**IEEE PES TRANSFORMERS COMMITTEE**

**DIELECTRIC TEST SUBCOMMITTEE**

**The meeting was held at the Hyatt Regency Hotel, Milwaukee, MI**

|  |
| --- |
| **Dielectric Tests Subcommittee** |
| **Chair: Poorvi Patel** | **Vice-Chair: Thang Hochanh** | **Secretary: Diego Robalino** |
| Room: **Regency AB** | Date: **Wednesday, March 22nd, 2023** | Time: 11:00 am to 12:15 pm |
| Total DTSC Members: 163 | Members present at the meeting: 94 | Attendance according to sign in sheet: 185 |
| Guests present: 91 | Membership requested: 23 | Membership accepted: 15 |
| Members moved to Guest Status: 27 |  |  |

# Chair’s Remarks

The Chair welcomed members and guests to the Spring 2023 meeting in Milwaukee. First reminder for WG and TF Chairs and secretaries to submit their minutes as soon as possible. The SC has a deadline to submit minutes on May 05. Requested to include attendance list and submit reports to SC Secretary.

The Chairs introduced Patrycja Jarosz, the new Standards Program Coordinator for the DTSC. She will replace Malia Zaman in this activity, she will still support Patrycja with any questions regarding PARs, ballots, etc.

Regarding Leaders' Training, it has become optional and not compulsory as it was before. Antitrust policy training remains mandatory. Nonetheless, taking the training is recommended to get a global perspective of IEEE organization and processes.

The committee has not had an automated system (AM system) for quite some time but now a new “Committee Management System (CMS)” will maintain centralized rosters. n e-mail was sent to all Committee members and guests to create a profile with Member Planet (e-mail from Ed teNyenhuis) to create a profile by April 22nd.

[**https://ieee.memberplanet.com/v2app/#/member-registration/join**](https://ieee.memberplanet.com/v2app/#/member-registration/join)

* ADCOM highlights

DTSC Chair presented to the group the IEEE SA Copyright and Patent Policies with links to the IEEE SA website.

|  |
| --- |
| **Status of Active Standards** |
| **Project** | **Title** | **Valid until** | **PAR Status** |
| C57.127 | Guide for the Detection of Acoustic Emissions from Partial Discharges | 2028 | WG inactive – possible start soon a TF for review |
| C57.160 | Guide for the Elec. Measurement of PD in HV bushings and Instrument Transformers | PAR extension for 1 year | PAR **2023** |
| C57.113 | Recommended practice for PD Measurement Power | In ballot process | PAR 2023 |
| C57.98 | Guide for Transformer Impulse Tests | 2021 – PAR extension approved for 2 years | PAR **2024** |
| C57.138 | Recommended Practice for Routine Impulse Tests for Distribution Transformers | 2026 | PAR 2026 |
| C57.161 | Guide for DFR Measurements | 2028 | WG Inactive. possible start soon a TF for review |
| C57.168 | Low-Frequency Test Guide | On ballot resolution – there is a PAR extension  | PAR 2023 |
| C57.12.200 | Bushing Dielectric Frequency Response Guide (ENTITY WG) | 2023 – Document recently published | WG inactive |

Chair reminded the upcoming NesCOm/RevCom meeting dates and deadlines. This is a reminder that October 16 is the last day to submit a PAR extension for RevCom.

|  |  |
| --- | --- |
| **Standard Board Meeting** | **Submittal Deadlines** |
| 29th of March 2023 |  |
| 15th of May 2023 | 4th of April 2023 |
| 28th of June 2023 | 19th of May 2023 |
| 19th of Septemeber 2023 | 11th of August 2023 |
| 5-6th of December 2023 | **16th of October 2023** |

# Secretary’s Report

SC Secretary requested unanimous approval to record the meeting for the sole purpose of minutes reporting. None are against it, and the meeting is recorded (only voice no video).

* From the last meeting, four (4) guests requested membership. Two were approved:
	+ Zan Kiparizoski
	+ Mama Mbouombouo
* Membership to DTSC was reviewed 2 out of 3 or 3 out of five. The same applies to keep member status in the SC.

For the meeting in Milwaukee, there are 163 members listed and a quorum requires 82 members in attendance. A list of members was presented to the audience to establish a quorum during this meeting. Looking at the list of members, we requested to stand up for headcount.

The headcount was completed with 92 members attending the meeting. **Therefore quorum was achieved.** The final review will be carried out against roster signatures.

# Quorum, Approval of Minutes, and Agenda

Once quorum was established, Chairperson requested a motion to approve the agenda:

* Motion by Dan Sauer, second Evgenii Ermakov
* No objection to the unanimous approval of the agenda hence approved.

Chairperson requested a motion to approve the Fall 2022 minutes:

* Motion by Evgenii Ermakov, second Arup Chakraborty
* No objection to the unanimous approval of the agenda hence approved.

**Attendance Summary**

|  |  |
| --- | --- |
|  | By Roster |
| Total Attendees | 185 |
| Total # Of Members | 163 |
| Members Present | 94 |
| **Quorum Present** | **YES (57.7%)** |

# SC Discussions and Motion passed.

New Business:

1. C57.127 – Detlev Gross made a motion to open a PAR study group to the guide for the detection of Acoustic Emissions from Partial Discharges.
* Tauhid Ansari second
* No discussions and unanimous approval to start the PAR study group
* First meeting to be held in Kansas City in the fall meeting
1. C57.161 – Evgenii Ermakov made a motion to open a PAR study group to the guide for DFR Measurements.
* Diego Robalino second
* No discussions and unanimous approval to start the PAR study group
* First meeting to be held in Kansas City in the fall meeting

Old Business:

1. No old business

# Taskforce and Working Group Reports

Reports are in the order presented during the meeting

**TF: Core Ground and Winding Insulation Resistance**

**Chair: Diego Robalino**

 **Secretary: Aniruddha Narawane**

**Minutes of Meeting held on 03/20/2023 from 4.45 pm CST to 6.00 pm CST**

**In-person Meeting: Gilpatrick meeting hall, Hyatt Regency, Milwaukee, WI.**

1. The meeting was called to order at 4.45 pm with a welcome by Chairman Diego Robalino.
2. Chairman checked for any patents and copy rights and there were none.
3. Based on the initial check there was no quorum however due to the size of the meeting room (Max attendance allowed in the room was 30 and the number of members listed was 48) some of the attendees either had to stand outside the room or could not be accommodated due to which verification of member attendance was not possible. Chairman mentioned that the agenda, and minutes of the meeting from F22 will be presented at the F23 meeting for approval.
4. Chairman presented the general agenda, Scope of the task force and requested to discuss the Scope.
5. There were presentations from a member and chairman which illustrated the results of IR tests performed at various voltage levels, at various intervals, with different types of connections, and the differences in results were explained based on the variations of these parameters. There were discussions related to the results shown and also questions to clarify the duration of the test etc. Presentations uploaded to the website.
6. Chairman mentioned that the intention is to receive the data based on various sub-task groups formed.
7. There were suggestions that the TF should include recommendations about test conditions, the type of instruments recommended, and possibly some values for the IR based on best practices.
8. The meeting was adjourned at 5.45.

**List Of Attendees**

|  |  |  |
| --- | --- | --- |
| **First Name** | **Last Name** | **Email** |
| Kayland | Adams | Kayland.Adams@prolec.energy |
| Tom | Aikons | tom-aikons@vantransformer.com |
| Carlos | Alonso | cha258@nyu.edu |
| Mihir | Amin | mihiramin@eaton.com |
| Tauhid | Ansari | tauhid.ansari@hitachienergy.com |
| Stephen | Antosz | santosz@ieee.org |
| Daniel | Blaydon | dblaydon@ieee.org |
| William | Boettger | WEBOETTGER@aol.com |
| Lorin | Bratu | lorin.bratu@trnch-group.com |
| David | Calitz | david.calitz@siemens-energy.com |
| Alfredo | Carrizales | juanalfredo.carrizales@prolecge.com |
| Samson | Debass | sdebass@epri.com |
| Jesse | Duffy | jduffy@nespower.com |
| Samragni | Dutta Rey | samragni.dutta\_roy@siemens-energy.com |
| Evgenii | Ermakov | evgeniiermakov@hitachienergy.com |
| Marco | Espindola | marco.a.espindola@hitachienergy.com |
| Raymond | Frazier | rfrazier@ameren.com |
| Loren | Gara | lgara@shermco.com |
| Rafael | Grajeda | rafaelgrajeda@eaton.com |
| Ravi | Gupta | ravi.gupta@megger.com |
| Roger | Hayes | roger.hayes1@ge.com |
| John | Herron | herronjph@aol.com |
| John | John | john\_john@vatransformer.com |
| Zan | Kiparizoski | ZKIPARIZOSKI@HOWARD.COM |
| Fernando | Leal  | ferleal@gmail.com |
| Kushal | Mahajan  | kushalmahajan@eaton.com |
| Gabriel | Mamede | gabriel.mamede@siemns-energy.com |
| Kumar | Mani | kumar.mani@duke-energy.com |
| Lee | Matthews | lmatthews@ieee.org |
| Ismael | Naja | ismaelnaja@eaton.com |
| Aniruddha | Narawane | Aniruddha Narawane <anarawane@ieee.org> |
| Herman | Parrales | herman.parrales@prolec.energy |
| Poorvi | Patel | ppatel@epri.com |
| Rakesh | Patel | rakesh.patel@hitachienergy.com |
| Damian | Podgorski | damianpod@live.com |
| Diego | Robalino | diego\_robalino@ieee.org |
| Tim | Rolque | tim.rolque@prolec.energy |
| Alberto  | Sandoval | albertosandovalmoreno@eaton.com |
| Dan | Sauer | dmsauer@eaton.com |
| Cihangir | Sen | cihangir.sen@duke-energy.com |
| Abdulmajid | Shaikh | ashaikh@deltastar.com |
| Jaber | Shalabi | jshalabi@vantran.com |
| Chris | Slattery | cslattery@firstenergycorp.com |
| Jason | Snyder | jdsnyder@firstenergycorp.com |
| Muhammed | Sohail | muhammad.sohail@trench-group.com |
| Andy | Speegle | aspeegle@energy.com |
| Charles | Sweetser | charles.sweester@omicronenergy.com |
| Eric | Tarango | etarango@olsun.com |
| Val | Tatli | valitatagm@gmail.com |
| Joseph | Tedesco | joseph.l.tedesco@hitachienergy.com |
| Samuel | Tekle | stekle@weg.net |
| Vijay | Tendulkar | vijaytendulkar@eaton.com |
| Eduardo | Tolcachir | ETOLCACHIR@TTE.COM.AR |
| Risto | Trifunoski | risto.trifunoski@trench-group.com |
| Ajith | Varghese | Ajith.Varghese@prolec.energy |
| Pragnesh | Vyas | pragnesh.vyas@sunbeltsolomon.com |
| David | Wallach | david.wallach@duke-energy.com |
| Kevin | Wirtz | kevin-wirtz@cargill.com |
| Jeffery | Wright | jwright@lublight.com |
| Anand | Zanwar | anand.zanwar123@gmail.com |

**TASK FORCE FOR REVISION TO LOW FREQUENCY DIELECTRIC TESTS**

## Milwaukee, Wisconsin Meeting – March 21, 2023, 1:45-3:30 pm CDT

Chair: Ajith Varghese

Vice Chair: Markus Schiessl

Secretary: Jason Varnell

# The meeting was called to order at 1:45 PM.

# 88 individuals were in attendance. A quorum was achieved with 27 of 39 total members present. 19 individuals requested membership; however, only 7 were given member status based on attendance and participation and will be added after the S23 meeting. 10 Members that were not present had missed 2 out of the last three meetings and will be moved to guests after the S23 meeting, which means there will be 36.

# A motion was made by Dan Sauer (Eaton Corp.) and seconded by Fernando Leal (Prolec-GE) to approve the Spring 2023 meeting agenda. There were no objections to unanimous approval of the agenda. A motion was made by Dan Sauer (Eaton Corporation) and seconded by Steve Antosz (Steve Antosz and Associates) to approve the Fall 2022 working group meeting minutes. There were no objections to unanimous approval of the Fall 2022 working group meeting minutes.

# Factory PD Limits and Procedure Survey Results

# The proposed changes from the Study Group on the factory PD procedure and limits were surveyed in the DTSC. The survey obtained 108 total votes, with a 70.4% approval rating. The comments received from the survey were reviewed. The surveyed text was the following:

1. Add a requirement for the measurement of PD at the Maximum System Voltage
2. PD limit 100 pC at Maximum System Voltage
3. Change the interval between measurements from 5 minutes to now 3 minutes during a 1-hour period

The task force reviewed the comments and unanimously approved the following text:

1. Immediately following the 1 h period, the voltage shall then be reduced to 1.05 X line to the ground value of the nominal system voltage (column 2, C57.12.00 Table 4) and held until a stable partial discharge level is obtained and the partial discharge level measured.
2. The magnitude of partial discharge level at 1.05 X Nominal System Voltage following the 1 h test period does not exceed 100 pC.

A motion was made by Dan Sauer (Eaton Corp) and seconded by Sanjib Som (PTTI) to take the approved text to the DTSC for a vote to include the text in the upcoming revision of C57.12.90. There were no objections to unanimous approval of the motion.

The task force unanimously agreed with the commenters to not change the requirement for the 5-minute measurement interval and therefore the 3-minute recommendation was removed. The task force unanimously agreed with the commenters to not add a requirement to report the partial discharge measurement during the enhancement period. It was recommended to take these two items to the low-frequency test guide (PC57.168).

# Task Force on PD Testing of Class 1 Power Transformers – Don Ayers

### The task force met on Monday, March 20, 2023. There was no quorum. There was discussion on 7 proposals that came from the survey of the RLFT TF; however, more work will be required to provide text to the RLFT TF and the chair will work on reviewing the membership due to lack of participation. See TF minutes in Appendix A.

# PD in Bushings During Factory Testing

1. The chair reviewed the history of discussion which included a review of the 2020 DTSC survey on the subject of venting bushings. Additionally, it was reviewed that during the F22 meeting a study group was formed to come up with recommendations to address the concerns. The study group met on 1/27/203, 2/10/2023, and 2/24/2023. Survey results are included in Appendix B of these minutes.
2. The summary of the study group was reported by the chair, which included recommendations to add requirements to report on the certified test report if bushings were vented during factory acceptance testing. It was also recommended to clarify that the induced test shall be repeated entirely after venting bushings. Additionally, recommended changes to the wording were given to explain the phenomenon. Lastly, a type test for bushings to simulate cool down was discussed as a possibility.
3. The following modified text to add to C57.12.90 was presented. The chair will work with a smaller group to improve the wording and grammar before going to the survey to the task force.

*If the partial discharge exceeding agreed limits, is observed during the induced testing of the transformer and appears to be generated within an OIP bushing(s), it is permissible to “vent” the bushing(s) to the atmosphere using the bushing manufacturer’s instructions.*

*Induce test shall be repeated entirely after venting and a note shall be added to the certified test report to indicate if any bushings were vented during Induce Test.*

*Note:*

*Partial discharge intended to be addressed by venting the bushing is the low energy discharge arising from partial vacuum created in expansion chamber or gas bubbles generated during the thermal test. Partial vacuum is created in the expansion chamber due to absorption of nitrogen or air into oil and gas bubbles are formed due to saturation of nitrogen. Partial discharges from these get resolved quickly on venting. If there are continuous gas bubble generation or elevated partial discharge remains after the venting, that may require additional investigation*

*If there are concerns of gas generation from Temperature rise test causing bushing failure during Impulse or Applied Voltage test, an induce test could be performed before impulse for diagnostic purpose, but a complete Induce test shall be repeated as last dielectric test.*

1. A motion was made by Steve Antosz (Steve Antosz and Assoc.) and seconded by Subash Tuli to survey the TF with the proposed wording. There was unanimous approval to go to survey.
2. Egon Kirchenmayer made a presentation on bushing test to simulate cool down behavior and bubble evolution, that could be considered as type or special Test.
	1. Data presented is only for 3 bushings and doesn’t show correlation if bushing that have PD and needed venting during induce test can be detected
	2. Many bushing manufacturers present during TF expressed concern that such a testing may need significant investment and resource and need more time review.
	3. No decision was made during the TF meeting on next steps with this. Presentation will be posted on website as reference material for future discussions.
3. Old business
	1. Jason Varnell (Doble Engineering) presented on contradictions on the induced overvoltage factor as presently written in C57.12.00 and C57.12.90. The task force agreed that the text should be cleaned up and a small study group was formed. The following volunteers agreed to participate: Jason Varnell (Doble Engineering), Steve Antosz (Steve Antosz Assoc.), Bill Griesacker (Griesacker and Assoc.), Salahuddin Shaikh (Hitachi Energy), and AbdulMajid Shaikh (Delta Star).
4. New business
	1. There was no new business.
5. The meeting was adjourned at 3:30 p.m. The next meeting will be in Kansas City, MO at the Fall 2023 Transformer Committee Meeting.

During the DTSC Ajith Varghese made the motion to approve the modifications in the text of C57.12.90 Section 10.8.2 according to what the WG approved during the session. The modified text was presented to the attendees in blue and yellow colors.

* Dan Sauer seconded the motion
* Open discussion. The attendees were asked for any objection to unanimous approval. None raised. **The motion was approved during the DTSC meeting.**
* Tauhid Ansari made a comment to support Ajith’s proposal to study the pressurization of bushings during Induce Test/heat run test.
* No clear field correlation between the practice of venting the bushing and failure in the field.



**Task Force on Revision of Impulse Tests**

Chair: Sylvain Plante

Vice Chair: Daniel Sauer

The TF met on March 21st, 2023, from 08:00 am to 09:15 am. Twenty-two (22) members and seventy-eight (78) guests attended the meeting (see attached attendance list). Forty-five (45) Guests were attending for the first time the Task Force. Nine (9) guests requested membership but only 7 are eligible to have attended at least 2 of the last 3 meetings. After this meeting, seven (7) members have been moved to the guest list, not having attended 2 of the last 3 meetings. The meeting was chaired by Sylvain Plante, Chair of the TF. and Mr. Daniel Sauer was the vice-chair.

The meeting has been called to order by the Chair at 08:00 am.

Attendance has been recorded in the TF's attendance EXCEL spreadsheets and included in the annex.

Presentation of the new Chair, Sylvain Plante, that has been nominated by the Dielectric Tests Subcommittee Chair.

IEEE Patents and Copyright slides were presented. There were no comments or requests regarding Patents and Copyrights.

Required quorum was met, presence of at least 20 members was required, we had 22. The TF membership roster has been reviewed after the F22 virtual meeting and eleven (11) members who did not attend at least one of the last three meetings have been moved as guests. Three (3) new members have been added since the last meeting. Thirty-eight (38) guests not having attended the last five (5) meeting has been removed from the guest roster.

The meeting agenda has been approved unanimously. Motion has been made by Arup Chakraborty and was seconded by Tauhid Haque Ansari.

The F22 virtual meeting minutes have been approved unanimously. Motion has been made by Jim McBride and was seconded by Kris Zibert.

The first item of business was related to the results of a survey related to a proposal made by Daniel Sauer for modifications to clauses 10.3.2.2, 10.3.2.3, 10.4.4 and 10.4.5 of IEEE C57.12.90. This proposal is concerning lightning impulse tests on series, multiple, delta or wye connections for transformers rated 15 kV and below. The survey was sent to the DTSC members and guests (154 participants). The return rate was 24.7% and an approval rate of 100% was obtained. All received comments were reviewed and discussed. Comments were editorial.

A motion to accept the new text and sent it to the Working Group of the C57.12.90 has been made by Steve Antosz and second by Kris Ziebert. It has been unanimously approved.

The second item of business was related to the survey sent to the TF regarding the use of tolerances on the applied voltage during switching and lightning impulse test. This subject raises a lot of comments and discussion. The comment from the survey has been reviewed.

A motion to accept Kyle D Stechschulte's comment was made by Steve Antosz and was seconded by Daniel Sauer and has been rejected (4 in favor, 13 against, 3 abstain).

A motion to accept Stephen Antosz 's comment was made by Stephen Antosz and was seconded by Dan Sauer and has been rejected (6 in favor, 7 against, 6 abstain).

After a lot of discussion, a new text has been proposed:

 “The basic rule for application of the tolerance on voltage crest value is that testing laboratories shall aim for the test value specified.  If for any of the impulses of a test series, the actual measured voltage is lower than the required voltage crest value but within the allowable tolerance of ±3%, the test shall be accepted as a valid test. For any required subsequent impulse on the same terminal, adjustments shall be made to aim for the specified test value.”

A motion to send to the DTSC for survey was made by Dan Sauer and was seconded by Stephen Antosz and has been accepted (18 in favor, 1 against, 0 abstain).

The revised proposal will be sent to the Dielectric Test Subcommittee for survey.

On new business, Ajith Varghese made a proposal for clause 10.2.4 of IEEE C57.12.90 regarding the tap selection during switching impulse test. His proposal was related to phase-to-phase voltage switching impulse withstand capability limitations for some on-load tap changers. Ajith explain the point, we had a few discussions, and we decide to send the proposal to survey, in order to leave time to members to study the question. The subject will remain on the agenda of the next meeting for discussion of the survey result.

The meeting adjourned at 09:15 am on March 21st, 2023.

The next meeting is planned to be held in Kansas City, Missouri, October 22-26, 2023.

|  |
| --- |
| Roster for the meeting |
| Role | First Name | Last Name | Company |
| Member | Kayland | Adams | GE Prolec |
| Member | Tauhid Haque | Ansari | Hitachi Energy |
| Member | Stephen | Antosz | Stephen Antosz & Associates, Inc |
| Guest | Donald | Ayers | Ayers Transformer Consulting |
| Guest | Christopher | Baumgartner | We Energies |
| Guest | Jason | Beaudoin |  |
| Guest | Duvier | Bedoya | Hitachi Energy |
| Guest | William | Boettger | Boettger Transformer Consulting LLC |
| Member | Dominique | Bolliger, Ph.D. | HV TECHNOLOGIES, Inc. |
| Guest | Susan | Bonfiglio |  |
| Guest | Christopher | borck |  |
| Guest | Michel | Botti |  |
| Guest | Jeffrey | Britton | Phenix Technologies, Inc. |
| Guest | Samuel | Brodeur | Hitachi Energy |
| Member | David | Calitz | Siemens Energy |
| Guest | camilo | casallas |  |
| Member | Arup | Chakraborty | Delta Star Inc. |
| Guest | Vivian | Chan |  |
| Guest | Ennyoung | Cho |  |
| Guest | Jaroslaw | Chorzepa | ABB Inc. |
| Guest | Rhett | Chrysler |  |
| Guest | yasin | demir |  |
| Guest | Paul | Dolloff | East Kentucky Power |
| Guest | Jeffrey | Door | The H-S Familly of compangs |
| Guest | Marco | Ferreira |  |
| Member | Hugo | Flores | Hitachi Energy |
| Guest | Raymond | Frazier | Ameren |
| Guest | Richard | Frye | EATON Corporation |
| Guest | Alireca | Gorzin |  |
| Guest | Bill | Griesacker | W. Griesaker |
| Guest | Mike | Hall |  |
| Guest | Gicyanni | Hernadez |  |
| Member | Sergio | Hernandez Cano | Hammond Power Solutions |
| Guest | Derek | Hollrak |  |
| Guest | saif | Hossain |  |
| Guest | Nick | Jensen | Deltastar |
| Member | John | John | Virginia Transformer Corp. |
| Guest | Thrinadha | Katapalli |  |
| Guest | Sheldon | Kenedy | Niagara Transformers |
| Guest | Qasim | Khan |  |
| Guest | Zan | Kiparizoski | Howard Industries |
| Guest | Evan | Knapp | Eaton corp |
| Guest | Bernard | LaBean Jr | Consumer Energy |
| Member | Mark | Lachman | Doble Engineering Co. |
| Guest | Alexander | Lasysch |  |
| Member | Fernando | Leal | Prolec GE |
| Guest | Moonhee | Lee | Hammond Power Solutions |
| Guest | Junho | Lee |  |
| Guest | Soyoung | Lee |  |
| Guest | Gabriel | Lopes Mamede | Siemens Energy |
| Guest | Kevin | Mazzei | Black & Veatch |
| Member | James | McBride | JMX Services, Inc. |
| Guest | Francis | Mills |  |
| Guest | Martha | Minoz |  |
| Guest | Juliano | Montanha | Siemens Energy |
| Member | David | Murray | Tennessee Valley Authority |
| Guest | George | Partyka | PTI Transformers |
| Guest | Harry | Pepe | Phenix Technologies, Inc. |
| Chair | Sylvain | Plante | Hydro-Quebec |
| Guest | Klaus | Pointner | Trench Austria GmbH |
| Member | Bertrand | Poulin | Hitachi Energy |
| Member | Jarrod | Prince | ERMCO |
| Guest | Ulf | Radbrandt | Hitachi Energy |
| Member | Leopoldo | Rodriguez | Transformer Testing Services LLC |
| Guest | Rodrigo | Ronchi | WEG Transformers USA Inc. |
| Member | Hakan | Sahin | Virginia/Georgia Transformer |
| Guest | Dinesh  | sankarrakurup |  |
| Member | Amitabh | Sarkar | Virginia Transformer Corp. |
| Vice-Chair | Daniel | Sauer | EATON Corporation |
| Guest | Alfons | Schrammel |  |
| Guest | Cihangir | Sen | Duke Energy |
| Guest | abdulmajid | Shaikh |  |
| Guest | Mike | Shannon | REA Magnet Wire |
| Guest | Ibrahim | Shteyh | Schneider électric |
| Member | Christopher | Slattery | FirstEnergy Corp. |
| Guest | Jason | Snyder |  |
| Member | Sanjib | Som | Pennsylvania Transformer |
| Guest | Fabian | Stacy | Hitachi Energy |
| Member | Kyle | Stechschulte | American Electric Power |
| Guest | Andrew | Steineman | Delta Star Inc. |
| Guest | Oakes | Stephan |  |
| Guest | Samuel | Tekle |  |
| Guest | Jacob | Thielbar |  |
| Guest | Scott | Thomas | Hitachi Energy |
| Member | Eduardo | Tolcachir | Tubos Trans Electric S.A. |
| Guest | Eduarda | Tolcachir | TTE |
| Guest | core | van dreel |  |
| Member | Ajith | Varghese | SPX Transformer Solutions, Inc. |
| Guest | Camaeron | Vart |  |
| Guest | Jos | Veens | SMIT Transformatoren B.V. |
| Guest | kannan | veeran |  |
| Guest | Mike | Waldrop |  |
| Member | David | Wallach | Duke Energy |
| Guest | Zack | Weiss | WEG Transformers USA Inc. |
| Guest | Kevin | Wirtz |  |
| Guest | Fei | Yang | Hitachi energy |
| Guest | Anand | Zanwer |  |
| Guest | Robert | Zaretsky | Sargent & Lundy |
| Member | Kris | Zibert | Allgeier, Martin and Associates |
| Member | Waldemar | Ziomek | PTI Transformers |

Discussed in the DTSC meeting:

**Proposed revised wording To send to C57.12.90 WG:**

**10.3.2.2 Windings for series, parallel or multiple connections**

The windings shall be tested for all series, parallel and multiple connections. The test voltage for these conditions shall correspond to the BIL of the winding for that connection.

**10.3.2.3 Windings for delta or wye connections**

The three-phase transformer shall be tested on both delta and wye connections. The test voltage for each connection shall correspond to the BIL of the winding for that connection.

**10.4.4 Windings for series, parallel or multiple connections**

For high-voltage windings with series, parallel or multiple connections above 15 kV, the routine impulse test shall be conducted on each connection at its assigned BIL. For nominal system voltages of 15 kV and below, only the series connections shall be tested, unless tests on all connections are specified.

**10.4.5 Windings for delta or wye connections**

For high-voltage windings of three-phase transformers with delta or wye connection above 15 kV, the routine impulse test shall be conducted on each connection at its assigned BIL. For nominal system voltages of 15 kV and below, only the wye connection shall be tested, unless tests on all connections are specified.

**Survey results:** **Revision of clauses 10.2.2.2 and 10.3.1.1 of IEEE C57.12.90**

Modification regarding peak voltage tolerance during impulse

*Date of issue:* November 2nd 2022;

*Closing date:* December 31, 2022;

*Number of surveys sent:* 78 in TF Revision to Impulse Tests;

*Number of surveys returned:* Total: 18 returns, **(23%)**

*Number of affirmative:* 17 + 4 with comments **(94.4%)**;

*Number of negative:* 1 (5.6%);

*Number of abstain:* 0;

*Comments received:* See the following table.

**Proposed text Add:**

The basic rule for application of the tolerance on voltage crest value is that testing laboratories shall aim, whenever possible, for the test value specified. If for one of the impulses of a test series, the actual measured voltage is lower than the required voltage crest value but within the allowable tolerance of -3%, the test shall be accepted as a valid test. Appropriate steps shall be taken to make adjustments in order to aim for the specified test value.

**Main highlights from the "Approve with comments" received:**

1. *Comment from David Wallach, Chris Baumgartner and Polo Rodriguer Berlanga:*

*Remove “Whenever is possible”*

For both clauses, revise the last sentence for clarity as follows:  For any required subsequent test, appropriate adjustments shall be made in order to aim for the specified test value.

1. *from Chris Baumgartner*

For both clauses, revise the last sentence for clarity as follows:  For any required subsequent test, appropriate adjustments shall be made in order to aim for the specified test value.

*TF Chair Observation: To be discussed.*

**Main highlights from the "Negative" received:**

*Comment from Kyle D Stechschulte*

While I fully support the additional language and the intent, I cannot support the addition without defining the “appropriate steps” to aim for the test value. My suggested alternative would be if the voltage is not raised then the sequential test shot shall not be accepted. Here is my attempt to put my thoughts in words:

This additional language allows the test engineer to re-impulse due to an impulse generator error and still have a valid test as discussed in great detail during the TF meeting in the fall, however, does require the lab to make steps to increase the crest value or repeat impulses.

*TF Chair Observation: To be discussed.*

During the session TF Chair made a motion to send the text approved by the TF to the DTSC members showing the survey for revision of clauses 10.2.2.2 and 10.3.1.1 of IEEE C57.12.90. Second Dan Sauer. Third Ewald Schweiger

A little discussion initiated by Sanjib Som asking for the text to be presented during the session. As motion stated the request is to send the text approved so all members will have access to it.

Stephen Santoz suggested to survey the SC at the time of making the request, that way there is no second step. There is no need to show the text if survey is requested. DTSC leaders to discuss simplification of the process to survey the DTSC.

Detlev Gross suggests to consecutively survey the WG and later the SC to make sure approval is granted.

**Finally motion is approved for TF Chair to survey the DTSC with the text surveyed and approved by the TF**.

# WG to Investigate the Interaction between Substation Transients and Transformers in HV and EHV Applications and Revision of C57.142

**Executive Ballroom (2), Milwaukee, WI, USA**

**Tuesday, March 21, 2023, 11:00 AM – 12:15 PM CDT**

Chairman – Jim McBride

Vice Chair – Xose Lopez-Fernandez

Secretary – Tom Melle

1. Welcome and Chair’s Remarks
2. Circulation of Attendance Sheets
3. IEEE Patent Policy Slides
4. Approval of Agenda and Minutes from Last Meeting
* Member count was 22 of 24 required for quorum; therefore, **quorum was not achieved**, 66 Guests were present, Total Attendance – 88
1. C57.142 Ballot and Comment Resolution status – Jim McBride: presentation of open comments before the ballot resolution group (BRG) and discussion of several key comments (latest documents to be posted on WG website).
* Comment on Page 16, Section 5: alignment of Guide with theory in IEC 62271-306, Section 16.4 (Tom Melle to review)
* Comment - Page 20, Section 5.2: magnitude of re-ignition versus load power factor. The Chair provided examples of transients in shunt reactors illustrating 1.2 MV(pp) transients on transformer with 1.4 MV BIL (Jeffrey Britton to review)
* Comment - Page 6, Section 3.4.1: discussion of transient recovery voltages (The Chair and Phil Hopkinson will review/survey with SWG BRG members and any experienced users or manufacturers)
* Comment - Page 34, Section 7.6: de-energizing transformers with disconnectors (Bertrand Poulin suggested to leave the informative paragraph and insert a note that is can be dangerous to de-energize with switch)
* Comment - Page 30, Section 7: mitigation method of “moving” the transformer’s resonant frequency (such as with CCVT). A straw ballot was conducted and the results were split. Chair will conduct a survey of the BRG.
* Comment - Page 33, Section 7.3: controlled switching to mitigate reignitions (the sentence will be rewritten to provide more clarity)
* Comment – Page 5, Section 3.3: discussed “ground-fault neutralizer” terminology. Jeff Britton suggested coordination with WG C57.32. Tom Melle is Vice-Chair of that Standard and will coordinate matching terminology.
1. Mitigation Methods Task Force Update – Jim McBride / Phil Hopkinson

All prior mitigation methods proposed by the TF are included in the Guide. The TF will review/consider CCVT, Capacitive Shields and any other potential mitigation methods suggested by comment resolution.

1. New Business – Ajith Varghese suggested preparing an updated presentation for sharing with any liaison groups (SWG, CIGRE, PCS and the TC at-large).
2. Next Meeting (Fall 2023 – Kansas City, MO Oct 23, 2023)
3. Adjournment at 12:15 PM CDT

Meeting Attendance

|  |  |  |  |
| --- | --- | --- | --- |
| Role | Last Name | First Name | Company |
| Chair | McBride | James | JMX High Voltage |
| Secretary | Melle | Thomas | HIGHVOLT |
| Member | Betancourt | Enrique | Prolec GE |
| Member | Boettger | William | Boettger Transformer Consulting LLC |
| Member | Britton | Jeffrey | Phenix Technologies, Inc. |
| Member | Garcia Wild | Eduardo | Siemens Energy |
| Member | Heiden | Kyle | EATON Corporation |
| Member | Hopkinson | Philip | HVOLT Inc. |
| Member | John | John | Virginia Transformer Corp. |
| Member | Joshi | Akash | Black & Veatch |
| Member | Kirchenmayer | Egon | Siemens Energy |
| Member | Li | Weijun | Braintree Electric Light Dept. |
| Member | Pointner | Klaus | Trench Austria GmbH |
| Member | Poulin | Bertrand | Hitachi Energy |
| Member | Roussell | Marnie | Entergy |
| Member | Sarkar | Amitabh | Virginia Transformer Corp. |
| Member | Sen | Cihangir | Duke Energy |
| Member | Sharp | Michael | Trench Limited |
| Member | Spurlock | Mike | Spurlock Engineering Services, LLC |
| Member | Varghese | Ajith | SPX Transformer Solutions, Inc. |
| Member | Vir | Dharam | Prolec-GE Waukesha |
| Member | Ziomek | Waldemar | PTI Transformers |
| Guest | Arritt | Robert | EPRI |
| Guest | Berube | Jean-Noel | Rugged Monitoring |
| Guest | Borck | Christopher | EATON Corporation |
| Guest | Casey | Cole | Invenergy |
| Guest | Chan | Vivian | Hitachi Energy |
| Guest | Cochran | Alex | U.S.E. |
| Guest | Craven | Michael | Qualus Corporation |
| Guest | Delgado Zamora | Gabriel | Invenergy |
| Guest | Digby | Scott | Duke Energy |
| Guest | Dillon | Nikolaus | Dominion Energy |
| Guest | Dolloff | Paul | East Kentucky Power |
| Guest | Ermakov | Evgenii | Hitachi Energy |
| Guest | Espindola | Marco | Hitachi Energy |
| Guest | FerdJallah | Esseddik | Trench Group |
| Guest | Frazier | Raymond | Ameren |
| Guest | Frye | Richard | EATON Corporation |
| Guest | Gamboa | Jose | H-J Family of Companies |
| Guest | Gara | Lorne | Shermco |
| Guest | Garcia | Miguel | Hitachi Energy  |
| Guest | Gaytan | Carlos | Prolec GE |
| Guest | Gross | Detlev | Power Diagnostix Consultant |
| Guest | Harley | John | FirstPower Group LLC |
| Guest | Hernandez | JC | Georgia Tech - NEETRAC |
| Guest | Hoffman | Saramma | PPL Electric Utilities |
| Guest | Hossain | Saif | Trench Limited |
| Guest | Jarosz | Patrycia | IEEE SA |
| Guest | Katapalli | Thrinadha | Virginia Transformer |
| Guest | Kessler | Stacey | Ulteig Engineers |
| Guest | Khan | Qasim | Georgia Tech - NEETRAC |
| Guest | Klempner | Dmitriy | Southern California Edison |
| Guest | Knapp | Evan | EATON Corporation |
| Guest | Labean, Jr. | Bernard | Consumers Energy |
| Guest | Lachman | Mark | Doble Engineering Co. |
| Guest | Mani | Kumar | Duke Energy |
| Guest | Mendez | Omar | Prolec GE |
| Guest | Mohamed | Marian | XCEL Energy |
| Guest | Montanha | Juliano | Siemens Energy |
| Guest | Mushill | Paul | Ameren |
| Guest | Nims | Joe | Allen & Hoshall, Inc. |
| Guest | Parkinson | Dwight | EATON Corporation |
| Guest | Patel | Monil | PG&E |
| Guest | Pleceyic | Uros | Invenergy |
| Guest | Plisic | Goran | Siemens Energy |
| Guest | Radbrandt | Ulf | Hitachi Energy |
| Guest | Radu | Ion | Hitachi Energy |
| Guest | Rainbolt | Bradley | EATON Corporation |
| Guest | Restrepo | Ana | Hitachi Energy |
| Guest | Richardson | Michael | Ameren |
| Guest | Rocque | Tim | Prolec GE Waukesha |
| Guest | Ronchi | Rodrigo | WEG-Voltran |
| Guest | Schiessl | Markus | SGB |
| Guest | Shaikh | Salahuddin | Hitachi Energy |
| Guest | Shertukde | Hemchandra | University of Hartford |
| Guest | Shteyh | Ibrahim | Consultant |
| Guest | Shull | Stephen | BBC Electrical Service, Inc. |
| Guest | Stacy | Fabian | Hitachi Energy  |
| Guest | Staley | Brad | Leeward Renewable Energy |
| Guest | Steineman | Andrew | Delta Star Inc. |
| Guest | Tolcachir | Eduardo | TTE |
| Guest | Vant | Cameron | Prolec-Waukesha |
| Guest | Veens | Jos | SMIT Transformatoren B.V. |
| Guest | Washburn | Alan | Burns & McDonnell |
| Guest | Weatherbee | Eric | PCORE Electric |
| Guest | Yun | Joshua | Virginia Transformer Corp. |
| Guest | Zaman | Malia | IEEE |
| Guest | Zhang | Shibao | PCORE Electric |

**WG – Guide for Dielectric Frequency Response on Bushings**

* **Nothing to report – Work Completed and guide published**

**TF – C57.138 – Recommended Practice for Routine Impulse Tests**

Chair: Hakan Sahin

Secretary: David Wallace

Meeting Date: 21 March 2023 Time: 3:15 pm EST

Location: Milwaukee, WI, USA

Attendance: Members 10

 Guests 27

 Guests Requesting Membership 18

 Total\* 37

**Meeting Minutes / Significant Issues / Comments:**

Meeting was called to order at 3:15pm EST, March 21, 2023.

1. Administrative
	1. IEEE Patent Policy and Call for Patents
		1. No comments from group.
	2. IEEE SA Copyright Policy
		1. No comments from group.
	3. Review of agenda
		1. No comments from group.
	4. Introductions of the attendees
		1. Attendance sheets were passed out.
	5. Updated membership review and count for quorum
		1. 30 people were in attendance with 9 members present. Quorum was not met
		2. Approval of the previous Fall\_22 meeting’s minutes approval will be done via email voting
		3. 18 attendees requested membership.
2. **Old Business**
	1. Old Business - Section 6.1.3: Effects of impulse generator loading, clarifications on Lg, and possible addition of a note about the effect of (Cpl) in the circuit – 1st slide



Jim discussed his comments on clause 6.1.3. On note 1 – Recommend the Lg from the circuit. Note 2 should be included – manufactures should include a capacitive shunt for the current measurement.

* 1. Old Business - Possible revision of Figure 2****

 Reto recommended remove resistive divider. Also change SG to IG

Jeff Britton recommended taking out the circuit showing both resistor and capacitor in the divider circuit and make it a simple divider circuit. Joshua suggested searching for any other changes similar to SG.

Dan Sauer commented on the Tank isolated from ground. This comment in the figure needs to be addresses. Steve, Jim and David also comments on this.

Possible modifications to Section 6.2.1 – Improved fault detection sensitivity. Need to add a note to make it message clear. Leave the figure as is.

Work will be done off line before the next meeting and circulated for email vote within members

1. Next meeting: Kansas City, KS USA 19-23, 2023 in Milwaukee, WI, USA.
2. Close of meeting
	1. Meeting adjourned at 4:30pm EST

Submitted by: Hakan Sahin Date:\_4/8/23\_ \_\_\_\_\_

**Meeting Attendance:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Last Name** | **First Name** | **Company** | **Checkbox to request membership** |
| Alonso | Mario | Georgia Transformers |  |
| Avanoma | Onoma | MJC | X |
| Binder | Wallace | Consultant |   |
| Bolliger | Alain | HV Technologies |   |
| Carr | Deniss | GE |   |
| Costa | Florian | Corimpex | X |
| CruzValdes | Juan Carlos | Prolec GE |   |
| Davis | Eric | Burns and McDonald |   |
| Diaz | Cesar | Eaton |   |
| Dolloff | Paul | EKPC |   |
| Door | Jeffrey | H-J | X |
| Elliott | William | Prolec GE |   |
| Fausch | Reto | RF Solutions |   |
| Flores | Hugo | Hitachi |   |
| Frye | Rich | Eaton |   |
| Frye | Richard | Eaton |   |
| Garcia | Eduardo | Siemens Energy | X |
| Givaldo | Orlando | HJ Family | X |
| Hernandez | Giovannie | Virginia Transformers |   |
| Hochanh | Thang | PowerTech |   |
| Hopkinson | Phil | Hvolt | X |
| Jordan | Steve | TVA |   |
| Lachman | Mark | Doble |   |
| McBride | Jim | JMXHV | X |
| Morris | Tim | Walton EMC |   |
| Murray | David | TVA |   |
| Orozco | Polo | GE Grid Solutions | X |
| Parrales | Herman | Prolec GE | X |
| Patel | Poorvi | EPRI |   |
| Plante | Sylvain | Hydro-Quebec | X |
| Posadas | Daniel | CELECO | X |
| Prince | Jarrod | ERMCO |   |
| Sahin | Hakan | Virginia and Georgia Transformer |   |
| Salinas | Fernando | Power Partners | X |
| Sauer | Dan | Eaton | X |
| Shalabi | Jaber | Vantran |   |
| Slattery | Chris | First Energy | X |
| Snyder | Steve | Hitachi Energy |   |
| Traut | Alan | Howard | X |
| Walker | David | MGM Transformers | X |
| Wallace | David | Mississippi State University |   |
| Wimbery | Barret | GE |   |
| Winter | Alexandar | Highvolt |   |
| Yun | Joshua | Virgina Transformer Corp | X |
| Zhang | Shibao | Pcore | X |

**WG – Low Frequency Test Guide PC57.168**

**Milwaukee, WI. USA | March 21st, 2023 | 9:30 – 10:45 AM CDT**

**Chair:** Dan Sauer

**Vice Chair:** -

**Secretary:** Sergio Hernandez

**Meeting Attendance**

The working group met at 9:35am. There were 57 attendees and 18/27 members present. Quorum was achieved.

Attendance

|  |  |
| --- | --- |
|  | Roster |
| Total Attendees | 57 |
| Total # Of Members | 28 |
| Members Present | 18 |
| Quorum Present | 64% |

**Discussions**

Administrative

1. IEEE Patent Policy and Call for Patents
	1. No comments from group.
2. IEEE SA Copyright Policy
	1. No comments from group.
3. Review and approval of agenda
	1. No comments from group.
4. Attendance sheets were passed out.
5. Updated membership review and count for quorum
	1. 57 people were in attendance with 18 members present. Quorum was met.
6. Approval of Agenda
	1. Anonymously approved with no objections.
7. Approval of minutes
	1. Anonymously approved with no objections.

.

Old business

1. PAR Extension approve – Good through Dec 2023.
	1. Anonymously approved with no objections.
2. Ballot Results presentation
	1. 95 out of 125 Ballots returned (76% return)
	2. 86% Approval Rate
	3. Abstentions – 3%
	4. Disapprove with MBS – 12 Comments
	5. Total Comments 287
3. Revision of Technical comments with WG
	1. 16 technical comments reviewed.
	2. 9 comments accepted and resolved
	3. 5 comments rejected
	4. Rest of the technical comments will be resolved with the BRG afterwards
	5. Editorial comments will be resolved by chair.

New business

1. Recruit members for the BRG
	1. Jeff Britton joins the existing BRG.
2. Adjournment
	1. Meeting was adjourned at 10:50 am

Dan Sauer

Sergio Hernández

Attendee List:

|  |
| --- |
| Present members list |
| First Name | Last Name | Company |
| Wallace | Binder | WBBinder Consultant |
| William | Boettger | Boettger Transformer Consulting LLC |
| Dominique | Bolliger, Ph.D. | HV TECHNOLOGIES, Inc. |
| Jeffrey | Britton | Phenix Technologies, Inc. |
| Eduardo | Garcia Wild | Siemens Energy |
| Detlev | Gross | Independient |
| Sergio | Hernandez Cano | Hammond Power Solutions |
| Moonhee | Lee | Hammond Power Solutions |
| Bertrand | Poulin | Hitachi Energy |
| Tim | Rocque | Prolec GE |
| Rodrigo | Ronchi | WEG-Voltran |
| Mickel | Saad | Hitachi Energy |
| Dan  | Sauer | EATON Corporation |
| Mike | Shannon | REA Magnetic wire |
| Fabian | Stacy | Hitachi Energy |
| Janusz | Szczechowski | Maschinenfabrik Reinhausen |
| Ajit | Varghese | Prolec GE |
| Shibao | Zhang | PCORE Electric |

|  |
| --- |
| Present guests list |
| Mihir | Amin | Eaton |
| Robert | Apritt | EPRI |
| Barry | Beaster | H-J Family of companies |
| Edwin | Betancourt | Siemens Energy |
| Juan Alfredo | Carrizales | Prolec GE |
| Camilo | Casallas | TRENCH LTD |
| Cole | Casey | Invenergy |
| Mama | Dias | Eaton |
| Tony | DrBiase | Tempel Canada |
| Fernando | Duarte | EPRI |
| Lorne | Gara | Shermco |
| Eduardo | Gicaclir | TTE |
| Rafael | Grajeda | Eaton |
| Patrycia | Jarosz | IEEE SA |
| Gary | King | Howard Industries |
| Present guests list ( cont’d) |
| Evan | Knapp | Eaton |
| Mathieu | Lochawe | Omicron Electronics |
| Kushal | Mahajan | Eaton |
| Jim | McBride | JMX High voltage |
| Juliano | Montanha | Siemens Energy |
| Aniruddha | Narawane | Eaton |
| Mark | Newbill | Hitachi Energy |
| Rakesh | Patel | Hitachi Energy |
| Uros | Plecevic | Invenergy |
| Ion | Radu | Hitachi Energy |
| Alberto | Sandoval | Eaton |
| Abdulmajid | Shaikl | Delta Star |
| Hemchandra | Shertukde | University of Hartford |
| Jonathan | Snodgnass | Texas ARM University |
| Markus | Souller | Power Diagnostix Systems |
| Kyle | Stechschulte | AEP |
| Matthew | Sze | Omicron Electronics |
| Erik | Tarango | OLSUN Electrics |
| Val | Tatu | Powersmiths |
| Samuel | Tekle | WEG Transformers USA |
| Vijay | Tendulkar | Eaton |
| Alan | Traut | Howard Industries |
| Cameron | Vant | Prolec GE |
| Alan | Washburn | Burns & McDonnell |

DTSC Chair asked to WG Chair if the task is still progressing within expected schedule. Dan indicated that a ballot resolution group is working already and should be no delays.

**WG – Partial Discharge Test – C57.113 (A. Naderian)**

**No meeting. The report was carried out by DTSC Chair.**

* The ballot for C57.113 has started and ends on March 23rd.
* Response rate only 40%
* 70 Ballot Group Members who have not voted to vote by March 23rd.
* **WG C57.160 PD in Bushings/PTs/CTs (T. Hochang)**

**Chair:** Thang Hochanh

**Vice Chair:** Reto Fausch

**Secretary: vacant**

**Meeting Attendance**

The working group met at 4:45pm CST . There were 44 attendees 30 Guest ;1 of the guests requested membership and 14 of 16 members present.

Quorum was achieved to conduct official business.

**Discussions**

* No essential patent claims or copyright violations noted.
* The Minutes of Spring 2022 meeting in Denver (CO) had been approved as written. Motion made by Zoltan Roman and second by Fabian Stacy.
* The Minutes of Fall 2022 meeting in Charlotte (NC) had been approved as written. Motion made by Dominique Bolliger and second by David Wallace.
* The Agenda was made by David Wallace and second by Marek Kornowsky.
* Discussion on item 1:
	+ The WG has proposed to remove the Figure 3 and Figure 4. Anything related to the capacitance C1, C2 and C3 has to be remove from the document. (page 24 clear). This come from a motion by Fabian Stacy and second by Shibao Zhang. The motion was accepted by the WG.
* Discussion on item 1:
	+ The following text: “In case of similar successive test objects, it is recommended to proceed to a new calibration verification before each test” (Clause 5.2), has been removed after a motion made by Shibao Zhang and second by Eric Weatherbee, was accepted by the WG. The revised document will be circulated to the WG for approval and balloting. In 2 weeks.

Old business: None

New business: None

Adjournment: Motion made by Marek Kornowsky and second by Fabian Stacy.



At the end of the presentation by the TF Chair, a question came up asking about C3. What is that capacitance in the bushing? That is not a common reference for the committee members.

Thang Hochanh indicated that it was a motion accepted during the discussion many years ago.

It has been explained that it is for those bushings having a test and a potential tap.

Detlev Gross mentioned that the proposal is not focused on a unique/uncommon construction. Thang indicated he encountered several units in the field with such characteristic.

Shibao Zhang indicated that this may be a special design. IEEE describes clearly C1 and C2. A C3 is confusing for the group and the team will review this concept.

DTSC Chair requested to submit the resolved ballot comments to Patrycja to recirculate the ballot. It was suggested to submit the information directly to the IEEE Program Coordinator and no need for SC review.

**WG – Transformer Impulse Test Guide PC57.98 (T. Hochang)**

**March 20th, 2023 | 3:15pm – 4:30pm CST**

**Chair:** Thang Hochanh

**Vice Chair:** Reto Fausch

**Secretary:** vacant

**Meeting Attendance**

The working group met at 3:15pm CST

There were 36 attendees 26 Guest 1 of the guests requested membership and 9 of 12 members present. Quorum was achieved to conduct official business.

Discussions

* No essential patent claims or copyright violations noted.
* The Minutes of Fall 2022 meeting in Charlotte (NC) had been approved as written. Motion made by Dominique Bolliger and second by Fernando Leal.
* The motion to approve the Agenda was made by Fernando Leal and second by Polo Rodrigez.

Discussion on item 1:

* PICTURE TO ADD.
* It was requested to the members and guest, to provides oscillogram showing real life waveshape having a deep valley following the peak occurrence.

A group of volunteers have the following members:

* Waldemar Ziomek
* Abdul Shaikh
* Duvier Bedoya
* Fernando Leal

Are volunteers to write a clause, discussing on the item above. Recommendations will be made when a chopping is performed on these oscillograms.

Old business: None

New business: None

Adjournment: Motion made by Fernando Leal and second by Jim McBride.



**Liaison Report – HVTT (J. Britton)**

**Presented by Jim McBride**

The HVTT Subcommittee held a hybrid meeting on January 11th, 2023 at the JTCM Meeting in Jacksonville, FL

* Active projects:
* *WG P1122 - Standard for Digital Recorders for Measurements in High-Voltage and High-Current Impulse Tests*: 1st round ballot completed in August 2022. In comment resolution. PAR valid until end of 2023.
* *WG P510 - Guide for Electrical Safety in High-Voltage Testing:*Near completion, a few WG comments still to be resolved prior to ballot. Expect to launch ballot before end of 2023. PAR valid until end of 2024.
* *WG P4.1 - Guide for the Practical Implementation of IEEE Standard 4 on High-Voltage and High-Current Measurement Systems:* In draft development. PAR valid through 2023. Will require an extension to complete.
* *WG P454 - Guide for the Detection, Measurement and Interpretation of Partial Discharges:*Did not meet in January 2023, but will meet virtually on March 29th, 2023. In draft development. PAR valid through 2023. Will require an extension to complete.
* *WG P2426 - Guide for Field Measurement of Fast-Front and Very Fast-Front Overvoltages in Electric Power System:*HVTT Subcommittee comments to Draft 6.0 returned to Working Group on March 10th, 2023. HVTT will vote on whether to approve for ballot after next revision is received. PAR valid until end of 2023, and may require extension.
* *TF – Review of Title, Scope and Purpose for IEEE Standard 4*– The Task Force was unable to reach agreement on the Title, Scope and Purpose for the revision in the January meeting. Approval will be sought by electronic vote so that the PAR can still be submitted this year. We have approximately 12 areas for revisions at this time.
* If you are interested in participating in future meetings:
	+ Contact Jim McBride (jim@jmxhv.com) or Jeff Britton (jbritton@doble.com) to begin receiving HVTT communications
	+ The next HVTT Subcommittee Meeting is expected to take place in the fall of 2023, with the meeting date and location to be announced

At the end of the DTSC session, Secretary invited Alan Sbravati to explain the activities of the IEEE Electrical Insulation Conference. Alan Sbravati invited members of the SC to attend the Conference in June 2023 in Quebec City.

The chair requested a motion to Adjourn. Motion by Dan Sauer and Evgenii Ermakov second.

The meeting adjourned at 12:10 PM.

**B6. List of Attendees to the DTSC meeting**

|  |  |
| --- | --- |
| **First Name** | **Last Name** |
| Kayland | Adams |
| Alex | Alahmed |
| Tauhid Haque | Ansari |
| Stephen | Antosz |
| Elise | Arnold |
| Javier | Arteaga |
| Donald | Ayers |
| Christopher | Baumgartner |
| Jason  | Beaudoin |
| Jean-Noel | Berube |
| Enrique | Betancourt |
| Vivek | Bhatt |
| Daniel | Blaydon |
| William | Boettger |
| Sanket | Bolar |
| Dominique | Bolliger |
| Susan | Bonfiglio |
| Jeremiah | Bradshaw |
| Jeffrey | Britton |
| Darren | Brown |
| David | Calitz |
| Deniss  | Carr  |
| Juan Alfredo | Carrizales |
| Camilo | Casallas |
| Juan | Castellanos |
| Arup | Chakraborty |
| Vivian  | Chan  |
| Craig | Colopy |
| Daniel  | Crochett |
| Juan Carlos | Cruz Valdes |
| Roberto | Da Silva |
| Eric | Davis |
| Sami | Debass |
| Scott | Digby |
| Huan | Dinh |
| Jeffrey | Door |
| Jesse | Duffy |
| Samragni | Dutta Roy |
| Evgenii | Ermakov |
| Marco | Espindola |
| Reto | Fausch |
| Marcos | Ferreira |
| Hugo | Flores |
| Bruce | Forsyth |
| Raymond | Frazier |
| Reajie  | Fu  |
| Miguel  | Garcia |
| Eduardo | Garcia Wild |
| James | Gardner |
| Rob | Ghosh |
| Bill | Griesacker |
| Detlev | Gross |
| Attila | Gyore |
| Michael  | Hall  |
| John | Harley |
| Jack  | Harley  |
| Roger | Hayes |
| Ronald | Hernandez |
| Jean Carlos | Hernandez |
| Sergio | Hernandez Cano |
| John | Herron |
| Thang | Hochanh |
| Saramma | Hoffman |
| Ryan | Hogg |
| Saif  | Hossain  |
| Patrycja  | Jarosz  |
| Nicholas | Jensen |
| John | John |
| Christopher  | Johnson  |
| Akash | Joshi |
| Kurt | Kaineder |
| Jerzy | Kazmierczak |
| Sheldon | Kennedy |
| Stacey | Kessler |
| Rafal  | Kowalski |
| Bernard | LaBean Jr  |
| Andrew | Larison |
| Moonhee | Lee |
| Aleksandr | Levin |
| Weijun | Li |
| Luis | Machain |
| Tim-Felix | Mai |
| Kumar | Mani |
| James | McBride |
| Brian | McBride |
| Timothy | Menter |
| Kent | Miller |
| Francis  | Mills |
| Juliano | Montanha |
| Emilio | Morales-Cruz |
| David | Murray |
| Ryan | Musgrove |
| Paul | Mushill |
| Ismael  | Naja |
| Aniruddha | Narawane |
| Mark  | Newbill  |
| Rudolf | Ogajanov |
| Parminder | Panesar |
| Tyler  | Parenti  |
| Dwight | Parkinson |
| Poorvi | Patel |
| Rakesh | Patel |
| Monil | Patel |
| Verena  | Pellon  |
| Harry | Pepe |
| Sylvain | Plante |
| Klaus | Pointner |
| Bertrand | Poulin |
| Thomas | Prevost |
| Jarrod | Prince |
| Khan  | Qasim |
| Ulf | Radbrandt |
| Ion | Radu |
| Scott | Reed |
| Michael  | Richardson  |
| Diego | Robalino |
| Tim | Rocque |
| Zoltan | Roman |
| Rodrigo  | Ronchi |
| Mickel | Saad |
| Hakan | Sahin |
| Albert | Sanchez |
| Dinesh | Sankarakurup |
| Amitabh | Sarkar |
| Daniel | Sauer |
| Alan | Sbravati |
| Alaor  | Scardazzi |
| Markus | Schiessl |
| Ewald | Schweiger |
| Cihangir | Sen |
| Abdulmajid | Shaikh |
| Salahuddin  | Shaikh  |
| Mike  | Sharp |
| Stephen | Shull |
| Jonathan | Sinclair |
| Thomas | Sizemore |
| Christopher | Slattery |
| Steven | Snyder |
| Jason | Snyder |
| Sanjib | Som |
| Andy  | Speegle  |
| Mike | Spurlock |
| Fabian | Stacy |
| Brad | Staley |
| Andrew | Steineman |
| Chris  | Steineman  |
| Ethan  | Sterger |
| Kerwin  | Stretch  |
| Charles | Sweetser |
| Janusz | Szczechowski |
| Matthew | Sze |
| Troy | Tanaka |
| Erik  | Tarango |
| Valeriu  | Tatu  |
| Vijay | Tendulkar |
| Jacob  | Thielbar |
| Scott | Thomas |
| Risto  | Trifunoshi  |
| Risto | Trifunoski |
| Cameron  | Vant  |
| Ajith | Varghese |
| Jason | Varnell |
| Dharam | Vir |
| Pragnesh | Vyas |
| David | Wallace |
| David | Wallach |
| Alan | Washburn |
| Joe | Watson |
| Eric | Weatherbee |
| Bruce | Webb |
| Zachery | Weiss |
| Drew | Welton |
| Daniel | Weyer |
| Joe  | White |
| Christopher | Whitten |
| Barrett | Wimberly |
| Kevin  | Wirtz  |
| Jeffrey | Wright |
| Fei  | Yang  |
| Guang | Yuan |
| Malia | Zaman |
| Anand | Zanwar |
| Shidao  | Zhang  |
| Kris | Zibert |
| Waldemar | Ziomek |