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

- 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

2. 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:

3. 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
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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

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

2. 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.

3. 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.

4. 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).

5. 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.

6. PD in Bushings During Factory Testing

   a. 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.

   b. 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.

   c. 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.

d. 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.

e. 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.

   i. 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

   ii. Many bushing manufacturers present during TF expressed concern that such a testing may need significant investment and resource and need more time review.

   iii. 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.

7. Old business

   a. 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).

8. New business

   a. There was no new business.

9. 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.

Attendance Record

Role	First Name	Last Name	Company
Guest	Alex	Alahmed	alahmed.alex@gmail.com
Guest	Tauhid Haque	Ansari	Hitachi ABB Power Grids
Member	Stephen	Antosz	Stephen Antosz & Associates, Inc
Member	Elise	Arnold	SGB
Member	Donald	Ayers	Ayers Transformer Consulting
Member	Christopher	Baumgartner	We Energies
Guest	Duvier	Bedoya	Hitachi ABB Power Grids
Guest	Edwin	Betancourt	Siemens Energy
Member	Daniel	Blaydon	Baltimore Gas & Electric
Member	William	Boettger	Boettger Transformer Consulting LLC
Guest	Christopher	Borck	Eaton
Guest	Michael	Botti	Hyosung HICO
Member	Jeffrey	Britton	Phenix Technologies, Inc.
Member	David	Calitz	Siemens Energy
Guest	Cole	Casey	Invenergy
Guest	Arup	Chakraborty	Delta Star Inc.
Guest	Scott	Digby	Duke Energy
Guest	Evgenii	Ermakov	Hitachi Energy
Member	Reto	Fausch	RF Solutions
Member	Hugo	Flores	Hitachi ABB Power Grids
Guest	Bruce	Forsyth	Bruce Forsyth and Associates PLLC
Guest	Raymond	Frazier	Ameren
Guest	Rich	Frye	Eaton
Guest	Renjie	Fu	ERMCO
Guest	Rob	Ghosh	General Electric
Member	Shawn	Gossett	Ameren
Member	Bill	Griesacker	Duquesne Light Co.
Guest	Detlev	Gross	Power Diagnostix Consult GmbH
Guest	Michael	Hall	Mid Central Electric
Guest	Jean Carlos	Hernandez	GT NEETRAC
Member	Sergio	Hernandez Cano	Hammond Power Solutions
Guest	Suramma	Hoffman	P&L
Member	Philip	Hopkinson	HVOLT Inc.
Guest	John	John	Virginia Transformer Corp.
Member	Stephen	Jordan	Tennessee Valley Authority
Member	Akash	Joshi	Black & Veatch
Guest	Thrinadha	Katapalli	Virginia Transformer Corp.
Guest	Jerzy	Kazmierczak	Hitachi ABB Power Grids
Guest	Egon	Kirchenmayer	Siemens Energy
Guest	Bernard	LaBean Jr.	Consumers Energy
Guest	Mathieu	Lachance	Omicron
Member	Mark	Lachman	Doble Engineering Co.
Member	Fernando	Leal	Prolec GE
Member	Weijun	Li	Braintree Electric Light Dept.
Guest	Gabriel	Mamede	Siemens Energy

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:

a) *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.

b) *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
5) 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.

6) 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.

7) New Business – Ajith Varghese suggested preparing an updated presentation for sharing with any liaison groups (SWG, CIGRE, PCS and the TC at-large).

8) Next Meeting (Fall 2023 – Kansas City, MO Oct 23, 2023)
9) 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
    a. IEEE Patent Policy and Call for Patents
        i. No comments from group.
    b. IEEE SA Copyright Policy
        i. No comments from group.
    c. Review of agenda
        i. No comments from group.
    d. Introductions of the attendees
        i. Attendance sheets were passed out.
    e. Updated membership review and count for quorum
        i. 30 people were in attendance with 9 members present. Quorum was not met
        ii. Approval of the previous Fall_22 meeting's minutes approval will be done via email voting
        iii. 18 attendees requested membership.

2. Old Business

a. 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

6.1.3 Effects of impulse generator loading

The impulse equipment used for routine impulse tests on distribution transformers must satisfy a different set of requirements than equipment used for design impulse testing in laboratory environments. Due to the large number of tests that must be performed on a typical production line and the short time allotted to the routine impulse test, impulse circuit parameters are generally not modified for each test. Therefore, the impulse circuit, as indicated in Figure 1, should be designed such that it will supply the proper impulse wave shape for all units to be tested without the need to make changes. A few guidelines on impulse circuit design for production line testing are given in the following paragraphs.

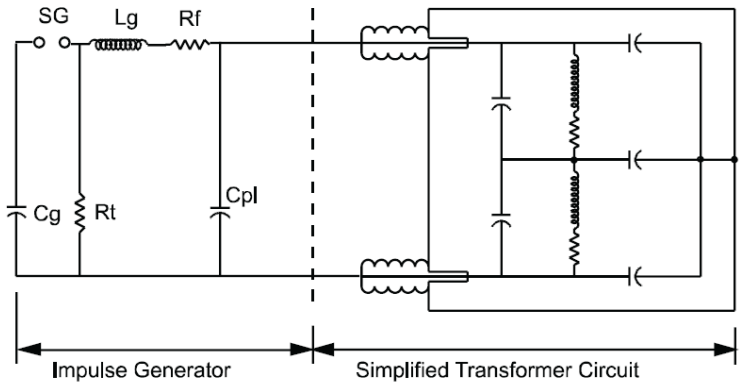

Figure 1—Typical lightning impulse circuit

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.

b. Old Business - Possible revision of Figure 2

6.2 Transformer connections

The required connections for routine impulse tests on distribution transformers are defined in 10.4 of IEEE Std C57.12.90-2015. The impulse is applied to one end of a high-voltage winding while the other end of the same winding is connected to ground through a low-impedance shunt or wide-band current transformer (CT). All other windings, the isolated tank, and the core are grounded in a likewise manner. A typical connection meeting these requirements is shown in Figure 2. It should be noted that in Figure 2 only one terminal of the non-impulsed winding is connected to ground. The single ground connection to the non-impulsed windings enhances fault detection sensitivity. However, the voltage to ground on any non-tested terminal should not be allowed to exceed 80% of its assigned BIL. Additional low-voltage impulses may have to be applied to the terminal under test to enable the voltage transferred to non impulsed terminals to be determined. Recommended connections for various types of transformers and a few special considerations are provided in the following paragraphs. The voltage divider and digital impulse recorder connection, as shown in Figure 2 was omitted for clarity in Figure 3 through Figure 20.

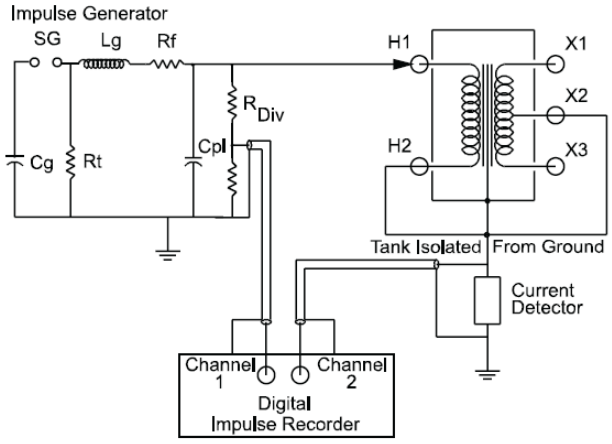

Figure 2—Typical transformer connection for routine impulse testing

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

3. Next meeting: Kansas City, KS USA 19-23, 2023 in Milwaukee, WI, USA.
4. Close of meeting
    a. 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
    a. No comments from group.
2. IEEE SA Copyright Policy
    a. No comments from group.
3. Review and approval of agenda
    a. No comments from group.
4. Attendance sheets were passed out.
5. Updated membership review and count for quorum
    a. 57 people were in attendance with 18 members present. Quorum was met.
6. Approval of Agenda
    a. Anonymously approved with no objections.
7. Approval of minutes
    a. Anonymously approved with no objections.

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Old business

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

New business

11. Recruit members for the BRG
    a. Jeff Britton joins the existing BRG.
12. Adjournment
    a. 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.

Total attendance: 44

Guests: 30

Members attending Spring 2023	
Dominique	Bolliger
Reto	Fausch
Detlev	Gross
Thang	Hochanh
Marek	Kornowski
Robert	Middleton
Daniel	Posadas
Zoltan	Roman
Steve	Snyder
Fabian	Stacy
David	Wallace
Eric	Weatherbee
Barrett	Wimberly
Shibao	Zhang

Members	16
Memb. Present	14
Quorum	87.5%

Requested Membership	
Risto	Trifunoski

Membership Req. 1

Attendance Spring 2023	
Lorin	Bratu
Deniss	Carr
Fabina	Cirino
Samson	Debass
Jeffrey	Door
Hassan	Elkassem
Eric	Euvrard
Esseddik	Ferdjallah
Derek	Hellsch
Patricia	Jaurosz
Kurt	Kalweder
Mathiew	Lachance
Nathan	Lange
Mario	Locarno
Gabriel	Mamede
Scott	McCloskey
Rudolf	Ogajanov
Geaorge	Partyka
Poorvi	Patel
Caroline	Peterson
Sylvain	Plante
Andre	Rottenbacher
Alaor	Scardazzi
Markus	Soeller
Januz	Szczechowski
Matthew	Sze
Risto	Trifunoski
Subash	Tuli
Cameron	Vant
Elliot	White

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.

Members attending Spring 2023	
Dominique	Bolliger
Arup	Chakraborty
Reto	Fausch
Sergio	Hernandez Cano
Thang	Hochanh
Fernando	Leal
Sylvain	Plante
Leopoldo	Rodriguez
Waldemar	Ziomek

Members	12
Memd. Present	9
Quorum	75.0%

Requested Membership	
Gabriel	Mamede

Attendance Spring 2023	
Alejandro	Ayala
Duvier	Bedoya
Wallace	Binder
Deniss	Carr
Vivian	Chan
Eunyoung	Cho
Daniel	Crockett
Roger	Dugan
Rich	Frye
Alireta	Gorein
Patrycja	Jarosz
Thrinadha	Katapalli
Evan	Knapp
Bernard	LaBean Jr
Ismael	Naja
Mark	Newbin
Lina	Sandsten
AbdulMajid	Shaikh
Jason	Snyder
Samuel	Tekle
Cameron	Vant
Alan	Washburn
Kannan	Veeran
Nick	Walder
Barret	Wimberly
Malia	Zaman

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

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