Annex D Dry Type Transformers Subcommittee

Wednesday October 25, 2023

IEEE Transformer DTSC Fall 2023 Meeting Kansas City, MO

Chair: **Casey Ballard**

Vice-Chair: **David Walker**

Secretary: **Dave Stankes**

D.1 Introductions, Chairs Remarks and Approval of Agenda and Minutes

The Dry-type Transformers Subcommittee (DTSC) met in the Century B room at the Westin at Crown Center Kansas City, MO on October 25, 2023 at 1:30 PM (CST).

The Chair notified the attendees that the meeting would be recorded for the purpose of accurately documenting the minutes, and that recording would be erased once minutes were completed.

Introductions:

Introductions were made and the Chair reminded participants to announce one's name and affiliation prior to speaking.

A roster was circulated, and the Chair requested any member who did not receive an e-mail invitation to this meeting to include it as they sign the roster as the e-mail the DTSC has on file is not accurate.

Chairs remarks:

Currently there is still no active system to enter the required attendance for meetings as AMS has been deactivated. The chair requested that WG Chairs continue to record attendance with tool of choice with expectation that information will be uploaded into the new attendance system once it is released.

The chair requested that WG and TF Chairs submit to him a brief update of what happened this week that he can plan to share at the closing meeting on Thursday.

Working Group (WG) and Task Force (TF) minutes from Fall meeting are requested to be turned in to Dave Stankes (Secretary) promptly so DTSC report can be submitted prior to December 8th deadline.

Copyright policy and Participant Behavior slides were reviewed with the attendees.

The chair acknowledged that several virtual WG meetings were held between the main Spring and Fall meetings and encouraged this to continue. If a WG is planning to hold a meeting, notification to the broader Transformers Committee meeting can be made by posting to the IEEE Transformer Committee website. Requests to post invitations on the website can be sent to tc-webmaster@ieee.org. Reminded attendees that attendance and meeting minutes from these in between meetings must be taken and retained, and information from these should be rolled into the minutes you submit for the following Spring or Fall meeting.

The chair introduced Patrycja Jarosz, the IEEE Liaison who will be the main contact for the DTSC. Patrycja reminded the DTSC that there is one mandatory training for all leaders of WG's and TF's, *Understanding IEEE SA's Antitrust, Competition, and Commercial Terms Policies*. Those who have not completed the training should have received a reminder e-mail to complete this course.

Patrycja also informed the DTSC that rosters for WG's are in the process of being uploaded onto IEEE My Project system. Information being collected is First and last name, e-mail address, and whether they are voting member or guest. The information is used for tracking the number of volunteers as well as for contacting individuals when/if awards are given. The information being uploaded into myProject does not take the place of meeting attendance rosters, and these should still be maintained by the WG Chairs in a system of choice. Sasha Levin asked how often this roster should be updated and Patrycja

recommended once per year. As individuals are uploaded into the IEEE my Project system, they will receive an e-mail asking them to confirm their participation for each project they are affiliated with. If you do not respond to this e-mail, you may no longer receive notifications regarding that project.

A question was raised by David Walker asking how exactly you are to verify your participation on the IEEE myProject website as it was not clear on how to do so. Patrycja confirmed that the link in the e-mail asking you to verify your participation does not take you directly to the place where you need to go. Suggested that you log into myProject and check your "Alert" section which should contain information on verification requests. Patrycja also offered to send an e-mail to members with instructions on how to confirm participation. Note that problems may be experienced if you have logged onto myProject with more than one e-mail address. If this is the case, you can contact her, and she will work with IT to merge the e-mail addresses to fix this issue.

For WG Chairs that are having trouble locating correct e-mails for participants, Greg Anderson may be of assistance. He can be contacted at gwanderson@ieee.org.

The chair reviewed a list of "best practices" for WG Chairs. Commended the group for doing a good job complying with these requirements.

The chair presented a slide with the names of all current members Rob Ghosh noted that his name was missing but that he was in fact a member. There were 50 attendees. Twenty-three of the 32 members of the DTSC were present, so a quorum was reached.

Approval of agenda and meeting minutes:

The chair entertained a motion to approve the planned agenda that was displayed at the meeting. Motion to Approve – Ken Klein. Tim-Felix Mai seconded the motion. The agenda was approved unanimously.

The chair entertained a motion to approve the Spring 2023 DTS meeting minutes that were posted on the Transformer Committee website. Motion to Approve – Aniruddha Narawane , 2nd – Klaus Pointner. The minutes from the Spring 2023 DTSC meeting were approved unanimously.

D.2 Working Group/Task Force Reports

The next order of business was the presentation of the reports of the various working groups and task forces. See the following sections for the individual reports:

D.2.1 Revision of IEEE C57.16 Chair Art Del Rio

WG did not meet. Art reminded the DTSC that a Draft has been approved by the WG. Next steps are to submit the draft to MEC once a few minor editorial changes are made and to then initiate the balloting group.

D.2.2 Revision of IEEE C57.12.52 Chair Joseph Tedesco

Joe noted that the WG did not meet as the document has just completed a ballot recirculation. One comment was received. The Comment Resolution Group has agreed on how to address the comment. It is expected that the project will be completed before the Spring meeting.

D.2.3 Revision for IEEE Revision of C57.12.01 Chair Casey Ballard

The WG met on Monday 10/23/23. The meeting was called to order at 1:45 pm by Chair Casey Ballard.

The chair made opening comments and introduced the leaders of the WG.

This is the fourth meeting of the WG for this next round of IEEE C57.12.01 continuous revision.

Attendance was collected and the meeting was convened with 59 participants, 28 members were present out of 34 total WG members; the meeting quorum was established. The membership can be requested and will be granted if the attendance requirements are met.
The list of attendees is presented at the end of this report.

The Meeting Agenda was reviewed.
Motion: "Approve the Agenda", moved by A. Narawane, seconded by T-F. Mai, approved unanimously.
The Unapproved Minutes of the Spring 2023 meeting were reviewed (Minutes were posted on the website).
Motion: "Approve the Spring 2023 Meeting Minutes", moved by C. Lovins, seconded by D. Walker, approved unanimously.

The Chairman requested patent disclosure, no patent claims were made.
IEEE Guidelines on WG procedure and IEEE Copyright policy have been reviewed and understood.

The chair commented that to be the most efficient all suggestions shall be provided in writing and sent to the Chair in advance of the WG meetings.

The Chair used the attached presentation to guide the WG meeting

IEEE C57-12-01 Fall 23.pptx

Old Business

TF Report on Environmental Conditions (Mai)

1) Fire and explosion (accidental or intentional) are not natural environmental events like weathering. Should such events be considered as extreme conditions like lightning and hurricanes. TF discussed the following questions:

a) Should Flame Spread (Burn Rate), Smoke and Toxicity Requirements for a transformer and components be part of the IEEE Dry Type Std C57.12.01 General Requirements?

b) Is the new Section "Environmental Conditions" a good place for it?

TF Motion (moved by T-F. Mai, seconded by D. Stankes):

"Add in front of Section 6.3:

6.3 Fire hazard

For transformers subject to a fire hazard, restricted flammability may be required. The emission of toxic substances and opaque smoke may need to be minimized.

Note: Further information about these conditions can be found at EN 45545, IEC60076-11 and NFPA 13".

The discussion touched on the need for better definitions, information on criteria, consideration of how the changes affect the test and what company is capable of providing such test services.

WG voted on the proposal as is: 14 members voted for it, 12 against it, one person abstained. Without a majority, the motion didn't pass.

The Chair asked the TF to develop an Informative Annex addressing the above comments. Attention shall be paid to the copyright aspects of the information. WG will discuss the report in the Spring 2024 meeting.

2) Environmental conditions – discussion on the environmental classes.

Class	Ambient contaminants	Example
E-N	Negligible	Clean indoor
E-L	Little	No direct access to the environment
E-M	Medium	Direct access to the environment with low density of industries (not exposed to winds directly from the sea)
E-H	High	Direct access to the environment area with high density of housing and/or industries. Areas exposed to wind from the sea

The Chair asked TF to continue their work on this topic, provide more clear definitions and examples. Test implications of the new proposals shall be evaluated. WG will discuss the report in the Spring 2024 meeting.

Insulation Resistance Pass/Fail Criteria (Tedesco)
No update as that group did not meet since the Spring 23 session (no information; we will keep this action item)

Power Factor Testing Pass/Fail Criteria (Walker)
Due to the high variability of the PF measurements of dry-type transformers, David thought that no PF values could be standardized or recommended. As some companies use this parameter, we shall review what is their approach and methodology for such measurements. The action will be kept in the next Agenda of TF.

25-times Limit on Short-Circuit Current (Tedesco)
Proposal / Motion (moved by J. Tedesco, seconded by V. Tendulkar).
"Amend the following clauses of the standard

- Clause 7.3.3.1

The symmetrical short-circuit current shall be calculated using transformer impedance only.

- Clause 7.3.

The symmetrical short-circuit current shall be calculated using autotransformer impedance only".

WG voted on the proposal: 23 members voted for it, 1 against it, 1 abstained. Motion passed.

On-Load Tap-Changer
Proposal: review relevant sections of IEEE C57.12.00 and C57.12.90 related to on-load tap changing to understand the existing application and test requirements.
T-F. Mai volunteered to review the information and develop the proposal for the WG for the Spring 24 meeting.

Consequences of Exceeding a Maximum System Voltage
Proposal: Clause 5.10.4 The preferred tapping range is 5% in 2.5% steps above and below rated voltage. Transformers may be provided with taps for voltages above rated voltages without increasing the insulation level, provided that the maximum system voltage defined in Table 3 is not exceeded. If the maximum system voltage is exceeded, the transformer shall be designed to withstand both the low frequency voltage level and the BIL for the next highest voltage class, according to Table 3.

Initially, the motion to approve the proposal was moved by K. Mani and seconded by D. Walker, but, after WG discussion, K. Mani withdrew the motion and the proposal was tabled for additional considerations.

Annex D

Indicating Maximum System Voltage

Proposal / Motion: add the "Maximum System Voltage" title to the first column of Table 3 (J. Tedesco moved and T-F. Mai seconded)

Maximum System Voltage	Nominal System Voltage	Low-frequency voltage insulation level	Basic lightning impulse insulation levels (BIL ratings) in common use kV crest (1.2 x 50 µs)												
kV RMS	kV RMS	kV RMS	10	20	30	45	60	95	110	125	150	200	250	300	350
1.5	1.2	4	S	1	1										

WG voted to approve the motion with no objections. Motion approved.

Potential new business for the next meeting:
Inclusion of 50 Hz

Short Circuit Temperature Calculation (Hossain)

Pole-mounted dry-type transformers

Other New Business

None

The WG will meet again during the Spring 24 IEEE TC meeting.
With no further business, the meeting was adjourned at 3:00 pm.

Chair: Casey Ballard
Secretary: Sasha Levin

WG IEEE C57.12.01 Meeting Participants List – Fall 2023

	Last name	First name	Company Name	Role
p	Alahmed	Alex	Energy	Guest
p	Ballard	Robert	DuPont	Chair
p	Casallas	Camilo	Trench Ltd.	Guest (RM)
p	Chiang	Solomon	The Gund Company	Member
p	Camerio	Stefano	LTC	Guest
p	Fu	Renjie	VF Transformers	Guest
p	Fyrer	Bob	DuPont	Member
p	Garcia	Miquel	Hitachi Energy	Guest
p	Coun	Alexander	Coil Innovation	Guest
p	Grajeda	Rafael	EATON Corporation	Guest (RM)
p	Gross	Detlev	Power Diagnostix Consultant	Guest
p	Hernandez	Giovanni	Virginia Transformer Corp.	Member
p	Hernandez Cano	Sergio	Hammond Power Solutions	Member
p	Hogg	Ryan	Bureau of Reclamation	Member
p	Hossain	Sait	Trench Ltd.	Guest

p	John	John	Virginia Transformer Corp.	Guest
	Mohammad	Iman	MGM Transformer Company	Member
p	Izquierdo	Jose	Siemens Energy	Guest
p	Kessler	Stacey	ULTEIG Engineers	Guest
p	Klein	Ken	Johnson	Member
p	Kushal	Mahajan	EATON Corporation	Member
p	Lee	Moonhee	Hammond Power Solutions	Member
p	Levin	Aleksandr	Weidmann Electrical Technology	Secretary
p	Li	Weijun	Braintree Electric Light Dept.	Member
p	Lovins	Colby	Federal Pacific	Member
p	Lowthor	Mark	Kruger Products, Inc.	Guest (RM)
p	Macias	Alejandro	Centerpoint Energy	Guest
p	Mai	Tim-Felix	Siemens Energy	Member
p	Mani	Kumar	Duke Energy	Guest (RM)
p	McKinney	Kenneth	UL Solutions	Member
p	Montpool	Rhea	Schneider Electric	Member
p	Morales	Elena	Siemens Energy	Guest
p	Moreno	Andre	Siemens Energy	Guest
p	Naranjo	Volney	Megger	Guest
p	Narawane	Aniruddha	EATON Corporation	Member
p	Novko	Ivan	Koncar	Guest
p	Nunn	Shawn	Hitachi Energy	Member
p	Nunn	Tommy	?	Guest
p	Ortega	Augustin	Siemens Energy	Guest
p	Pepe	Harry	Phenix Technology, Doble Company	Guesty
p	Powell	Chris	Intermountain Electronics	Member
p	Pugal	Servaraj	VA Transformers	Guest (RM)
p	Sandoval	Alberto	EATON Corporation	Guest (RM)
p	Shannon	Mike	REA Magnet Wire	Guest
p	Sharifi	Mosoud	Siemens Gamesa	Guest
p	Sharp	Michael	Trench Ltd.	Guest
p	Shannon	Michael	REA Magnet Wire	Guest
p	Sonnenberg	Brian	Instrument Transformers, LLC	Member
p	Staley	Brad	Leeward Renewable Energy	Guest
p	Stankes	David	3M	Member
p	Stretch	Kerwin	Siemens Energy	Member
p	Tarango	Erik	Olsun Electric	Guest
p	Tatu	Valeriu	Powersmiths	Member
p	Tedesco	Joseph	Hitachi Energy	Member
p	Tendulkar	Vijay	Eaton Santa Ana, CA	Member
p	Walker	David	MGM Transformer Company	Member
p	Weyer	Daniel	Monolith	Guest

p	Wang	Terry	Trench Ltd.	Guest
p	Ziger	Igor	Koncar	Guest

D.2.4 C57.134 Chair Colby Lovins

Colby noted that the WG did not meet as the document is currently in comment resolution. Ballot achieved 94% approval response. 50 comments were received and all but 16 of the comments have been addressed by the comment resolution team. It is expected that the project will be completed before the Spring meeting.

D.2.5 Revision for IEEE 259 Chair Dave Stankes

Chair: David Stankes
Vice-Chair/Secretary: Joseph Tedesco

The KC meeting was the ninth meeting of the IEEE 259 Working Group. The meeting was held in the Shawnee/Mission Meeting Room and Dave Stankes called the meeting to order at 3:16 PM.

To save time, quick introductions were skipped.

There were 44 people present in the meeting, with 11 members and 31 guests. No one requested membership. The Working Group had 17 members; therefore, a quorum was reached, and business could proceed.

Dave S. asked for a motion to approve the agenda. Casey Ballard moved to accept the agenda, with Tim-Felix Mai seconding the motion. There was no discussion, and approval of the agenda was unanimous.

Dave S. then asked for a motion to approve the minutes of the Spring 2023 meeting and the two Summer 2023 virtual meetings. Aniruddha Narawane so moved, with a second from Rob Ghosh. There was no discussion, and the approval of the minutes was unanimous.

Dave S. showed the patent and copyright slides. He asked if there were any patent or copyright concerns from those in attendance; no one had any concerns or noted any patent/copyright issues.

Old Business:

- Dave S. discussed the developments to the draft that had taken place since the Spring 2023 meeting.
- Dave S. reviewed the six motions that had been passed at the August virtual working group meeting.
- Tim-Felix reviewed the flow chart of the overall process (initial decisions, screening, aging, etc.).
    - Joe Tedesco asked whether 259 would use TI (thermal index) and RTI (relative thermal index) or ATI (absolute thermal index) and RTI (relative thermal index).

        - Dave would check on which terminology would be used.
    - Casey asked where would the flow chart be put, in the text or in an annex?
        - Dave would like to put it in the body of the text somewhere.
        - The point was made that it is possible to have a normative annex. Thus, if it were put in an annex, it could still be normative.

New Business:

- Dave S. reviewed the PAR and proposed that changes be made to the scope and purpose.
    - The PAR expires on December 31, 2024, so an extension will likely be necessary.
    - Dave planned to consult with Steve Shull on the optimal timing of the PAR extension and the PAR revision.
    - The proposed new scope was shown. It was simplified from the original, removing references to specific NEMA standards and getting to the heart of the reason those standards were referenced, namely that the scope was insulation systems for voltages up to 600 V.
        - Casey pointed out that there is a small gap. IEEE C57.12.60 covers voltages of 601 V and up while the proposed scope here covers voltages through 600 V. What about between 600 V and 601 V?
        - There was informal discussion about support for the proposed scope. It was generally liked.
        - Tim-Felix proposed that the language of the scope be changed to "voltages below 601 V," thus removing the gap. That idea was accepted.
        - There was no further discussion, and Dave planned to come back for a formal vote at a future meeting.
    - The proposed new purpose was shown.
        - There was informal discussion about support for the proposed scope. It was generally liked.
        - There was no further discussion, and Dave planned to come back for a formal vote at a future meeting.
- Dave S. showed the clause in NEMA ST 20 (units with voltages through 600 V) that references using insulation systems approved by UL 1446 instead of IEEE 259.
    - Dave asked if this would be a problem? No one in attendance took issue with this.
- Dave S. showed the latest draft and discussed adding the language regarding modifications to insulation systems currently in IEEE C57.12.60. These modifications include enhanced sealed tube testing for some components, such as varnish.
    - Attendees were asked if anyone had used the enhanced sealed tube test to add varnishes to an insulation system. No one in attendance had done so.
- Dave S. planned to consult with Steve Shull on the optimal timing of the PAR extension and the PAR revision.
- Casey asked how would the temperature class be defined for the reference insulation system (for RTI)?
    - Would experience be allowed (similarly to as described in IEC 60505)? Or would a reference insulation system be required to have been qualified with IEEE 259?
- The question was asked, in light of the clauses in the draft changing, whether the task forces were still valid?
    - Dave S. solicited volunteers from the attendees for new task forces based on the new order of clauses.
        - General: Evanne Wang

- Test Objects: Ed Van Vooren (while not in attendance, he had been interested in this)
- Screening Test: Roger Wicks (while not in attendance, he had been interested in this)
- Thermal Aging: Dave S.
- Mechanical Tests: Tim-Felix
- Modifications to Systems: Solomon Chiang

- Solomon asked whether the aging test would include a conditional approval, similar to the UL procedure where they will approve a system that hasn't reached the minimum time if it has an extremely good correlation coefficient to the date?
  - Dave S. would look into it.

The date of the next meeting for the whole Working Group was not explicitly announced but would be either a virtual meeting during the winter or March 11/12, 2024 in Vancouver, BC, Canada.
The meeting was adjourned at 4:31 PM. Attendance list is below.

Role	First Name	Last Name	Affiliation
Member	Robert	Ballard	DuPont
Guest	Deniss	Carr	GE
Guest	Camilo	Casallas	Trench Limited
Guest	David	Caverly	Trench Ltd.
Member	Solomon	Chiang	The Gund Company
Guest	Bob	Fryer	DuPont
Member	Rob	Ghosh	GE
Guest	Luis	Gonzalez	Canduct Industries
Guest	Rafael	Grajeda	Eaton
Guest	Jose	Izquierdo	Siemens Energy
Guest	Ken	Klein	Johnson Electric
Guest	Jason	Lambert	JST Power
Member	Moonhee	Lee	Hammond Power Solutions
Member	Alexandr	Levin	Weidmann Electrical Technology
Member	Colby	Lovins	Federal Pacific
Guest	Tiffany	Lucas	Prolec GE
Guest	Kushal	Mahajan	Eaton
Member	Tim-Felix	Mai	Siemens Energy
Guest	Ken	McKinney	UL Solutions
Guest	Elena	Morales	Siemens Energy
Guest	André	Moreno	Siemens Energy
Guest	Volney	Narango	Megger
Member	Aniruddha	Narawane	Eaton Corporation
Guest	Shawn	Nunn	Hitachi Energy
Guest	Tommy	Nunn	JST Power
Guest	Agustin	Ortega	Siemens Energy
Guest	Klaus	Pointer	Trench Austria
Guest	Chris	Powell	Intermountain Electronics
Guest	Tony	Reiss	Custom Materials
Guest	Marilia	Ribeiro	GE Grid Solutions
Guest	Zoltan	Roman	GE
Guest	Alberto	Sandoval	Eaton
Guest	Michael	Sharp	Trench Limited
Guest	Brian	Sonnenberg	ITI
Chair	David	Stankes	3M
Guest	Erik	Tarango	Olsun Electrics
Guest	Val	Tatu	Powersmiths
Secretary	Joseph	Tedesco	Hitachi Energy
Member	Vijay	Tendulkar	Power Distribution, Inc. (PDI)
Guest	Evanne	Wang	DuPont
Guest	Terry	Wong	Trench Ltd.
Guest	Guang "Grace"	Yuan	Hitachi Energy

Working Group for 259 conducted two virtual meetings between the Spring and Fall meetings, held on June 27th and August 17th. Attached are the minutes from those meetings.

IEEE 259 WG virtual meeting Tuesday, June 27, 2023

Chair: David Stankes
Vice-Chair/Secretary: Joseph Tedesco

This was the seventh meeting of the IEEE 259 Working Group. The meeting was held virtually over Microsoft Teams and Dave Stankes called the meeting to order at 8:02 AM.

In the interest of time, introductions were foregone, and Dave asked that all attendees record their affiliations in the Chat section of Microsoft Teams.

There were ultimately 15 people present in the meeting, with 10 members and 5 guests. One guest requested membership. Some attendees arrived after the meeting had begun, but at the time of the quorum check, there were 9 members present. The Working Group had 17 members; therefore, a quorum was reached, and business could proceed.

Dave showed the patent and copyright slides. He asked if there were any patent or copyright concerns from those in attendance; no one had any concerns or noted any patent/copyright issues.

Old Business:

- Dave showed the current PAR, which was approved on December 3, 2020.
- Dave reviewed the underlying assumptions underlying the ongoing revision of IEEE 259.
    - The purpose of the standard will be to evaluate the insulation system for use in a LV transformer coil and not to be a transformer test.
    - The standard will allow the assignment of a TI (thermal index) describing pre-selected correlation times to enable the comparison of different insulation systems' performance.
    - IEEE 259 will be used for LV transformers consistent with NEMA ST 20.
    - The standard will include the procedure for modifying an existing insulation system.
- The concept of the flow chart developed for IEEE 61857-41 was reintroduced, and Ed Van Vooren expanded on the usage of the flow chart. The purpose of the flow chart is to agree on the process flow before revising the text.
- Dave reviewed the major points from the current revision and the statement from NEMA ST 20-2021 that requires insulation system to be tested according to UL 1446.
    - Dave noted that this last point would need to be addressed.

New Business:

- Tim-Felix Mai showed the flow chart developed for IEC 61857-41 and compared it with IEEE 259 Draft 3 (current draft) to show the similarity between the IEC sections described in the flow chart are similar to the clauses in IEEE 259.
    - Ed pointed out that the test procedures are the same, so there will be no copyright issues with using a similar approach as IEC 61857-41. We will have to change section titles and descriptions as needed.
    - Furthermore, the choice of TI vs. RTI (relative thermal index) doesn't change the test method, only the analysis of the data at the end.

        - The TI calls for 1 set of coils, while the RTI calls for 2 sets of coils (reference coils and test coils). The reference coils do not need to be tested concurrently if the test reference exists and is valid.
            - This choice should be made before the testing begins, but it doesn't affect the overall method, screening tests, etc.
- Dave pointed out that IEEE C57.12.60 calls for the use of IEEE 259 with a time of 40,000 hours.
    - Ed reminded everyone that this was a correlation time, meaning that the result of the test would be, by definition, a TI.
- Ed stated that it was important to determine if we wanted IEEE 259 to be a general test method or only for use with 2 specific transformer standards.
    - Tim-Felix pointed out that the overall approach was for testing insulation systems, not for applications.
        - Correlation times are for applications, so they don't need to be included in this standard.
- There was general agreement about the approach of using the flow chart to guide the revision process.
- We began reviewing the draft.
    - A new clause (Clause 4) was added to make a new introductory general section.
    - The clause with test specimens became Clause 5.
    - Text was moved around to appropriate clauses.
- Dave stated that he, Ed, and Tim-Felix would meet separately to complete moving the test around. Anyone else that wants to join in this effort will be welcome.
    - Once that text is done, the draft will be sent to the working group.

There will be future working group meetings prior to the Fall meeting in Kansas City. The future dates were proposed: July 20, August 17, and September 14 (optional). Dave noted that we may need a PAR extension and that it may become necessary to revise the PAR. A proposal or proposals to for these changes, if any are needed, will be made at the Fall meeting.

The meeting was adjourned at 9:15 AM.

Role	First Name	Last Name	Affiliation
Guest	Camilo	Casallas	Trench Limited
Member	Solomon	Chiang	The Gund Company
Member	Derek	Foster	Magnetics Design, LLC
Guest	Rob	Ghosh	GE
Member	Chuck	Johnson	Hitachi Energy
Member	Moonhee	Lee	Hammond Power Solutions
Member	Alexandr	Levin	Weidmann Electrical Technology
Member	Colby	Lovins	Federal Pacific
Member	Tim-Felix	Mai	Siemens Energy
Guest	Ken	McKinney	UL Solutions
Guest	Chris	Powell	Intermountain Electronics
Chair	David	Stankes	3M
Guest	Val	Tatu	Powersmiths
Secretary	Joseph	Tedesco	Hitachi Energy
Member	Ed	Van Vooren	ELTEK International Laboratories

IEEE 259 WG virtual meeting Thursday, August 17, 2023

Chair: David Stankes
Vice-Chair/Secretary: Joseph Tedesco

This was the seventh meeting of the IEEE 259 Working Group. The meeting was held virtually over Microsoft Teams and Dave Stankes called the meeting to order at 8:32 AM.

In the interest of time, introductions were foregone, and Dave asked that all attendees record their affiliations in the Chat section of Microsoft Teams.

At the initial quorum check, there were 8 people present, with 8 members and 0 guests. The Working Group had 18 members, therefore there was no quorum and no business would be able to proceed. Dave proceeded and would later check for quorum again. At that time, there were 10 people present, with 9 members and 1 guest. The guest did not request membership. With 18 members in the Working Group, a quorum was reached, and business could proceed.

Dave showed the patent and copyright slides. He asked if there were any patent or copyright concerns from those in attendance; no one had any concerns or noted any patent/copyright issues.

After the quorum was reached, Dave asked for a motion to approve the agenda and minutes. Ed Van Vooren made the motion and Solomon Chiang seconded the motion. The motion passed unanimously.

Old Business:

- Dave showed the drafts and discussed how the aim was to have a clean draft that was based on the flow chart introduced at the Spring 2023 meeting in Milwaukee.
    - Motions will be made to reach agreement on the changes to be made to the plan for the next draft.
- Dave reviewed open questions.
    - Is additional text needed to discuss RTI and TI?
    - What is the relationship with IEEE C57.12.60 and NEMA ST 20?

New Business:

- Motions were discussed.
- Motion 1: Include an optional screening test, such as in C57.12.60, in the next draft.
    - Motion made by Tim-Felix Mai, and it was seconded by Chuck Johnson.
    - Ed made a friendly amendment to specify that this was screening of the test coil design. The friendly amendment was accepted by Tim-Felix.
        - There was no discussion, and Motion 1 passed unanimously.
- Motion 2: Replace “Suggested aging temperature and exposure times per cycle” table with the same type of table from C57.12.60 and move the existing table to an Annex.
    - Motion made by Tim-Felix, and it was seconded by Rob Ghosh.
        - There was no discussion, and Motion 2 passed unanimously.
- Motion 3: Move current Clauses 6.6 and 6.2.2 “Alternate procedure for internal resistive heating energized samples” to an Annex.
    - Motion made by Tim-Felix, and it was seconded by Rob.
        - Tim-Felix added some additional explanation, and there was discussion pertaining to whether using resistive heating was still permissible. It

would still be allowed, but oven aging was the recommended method. Additional text would be added showing that resistive heating would still be permitted.
        - Motion 3 passed unanimously.
- Motion 4: Include how to modify an existing EIS.
    - Motion made by Tim-Felix, and it was seconded by Ed.
        - Tim-Felix added some additional explanation, and there was no further discussion.
        - Motion 4 passed unanimously.
- Motion 5: Incorporate text regarding criteria for failure from C57.12.60 Clause 4.4 to the next draft of 259.
    - Tim-Felix added some additional explanation, and Ed and Chuck further clarified that this motion would be solely to add text that was already approved by IEEE (the text from C57.12.60) into the draft. There would be no changes to that text.
    - Motion made by Tim-Felix Mai, and it was seconded by Chuck Johnson.
        - There was no further discussion, and Motion 5 passed unanimously.
- Motion 6: Incorporate text about reporting results and analysis of those results from C57.12.60 to the next draft of 259.
    - Motion made by Tim-Felix Mai, and it was seconded by Chuck Johnson.
        - There was no discussion, and Motion 6 passed unanimously.
- Dave stated that he planned to work with Ed, and Tim-Felix to generate a clean draft.

There would most likely not be another interim meeting before the Fall meeting in Kansas City. Therefore, the next meeting will be at the Fall 2023 meeting in Kansas City on October 23, 2023.

The meeting was adjourned at 9:45 AM.

Role	First Name	Last Name	Affiliation
Member	Solomon	Chiang	The Gund Company
Member	Rob	Ghosh	GE
Member	Chuck	Johnson	Hitachi Energy
Member	Moonhee	Lee	Hammond Power Solutions
Member	Alexandr	Levin	Weidmann Electrical Technology
Member	Tim-Felix	Mai	Siemens Energy
Guest	Chris	Powell	Intermountain Electronics
Chair	David	Stankes	3M
Secretary	Joseph	Tedesco	Hitachi Energy
Member	Ed	Van Vooren	ELTEK International Laboratories

D.2.6 Revision of IEEE C57.94 Chair Ken Klein

The Working Group met in Roanoke Meeting room. The meeting was called to order at 8:00 AM by Chair Ken Klein.

Chair made opening comments.

Introductions were made by all participants. WG Roster has been distributed and signed.

Attendance:
- 33 total participants
- 9 Members
- 24 guests

There were 9 out of 15 members present. A quorum was present.

WG Meeting Agenda
1. Welcome & chair's remarks
2. Introduction of attendees, attendance & determination of quorum
3. Approval of agenda
4. Approval of minutes from Spring 2023 meeting
5. Call for essential Patents & IEEE SA Copyright Policy review
6. Review of TF sections
    - o Normative references: Roger
    - o Definitions: Tim-Felix (Complete)
    - o Application: Colby & Chris (Complete Fall 2022)
    - o Installation: Dave (Complete Fall 2022)
    - o Testing: Kerwin & Joe (Complete Spring 2023)
    - o Operation: Casey
    - o Maintenance: Ken Klein & Kerwin
7. Meeting Adjournment

The agenda was approved unanimously without discussion.
Motion: Joe, Second: Kerwin

The WG Meeting minutes of the Spring 2023 Meeting were approved unanimously without discussion.
Motion: Dave, Second: Chris

The chair presented the information on Patent Disclosures and IEEE SA Copyright Policy. He asked the group to report any relevant patent issues – None were communicated.

Old Business:
Review of TF sections:

Casey - Report on section 7 - Operation
No change needed.

Joe: A TF in C57.12.01 is working on environmental conditions. If something will be added there, most likely some information should be added in this document, too.

Kerwin - Report on section 8 - Maintenance
No change needed.
Discussion about figure 1 'Typical drying curve for transformer windings' figure has a low quality and should be redrawn. Best would be if somebody could share typical drying data preferably in Excel to create a new graph. Ryan Hogg volunteered to check if he can provide some data.

Discussion about other / new maintenance tasks: Ryan Hogg will prepare material and send it to the chair.

Discussion about removing the reference in the Annex A to C57.12.50 → Chair will check.

New Business:
None

The meeting was adjourned, without objection, at 8:45 AM.

The WG will meet again at the Spring 2024 meeting in Vancouver (Hyatt Regency), British Columbia, Canada, March 10 – 14, 2024.

Chair: Ken Klein

Vice-Chair: David Stankes

Secretary: Tim-Felix Mai

Participation list:

	First Name	Last Name	Company	
1	David	Stankes	3M	Vice Chair
2	Robert	Ballard	DuPont	Member
3	Tim-Felix	Mai	Siemens Energy	Secretary
4	Ken	Klein	Johnson	Chair
5	Joseph	Tedesco	Hitachi Energy	Member
6	Colby	Lovins	Federal Pacific	Member
7	Solomon	Chiang	TGC	Member
8	Kerwin	Stretch	Siemens Energy	Member
9	Vijay	Tendulkar	Eaton	Guest
10	Shawn	Nunn	Hitachi Energy	Guest
11	Val	Tatu	Powersmiths	Guest
12	Erik	Tarango	Olsun Electric	Guest
13	Bob	Fyrer	DuPont	Guest
14	Rob	Ghosh	GE	Guest
15	Andre	Moreno	Siemens Energy	Guest
16	Rafael	Garjeda	Eaton	Guest
17	Ryan	Hogg	Bureau of Reclamation	Guest
18	Alex	Alahmed	Evergy	Guest
19	Aniruddha	Narawane	Eaton	Guest
20	Patrycja	Jarosz	IEEE SA	Guest
21	Jason	Lambert	JST Power	Guest
22	Kushak	Mahajan	Eaton	Guest
23	Chris	Powell	Intermountain Electronics	Member
24	Masoud	Sharifi	Siemens Gamesa	Guest
25	Val	Tatu	Powersmiths	Guest
26	Guang	Yuan	Hitachi Energy	Guest
27	Daniel	Weyer	Monolith	Guest
28	Tommy	Nunn	Comcast	Guest
29	Jose	Izquierdo	Siemens Energy	Guest
30	Agustin	Ortega	Siemens Energy	Guest

31	Renjie	Fu	Ermco / V&F Transformer	Guest
32	Terry	Wong	Trench LTD	Guest
33	Saif	Hossain	Trench LTD	Guest

D.2.7 Revision of IEEE C57.96 Chair Aniruddha Narawane

Chair: Aniruddha Narawane
Vice Chair: Iman Mohammed
Secretary: Kerwin Stretch

- Meeting called to order by the chair at 11:00
- Patent claims and copyright shown – no issues or questions were raised.
- 12 of 16 members present for Quorum
- Vijay Tendulkar, Eaton (1st) & Ken Klein, Johnson Coil (2nd) - Agenda approved unanimously
- Joe Tedesco, Hitachi (1st) & Tim Felix Mai, Siemens Energy (2nd) – Minutes approved unanimously.
- Sergio Hernandez, Hammond Power - showed Temp Rise calculator. REMINDER – The excel contains macros and this may cause issues on some computers with strict IT security policies. The file is time limited and will not be usable after November 30.
- Proposal to Rename of Eddy and Stray to Other Losses in the calculator
- Can the protection be removed from Calculation Tool? – To be answered by Manish.
- Question - where does exponent come from? It is already defined in the standard..
- Question – Why 6 and 10 degrees for trafo construction for cast resin. Answered - Comes from a consensus survey. Values to be used if you do not have better data.
- 6.3 Lifetime Equations - Roger Wicks was checking along with Chuck Johnson. Casey Ballard to check with Roger. Joe Tedesco with Chuck.
- Fix spelling of word it initial in Eq 27
- Vijay Tendulkar, Eaton (1st) and Ken Klein, Johnson Coil (2nd) motion to remove 6.8.3 Thermal Relay - 4 abstain 9 for – motion passed
- Casey Ballard, Du Pont - should insulation class be 150 or 155? Align with 12.60 to 155. Casey will check with Rick Marek to get an updated table.

- Question - should we add 240 class to table 7? Answer - No table 7 is examples, not all inclusive.

- Joe Tedesco- motion to change all references of 150 to 155. Second from Tim Felix. Tabled pending further investigation checking with previous chair.

- Question - should we drop 12.56 from bibliography? Still in normative reference and introduction.

- 12.01 goes up to 30 MVA our introduction is for 10 MVA. Should we align to 12.01? Should we investigate why 10 MVA was there….

- Introduction remove 10 MVA - suggested by Casey Ballard - agreed by group - Chair can change without motion

- Wording withdrawn must change to superseded.

Adjourn at 12:15

A comment was offered by Casy Ballard at the DTSC meeting stating that we follow IEEE 1 regarding what insulation thermal classes are assigned. The correct insulation class that should be referenced is Class 155 (in reference to the 14th bullet point in meeting minutes.)

WG C57.96 - MEETING ATTENDANCE

Last Name	First Name	Company	Role
Ballard	Robert	DuPont	Member
Chiang	Solomon	The Gund Company	Guest
Fryer	Bob	DuPont	Guest
Fu	Renjie	ERMCO	Guest
Grajeda	Rafael	EATON Corporation	Guest
Hernandez	Sergio	Hammond Power Solutions	Guest
Hernandez	Ronald	Doble	Guest
Iman	Mohammad	MGM Transformer Company	Vice-Chair
Jarosz	Patrycja	IEEE SA	Guest
Klein	Ken	Johnson Coil	Member
Lambert	Jason	JST Power	Guest
Lawless	Andrew	Pralar	Guest
Levin	Aleksandr	Weidmann Electrical Technology	Guest
Lovins	Colby	Federal Pacific	Member
Mahajan	Kushal	EATON Corporation	Member
Mai	Tim-Felix	Siemens Energy	Member
Martinez	Dan	JFE Shoji Canada	Guest
Montpool	Rhea	Schneider Electric	Member
Moreno	Andre	Siemens Energy	Guest
Narawane	Aniruddha	EATON Corporation	Chair
Nunn	Shawn	Hitachi Energy	Member
Nunn	Tommy	JST Power	Guest
Ortega	Agustin	Siemens Energy	Guest
Powell	Chris	Intermountain Electronics	Member
Sandoval	Alberto	EATON Corporation	Guest
Selvaraj	Pugal	Virginia Transformer Corp.	Guest
Shannon	Michael	REA Magnet Wire	Guest
Simons	Andre	JFE Shoji Canada	Guest
Stankes	David	3M	Guest
Stretch	Kerwin	Siemens Energy	Secretary
Tatu	Val	Powersmiths	Member
Taylor	Marc	JFE Shoji Canada	Guest
Tedesco	Joseph	Hitachi Energy	Member
Torango	Erik	Olsun Electrics Corporation	Guest
Walker	David	MGM Transformer Company	Guest
Yuan	Guang	Hitachi Energy	Guest
		Members	13
		Guests	23

D.2.8 Revision of IEEE C57.124 Chair Tom Prevost

WG did not meet. The document has been prepared for ballot and has been submitted to MEC. Requested that the DTSC members look for a ballot invitation that will be sent out soon. Expects that the document will be in ballot before the end of the year and that the results of the ballot will be shared at the next DTSC meeting. The Chair requested that once the WG Chair receives e-mail confirmation that the ballot pool is being formed, please notify the Chair so that he can send out a separate reminder notification to the SC for participation.

D.2.9 Revision of IEEE C57.12.91 David Walker

The Working Group met at the Westin Crown Center – Shawnee/Mission Conference Room. The meeting was called to order at 4:45 PM by Chair, David Walker

Chair made opening comments.

13 of 18 members in attendance. Quorum was met.

Approval of Agenda: The Fall 2023 agenda was approved unanimously without discussion.
Motion: Casey Ballard
Second: Aniruddha Narawene

Approval of Minutes: The Spring 2023 minutes were approved unanimously without discussion.
Motion: Colby Lovins
Second: Joe Tedesco

Call For Patents: The Chair presented the information on Patent Disclosures and asked the group to report any relevant patent issues – None were communicated.

Copyright Notice: The Chair presented the IEEE_SA Copyright Policy. No discussion.

Old Business

Chair continued slides from previous meeting introducing potential revisions or additions for the next version of this Standard.

- **What to do with fire, environmental, and climatic testing.**
  - **Current State: There is no definition in C57.12.01 for this testing.**
  - **Discussion was tabled until C57.12.01 includes these in that standard.**

- **Updating exponents for temperature rise correction factors.**
  - **Current State: Equations 25, 26, 27 and 42 correction factors include exponents that are historical but may need revisions.**
  - **Proposal: Perform testing to measure these exponents to ensure accuracy.**

  Proposer, Manish Saraf, was not present at the meeting.
  No manufacturers have taken any data since previous meeting.
  Matter was tabled until the next meeting where Manish can present for discussions regarding testing and data collection.

- **What to do with fans during AF testing?**

- **Current state:**
  - **Clause 11.1 requires fans to be on during the AF test**
  - **Clause 11.5 requires fans to be off prior to hot-resistance measurements**
  - **Clause 13.3.3 requires fans to be on during a sound test**
  - **Other tests do not specify any difference for AF testing has fans turned off at shutdown**

Manish Saraf provided data that shows when the fans are shutdown, the data spikes, and the extrapolation back to time 0 is skewed.

Proposal: Change clause 11.5 to: The steady-state temperature rise is reached when the surface temperature rises over ambient of all surface temperature measurements required in 11.3 become stable, which is defined as a variation of no more than 2 °C during a consecutive 3 h period. When the temperature rises become stable, the test voltage and current shall be removed, and the fans, if used, shall be left <u>on for the duration of the resistance measurements.</u>

Motion: Joe Tedesco
Second: Moonhee Lee

Discussion included:
The importance of historical data and the implication of changing the standard practice.
C57.12.90 standard turns the fans off before resistance measurements are taken
IEC does not mention fans during temperature rise testing

Vote:
Yes-0
No-5
Abstain-7
<u>Motion Fails</u>
(Plan to revisit this again when Manish is present so he can share the data that he has and better explain the proposal.)

- **How to perform testing for AFWF or WF units**
  - **Current state: There are no specifications about testing for AFWF nd/or WF units**

Proposal by Tim-Felix Mai
Investigate what specifications and /or/details are given in IEC 60076-11 and IEEE C57.12.190

IEC 60076-11 has "for water-cooled transformers, a temperature of cooling water at the inlet not exceeding: 25 deg C at any time and 20 deg C yearly average.
C57.12.01: 4.1.2.2 When water-cooled, the temperature of the cooling water (ambient temperature) shall not exceed 30 °C, and the average temperature of the cooling water for any 24 h period shall not exceed 25 °C. Minimum water temperature shall not be lower than 1 °C, unless the cooling water includes antifreeze, which is suitable for −20 °C operation.

IEC 60076-11: 10.1 Normal temperature-rise limits
The average temperature rise of the winding is defined as the difference between the average temperature of the winding and the temperature of the cooling air or of the water at the intake of the cooling equipment, for air-cooled or water-cooled transformers.

It is assumed throughout this part that the service temperatures of different parts of a transformer can each be described as the sum of the external cooling medium temperature (cooling air or cooling water) and the temperature rise of the transformer part.
In addition, change of wording cooling medium instead of cooling air

IEEE Std. C57.12.90
11.3.1.2 Water-cooled transformers
For water-cooled transformers, the flow rate in liters per minute and the temperature of the incoming and outgoing water shall be measured.
The ambient temperature shall be taken as that of the incoming water and should not be less than 20 °C nor more than 30 °C. For temperatures within this range, no correction factor shall be applied. Tests may be made at temperatures outside this range when suitable correction factors are available.

11.2.2 Hot-resistance measurements
When the transformer is shut down for hot-resistance measurements, fans and cooling water shall be shut off.

Proposal: Add C57.12.90 wording to C57.12.91
Motion: Tim-Felix Mai
Second: Joe Tedesco

Discussion: Casey Ballard mentioned that the standard doesn't state whether water-cooled transformers use water during temperature test resistance measurements.

Vote:
Yes-9
No-0
Abstain-6
Passed

- **Voltage correction factor in no Load Loss test:**
  - **Topic was initiated by Manish Saraf, who was not in attendance.**
  - **Tabled for later meeting**

- **Add a tolerance to current for load loss measurements**
  Proposal: Joe Tedesco to add d) to Clause 9.3.1
  d) Current measurements during load loss testing shall have a tolerance as specified in IEEE Std C57.12.01.
  - **Tabled for future meeting when data is available.**

- **Add a load loss metering angle**
  Proposal: Add text from Clauses 9.4 and 9.4.1 from C57.12.90
  - **tabled for future meeting to allow more discussion time.**

- **Short Circuit of axially split windings (as per C57.12.90)**
  C57.12.91 does not mentioned how to test axially split windings. C57.12.90 requires the test twice, once with one winding short circuited and again with the other short circuited.
  Tabled for future meeting. David Walker will provide a written proposal using language from C57.12.90.

- **Impulse Testing – Low voltage / impedance windings**

Impulse testing of LV windings is difficult to get a good waveshape. C57.12.91 already includes verbiage to address this problem

- **Should the current standard be revised or left as is?**
- **There is no consensus on how to improve from the current wording of the standard.**
- **Tabled for future meeting due to time constraints.**

Adjourned at 6:00

The Working Group will meet again at the Spring 2024 meeting,

Chair: David Walker
Vice-Chair: Tim-Felix Mai
Secretary: Rhea Montpool

Participation list:

Last Name	First Name	Company	Req. Membership
Alahmed	Alex	Evergy	Requesting
Allen	Jerry	Metglas	
Ballard	Robert	DuPont	Member
Chiang	Solomon	Gund Company	
Fryer	Bob	Dupont	
Fu	Renjie	Ermco	Requesting Membership
Grajeda	Rafael	Eaton	
Hernandez	Giovanni	Virginia Transformer	Member
Hernandez Cano	Sergio	Hammond Power Solutions	Member
Iman	Mike	MGM	Requesting Membership
Klein	Ken	Johnson	Member
Kumar	Mani	Kumar.mani@duke-energy.com	Requesting
Lawless	Andrew	aplawless@nc.rr.com	
Lee	Moonhee	Hammond Power Solutions	Member
Lovins	Colby	Federal Pacific Transformer	Member
Mahajan	Kushal	Eaton	Requesting
Mai	Tim-Felix	Siemens Energy	Member
Marathe	Swapnil	Megger	
McKinney	Ken	UL Solutions	Requesting
Montpool	Rhea	Schneider Electric	Member
Moreno	Andre	Siemens Energy	
Naranjo	Volney	Megger	Requesting
Narawane	Aniruddha	Eaton	Member
Nunn	Shawn	Hitachi Energy	Requesting
Nunn	Tommy	JST	

Ortega	Agustin	Siemens Energy	Requesting
Pepe	Harry	Phenix Tech	
Powell	Chris	I.E.	Member
Sandoval	Alberto	Eaton	
Stankes	David	3M	Requesting
Stretch	Kerwin	Siemens Energy	Member
Syed	Ali	Comed	
Tarango	Erik	Olsun	
Tatu	Valeriu	Powersmits	Requesting
Tedesco	Joseph	Hitachi ABB Power Grids	Member
Tendulkar	Vijay	Eaton	Requesting
Thiede	Andreas	High Volt Dresden	
Thompson	Ryan	Burns & McDonnell	
Walker	David	MGM	Member
Wang	Evanne	Dupont	
Wiesel	Devora	Con Edison	
Yuan	Guang	Hitachi Energy	

D.2.10 Revision of C57.12.59 Chair Derek Foster (not present) (Casey Ballard offered comments from slide that Derek has submitted)

Derek felt that he had a good number of WG members but if you are interested in working on C57.12.59 please reach out to him at drfoster@ieee.org. . Draft 1 of the document has been created and has been circulated to the WG membership. If you are a guest and would like to review the document, please contact Derek.

D.3 Old Business

D.3.1 Status of Dry-Type Transformer Documents

The chair presented slides showing DTSC standards activity and status that are part of the Standards Report found on the Transformer Committee website.

- IEEE 259 – Will require a PAR extension and this is already being addressed.
- IEEE C57.12.52 – In ballot and should be completed on time.
- IEEE C57.12.58 – Guide for conducting a transient voltage analysis of a Dry-type transformer coil – Has a revision due date of 2027 so we should consider starting work on this document. Will need a volunteer to lead this revision. Expect this work will be conducted virtually.
- IEEE C57.124 - will be in ballot soon
- IEEE C57.134 – In ballot process
- IEEE C57.16 – In ballot process
- IEEE C57.94 – In progress (Ken Kline asked that his name be corrected on the Standards Report.)

D.3.2 Entity PAR Guide for Bridge-Arm Reactors for Low-Frequency (20Hz) Power Transmission

Michael Sharp provided update.

- As part of our response, we shared a draft of IEEE C57.12.16 document which already handles a lot of the details and information for this type of equipment.
- Not mature technology.
- Presented this to the Entity group and they agreed with our comments.

- We have been informed that this proposal P122 Guide for Bridge-Arm Reactors for Low-Frequency (20Hz) Power Transmission Proposal has been withdrawn by the proposer.

D.4 New Business

D.4.1 Opening ANSI C57.12.55 Dry-Type Transformers Used in Unit Substations, Including Unit Substations – Conformance Standard

It is an ANSI, not an IEEE document. IEEE has the copyright to this document, but we have worked on this document since 1987.

Typically referred to as the IEEE enclosure standard because that is mostly what it covers. Originally developed by NEMA and came over to IEEE with all of the other documents that start with "5".

Reviewed the results of the Fall 2021 online survey where SC vote resulted in recommendation to open up and revise the document. The Chair asked if anyone would like to make a motion to reverse the recommendation to open up the document. No one offered a motion to reverse the earlier decision so the document will be opened. Shawn Nunn volunteered to become the TF Chair to help develop a PAR for this standard revision. Shawn and Casey asked for volunteers to become members of the PAR study group. The following people volunteered:

- David Walker
- Tim-Felix Mai
- Kerwin Stretch
- Aniruddha Narawane
- Colby Lovins
- Joe Tedesco
- Kushal Mahajan
- Camilo Casallas
- Vijay Tendulkar

Revisited the need to start the revision of IEEE C57.12.58 – Guide for conducting a transient voltage analysis of a Dry-type transformer coil. Ken Klein tentatively agreed to serve as TF Chair to help develop the PAR for this revision. Volunteers to become members of the PAR study group were requested. The following people volunteered:

- Tim-Felix Mai
- Joe Tedesco
- Colby Lovins
- David Walker
- Chris Powell
- Terry Wong
- Saif Hossain

IEEE 259 - Tim-Felix Mai agreed to serve as Vice Chair

IEEE 12.01 – Joe Tedesco agreed to serves as Vice Chair

With no further business, the meeting was adjourned at 2:25 PM.

Chairman: Casey Ballard

Vice Chairman: David Walker

Secretary: David Stankes (prepared meeting minutes)

Attendees

Role	First Name	Last Name	Company
Vice Chair	David	Walker	MGM Transformer Company
Secretary	David	Stankes	3M
Member	Solomon	Chiang	The Gund Company
Member	J. Arturo	Del Rio	Siemens Energy
Member	Rob	Ghosh	GE
Member	Sergio	Hernandez Cano	Hammond Power Solutions
Member	Mohammad	Iman	MGM Transformer Company
Member	John	John	Virginia Transformer Corp.
Member	Ken	Klein	Johnson Coil
Member	Moonhee	Lee	Hammond Power Solutions
Member	Aleksandr	Levin	Weidmann Electrical Technology
Member	Colby	Lovins	Federal Pacific Transformer
Member	Tim-Felix	Mai	Siemens Energy
Member	Aniruddha	Narawane	Power Distribution, Inc. (PDI)
Member	Shawn	Nunn	Hitachi ABB Power Grids
Member	Klaus	Pointner	Trench Austria GmbH
Member	Thomas	Prevost	Weidmann Electrical Technology
Member	Michael	Sharp	Trench Limited
Member	Hemchandra	Shertukde	University of Hartford
Member	Brian	Sonnenberg	Instrument Transformers, LLC
Member	Kerwin	Stretch	Siemens Energy
Member	Joseph	Tedesco	Hitachi ABB Power Grids
Member	Vijay	Tendulkar	Power Distribution, Inc. (PDI)
Guest	Comilo	Casallas	Trench Limited
Guest	Rhett	Chrysler	ERMCO
Guest	Renjie	Fu	ERMCO
Guest	Bob	Fyrer	DuPont
Guest	Miguel	Garcia	Hitachi Energy
Guest	Rafael	Grajeda	Eaton
Guest	Saif	Hossain	Trench Limited
Guest	Alejandro	Macias	CenterPoint Energy
Guest	Kushal	Mahajan	Eaton
Guest	Kenneth	McKinney	UL LLC
Guest	Andre	Moreno	Siemens Energy
Guest	Jerry	Murphy	Reedy Creek Energy Services
Guest	Tommy	Nunn	JST Power
Guest	Chris	Powell	Intermountain Electronics
Guest	Ulf	Radbrandt	Hitachi ABB Power Grids
Guest	Alberto	Sandoval Moreno	EATON Corporation

Guest	Chris	Talbert	JST Power
Guest	Erik	Tarango	Olsun Electrics Corporation
Guest	Valeriu	Tatu	Powersmiths International
Chair	Robert	Ballard	DuPont
Guest	Patrycja	Jarosz	IEEE
Guest	Agustin	Ortega	Siemens Energy
Guest	Harry	Pepe	Phenix Technologies, Inc.
Guest	Narango	Volney	Megger
Guest	Evanne	Wang	Dupont
Guest	Terry	Wong	Trench LTD
Guest	Guang	Yuan	Hitachi Energy