

PC57.19.00 - WG for the Revision of IEEE Standard General Requirements and Test Procedure for Power Apparatus Bushings

10:45 AM to 12:00 PM CST on Monday, April 26, 2021
On-Line Virtual Meeting

Unapproved Meeting Minutes

WG Chair Peter Zhao presided over the meeting, with David Stockton as the Secretary.

Member list was displayed, and a live poll was performed confirming there was a quorum present. Official attendance was generated from the information provided following the meeting from the PSAV meeting hosting service.

Total Attendance	88
Members in Attendance	24 out of 44 members, quorum attained
Guests in Attendance	64
Guests Requesting Membership	12

The WG Chair presented the agenda with the call for patents, none were received, and that copyright information can be found on the Transformer Committee website. The Secretary noted that the F20 minutes need to be approved and the agenda as well. The Chair asked if there were any objections or comments regarding the F20 minutes and none were received so they were noted as approved (motion by Jeff Benach, second by Shibao Zhang).

The remaining meeting time focused on review of the comments received from the review group with the attendees. The following is a summary of those discussions and resulting disposition or follow up action to be taken:

Review Section: 7. Test Procedure: Section 7.4.2 – S Zhang clarified comments.

Discussion, disposition, and/or follow up action:

- **Accepted**

Review Section: 7. Test Procedure –Proposed Change: Scott Digby proposed to add dry switching impulse testing.

Discussion, disposition, and/or follow up action:

- Need verbiage and help from testers; Dave Geibel to take lead (dmgeibel@yahoo.com).

Review Section: 3, Page 3, Section 3.6, line 11 – S We should clear up the notion that this requires a second capacitor to form a proper divider. **Proposed Change:** A connection to one of the capacitance layers which divides the layers into sections C1 and C2 such that the capacitance graded internal insulation forms a voltage divider.

Discussion, disposition, and/or follow up action:

- **Revised:** D Geibel and S Zhang to develop proposed verbiage.
- The following is some of the discussion that took place regarding this proposal:
 - Must have capability for C2 to operate in an ungrounded mode with continuous voltage (D Geibel and Sebastien Riopel discussion).
 - S Zhang questioned whether we should define continuous operating voltage for C2 voltage taps; agreed it would be valuable, but bushing OEMs are not ready to put that into values today without testing and design reviews.
 - Bruno Mansuy noted that monitoring devices typically require approx. 100 V; D Geibel noted that bushing potential devices require 6 to 8 kV.

Review Section: 3, Page 3, Subclause 3.10, line 22 – We need to distinguish between the high quality epoxy casting and, for example, the traditional polymer concrete, or bulk epoxy. **Proposed Change:** Geibel, Ryan Musgrove, Kyle Stechschulte, Raymond Curtiss Frazier, Hugo Flores to meet and provided revised definition(s) within 2 months. Direction seems to be leave composite definition as-is, and add definition for dry-type bushings which is consistent with TF Dry Bushings and HVDC standard.

Discussion, disposition, and/or follow up action:

- **Revised:** D Geibel to lead TF mentioned above to provide revised definition(s) within 2 months.
- The following is some of the discussion that took place regarding this proposal:
 - Extensive conversation back and forth about the definition of “composite bushing.” It seems that the term was coined from composite insulators, i.e. silicone sheds, and has evolved into the term composite bushings. End users Anthony Franchitti and Raymond Curtis Frazier confirmed their expectation of a composite bushing refers to no porcelain outer insulator.
 - Devki Sharma noted that the IEC definition is the same as IEEE.
 - Art del Rio noted that we need to be consistent with the HVDC references.

Meeting was adjourned, 12:15pm. Motion by Dave Geibel, second by Durand Stacy

Respectfully Submitted,
WG Secretary David Stockton

Recorded Attendance as provided by PSAV data following the virtual meeting

Role	First Name	Last Name	Company
Chair	Peter	Zhao	Hydro One
Secretary	David	Stockton	H-J Family of Companies
Member	Jeff	Benach	Weidmann Electrical Technology
Member	Barry	Beaster	H-J Enterprises, Inc.
Member	Stephen	Jordan	Tennessee Valley Authority
Member	Devki	Sharma	Entergy
Member	Richard	vonGemmingen	Dominion Energy
Member	Scott	Digby	Duke Energy
Member	Thomas	Spitzer	City Transformer Service Co.
Member	J. Arturo	Del Rio	Siemens Energy
Member	Shibao	Zhang	PCORE Electric
Member	Sebastien	Riopel	Electro Composites ULC
Member	Eric	Weatherbee	PCORE Electric
Member	Mario	Locarno	Doble Engineering Co.
Member	Troy	Tanaka	Burns & McDonnell
Member	Egon	Kirchenmayer	Siemens Energy
Member	Marek	Kornowski	Polycast International
Member	Eric	Schleismann	Southern Company Services
Member	William	Solano	Instrument Transformer Equip Corp
Member	Eric	Euvrard	RHM International
Member	Niklas	Gustavsson	Hitachi ABB Power Grids
Member	Bruno	Mansuy	Trench France SAS
Member	Robert	Middleton	RHM International
Member	Raja	Kuppuswamy	Dynamic Ratings, Inc.
Member	Brad	Staley	Salt River Project
Member	Lee	Tyler	Warco, Inc.
Guest	Susan	McNelly	Xcel Energy
Guest	Dennis	Marlow	DenMar TDS Transformers
Guest	William	Boettger	Boettger Transformer Consulting LLC
Guest	Juan	Castellanos	Prolec GE
Guest	Javier	Arteaga	ABB Enterprise Software Inc
Guest	Dinesh	Sankarakurup	Duke Energy
Guest	Philip	Hopkinson	HVOLT Inc.
Guest	Christopher	Baumgartner	We Energies
Guest	Gael	Kennedy	GR Kennedy & Associates LLC
Guest	Ewald	Schweiger	Siemens Energy
Guest	Rogério	Verdolin	Verdolin Solutions Inc.
Guest	Gary	Hoffman	Advanced Power Technologies
Guest	Neil	Strongosky	Memphis Light, Gas & Water
Guest	John	Brafa	Hub City Consulting Services
Guest	Shamaun	Hakim	WEG Transformers USA Inc.

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Guest	Jose	Gamboa	H-J Family of Companies
Guest	Poorvi	Patel	Electric Power Research Institute (EPRI)
Guest	Juan Carlos	Cruz Valdes	Prolec GE
Guest	Daniel	Sauer	EATON Corporation
Guest	Anthony	Natale	HICO America
Guest	Huan	Dinh	Hitachi ABB Power Grids
Guest	Krishnamurthy	Vijayan	PTI Transformers
Guest	Ryan	Musgrove	Oklahoma Gas & Electric
Guest	Jos	Veens	SMIT Transformatoren B.V.
Guest	David	Murray	Tennessee Valley Authority
Guest	John	John	Virginia Transformer Corp.
Guest	Steven	Brzoznowski	Bonneville Power Administration
Guest	Christopher	Whitten	Hitachi ABB Power Grids
Guest	Kurt	Kaineder	Siemens Energy
Guest	Orlando	Giraldo	H-J Family of Companies
Guest	Kristopher	Neild	Megger
Guest	Jason	Varnell	Doble Engineering Co.
Guest	Jonathan	Reimer	FortisBC
Guest	Anthony	Franchitti	PECO Energy Company
Guest	Diego	Rincon	Electroporcelana Gamma
Guest	Yves	Vermette	Electro Composites ULC
Guest	Kris	Zibert	Allgeier, Martin and Associates
Guest	Raka	Levi	Retired
Guest	Wayne	Ellis	Memphis Light, Gas & Water
Guest	William	Whitehead	Siemens Energy
Guest	Anastasia	O'Malley	Consolidated Edison Co. of NY
Guest	Feras	Fattal	Manitoba Hydro
Guest	Peter	Kleine	US Army Corps of Engineers
Guest	Malia	Zaman	IEEE
Guest	Brady	Nesvold	Xcel Energy
Guest	George	Partyka	PTI Transformers
Guest	Nitesh	Patel	Hyundai Power Transformers USA
Guest	Jorge	Cantu de Leon	SPX Transformer Solutions, Inc.
Guest	Juan	Ramirez	CELECO
Guest	John	Reagan	Oncor Electric Delivery
Guest	Kyle	Stechschulte	American Electric Power
Guest	Yaquan (Bill)	Li	BC Hydro
Guest	Matthew	McFadden	Oncor Electric Delivery
Guest	Jeffrey	Door	H-J Family of Companies
Guest	Tim	Rocque	SPX Transformer Solutions, Inc.
Guest	Stefan	Schindler	Maschinenfabrik Reinhausen
Guest	Raymond	Frazier	Ameren
Guest	Onome	Avanoma	Transformer Consulting Services Inc.

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Guest	Roger	Hedlund	Hitachi ABB Power Grids
Guest	Kayland	Adams	SPX Transformer Solutions, Inc.
Guest	Susan	Bonfiglio	Western Area Power Admin.
Guest	Edmundo	Arevalo	Bonneville Power Administration
Guest	Nicholas	Podany	Bureau of Reclamation
Guest	Brandon	Dent	Memphis Light, Gas & Water
Guest	Mubarak	Abbas	Siemens Industry
Guest	Dipakkumar	Patel	Instrument Transformer Equip Corp
Guest	Didier	Hamoir	Transformer Protector Corp
Guest	Olle	Benzler	Megger
Guest	Michael	Warntjes	American Transmission Co.
Guest	Jacques	Vanier	Electro Composites (2008) ULC
Guest	Derek	Hollrah	Burns & McDonnell
Guest	Nick	Sewell	Alabama Power
Guest	Jonathan	Deverick	Dominion Energy