

IEEE SWITCHGEAR COMMITTEE CORRESPONDENCE

Minutes: Working Group on Revision of Fuse Standards-C37.41, High-Voltage Fuses
 Subcommittee
 Place: San Diego, CA
 Date: October 9th and 10th, 2023
 Chair: Sterlin Cochran
 Secretary: John Leach

WG Voting Members “VM”, non-voting members “NVM”, and non-members “NM” present on 9th (Task Force meeting) and 10th, WG meeting.

Name	Employer/Affiliation	Status	9th	10 th
Tim Anderson	Aluma-Form	NM	X	X
Emmanuel Ankrah	KEMA Labs	VM	x	x
Jacob Blake	Hubbell	NM	X	-
Chris Borck	Eaton	VM	x	x
Mohit Chabra	S&C Electric	VM	-	x
Sterlin Cochran	Eaton (Chair)	VM	x	x
Jeramie Cooper	Eaton	VM	x	x
Thomas Dawson	Mersen	NM	X	X
Boubacar Diallo	Southern States	NM	X	-
Brennen Fleming	Hubbell Power Systems	VM	x	x
Gary Haynes	ABB Inc.	VM	x	x
Travis Johnson	Xcel Energy	VM	-	-
Jeff Jordan	Southern States	NM		X
John Leach	-/Self (V-Chair/Secretary)	VM	x	x
Eric (Qian) Li	Powertech Labs	VM	-	x
Chumming Ma	Burns & McDonnell	NM		X
Pete Marzec	S&C Electric	VM	-	x
Gary Meerins	Southern States	NM		X
Anne Miller	TCI	NM		X
Chris Morton	Morton Consulting	VM	x	x
Aaron Motes	ABB–Hi-Tech	VM	x	x
Carlos Nieto	S&C Electric	VM	x	x
Caryn Riley	Georgia Tech/NEETRAC	VM	x	x
Manpreet Singh	Southern States	NM		X
Jon Spencer	Utility Solutions	VM	x	x
Dustin Sullivan	Hubbell Power Systems	VM	x	x
Eric Vasquez	PG&E	NM		X
Randy Ward	Aluma-Form	VM	x	x
Jim Wenzel	Eaton	VM	x	x
Charles Worthington	Hubbell Power Systems	VM	x	x
Elija Yarbrough	Hubbel	NM	-	X
Danish Zia	UL LLC	VM	-	x

*Now eligible for voting membership

1. **The Task force meeting concerning Test Series 4** - this meeting was on Monday 9th October, afternoon (see item 8).
2. **Meeting Call to Order**
The WG meetings were called to order on Tuesday October 10th at 8:00 am.
3. **Approval of agenda**
The provisional agenda distributed before the meeting, had no changes proposed so was approved as circulated.
4. **Attendee introductions**
Attendees were asked to sign in. We have four new voting members at this meeting, Emmanuel Ankrah, Eric Li, Carlos Nieto, and Randy Ward, who are welcomed. "Visitors" (classed as non-members) need to contact the secretary, John Leach, if they are seeking membership, in which case they become non-voting members until they have attended 2 of 4 meetings, at which time they become eligible, at their next meeting, to become voting members.
5. **Approval of Tuesday/Wednesday April 18th – 19th, 2022, Clearwater Beach, FL, minutes**
The April minutes were reviewed and accepted as circulated.
6. **Report from the Chair**
Sterlin welcomed everyone and explained that the intent of the meeting was to move through the latest draft of the document, covering those sections for which input had been received, and hopefully finish the whole draft to enable a ballot by year's end (in accordance with the PAR). He reported that there had been a TS4 Task force meeting on Monday that had finalized the proposals for Test Series 4 for cutouts that use replaceable links, and that this information had been circulated in the draft produced before the meeting. It was anticipated that no significant changes would be needed in this information before the ballot of the proposed standard.
7. **Report and Discussion of Relevant IEC activities – John Leach**
John stated that there had been no significant IEC activity relevant to the HV Fuses subcommittee in the last six months. While a full report will be made to the subcommittee on Wednesday, he stated that, for the benefit of members who would not be at that meeting, he would report on future expulsion fuse issues. He stated that the Maintenance Team (MT4) led by Sterlin would likely meet, on-line, once we had a firm position on the IEEE changes to Test Series 4 for cutouts, as this was one of the proposals to be reviewed in deciding whether a revision of IEC 60282-2 (expulsion fuses) would be required. This must be decided before this time next year when the next SC32A meeting will be held.
8. **Reports from the Task Force TF3 Test Series 4 for cutouts – Haynes:**
The task force met on Monday to review the final recommendations that had been distributed to all WG members before this meeting. The overall significant points are that the TS 4 tests would now consist of two tests (4.1 and 4.2) and the TRV values would use the Two-Factor (IEC) method. Changes to the proposals, discussed at the meeting, were minor. One change is to add two columns to the TRV tables showing the equivalent Peak Factor and frequency (the old way of specifying the TRV). The purpose of this is so that users can quickly identify what changes have been made to TRV (in most cases, no change at all). A second proposal is to introduce U_r as an equivalent term to "V" for rated maximum voltage and therefore be able to use U and its

derivatives in the TRV tables. This is to line up with most Switchgear and IEC standards including the common document C37.100.1. The third main change is to use just one table of TRV for CL fuses as they have always used one set of TRV values for Class A and Class B. Because the X/R for Class A and Class B are different, and the derivation of two-Factor TRV includes a term with X/R, there are very slight differences. However, because this is only 0.27% and the effect of TRV on CL fuses is very small, it was decided to just use one table to avoid confusion – the one proposed for Class A.

9. Revision of C37.41/42 – review of draft 4b

- 1) Starting where we had finished discussion at the Spring meeting, in Clause 18 (polymeric insulators), there was some discussion as to whether the title should include “expulsion fuses” as some tests may be done with blades as well as fuseholders/fuse units. Eventually it was concluded that all cutout fuse supports should be capable of operating as a fuse cutout, not just as part of a disconnecting switch, and so both “expulsion fuse” would be retained in the title and a “general” subclause would be added to cover this important point. As a result of this decision the specific components to be used with a cutout fuse support for any given test was added (frequently this is “a blade or fuseholder/fuse unit”).
- 2) In the “Mechanical endurance at temperature extremes” test it was decided that a drop open test (by melting a fuse link) was unnecessary.
- 3) Long-term deformation/creep testing: clarification was made concerning a temperature rise test.
- 4) Tracking and erosion: wording was added to allow a wire to be used to energize both terminals of the cutout fuse support, and alternative components clarified.
- 5) Various minor clarifications regarding testing, including “number of test samples” were made in response to previous comments.
- 6) After a discussion involving the rather minimalist “Conformance test” subclause (a dielectric test) it was decided to remove this clause completely. It was considered that, if a customer wants or needs any conformance testing, this should be negotiated between them and the manufacturer.
- 7) In 21, Application, operation, and maintenance guideline, 21.2 Capacitor fuses information seems to be out of place. It was decided to move it, probably to clause 9.
- 8) Annex A: in this we state that no changes to testing requirements is anticipated for product covered by this Annex. It was decided to emphasize this (as even we seemed to have forgotten this aspect) and return the slant rated requirements to the pre 2016 values (particularly regarding Test Series 4 for cutouts). The overview concluded with “If new devices are to be developed that are included in Annex A, appropriate testing shall be decided between the manufacturer and user.”
- 9) Annex G: G.8 it was agreed to use part of Fig 10 from C37.48 to demonstrate the mounting strap and cutout angle from the vertical.

Additional information required to complete the document before ballot:

- 10) In 18.1.1.4.2 Figure X is still required. A sketch needs to be sent to John for him to make a drawing and insert it into the document
- 11) In 19.1 Cutout and capacitor unit fuses and associated fuse links: Figure 13 was to have the element and “attachment spacing” added to enable it to be used in 9.2.3.3.4. This

change to the figure had not been supplied, but after discussion John said that he would be able to add it for the next draft.

- 12) Restructuring of Annex E and Annex F will be done to cover the TRV issues and include explanations of how various factors are derived. Equations will be removed from the TRV tables.

Based on our PAR we should try and circulate a draft for ballot before the end of the year, or at least in January. This will enable us to have comments to discuss at the Spring meeting. This may mean we need an on-line meeting sometime in the next two months. We will attempt to get a new draft with all the changes discussed at this meeting circulated within the next few weeks. After the meeting John will circulate a draft as usual, but in this case all changes made at the meeting will be “accepted” (rather being circulated as “track changes”). In this way only new text that was not either circulated before the fall meeting, or changed during the meeting, will appear as “track changes”. In this way it will be easy for members to check and either approve or submit comments.

10. New Business None

11. New Business None

12. Next meeting

Spring 2024, (March 31st – April 4th) Westin Beach, Fort Lauderdale, FL

Fall 2024, (October 13th – 17th) OMNI Hotel, Oklahoma City, OK

Spring 2025, (April 13th – 17th) Wyndham Grand Orlando Resort Bonnet Creek, Orlando, FL

Fall 2025 (October 5th – 9th) Peppermill Resort, Reno NV

13. Adjournment: the meeting was adjourned at 5:50pm on October 10th, 2023

Respectfully Submitted,
John Leach, Secretary