

WG C57.100: IEEE Standard Test Procedure for Thermal Evaluation of Insulation Systems for Liquid-Immersed Distribution and Power Transformers

Fall 2020 “Virtual” Meeting – 20 October 2020, 2:20 p.m. – 3:35 p.m. CDT, Webex
Chairman: Roger Wicks, Secretary: Kevin Biggie

The Chair called the meeting to order at 2:20 p.m. and welcomed attendees. After a second attendance poll, 33 members were present (of 63), thus a quorum was achieved. Full attendance details were provided separately by the PSAV virtual meeting service.

Subsequently, attendance was confirmed to be a total of 99 attendees, with 33 members and 66 guests present. There were 17 guests requesting membership, with 6 meeting the membership requirement of attending the last two consecutive, or three of the last five meetings of an existing WG. The WG welcomes new members: Afshin Rezaei, George Frimpong, Gilles Bargone, Kevin Rapp, Rob Ghosh, and Timothy Raymond. Thus, the new total number of members is 69, including the Chair and Secretary. The other 11 guests requesting membership will be reconsidered upon achieving the meeting attendance membership requirements. Final attendance was recorded in AMS, and rosters are listed at the end of the minutes.

The Chair then proceeded with a review of a prepared meeting presentation, beginning with the meeting agenda, Essential Patent Claims information (none were noted), copyright information, and status of the PAR (which expires in December 2022). Then the results of a working group survey conducted after the last meeting (27 May virtual meeting) were reviewed, and it was mentioned that Draft 1 circulated before the meeting included: section reordering, an alternate lifetime (135k hours), and a screening test, all resulting from the WG survey results.

Roger then reviewed a proposed “Change Section” (= Clause 6) in Draft 1, with details on a sub-section about change in life requirements, discussing modified testing times or temperatures. Sasha Levin clarified that the proposed change in life (from 180k to 135k hours) question from the WG survey was not a proposal to change testing times or temperatures, but rather to use a shorter life for evaluating test results to derive thermal class. Rick Marek agreed with Sasha not to change test times, stating that at 180k hours materials are fragile and the curves are flat, thus 135k hours would be better. Alan Sbravati agreed also, and added that DP at 150k hours may also be considered.

Roger also reviewed the proposed screening test that was added as Annex C in Draft 1.

Short updates were reviewed on activities of the Task Forces. TF 1 - Industry Proven System Listing: wire enamel added in May meeting. TF 2 - Location of test methods in draft: reordered per the WG survey, but need to confirm “Power Transformer Test” is ‘Informative’ and not ‘Normative’ in Draft. TF3 - Sealed Tube Method improvement: highlights of several points were made.

One particular proposal about sealed tube method improvement was presented by Tom Prevost, regarding material testing ratios. Tom’s presentation provided background and justification for his proposal to have just one material ratio (not separate Distribution and Power ratios), being the Distribution ratio, by weight, at 14.2 to 1 (equivalent to current 16.3 to 1 Distribution ratio by volume). Radek Szweczyk asked if one ratio is used, what would be the paper to board ratio. Sasha agreed with having one ratio, but made a point for using a worse case to be conservative, which would rather be the Power ratio, both of solid to liquid and paper to board. Tom replied that the entire sealed tube being at a single high temperature is already a worse case vs. what would be seen in a transformer, and Alan agreed. Roger mentioned that a change to the ratios should consider a statement about disposition of earlier tests not conducted to the new ratios. Ed Casserly mentioned a concern about liquids also being measured by weight in the ratio, and

that because different liquids have different densities, he recommended a ‘blend’ of listing liquid by volume and solids by weight in the ratio. Jinesh Malde agreed with Ed, and suggested that the topic of material ratios and the proposal by Tom and discussion in this meeting be addressed in his TF3.

Jinesh brought up the recent published work by Weidmann on an aging test method for enameled wire in liquids, and asked if this should be considered for potential inclusion in the standard, perhaps with further input from wire manufacturers. Sasha added that it is recognized that there is no current test method to determine the thermal class of enameled wires in liquid, and agreed with forming a new Task Force to include contents from the published proposed method as a separate test in a new Annex. Jinesh agreed. Sasha then made a motion, which was worded as follows: “Motion to develop a normative Annex for evaluation of the thermal performance of enameled wires in liquids.” Jinesh seconded the motion. A member vote on the motion was held, and the motion passed: For = 28, Against = 1, Abstain = 3, No Vote = 1.

Luiz Cheim briefly reviewed again several points presented in the May meeting related to end of life, including: consideration of pyrolysis, hydrolysis and oxidation; importance of DP testing and that it can be related to paper samples from real transformers; that insulation mechanical end of life does not mean actual end of life; and the importance of the effect of moisture and oxygen on aging.

Roger briefly reviewed next steps, and that another draft with updates from today’s discussion points would be circulated by the end of October for comment, targeting to have another draft for review prior to the next meeting.

The virtual meeting was adjourned at 3:35 p.m. Next planned meeting would be in the spring.

Respectfully submitted,

Kevin Biggie
Secretary

Roger Wicks
Chair

Attendance WG C57.100 Fall 2020 Virtual Meeting:

Members (33)

Alan	Sbravati	Cargill, Inc.
Aleksandr	Levin	Weidmann Electrical Technology
Attila	Gyore	M&I Materials Ltd
Bruce	Forsyth	Bruce Forsyth and Associates LLC
Clemens	Reiss IV	Custom Materials, Inc.
Darrell	Mangubat	Siemens Power Operations Inc.
David	Stankes	3M
Dinesh	Sankarakurup	Duke Energy
Edward	Casserly	Ergon, Inc.
Emilio	Morales-Cruz	Qualitrol Company LLC
Evanne	Wang	DuPont
Ion	Radu	Hitachi ABB Power Grids
Jinesh	Malde	M&I Materials Inc.
Jon	Karas	SDMyers, LLC.
Juan	Castellanos	Prolec GE
Kevin	Biggie	Weidmann Electrical Technology

Kurt	Kaineder	Siemens Energy
Luiz	Cheim	Hitachi ABB Power Grids
Mark	Tostrud	Dynamic Ratings, Inc.
Mickel	Saad	Hitachi ABB Power Grids
Onome	Avanoma	Transformer Consulting Services Inc.
Paul	Su	FM Global
Radoslaw	Szewczyk	Specialty Products Poland Sp. z o.o.
Richard	Marek	Retired
Robert	Ballard	DuPont
Roger	Wicks	DuPont
Samuel	Sharpless	Rimkus Consulting Group
Sheldon	Kennedy	Niagara Transformer
Solomon	Chiang	The Gund Company
Stacey	Kessler	Basin Electric Power Cooperative
Steven	Schappell	SPX Transformer Solutions, Inc.
Stuart	Chambers	Powertech Labs Inc.
Thomas	Prevost	Weidmann Electrical Technology

Guests (66)

Afshin	Rezaei-Zare	York University
Anastasia	O'Malley	Consolidated Edison Co. of NY
Anatoliy	Mudryk	Camlin Power
Anthony	Franchitti	PECO Energy Company
Ashmita	Niroula	Ergon, Inc.
Bill	Griesacker	Duquesne Light Co.
Bruce	Webb	Knoxville Utilities Board
Chao	Li	EATON Corporation
Chris	Powell	Intermountain Electronics
Daniel	Weyer	Nebraska Public Power District
Daniel	Tournoux	SPX Transformer Solutions, Inc.
Daniela	Ember Baciu	Hydro-Quebec IREQ
David	Murray	Tennessee Valley Authority
Derek	Hollrah	Burns & McDonnell
Dmitriy	Klempner	Southern California Edison
Donald	Lamontagne	Arizona Public Service Co.
Eric	Theisen	Metglas, Inc.
Erich	Buchgeher	Siemens Energy
Fernando	Leal	Prolec GE
Fernando	Saldivar	Prolec GE
Gary	King	Howard Industries
George	Frimpong	Hitachi ABB Power Grids
Gilles	Bargone	FISO Technologies Inc.
Hakan	Sahin	Independent
Homero	Portillo	Advanced Power Technologies
Hugo	Avila	Hitachi ABB Power Grids
Javier	Arteaga	ABB Enterprise Software Inc
John	Reagan	Oncor Electric Delivery

Juan	Acosta	Ergon, Inc.
Kevin	Rapp	Cargill, Inc.
Kevin	Sullivan	Duke Energy
Kristopher	Neild	Megger
Kushal	Singh	ComEd
Lee	Matthews	Howard Industries
Malia	Zaman	IEEE
Marco	Espindola	ABB Enterprise Software Inc.
Marion	Jaroszewski	Delta Star Inc.
Martin	Munoz Molina	Orto de Mexico
Michael	Franchek	Retired
Michael	Warntjes	American Transmission Co.
Nicholas	Kostich	Ameren
Nitesh	Patel	Hyundai Power Transformers USA
Oleg	Roizman	IntellPower Pty Ltd
Parminder	Panesar	Virginia Transformer Corp.
Patrick	Picher	Hydro-Quebec IREQ
Paul	Jarman	University of Manchester
Pragnesh	Vyas	Sunbelt-Solomon Solutions
Rainer	Frotscher	Maschinenfabrik Reinhausen
Richard	vonGemmingen	Dominion Energy
Roderick	Sauls	Southern Company Services
Ronald	Hernandez	Doble Engineering Co.
Ryan	Musgrove	Oklahoma Gas & Electric
Samraghi	Dutta Roy	Siemens Energy
Sanjay	Patel	Royal Smit Transformers
Saramma	Hoffman	PPL Electric Utilities
Saurabh	Ghosh	Transformers & Rectifiers (India) Ltd
Shawn	Gossett	Ameren
Shiva	Rampersad	Dow Chemical Company
Suresh	Babanna	SPX Transformer Solutions, Inc.
Susan	McNelly	Xcel Energy
Tiffany	Lucas	SPX Transformer Solutions, Inc.
Tim	Rocque	SPX Transformer Solutions, Inc.
Timothy	Raymond	Electric Power Research Institute (EPRI)
Valery	Davydov	Mr. Valery Davydov
Yaquan (Bill)	Li	BC Hydro
Zachary	Draper	Delta-X Research Inc.

Guests Requesting Membership at Fall 2020 Meeting (17)

Afshin	Rezaei-Zare	York University
Ashmita	Niroula	Ergon, Inc.
Chao	Li	EATON Corporation
Daniel	Weyer	Nebraska Public Power District
George	Frimpong	Hitachi ABB Power Grids
Gilles	Bargone	FISO Technologies Inc.
Hakan	Sahin	Independent

Hugo	Avila	Hitachi ABB Power Grids
Juan	Acosta	Ergon, Inc.
Kevin	Rapp	Cargill, Inc.
Kevin	Sullivan	Duke Energy
Nitesh	Patel	Hyundai Power Transformers USA
Pragnesh	Vyas	Sunbelt-Solomon Solutions
Samraghi	Dutta Roy	Siemens Energy
Saurahb	Ghosh	Transformers & Rectifiers (India) Ltd
Suresh	Babanna	SPX Transformer Solutions, Inc.
Timothy	Raymond	Electric Power Research Institute (EPRI)

New Members as of Fall 2020 Meeting (6)

Afshin	Rezaei-Zare	York University
George	Frimpong	Hitachi ABB Power Grids
Gilles	Bargone	FISO Technologies Inc.
Kevin	Rapp	Cargill, Inc.
Saurahb	Ghosh	Transformers & Rectifiers (India) Ltd
Timothy	Raymond	Electric Power Research Institute (EPRI)