

Performance Characteristics Subcommittee

Task Force Report

Document #:	C57.12.90		
Document Title:	PCS Task Force Continuous Revision to Test Code C57.12.90		
Chair:	Hakan Sahin	Vice-Chair	N/A
Secretary	Adam Sewell	Percent Complete	95%
Current Draft Being Worked On:	N/A	Dated:	N/A
PAR Expiration Date:	N/A		
Meeting Date:	25 March 2025	Time:	9:30am – 10:45am
Location:	Denver, CO, USA		
Attendance:	Members	44 of 59	
	Guests	80	
	(Guests Requesting Membership)	(34)	
	Total*	124	
* Attendance list for this meeting is shown at end of meeting minutes			

Meeting Minutes / Significant Issues / Comments:

Meeting was called to order at 9:30am, March 25, 2025 at Hyatt Regency Denver.

1. Administrative

- a. IEEE Patent Policy and Call for Patents and IEEE SA Copyright Policy
 - i. No comments from group
- b. Review of Spring 2025 agenda
 - i. No comments from group
- c. Introductions of the attendees
 - i. Attendance was taken by QR Code sign-in...no paper attendance sheets were passed out. Due to time constraints, chair did not have each attendee announce their name/affiliation. Name/affiliation was announced as attendees spoke during the meeting.
- d. Updated membership review and count for quorum
 - i. 59 members were listed and 40 were counted as present by hand count. Based on the hand count, the chair announced there was QUORUM for this meeting.
 - ii. Attendance list after meeting completed showed 44 members attended.
 - iii. **Members are expected to attend and stay in the meeting so business can be conducted.**
 - iv. **Member requests should be sent to secretary – adamsewell@ieee.org**
- e. Approval Spring 2025 agenda
 - i. MOTION-S.Som, 2nd-J.John
 - ii. No opposition to unanimous approval – MOTION APPROVED

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- f. Approval of Fall 2024 unapproved minutes
 - i. MOTION-D.Wallach, 2nd-J.John
 - ii. No opposition to unanimous approval – MOTION APPROVED

2. Old Business

- a. From Fall 2024 meeting, review of the recommended revision to Clause 5.1: Determination of cold temperature, under Clause 5: Resistance measurements

5.1 Determination of cold temperature

The cold temperature of the windings shall be determined as accurately as possible when measuring the cold Resistance *by using top liquid (What to do for conservator units?), top and bottom temperature probes or sensors, to determine top liquid and average liquid temperatures. If a temperature rise test is required on the subject transformer, same temperature probes shall be used to determine the liquid temperatures.* The precautions in 5.1.1, 5.1.2, and 5.1.3 shall be observed.

5.1.1 General

Cold-resistance measurements shall be made on a transformer only when the liquid or winding temperature is stable. The temperature is considered stable if the top average liquid temperature does not vary more than 2 °C in a 1 h period. Define average??

5.1.2 Transformer windings immersed in insulating liquid

The temperature of the windings shall be assumed to be the same as the average temperature of the insulating liquid, provided the following occurs:

- a) The windings have been under insulating liquid with no excitation and with no current in the windings for a minimum of 3 h for a transformer without pumps and for 1 h for transformer with pumps running before the cold resistance is measured.
- b) The temperature of the insulating liquid has stabilized, and the difference between top and bottom temperature does not exceed 5 °C.

- b. J.Varnell proposed suggested wording for the TF discussion on the winding resistance:
 - i. The cold temperature of the windings for class II transformers shall be determined by a thermocouple or suitable thermometer immersed directly in oil.
- c. Discussions were had about wording of cold temperature measurement and will be continued at Spring 2025 meeting –
 - i. MOTION to change 5.1 wording: For Class-I and distribution transformers, the temperature of the windings shall be measured as accurately as possible. The cold temperature of the windings for Class-II transformers shall be measured by a suitable temperature probe either directly immersed, or in a thermowell fully immersed in the transformer liquid.
 - 1. MOTION by D.Sauer, 2nd – S.Som
 - 2. After discussions, MOTION to table/kill made by D.Sauer, 2nd – H.Flores
 - 3. No opposition to unanimous approval of MOTION to table/kill – MOTION APPROVED

3. New Business

- a. Form a small group to review wording for section 5.1 Determination of cold temperature offline/between meetings.

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- i. Volunteers to propose/review Section 5.1 wording – T.Ansari, S.Antosz, H.Sahin, D.Sauer, A.Varghese, J.Varnell
 - b. R.Musgrove brought up discussion about the location of clause 10.5.1 within the standard. TF agreed that this belongs under the Di-electrics SC and the new business is handed over to the TF Cont. Revision to low frequency tests C57.12.90 – DiTests
 - c. TF reviewed another possible new business which is related to the % current applied during load loss and impedance tests. Chair agreed to consider this as new business and will be discussed during the next meeting.
- 4. Membership changes
 - a. Officers will look at attendance and change TF membership status before next meeting.
- 5. Next meeting: October 21, 2025 at Fall 2025 Transformers Committee Meeting scheduled for October 19-23, 2025, Bonita Springs, FL, USA
- 6. Close of meeting
 - a. Meeting adjourned at 10:45am

Submitted by: Hakan Sahin Date: _____

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March 25, 2025 Meeting Attendance: (RM = Request Membership)

LAST NAME	FIRST NAME	COMPANY/AFFILIATION	Role
Adams	Kayland	Prolec-GE Waukesha	MEMBER
Alonso	Mario	Georgia Transformer	GUEST
Amin	Mihir	Eaton	GUEST-RM
Ansari	Tauhid	Hitachi Energy	MEMBER
Antosz	Stephen	Consultant	MEMBER
Arnold	Elise	SGB	MEMBER
Avanoma	Onome	MI Consulting	GUEST-RM
Bargone	Gilles	FISO	MEMBER
Bedoya	Duvier	Hitachi	MEMBER
Blaydon	Daniel	Baltimore Gas and Electric	MEMBER
Boettger	William	Boettger Transformer Consulting LLC	MEMBER
Bolliger	Dominique	HV TECHNOLOGIES, Inc.	MEMBER
Bolliger	Alain	HV TECHNOLOGIES Inc	GUEST
Botti	Michael	Hyosung HICO	GUEST-RM
Bradshaw	Garrett	Howard Industries, Inc.	GUEST
Brekalo	Josipa	KONCAR D&ST	GUEST
Britton	Jeffrey	Doble Engineering	MEMBER
Brzoznowski	Steven	BPA	GUEST-RM
Calitz	David	Siemens Energy	GUEST-RM
Carrizales	Alfredo	Prolec GE	MEMBER
Cisco Sullberg	Adriana	Salt River Project	GUEST
Colopy	Craig	Retired from EATON	GUEST
Crockett	Janet	Fayetteville PWC	GUEST
Dappen	Tim	Cargill	GUEST-RM
Dennis	Scott	Hitachi Energy	MEMBER
Diaconu	Dumitru	Delta Star inc	GUEST
Dillon	Nikolaus	Dominion Energy	GUEST
Dorpmanns	Luc	Royal SMIT Transformers	GUEST
Duffy	Jesse	Nashville Electric Service	GUEST
Dutta Roy	Samragni	Siemens Energy Inc	MEMBER
Espitia	Egui	Reinhausen Manufacturing Inc	GUEST
Fausch	Reto	RF Solutions	GUEST-RM
Flores	Hugo	Ermco	MEMBER
Frazier	Raymond	Ameren	MEMBER
Garcia	Eduardo	Siemens Energy	GUEST
Girgis	Ramsis	Hitachi Energy	MEMBER
Gorzin	Alireza	Black & Veatch	MEMBER
Gossett	Shawn	Ameren	MEMBER
Griesacker	William	WGA	MEMBER
Heinzig	Peter	Weidmann	GUEST
Hernandez Decanini	Giovanni	Virginia Transformer Corp	MEMBER
Holifield	Thomas	Howard Industries	GUEST
Hrkac	Miljenko	Hitachi Energy	GUEST-RM
Iman	Mike	MGM Transformers	GUEST-RM
Jakob	Karl	Cargill	GUEST
Janakiraman	Balaji	Virginia Transformers	GUEST
Jang	Sukin	ILJIN Electric	GUEST
Jensen	Nick	Delta Star	GUEST-RM
John	John	Virginia Transformer Corp	MEMBER
Kadar	Laszlo	Laszlo & Associates	GUEST
Kennedy	Sheldon	Sheldon P Kennedy Engineering PLLC	GUEST
Khan	Qasim	NEETRAC Georgia tech	GUEST-RM
kim	dalho	iljin electric	GUEST
Kiparizoski	Zan	Howard Industries	GUEST
Koprivnjak	Matija	Koncar D&ST	GUEST
Kosedagi	Nihat	ERMCO	GUEST-RM
Kumar	Arvind	Delta star inc	GUEST-RM
LaBean Jr	Bernard	Consumers Energy Company	GUEST
Lachman	Mark	Doble	MEMBER
Leal	Fernando	Prolec ge	MEMBER
Lee	Moonhee	Hammond Power Solutions	MEMBER
Levin	Aleksandr	Weidmann	GUEST

LAST NAME	FIRST NAME	COMPANY/AFFILIATION	ROLE
Mahajan	Kushal	Sungrow	GUEST
Mamede	Gabriel	Siemens Energy	GUEST-RM
Martinez Mares	Alberto	WEG	GUEST-RM
McBride	Brian	Cargill	GUEST
McBride	Jim	JMX High Voltage	GUEST
Melle	Tom	MELLE	GUEST-RM
Mills	Francis	POWER Engineers	MEMBER
Montanha	Juliano	Siemens Energy	GUEST
Munoz	Marta	Hitachi Energy	GUEST-RM
Naderian	Ali	Potencia Partners	GUEST
Narawane	Aniruddha	Eaton	GUEST
Neild	Kris	Megger	MEMBER
Ortiz	Cuauhtemoc	Niagara Power Transformer Corp	GUEST-RM
Palhatiya	Ajay	Virginia Transformer	GUEST-RM
Pandya	Manan	Siemens Energy	GUEST-RM
Panesar	Parminder	Virginia Transformer Corp	GUEST-RM
Patel	Monil	PG&E	GUEST
Patel	Nitesh	Hyundai Power Transformers	GUEST-RM
Patel	Sanjay	Royal Smit Transformers	MEMBER
Patel	Dipeshkumar	Hyper solutions	GUEST-RM
Pepe	Harry	Phenix Technologies	MEMBER
PEREZ	MARCELINO	PROLEC	GUEST-RM
Poulin	Bertrand	Hitachi Energy	GUEST
Reyes perez	Juan	Hitachi energy	GUEST
Ronchi	Rodrigo	WEG Transformers México	GUEST
Ryu	Hyounggon	HD hyundai electric	GUEST
Sahin	Hakan	Georgia transformer	MEMBER
Santos	Armando	Prolec GE	GUEST
Sauer	Daniel	Eaton	MEMBER
Schiessl	Markus	SGB	MEMBER
Sethi	Kabir	Hitachi Energy Germany Ag	GUEST-RM
Sewell	Adam	Quality Switch	MEMBER
Shalabi	Jaber	Vantran Industries	GUEST-RM
Shannon	Michael	Rea Magnet Wire	GUEST-RM
Shertukde	Hemchandra	UHART-DDI	MEMBER
Slattery	Christopher	FirstEnergy	MEMBER
Smith	Jimmy	Howard Industries	GUEST
SOM	SANJIB	PTT, LLC	MEMBER
Stechschulte	Kyle	AEP	GUEST
Steele	Hampton	TVA	GUEST
Steineman	Andy	Delta Star, Inc.	GUEST
Tan	Jonathan	Northern Transformer	GUEST-RM
teNyenhuis	Ed	Hitachi Energy	MEMBER
Thiede	Andreas	HIGHVOLT Dresden	MEMBER
Thomas	Scott	Hitachi Energy	GUEST
Trujillo	Pedro	Hyundai	GUEST
Van Dreef	Cole	American Transmission Company	MEMBER
Varghese	Ajith	Prolec GE Waukesha	MEMBER
Varnell	Jason	Doble Engineering	MEMBER
Veeran	Kannan	Virginia/Georgia Transformer	GUEST-RM
Villa	Hector	Ecuatran SA	GUEST
Vyas	Pragnesh	Cleveland Cliffs	MEMBER
Wagner	John	AEP	GUEST-RM
Wallach	David	Duke Energy	MEMBER
Watson	Joshia	NPPD	GUEST
Weyandt	Paul	Schneider Electric	GUEST-RM
White	Leon	Hedrich North America	GUEST
Yang	Fei	Hitachi Energy	GUEST-RM
Yuan	Guang	Hitachi energy	GUEST-RM
Zhang	Hongzhi	Hitachi Energy	GUEST-RM
Zibert	Kris	Allgeier Martin	MEMBER
Ziomek	Waldemar	PTI Transformers LP	MEMBER