

C37.74 Working Group Meeting Minutes

April 17th, 2023 Clearwater, FL



Chair: Kennedy Darko

Secretary: Travis Johnson

Meeting Agenda

1. Call to Order K Darko
11:33am EST Kennedy called to order
2. Call for Patents and copyrights K. Darko
 - i. [Patent Slides – No patent claims](#)
 - ii. [Copyright Slides – No copyright concerns](#)
3. Introduction of Members and Guests T. Johnson
Complete
4. Attendance and quorum check (50% + 1) (18 members = 10 needed for quorum) T. Johnson

15 of 18 members in attendance

Motion to Approve: Karla T

Second: David B
5. Approval of agenda K. Darko
6. Approval of previous meeting minutes K. Darko

[In-person – Fall 2022 Burlington](#)
[Virtual: 01/25/2023](#)
[Virtual: 02/02/2023](#)
[Virtual: 02/10/2023](#)
[Virtual: 03/07/2023](#)
[Virtual: 03/17/2023](#)
[Virtual: 04/03/2023](#)

Approval by consensus
7. Action Items K. Darko
 - i. Project schedule review - Complete
 - ii. Summary of decisions from virtual meetings
 - iii. Ad hoc team reports
1. **Cable charging:** (Team: I. Rokser, F. DeCesaro, H. Bannink, C. Borck, K. Darko)

Background C37.74 points to obsolete standard IEEE 1247. Ad hoc team reviewed IEEE 1247, C37.62, C37.60, C37.100.2, IEC 62271-103, and determined that there is no one good reference and

recommended a newly written test in C37.74 which pulls specifics from other documents rather than refer to any of these standards. The following were suggested:

- Suggested no pre-conditioning language.
- Suggested no limitation on restrikes.

Looked at the standards on the testing criteria.

Outstanding questions and items that are still open for discussion.

- *Grounding:* Team suggested only solidly grounded testing because in US that is the application.

It was agreed that an ungrounded system will yield higher over-voltages and if such an application existed, the standard should provide guidance for testing with agreement between manufacturer and user. It was suggested that this scenario can be handled as a note or modification to the circuit diagram.

- The ad-hoc indicated its investigation revealed that almost all cable systems used in the US are shielded cables and belted cable testing was not covered.
- *Restrikes:* The ad hoc team suggested not setting a limit for the number of allowable restrikes as in C37.62 but instead documenting the number of restrikes that occur during testing. After lengthy discussion the following suggestion stood out
 - Harmonizing with 37.60 / 37.62
 - Users on approval/ disapproval of restrikes (some 0, some 3, some don't care.)
 - The members present at the WG voted fairly equally between including some restrikes and leaving language out.

Ad- hoc to come back with final recommendations.

- A test lab raised the issue of test voltage before operation is not covered. It was noted that the test voltage is listed as 3% -0% of the rated voltage at that start.
- Preconditioning is not covered – That was intentional – If preconditioning is needed, the testing can be re-ordered if this is desired.

C37.62 and C37.60 and are fault interrupting, this is targeting load interrupting operation. The switch does not matter as it can restrike all day long, however the other equipment around are negatively impacted by restrikes. Hence why there is not a limit on the restrikes, but instead record the number of restrikes. Cable charging if a restrike is detected, this would be recorded as a failure (from a utility perspective).

It was suggested that regardless of whether restrike limits are set or not, some explanation be put in the standard for future reference.

There was lengthy debate on device types that are more susceptible to restrikes (example: vacuum vs air vs oil). It was noted that IEEE standards are not device specific.

Motion: Harmonize the number of restrikes with C37.62 (3), Limit should be lower than C37.62 (0),

There was discussion on why line charging is not covered in C37.74. A note in the proposal stating that the cable charging test covered system with combined cables and lines as long as the contribution of the line was limited to 1% was debated. The note came from C37.62. It was advised to have some explanation in the standard explaining why line charging is not covered.

- The supply circuit frequency was pulled straight from C37.62.
- Definition of DC offset defined as less than 20%

2. **Switches with semi-conductive exteriors** (Team: E. Almeida, D. Beseda, K. Darko, Anil D.)

The purpose of this test is to verify that DSG that utilizes insulation shields have suitable touch potential performance. These insulation shield tests are intended for insulation shields such as semiconductive coatings or layers that can be inadvertently directly contacted while the DSG is energized. These insulation shield tests do not apply to metallic shielded components utilized on DSG. Important that this can be tested in a modular format (do not have to test the entire DSG.) Ad hoc used IEEE 592 as starting point.

Questions were raised about applicability of the shield resistance test in IEEE 592 with emphasis on the high temperature(at 121 °C) required for the aging test.

It was pointed out that there are other factors that could contribute to aging of the semi-conductive shields, such as, environment, chemical exposure, UV etc.

The limit of the shield resistance 5000 ohm after the test was also called into question. The aging test required is rather complicated and it was suggested to review work completed by **CSA C22.2 #297** for baseline.

The WG agreed that the shield resistance test in IEEE 592 was not applicable but rather the touch potential test will suffice.

The ad hoc team will review comments and come back with new recommendations. It was suggested that measuring touch voltage, performing an aging test and remeasuring the touch voltage to ensure it is below the set limit could be a good approach. A manufacturer suggested using a test that can be used during production routine testing for verification.

3. **Int. visible break:** (Team: K. Trost, F. DeCesaro, R. Jain, T. Johnson, J. Gieger, K. Darko)

The ad hoc team built on the work previously completed by the definition task force. The team walked the WG through the work completed so far. Items touch on were, dielectric testing and configurations, types of visible break, three-line representation, interlocking or sequencing systems and mechanical endurance testing.

Figure 2 had been updated to include visible break the dielectric test configuration updated to account for integrated visible break. Table 7 had been edited to add a new column for visible break. Definitions for dependent and independent visible break were also added to the document for clarity.

The WG was in general in favor of the work completed, but appears members needed more time to digest the content.

The ad hoc will be coming back once the work is completed for a full review.

4. **Partial discharge pre-stress voltage**

C37.74 does not currently specify pre-test voltage for partial discharge. 3 options were presented.

- Option 1 is to use the same prestress level as in C37.62.
- Option 2 use 1.3 multiplier.
- Option 3 phase to phase for overhead ungrounded systems.

Issues were raised about making sure that the partial discharge testing focused on the DSG without causing the connections or cables to fail due to the pre-stress voltage being higher than the cable are designed to handle.

After some discussion, the ad hoc was asked to go review work being done by IEEE C37.301 and come back with recommendations.

5. Submersion testing

Not discussed.

iv. Any other business.

i. Essentially sinusoidal vs approximately sinusoidal – Not discussed.

8. Next meeting – Virtual

9. Adjournment

Role	First Name	Last Name	Company Name	Spring 2023
Chair	Kennedy	Darko	G&W Electric Co	x
Member	Edwin	Almeida	Southern California Edison	x
Member	Harm	Bannink	G&W	x
Member	David	Beseda	S&C Electric Co.	x
Member	Frank	DeCesaro	DeCesaro Consulting Services, LLC	x
Member	Jeffrey	Gieger	ABB/Elastimold	x
Member	Harold	Hirz	G&W	x
Member	Rahul	Jain	S&C Electric Company	
Member	John	Kapitula	ABB	x
Member	Stephen	Pell	Siemens	x
Member	Caryn	Riley	Georgia Tech/NEETRAC	x
Member	Grant	Ringham	BC Hydro	
Member	Ian	Rokser	Eaton Corp	x
Member	Victor	Savulyak	KEMA	x
Member	Francois	Soulard	Hydro-Quebec	x
Member	Joseph	Stemmerich	Trayer Engineering Corporation	x
Member	Karla	Trost	G&W Electric	x
Secretary	Travis	Johnson	Xcel Energy	x
Guest	Samuel	Andris	KEMA Labs	x
Guest	Ganesh	Balasubramanian	Eaton	x
Guest	Andreas	Bartels	Powell Industries	x
Guest	Christopher	Borck	Eaton's Power Systems Division	x
Guest	Ngoc	Bui	SDG&E	x
Guest	Kelsey	Bush	ABB Elastimold	x
Guest	Sudarshan	Byreddy	Burns & McDonnell	x
Guest	Mohit	Chhabra	S&C Electric	x
Guest	Anand	Chiravuri	Black & Veatch	x
Guest	Kent	Coldsnow	Fort Collins Utilities	x

Guest	Stacey	Davies	Siemens Industry	x
Guest	Anil	Dhawan	Allgos Group	x
Guest	Joseph	Fitzgerald	Eaton	x
Guest	Paul	Found	BC Hydro	x
Guest	Kaylor	Garcia	Utility Solutions Inc.	x
Guest	Brian	Gerzeny	Powell Electrical Systems Inc	x
Guest	Peter	Glaesman	PCORE Electric, CO / Hubbell Power Systems	x
Guest	Ilya	Glinsky	Southern California Edison, Westminster, CA	x
Guest	Christopher	Hastreiter	Eaton, South Milwaukee WI	x
Guest	Jackie	Kandel	Powell	x
Guest	Eric (Qian)	Li	Powertech Labs	x
Guest	Adrian	Lopez	Powell Industries	x
Guest	Colby	Lovins	Federal Pacific, Bristol, VA	x
Guest	Ken	Mckenney	UL Solutions	x
Guest	Federico	Michele	CESI	x
Guest	Jonathan	Neujahr	Eaton	x
Guest	Roberto	Oliwares	Siemens Industry	x
Guest	Al	Pruitt	The Durham Co.	x
Guest	Larry	Putman	Powell	x
Guest	Leonel	Santos	Schneider Electric	x
Guest	Rob	Schuetz	Eaton	x
Guest	Hall	Sigmon	Siemens	x
Guest	Chris	Slattery	First Energy	x
Guest	Jon	Spencer	Utility Solutions	x
Guest	Truett	Thompson	Siemens	x
Guest	Tim	Tillery	Howard Industries Laurel, MS	x
Guest	Nenad	Uzelac	G&W Electric Co, Bolingbrook, IL	x
Guest	Eric	Vazquez	PG&E	x
Guest	Nenad	Uzelac	G&W Electric Co	x
Guest	James	Wenzel	Eaton	x