cai	JSHP	Guest
37	Noah Chesser	Oncor Electric Delivery	Guest
38	Eun Young Cho	HZW-America	Guest
39	Michael Cook	Dominion SC	Guest
40	Thomas Dauzat*	Prolec GE	Guest
41	Antonio Di Biase	Tempel	Guest
42	Hector Garza	Orto de Mexico	Guest
43	Richard Grandbois	IFD Technologies	Guest
44	Zach Hall	Fayetteville PWC	Guest
45	Paul Henault	IFD Corporation	Guest
46	Javier Hernandez	Orto de Mexico	Guest
47	Traci Hopkins	H2scan Corp.	Guest
48	Jose Hora	GlobeCore	Guest
49	Karl Jakob	Cargill, Inc.	Guest
50	Gilbert Kozer	Northeast Transformer Services, LLC	Guest
51	Patrick Kozer	Northeast Transformer Services, LLC	Guest
52	Parry Lively*	Tempel	Guest
53	Tim Menter	Lincoln Electric System	Guest
54	Justin Minikel	EATON Corporation	Guest
55	Martin Munoz Molina	Orto de Mexico	Guest
56	Hugo Murillo	H-J Family of Companies	Guest
57	Tyler Parenti	Cargill, Inc.	Guest
58	Daniel Posadas*	PROLEC S.A. DE C.V.	Guest
59	Afshin Rezaei-Zare*	York University	Guest
60	Mason Rush	Central Moloney, Inc.	Guest
61	Fernando Salinas	Power Partners, Inc.	Guest
62	Pugal Selvaraj	Virginia Transformer	Guest
63	Adrian Silgardo	IFD Corporation	Guest
64	Craig Tennant	H-J Family of Companies	Guest
65	Timothy Tillery	Howard Industries	Guest
66	Malia Zaman	IEEE	Guest

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

Date: Wednesday, October 26, 2022

C57.12.39 – Tank Pressure Coordination – Carlos Gaytan

This working group did not meet

Task Force on Transformer Efficiency and Loss Evaluation – Phil Hopkinson

Phil Hopkinson presented the following minutes from the working group meeting on October 17, 2022, at 9:30 a.m. with 141 in attendance.

The Fall meeting of the task force met on Monday, October 17, 2022, at 9:30 AM. The meeting was chaired by Philip Hopkinson, the task force chairman. Prior to the meeting, the unapproved agenda and a Power Point presentation addressing several DOE related organizations on distribution transformer loading was circulated to the entire Distribution Transformer membership. By count from the circulated rosters, 141 persons were in attendance. Without comment on the proposed agenda, the technical presentation was started. A copy of the Power Point presentation is contained in the Distribution Transformer section of the committee website. The chairman made opening comments regarding the previous meeting looking at dual-nameplate rating of transformers, while the focus of this meeting was on future load growth.

When the slide showing peak versus average loading was discussed, several comments regarding the difference between the peak and average from various regions and even individual meters. This ratio might vary between five and ten. It was stated that the Dan Mulkey slide has an X-axis of percent loading and is slight skewed giving a mode value which would differ from the average value.

The discussion on the possible efficiency increases of 20% from a possible NOPR from the DOE showed the probable solution may only be possible with an amorphous core steel. A slide with calculations on a 25 kVA and 50 kVA, with the current 2016 DOE limits, showed the no load and load loss values at 100% and 50% loading comparing M3 steel and amorphous steel. The possible effect of this increase may mean only copper windings and amorphous core steel would be needed.

A projection from the EIA indicates that only a 1% per year growth rate in energy may exist until the year 2050. A comment on demographics would certainly permit levels in many regions of the country to exceed this rate by a significant factor. Other projections indicate growth could be as high as 50% by the year 2050. This rate could still be achieved with M3 core steel.

With the push to reduce hydrocarbon fuels, three electric growth markets were presented. One of these is transportation electrification. With the average home consumer driving 12000 miles per year and the average of 4 miles per KWH might yield each EV adding about 4000 KWH per year. Heavier vehicles average about 3 miles per KWH. Building electrification is headed to reduce natural gas with heating being replaced by heat pumps. Codes and standards are well underway to promote this growth. The result of this will be to thermally stress transformers on the grid and will be more critical in the future. One challenge in the final conversion to electric vehicles will be the current inability to provide this power in the regions presently unable to provide what will be needed.

Meeting Attendance Follows:

Last Name	First Name	Company
Almeida	Nabi	Prolec GE
Andersen	Glenn	Fayetteville PWC

Arteaga	Javier	Hitachi Energy
Ayala	Alex	Power Partners, Inc.
Ayers	Donald	Ayers Transformer Consulting
Ballard	Casey	Dupont
Bargune	Gilles	FISO
Bates	Jared	Onkor Electric Delivery
Beaster	Barry	H-J Family of Companies
Biggie	Kevin	Weidmann Electrical Technology
Blew	David	Retired (PSE&G)
Boettger	William	Boettger Transformer Consulting LLC
Britton	Jeffrey	Phenix Technologies, Inc.
Brown	Darren	Howard Industries
Callsen	Thomas	Weldy-Lamont Associates
Cheim	Luiz	Hitachi Energy
Chisholm	John	IFD Corporation
cho	Eunyoung	HICO America
Chrysler	Rhett	ERMCO
Cresser	Noah	Onkor Electric Delivery
Da Silva	Roberto	Cargill
Dahlke	Michael	Central Moloney, Inc.
DeRouen	Craig	ERMCO
Di Biase	Antonio	Tempel
Door	Jeffrey	The H-J Family of Companies
Elliott	William	Prolec GE
Fang	Zhu	R.E. Uptegraff
Frimpong	George	Hitachi Energy
Fyrer	Bob	Dupont
Gamboa	Jose	H-J Family of Companies
Garcia	Benjamin	Southern California Edison
Gaytan	Carlos	Prolec GE
Ghafourian	Ali	The H-J Family of Companies
Giraldo	Orlando	The H-J Family of Companies
Granbois	Richard	IFD Technologies
Guerrero	Johnny	Con Edison
Gupta	Ravi	Megger
Hall	Zach	Fayetteville PWC
Hall	Zach	Fayetteville PUC
Hamilton	Kendrick	Power Partners, Inc.
Henault	Paul	IFD Corporation
Hernaidez	Sergio	Hammond Power Solutions
Hernandez	Giovanni	Virgina Transformer
Herron	John	Raytech USA
Hopkinson	Philip	HVOLT Inc.
Iman	Mohammad	MGM Transformer Company
Issack	Romadan	AEP

John	John	Virginia Transformer Corp.
Klaponski	Brian	Carte International Inc.
Kopp	Alvin	HVTE Inc.
Kozer	Gillbert	Northeast Transformer
Kozer	Patrick	Northeast Transformer
Lachman	Mark	Doble Engineering Co.
Larison	Andrew	Hitachi Energy
Lawless	Andrew	Potencia Partners
Lee	Moonhee	Hammond Power Solutions
Levin	Aleksandr	Weidmann Electrical Technology
Lively	Parry	Tempel
Lovins	Colby	Federal Pacific
Macias	Alejandro	CenterPoint Energy
Malde	Jinesh	M & I Materials
Menter	Tim	Lincoln Electric System
Meyers	Aaron	EATON Corporation
Miller	Kent	T & R Electric Supply
Minikel	Justin	EATON Corporation
Montpool	Rhea	Schneider Electric
Morgan	Michael Tyler	Duke Energy
Morris	Tim	Walton EMC
Murillo	Hugo	The H-J Family of Companies
Mushill	Paul	AMEREN
Naderian	Ali	Metsco
Naranyo	Volney	Megger
Neder	Frank	Trench Germany
Num	Shawn	Hitachi Energy
Oakes	Steven	WEG Transformers USA Inc.
Parkinson	Dwight	EATON Corporation
Patel	vinaybhai	Con Edison
Payerle	George	Carte International Inc.
Pepe	Harry	Phenix Technologies, Inc.
Ploetner	Chris	Siemens Energy
Prince	Jarrod	ERMCO
Radu	Ion	Hitachi Energy
Rashid	Adnan	Measurement Canada / ISED
Reepe	Robert	GA Power Co
Rezai	Hossein	XF Consultant
Riordan	Kevin	WEG Transformers USA Inc.
Rush	Mason	Central Moloney, Inc.
Sampat	Mahesh	EMS Consulting Inc.
Sanchez	Albert	Knoxville Utilities Board
Sannrinberg	Brian	General Electric
Saraf	Manisn	MPS
Sawant	Anil	Virgina Transformer

Sbravati	Alan	Hitachi Energy
Schneider	Jeff	Power Partners, Inc.
Selvaraj	Pugazhenthi	Virginia Transformer
Sewell	Russell	Quality Switch, Inc.
Shannon	Michael	Rea Magnet Wire
Sharifi	Masoud	Siemens Gamesa
Shingari	Avijit	PEPCO Holdings
Shrewsbary	Justin	AMR PEMCO
Shull	Stephen	BBC Electrical Services, Inc.
Siebert-Timmer	Audrey	IFD Technologies
Silgardo	Adrian	IFD Technologies
Simons	Andre	Cogent Power Inc.
Skinger	Kenneth	Scituate Consulting Inc.
Smith	Edward	H-J Family of Companies
Snyder	Steven	Hitachi Energy
Sohail	Muhammad Abdullah	Trench Canada
Spurlock	Mike	Spurlock Engineering Services, LLC
Staley	Brad	Leeward Renewable Energy
Stankes	David	3M
Streich	Kerwin	Siemens Energy
Tatu	Val	Powersmitus
Taylor	Marc	JFE Shoji Power
Tedesco	Joseph	Hitachi Energy
Tennant	Craig	The H-J Family of Companies
teNyyenhuis	Ed	Hitachi Energy
Thenser	Eric	Metglas, Inc.
Thibault	Michael	Pacific Gas & Electric
Traut	Alan	Howard Industries
Trifunoski	Risto	Trench Canada
Tyler	Lee	WARCO, Inc
Valentin	Reinaldo	Duke Energy
Van Horn	Jeremy	IFD Corporation
Vanderwalt	Alwyn	ECI
Vartanian	John	National Grid
Verdell	Joshua	ERMCO
Vyas	Pragnesh	Sunbelt Soloman
Walder	Urek	EATON Corporation
Walker	David	MGM Transformer Company
Wallach	David	Duke Energy
Webb	Bruce	Knoxville Utilities Board
Weiss	Zachery	WEG Transformers USA Inc.
Wilks	Alan	Consultant
Zarnowski	Michael	Carte International Inc.

PC57.167 – Guide for Monitoring Distribution Transformers – Gary Hoffman

Gary presented the following minutes from the working group meeting on October 18, 2022 at 4:45 p.m. This document is currently going through ballot.

- 29 members - quorum achieved
- Ballot processing ○ 231 comments being resolved by Ballot Resolution Committee
    - ○ 10-3-22 recirculating resulted in 4 comments and 92% approval
    - ○ Plan on 2nd recirculating on 10-10-22 which will include the rosters
    - ○ January 2023 to RevCom
    - ○ Plan on PAR extension request - just in case
- Question asked by Brian Klaponski in regards to Utility acceptance
    - ○ Impression that not many due to costs involved
    - ○ Suggestion of a potential tutorial at future meetings

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

Rhett Chrysler presented the following minutes from the working group meeting on October 18, 2022 at 1:45 p.m. with 24 in attendance. During the WG meeting the group voted to move the current document to ballot. This motion was brought to the subcommittee where it was approved unanimously.

1. Chair called the meeting to order at 1:45pm. Members introduced themselves with their affiliation.

2. Total attendance of 24 is listed below. 14 of 19 members present and quorum was verified (73%). 1 guest requested membership.

First Name	Last Name	Company or Affiliation	Current Role
Glenn	Andersen	Fayetteville PWC	Member
Jared	Bates	Oncor Electric Delivery	Guest*
Jim	Cai	JSMP Transformer	Guest
Noah	Chesser	Oncor Electric Delivery	Guest*
Rhett	Chrysler	ERMCO	Member
Michael	Cook	Dominion Energy	Guest
Craig	DeRouen	ERMCO	Guest
Carlos	Gaytan	Prolec GE	Guest
Zach	Hall	Fayetteville PWC	Guest
Ramadan	Issack	American Electric Power	Member
Gary	King	Howard Industries	Member
Alejandro	Macias	CenterPoint Energy	Member
Lee	Matthews	Howard Industries	Member
Jerry	Murphy	Reedy Creek Energy Services	Member
Dwight	Parkinson	EATON Corporation	Guest
Robert	Reepe	Georgia Power Co.	Member
Stephen	Shull	BBC Electrical Services, Inc.	Member
Adrian	Silgardo	IFD Corporation	Guest
Edward	Smith	H-J Family of Companies	Member

Craig	Tennant	H-J Family of Companies	Guest
Michael	Thibault	Pacific Gas & Electric	Member
Alan	Traut	Howard Industries	Member
Joshua	Verdell	ERMCO	Member
Alan	Wilks	Consultant	Member

Guest* = Requesting Membership

Chair Report

a. PAR for revision of C57.12.35 approved on 6/13/19 with an expiration date of 12/31/2023. The current published document C57.12.35-2013 also expires 12/31/2023.

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

4. Motion to approve meeting agenda (Steve Shull/Mike Thibault). Approved unanimously.

5. Motion to approve Spring 2021 Denver meeting minutes (Jerry Murphy/Lee Matthews/). Approved unanimously.

6. Old Business
    a. Added 4.3.4 for the temporary label utilizing the QR code per TF recommendation. This is an alternate to the existing temporary label utilizing bar code.
        i. 4.3.4.5 Change the location of the human readable interpretation on the temporary label from beneath the QR code to adjacent the QR code.
        ii. QR code dimensions 2" X 2". Label dimensions are 3" X 5" minimum.
        iii. Ed Smith/Gary King move to include 4.3.4 and the definition of QR code in definitions. Unanimous approval.
    b. Figure 5 thru 13 - change Temporary Bar Code Location to Temporary Label Location.

7. New Business
    a. Motion to ballot draft 5 (Steve Shull/Jerry Murphy) including revisions as noted in this meeting. Unanimous approval of members present.
    b. Comment resolution group formed. Rhett Chrysler (chair), Jerry Murphy, Steve Shull, Robert Reepe, Lee Matthews. CRG is authorized to provide responses and to determine which comments need to be brought before the entire WG for approval.

8. Next meeting – Milwaukee, WI March 19-23, 2023

9. Meeting adjourned at 2:19pm.

Submitted by: Alan Traut, Secretary

Date: 10/18/2022

Task Force Tank Touch Temperature – Bruce Webb

Bruce Webb presented the following minutes from the working group meeting on October 17, 2022 at 4:45 p.m. with 36 in attendance.

1. Call to order
   The meeting was called to order by the Chair (Bruce Webb) with Vice-Chair (Ali Ghafourian) and Secretary (Albert Sanchez) in attendance on Monday October 17, 2022, at 4:45 PM.

2. Approval of agenda
   As this was the very first meeting of the Distribution Transformer SC TF on Tank Touch Temperature, the meeting attendees were provided the Chair's proposed agenda for their consideration and approval. The agenda was approved without any opposition.

3. Welcome and Introduction
   The Chair identified the meeting topic, welcomed the attendees and allowed the attendees to identify themselves and their affiliations.

4. Attendance and Contact Sheets
   The Secretary (Albert Sanchez) distributed attendance sheets and the Chair requested that attendees provide clear and legible email addresses to address the ongoing 123Signup platform issues. Thirty-six (36) attendees completed this request with twenty-eight (28) requesting the automatic membership and the remaining seven (7) participating as guests.

5. Participant Behavior
   The Chair displayed several slides identifying the IEEE Codes of Ethics & Conduct expectations and specifically asked the attendees to maintain responsible behavior during the meeting, to treat one another nicely and with respect, and to avoid injuring others reputation or employment. There was no opposition to the requirements or request.

6. Essential Patent Claims
   There was a call for essential patent(s) by the Chair. There were none brought forward. The Chair announced if there was one to let the Chair, Vice Chair, or Secretary know. The IEEE essential patient claim slides and guidelines were shown to the TF attendees, and this was recorded by the Secretary.

7. Copyright Policy
   The IEEE copyright slides and guidelines were shown to the TF attendees without further discussion, and this was recorded by the Secretary.

8. Chair's Brief History Leading to this Meeting
   The attendees indulged the Chair and allowing him to relay his personal experience and observations relative to tank touch temperatures and leading to the creation of this TF. In brief, this included:
   a. Westinghouse Electric transformer design experience: a concentration on temperature rises and not limits,
   b. An open letter to the C57.154 WG with concern for an allowable 135 °C top-oil temperature rise,

c. TF work within the C57.12.38 WG resulting in a presentation citing expectant temperatures with supporting research on the matter from various references including ASTM, UL and NASA,
d. TF work within the Enclosure Integrity suite of standards which resulted in the development of a Warning note being added to the C57.12.28 and .29 Standards, and
e. Lastly, the creation of this SC following extensive discussion in the S22 Denver Committee meeting

9. Introduction of TF Directive
The Chair proposed a TF directive developed from the S22 Denver SC minutes Annex C.4 New Business. It read as follows and there was no opposition to its use:

> '… the Task Force is to further investigate perceived safety concerns regarding tank touch temperatures for transformers that are accessible to the public by…
>
> - exploring input and feedback from outside resources and experts,
> - evaluating opportunities to specifically address such concerns, and
> - making recommendations to the SC for next steps, if any.'

10. Open Discussion

… things we might consider:
- Are we truly concerned?
- Do we need a Standard limit?
- What impact to existing Standard values, if a change is recommended, should we consider?
- What other experts might be available to assist the TF: UL, ASTM, NASA, etc.
- Should we consider any specific equipment protection(s): design/construction, guarding, labeling, etc.
- Ought we consider component and accessory issues: gasketing, bushings, gauges, paint, labeling, etc.
- Other

Discussion
- Chair – is the Standards operational limit 105 °C? We can boil water at 100 °C. With C57.154, the allowable top oil temperature is 135 °C (275 °F).
- S. Shull/J. Murphy - It is a concern.
- S. Shull - it is concern particularly with dual nameplate rated transformers on the horizon. It may not be as big of a concern with overhead units or three-phase units compared with single-phase pad-mounted units used in residential situations. … an extreme concern.
- J. Arteaga (Hitachi) OSHA guidelines brought up. They set a limit, a maximum skin limit of 60°C after 5 seconds. Our standard temperature may be higher than that with the answer being safety cages to protect the workers. Fencing? Would it apply to pad mounts? Is it applicable here?
- Small children are a likely concern if they were to sit on or come in contact with a hot transformer.
- We appear to allow a higher temperature in our standard for allowable temperature rise exceeding OSHA.

- Chair – No apparent TOSHA requirement. Would have thought there would be something related to boiler/boiler piping safety efforts, but nothing yet found.
- Chair - UL1561 suggests that dry type enclosure temperatures not exceed 50°C
- UL is not a standard... They are for insurance underwriter's purposes
- Chair/Vice-Chair – D. Mulkey has suggested we investigate guidelines from the automotive industry where consideration for black vehicles in the hot sun like in places like Arizona might be considered? Is there a standard here?
- Impacts on equipment loading over the next 5 years from EV deployments could be significant, adding to our risk
- R. Hogg (Bureau of Reclamation) - Colorado painting transformers. Making them attractions. Risk of drawing people to hot equipment.
- M. Thibault (PG&E) - Good points. What do you do about it? Perhaps a baffle added to your construction standard that reduces exposure to the hot transformer. Add it to requirement to not exceed "x" amount of temperature... a big lift!
- Only utilities install transformers. Touching transformers and getting a burn is the concern. Fencing could be a solution? Labeling may be the more direct/immediate solution?
- S. Shull - Consider UL and other discussed standards as situational standards, and not work standards. UL is for insurance and may or may not apply.
- M. Thibault – asked for a raise of hand to determine if any attendant utilities were regulated. Requirements may need to meet state regulator requirements... like Public parks & playgrounds? For example, shades for slides. Like poke and prod requirements for tamper resistance. It may be situational.
- Contribute. Hazard Wheel for safety operation. More investigation. A sub-task force? Red tag events for utilities?
- Sbravati (Hitachi) - perhaps if the average temperature rise is 25 °C it may not be an issue, but for units at 120 °C it may be
- M. Thibault – check for red tags. Check with peers and legal staff.
- Chair – recollection of utility using placards for safety purposes to protect personnel working on network transformers in vaulted locations.
- A. Sbravati (Hitachi) - using coatings to improve insulation, but at a cost.
- It's situational, rural locations vs. Metropolitan areas/public parks... 175% loaded units likely pose a risk with EV applications
- Is a feasibility study needed to determine how to proceed?
- T. Tillery (Howard) - May be a non-issue at present, but we may need to look ahead to a future where design alternatives may be needed in 5 years. Better to prepare just in case. Perhaps a heat run test at 100% for evaluation purposes needs consideration. Suggestion to create a guide with criteria and risk assessments for locating transformers?
- A. Sbravati (Hitachi) - One things is consideration for construction workers while another thing is consideration for the public. Insulation? Assuming there will be added cost to address this... top-oil limit or guarding.
- R. Reepe (Georgia Power) - This topic started on DOE activity with dual nameplating and 85 °C rise along with the potential increase in load by 2030.
- No reason to address this. Qualified workers must be trained to address high temperature units when working behind the fence, etc. High energy areas. Hazard Wheel for safety operation. K. Biggie (Weidman) - Perhaps do heat run tests for padmounted transformers, like power transformers?

- J. Verdell (Ermco) - transformers get hot from simply sitting on a yard in a de-energized state. Heat run is at 100% load.
- Chair - can we standardize a temperature limit at the factory in a lab environment without consideration of abnormal operating conditions like sunlight, emissivity matters, and other that may elevate their temperatures in their natural conditions for service?
- Chair – at KUB, we find many of our distribution transformers to be lightly loaded, on average around 50%.
- J. Murphy (RCES) - Influx of EVs is to be expected in the not-too-distant future adding to load and extra unit heating.
- J. Arteaga - Reference to the DOE study work and distribution transformers being on average around 44%.
- T. Tillery – what can we do? Make the lids dome shaped? In Australia, the hot portion of the unit is often protected and shielded. Perhaps a Guide is needed to assess situational risk.
- S. Shull - More investigation. A sub-task force? Controlled spaces vs. Public spaces?
- **Motion M. Thibault (PG&E) - Recommendation for members to go back to their individual or company situational conditions for any incidents or actions taken related to tank touch temperatures and share them with the TF during the next meeting.**
- G. Ante (SCE) – The issue? Burn protection? Wouldn't liability be placed on affected parties.
- S. Shull brought up a case that utility was liable for an individual going through 3 substation barriers and was awarded damages despite a breach of their security measures. A $1.5M penalty was assessed.
- Chair – a reminder to review the C57.12.28 Tank Touch Temperature report on the Committee website. Burn risk... ASTM/NASA.
- E. Theisen (Metglas) - high temperature danger to wildlife? The new temperatures are hotter than most things accruing in nature. Another concern of hot temperature is pole mounted units for qualified personnel.
- Chair – Similarly mobile transformers are often designed with insulation systems that allow for higher than standard temperature rises, albeit they are typically utilized in applications subject to access by qualified personnel only.
- Fenced. Proper PPE?
- G. Ante (SCE) – The issue? Burn protection? Wouldn't liability be placed on affected parties.
- S. Shull brought up a case that utility was liable for an individual going through 3 substation barriers and was awarded damages despite a breach of their security measures
- T. Callsen (Weldy Lamont) – If using dual rated Bayonet fuses melt... those melt at 145 °C. Perhaps we need to look at that as an upper limit.
- Research at NEETRAC may have performed long ago (circa 2004) to understand temperature levels of unloaded, energized no-load, capacity loaded/overloaded? , and with a protected cover (cooked). It was understood that at some point there was a consensus from participating parties to terminate the research and the reporting effort.
- Chair – so then there was no concern.
- Now it is a different time.

- A. Sbravati (Hitachi) - Design conditions allow for 95 °C, but it appears that 50 °C is perhaps a limit. Are we opening a pandora's box?
- Who bears the responsibility for this, Users, vendors, other?
- Raymundo Chapa (WEG) - Should we consider adding a warning label(s) to address the matter without adding excessive costs to the User and difficulties for the Manufacturers?
- Not an engineered solution, but a great first step.
- Fencing? Likely an untenable solution.
- 1960's no seatbelts, now seatbelts mandated.
- A motion is on the table to go back home and determine their own situations.
- **5:45 Second - J. Van Horn (IFD Tech.)**
- **Any Objections? One (1) objection** J. Arteaga
- **Any Abstentions? None**
- **Motion passes by attendee majority.**
- Moving forward - Ask the group for ideas on situational conditions of any incidents and share with the group.
- Chair - We will be requesting feedback regarding your/your utilities experiences on the matter, if any via an email survey to attendee email addresses
- R. Hogg (Bureau of Reclamation) - perhaps consideration should be given to a virtual brainstorming meeting be held between the fall and spring meetings to discuss possible solutions to hot tank touch temperatures?

11. Next Steps

    The Chair resolved to reach out to attendees via email for potential remote activities prior to the next in-person meeting without attendee objection.

12. Next meeting--date and location

    The Next meeting will the **Spring 2023 Meeting Milwaukee, Wisconsin, USA**

13. Adjournment

    The meeting was adjourned by the Chair at 5:55 PM

Submitted by: Albert Sanchez

Date: October 19, 2022

ATTENDANCE

	Last Name	First (Given) Name	Company (Affiliation)	Requesting Membership Yes	No
1	Ante	Greg	So. California Edison	X	
2	Arteaga	Javier	Hitachi Energy	X	
3	Ayala	Alex	Power Partners	X	
4	Bates	Jared	Oncor Electric Delivery	X	
5	Biggie	Kevin	Weidmann Electrical Technology	X	
6	Brown	Darren	Howard Industries	X	
7	Callsen	Thomas	Weldy Lamont	X	
8	Chapa	Raymundo	WEG	X	

9	Chesser	Noah	Oncor Electric Delivery	X	
10	Cook	Michael	Dominion SC		X
11	Cruz Valdes	Juan Carlos	Prolec GE	X	
12	Dahlke	Michael	Central Moloney, Inc.	X	
13	Felton	Todd	MVA		X
14	Grandbois	Richard(Luke)	IFD Technologies	X	
15	Guerrero	Johnny	Con Edison		X
16	Henault	Paul	IFD Technologies		X
17	Hogg	Ryan	Bureau of Reclamation	X	
18	Kennedy	Gael	GRKennedy & Associates LLC	X	
19	Kozer	Patrick	Northeast Transformer	X	
20	Menter	Tim	Lincoln Electric System		X
21	Minikel	Justin	Eaton	X	
22	Murphy	Jerry	RCES	X	
23	Parkinson	Dwight	Eaton	X	
24	Reepe	Robert	GA Power Co.	X	
25	Sbravati	Alan	Hitachi Energy		X
26	Schneider	Jeff	Power Partners	X	
27	Shull	Stephen	BBC Electrical Services	X	
28	Stankes	Dave	3M	X	
29	Theisen	Eric	Metglas		X
30	Thibault	Mike	PG&E	X	
31	Tillery	Tim	Howard Industries	X	
32	Valentin	Reinaldo	Duke Energy	X	
33	Van Horn	Jeremy	IFD Technologies	X	
34	Verdell	Joshua	ERMCO	X	
35	Wang	Evanne	Dupont	X	
36	Wilks	Alan	Consultant	X	

C.3 Old Business

- Phil Hopkinson brought up a discussion point on transformers connected to inverters.
    - He gave a presentation on this topic during this committee meeting (Monday 10/17 at 4:45)
    - Inverters can be bad for transformers.
        - Core lamination to lamination voltage can build up.
        - This can cause partial discharge which causes hydrogen to build up
        - Also causes heating and carbon build up
    - Proposal is to add a core shield to mitigate.
    - Recommend adding a core ground to the solar document.
    - PCS is considering this.
    - Also noted that Natural Esters somehow help mitigate some of this issue.
        - Higher dissipation factor?

- Draining the charge from the core laminations?

- No other old business

C.4 New Business

- Al Traut brought up that C57.138 was started back up and urged this SC to participate.
- Phil brought up a discussion on transformer classification.
    - Distribution has grown from 500 kVA to 10 MVA
    - Distribution is what DOE covers
    - Power is above that
    - The thought is is that we need to establish some definitions to ensure people get what they want.
    - Motion to organize a TF to define what a distribution transformer is with Phil being the chair. Motion made by Ali Ghafourian and seconded by Dan Sauer. Motion passes unanimously.
    - Dan asked if this belongs here or in 12.80.
    - Ed made the comment that we can figure that out within the task force.
    - Bruce Forsyth noted that this discussion was needed but to make any changes of this nature it would have to go up a level, to the full committee.
- No additional New Business was brought forward.

C.5 Chairman's Closing Remarks and Announcements

Ed had no closing comments to the SC.

C.6 Adjournment

Ed adjourned the meeting as provided in the meeting agenda at 10:44am.

List of Attendees and Affiliations:

Last Name	First Name	Role	Company
Abdullah	Ahmad	Guest	Martenson
Almeida	Nabi	Member	Prolec GE
Ante	Gregory	Guest	Southern California Edison
Antweiler	Irving	Guest	Retired Schneider Electric
Arteaga	Javier	Member	Hitachi Energy
Ayala	Alex	Guest	Power Partners
Bargone	Gilles	Guest	FISO Technologies Inc.
Bates	Jared	Guest	Oncor Electric Delivery
Baumann	Brian	Guest	Cargill, Inc.
Benach	Jeff	Guest	Megger
Biggie	Kevin	Member	Weidmann Electrical Technology
Blaszczyk	Piotr	Guest	Specialty Transformer Components LLC
Britton	Jeffrey	Guest	Phenix Technologies, Inc.
Callsen	Thomas	Member	Weldy-Lamont Associates
Chapa	Raymundo	Guest	WEG Transformers USA Inc.
Chesser	Noah	Guest	Oncor Electric Delivery
Chisholm	John	Member	IFD Corporation
Chrysler	Rhett	Member	ERMCO
Colopy	Craig	Member	Retired (Eaton)
Cook	Michael	Guest	Dominion Energy SC
Dahlke	Michael	Guest	Central Moloney, Inc.
Dauzat	Thomas	Member	General Electric
DeRouen	Craig	Guest	ERMCO
Di Biase	Antonio	Guest	Tempel
Dulac	Hakim	Member	APT (Qualitrol)
Dutta Roy	Samragni	Guest	Siemens Energy
Elliott	William	Guest	Crescent Power Systems (Prolec GE)
Forsyth	Bruce	Guest	Bruce Forsyth and Associates PLLC
Frimpong	George	Guest	Hitachi Energy
Frye	Rich	Guest	EATON
Garcia	David	Guest	EATON Corporation
Gaytan	Carlos	Member	Prolec GE
Ghafourian	Ali	Member	H-J Enterprises, Inc.
Giraldo	Orlando	Guest	H-J Family of Companies
Gonzalez	Luis	Guest	Canduct Industries Limited
Gonzalez Ceballos	Jose Antonio	Guest	Georgia Transformer
Grabdbois	Richard	Guest	IFD Technologies
Hamilton	Kendrick	Member	United STd Electric (Power Partners, Inc.)
Heiden	Kyle	Member	EATON Corporation
Hernandez Cano	Sergio	Member	Hammond Power Solutions

Hoffman	Gary	Member	Advanced Power Technologies
Hogg	Ryan	Guest	Bureau of Reclamation
Hopkinson	Philip	Member	HVOLT Inc.
Issack	Ramadan	Member	American Electric Power
Jakob	Karl	Guest	Cargill, Inc.
John	John	Member	Virginia Transformer Corp.
Kelly	Joe	Guest	TCI
Kennedy	Gael	Member	GR Kennedy & Associates LLC
King	Gary	Member	Howard Industries
Klaponski	Brian	Member	Carte International Inc.
Larison	Andrew	Member	Hitachi Energy
Leal	Gustavo	Guest	Dominion Energy
Leal	Fernando	Guest	Prolec GE
Lee	Moonhee	Member	Hammond Power Solutions
Levin	Aleksandr	Guest	Weidmann Electrical Technology
Li	Weijun	Member	Braintree Electric Light Dept.
Lovins	Colby	Guest	Federal Pacific
Machain	Jose	Guest	Prolec GE
Macias	Alejandro	Member	CenterPoint Energy
Mai	Tim-Felix	Member	Siemens Energy
Matthews	Lee	Member	Howard Industries
McBride	Brian	Member	Cargill, Inc.
Mellin	Toni	Guest	Vaisala
Menter	Timothy	Guest	Lincoln Electric System
Meyers	Aaron	Guest	EATON Corporation
Miller	Kent	Member	T&R Electric Supply Co.
Minikel	Justin	Guest	EATON Corporation
Mora	Jose	Guest	GlobeCore
Murphy	Jerry	Vice-Chair	Reedy Creek Energy Services
Naderian	Ali	Guest	METSCO Energy Solutions Inc.
Neild	Kristopher	Guest	Megger
Oliveira	Jonas	Guest	Hitachi Energy
Parkinson	Dwight	Member	EATON Corporation
Patel	Vinay	Guest	Consolidated Edison Co. of NY
Pepe	Harry	Guest	Phenix Technologies, Inc.
Prince	Jarrod	Member	ERMCO
Radu	Ion	Member	Hitachi Energy
Rashid	Adnan	Guest	Measurement Canada / ISED
Reepe	Robert	Member	Georgia Power Co.
Riordan	Kevin	Guest	WEG Transformers USA Inc.
Rush	Mason	Guest	Central Moloney, Inc.
Salinas	Fernando	Guest	Power Partners
Sanchez	Albert	Member	Knoxville Utilities Board

Sauer	Daniel	Member	EATON Corporation
Sbravati	Alan	Guest	Hitachi Energy (Cargill, Inc.)
Schneider	Jeffrey	Member	Power Partners/Spire Power Solutions
Selvaraj	Pugal	Guest	Virginia Transformer Corp.
Shaikh	Abdulmalid	Guest	Delta Star Inc.
Shannon	Mike	Guest	Rea Magnet Wire
Shertukde	Hemchandra	Member	University of Hartford
Shingari	Avijit	Member	Pepco Holdings Inc.
Siebert-Timmer	Audrey	Member	IFD Corporation
Silgardo	Adrian	Member	IFD Corporation
Simons	Andre	Guest	JFE Shoji
Smith	Edward	Chair	H-J Family of Companies
Snyder	Steven	Member	Hitachi Energy
Solano	William	Guest	Instrument Transformer Equip Corp
Stank	Markus	Member	Maschinenfabrik Reinhausen
Stankes	David	Guest	3M
Stretch	Kerwin	Member	Siemens Energy
Subramany	Shankar	Guest	KEMA Labs
Szczechowski	Janusz	Member	Maschinenfabrik Reinhausen
Taylor	Marc	Guest	JFE Shoji Power Canada Inc.
Tendulkar	Vijay	Member	EATON (Power Distribution, Inc. (PDI))
Thibault	Michael	Member	Pacific Gas & Electric
Tillery	Timothy	Member	Howard Industries
Tostrud	Mark	Guest	Dynamic Ratings, Inc.
Traut	Alan	Member	Howard Industries
Van Horn	Jeremy	Member	IFD Corporation
Vartanian	John	Guest	National Grid
Verdell	Joshua	Secretary	ERMCO
Verdolin	Rogerio	Member	Verdolin Solutions Inc.
Vyas	Pragnesh	Member	Sunbelt-Solomon Solutions
Walden	Mick	Guest	EATON Corporation
Washburn	Alan	Guest	Burns & McDonnell
Webb	Bruce	Member	Knoxville Utilities Board
Weiss	Zachery	Guest	WEG Transformers USA Inc.
Whitehead	William	Guest	H2scan Corporation
Wilks	Alan	Member	Consultant
Williams	Trenton	Member	Advanced Power Technologies
Yang	Baitun	Member	R.E. Uptegraff
Yun	Joshua	Member	Virginia Transformer Corp.
Zaman	Malia	Guest	IEEE
Zarnowski	Michael	Member	Carte International