

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

11:00 AM to 12:15 PM, Monday March 25, 2019
Hilton Hotel, Anaheim, California USA

Unapproved Meeting Minutes

WG Chair Peter Zhao presided over the meeting, with Eric Weatherbee as Secretary. Introductions were made, and meeting rosters were circulated to record the attendance.

Total Attendance	47
Members in Attendance	26 out of 39 members, quorum attained
Guests in Attendance	21
Guests Requesting Membership	9

The WG Chair stated the goal is to complete the revision by 2020 and then reviewed the SOW (Scope of Work). Stating there are new technology developments and two new standards (19.04 High Current and 19.02 Distribution) that are to be included in this revision of the standard. We have assigned volunteers to review groups that worked together between meetings to address each section of the standard. Their work has been documented and is available on the website for review at any time. All new members are asked to review this information and to submit any additional comments for consideration prior to the next meeting so that it can be included in the online documentation and reviewed during the meetings.

Mr. Devki Sharma commented that there is a need to include 230kV and 500kV GIS bushings in this standard.

- a. Dr. Shibao Zhang commented that there is no bushing standard that addresses GIS bushings and therefore he doesn't believe they can be included in 19.00 at this time.
- b. The Chair stated if Mr. Sharma has information regarding GIS bushings that he would like included into the document he can submit them for review.
- c. Mr. Sharma stated that a new WG would need to be formed to determine the proper information.
- d. The Chair stated that due to time constraints a new WG would not be able to complete the needed information in time to be included in this revision cycle of the document.
- e. Mr. Sharma agreed and withdrew his request per the discussions.

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: 5. Rating: Page 7, Subclause 5.3, Line 5 – Comment from Mr. Scott Digby: include table 1 of 19.04
Proposed Change: Add: to the end of phrase Std. C57.19.01 “and C57.19.04”

Discussion, disposition, and/or follow up action:

- Accepted

Review Section: 5. Rating: Page 7, Subclause 5.3.X, Line NA – Comment from Mr. Digby: add new subclause to cover “Rated dry switching-impulse voltage as 19.04 references this test and not wet switching. Will also provide a new subclause wording for section 7.2 Design Testing. **Proposed Change:** Add: **TBD**

- Mr. Barry Beaster asked if we are going to be able to include things that are covered differently in 19.02.

- Dr. Shibao Zhang stated that the time-line to complete 19.02 may not be conducive with including in this revision of 19.00.
- The Chair stated he will ask 19.02 in the Bushing SubCom what their time-line to completion is.

Review Section: 5. Rating: Page 8, Subclause 5.4.1, Line 14 – Comment from Mr. Digby: reference to 19.04 for bus enclosure applications **Proposed Change:** Add: to the end of the last paragraph “For bushings located within bus enclosures refer to C57.19.04 for requirements.”

Discussion, disposition, and/or follow up action:

- **Accepted**

Review Section: 6. General Requirements: Page 8, Subclause 6.2, Line 32 – Comment from Mr. Dave Geibel: As a bushing manufacturer I do not know the pressure in the apparatus that the bushing will be applied. **Proposed Change:** Revise to “Open bushings shall be designed to withstand both full vacuum and two atmospheres of positive pressure.”

Discussion, disposition, and/or follow up action: **TBD**

- The comment submitter Dave Geibel was not in attendance to answer questions as many attendees felt the pressure was excessive or were unsure if Mr. Geibel was asking for two atmospheres of absolute pressure or gage pressure.
- Mr. Digby noted that C57.12.00 states the pressure in the tank shall not exceed 2 atmospheres of absolute pressure or about 15psig. This may be where Mr. Geibel obtained the value.
- Mr. Egon Kirchenmayer believes Mr. Geibel means total pressure which would be 15psig.
- Mr. Durand Stacy stated it is possible that Mr. Geibel may have meant 30psig so that there was safety factor of 2.
- **Dr. Zhang volunteered to revise the statement to clearly specify a value of 15psig and submit to Mr. Geibel and Mr. Stacy to confirm it meets his original intentions.**

Review Section: 6. General Requirements: Page 9, Subclause 6.2, Line 1-3 – Comment from Mr. Sebastien Riopel: Change the requirement of voltage taps to be optional **Proposed Change:** Change the requirement of voltage taps for bushings above 350kV BIL bushings to allow test taps as an alternative.

Discussion, disposition, and/or follow up action:

- **Rejected**, (5 Approve, 11 Oppose, 5 Abstain).
 - Mr. Mario Locarno commented that C2 data is irrelevant for solid cast bushings as it does not provide much information.
 - Mr. Stacy disagreed, stating he believes it is relevant and shows degradation in those designs as well.
 - Mr. Tommy Spitzer asked if it was possible to use online monitoring with a test tap?
 - Mr. Bruno Mansuy stated that IEC bushings do not use voltage taps, only test taps which can be read and monitored. There are positives and negative for both designs.
 - Dr. Zhang stated his company already receives calls on occasion for changes in bushings that use test tap and anticipates this change would increase the confusion leading to more calls.
 - Utility person commented that they do have IEC designs with test taps at above 350 BIL but they do not have online monitoring hooked up to them. Now they require all their bushings above 350 BIL to have voltage taps.
 - Mr. Locarno stated he is concerned that most of the testing is now done by testing companies which hand over the data and anticipates this would lead to more confusion when analyzing the data.

- Mr. Eric Euvard stated that their bushing design above 350 BIL offer voltage taps as option but agrees the standard should allow either tap design to be optional.
- The Chair stated his company have had both types of on their system and found the test tap would sometime break just from performing testing therefore he personally prefers the more robust design of the voltage tap.

Review Section: 7. Test Procedure: Page 11, Subclause 7.1.2, Line 8 – Comment from Dr. Zhang: Mounting bushings for electrical testing in the factory could be different from the real application, horizontally mounted bushings may also be tested vertically for electrical purposes. **Proposed Change:** Change to “For electrical tests, bushings shall be mounted on a supporting structure and with their ends in the media of the type in which they are intended to operate.”

Discussion, disposition, and/or follow up action: **TBD, Dr. Zhang to clarify and resubmit**

- There was confusion on the meaning of comment as written.
- Dr. Zhang explained that bushings for use in horizontal applications can be electrically tested in the vertical position was his comment intention and will clarify and resubmit.

Meeting was adjourned, 12:15pm

Respectfully Submitted,
WG Secretary Eric Weatherbee