C37.74 Working Group Meeting Minutes

October 9th, 2023 Catamaran Resort, San Diego, CA
October 12, 2023 – REV2

Chair: Kennedy Darko **Secretary**: Travis Johnson
Minutes taken by Frank DeCesaro

Meeting Minutes

1. Call to Order 1:30 PM on 10/9/23 and 8:00 AM on 10/12/23

2. Call for Patents and Copyrights.
   i. Patent Slides
   ii. Copyright Slides

   There were no patent or copyright issues brought on either day.

3. Introduction of Members and Guests

4. Attendance and quorum check
   i. Quorum was met.

5. Approval of agenda Moved by Karla Trost David Beseda seconded on 10/9/23

   Moved by Ian Rokser and Caryn Riley on 10/12/23.

6. Approval of previous meeting minutes
   i. Joe Stemmerich moved, and Jeff Geiger seconded. To approve minutes from April 17th 2023 meeting in Clearwater FL.

7. Chair's remarks / Project Status
   i. Project schedule displayed. A lot has been covered, multiple meetings between in person meetings. The last working group ballot was disappointing. There were 17 members and only received 5 responses. We did get some good comments back. We will work on that today. Once resolved we will go to MEC and not have another working group ballot.

      We plan on balloting in November and target comment resolution by Spring 2024 meeting. Our PAR expires in December 2024.

ii. It was commented that it will be helpful receiving a red line version of the document for reviewing. The chair will see how to accommodate.

8. Resolution of comments from draft review 10/9/23 and 10/12/23

The chair had sent out the comment spreadsheet.
KT suggested using the language that was just placed into C37.63 regarding position indicators. The WG agreed to use wording from C37.63.

The standardization of color and optional use of symbols was discussed in Spring 2015 Switchgear meetings. Discussion were to updated text to standardize colors (no issue with this draft) but also to allow the use of symbols - which is not included in this draft.

Add the following bullets to section 6.8:

a) Red background with the word “closed” and / or the symbol “|” [see ISO 7000 #5007] in contrasting color to indicate closed contacts.
b) Green background with the word “open” and/ or the symbol “O” [see ISO 7000 #5008] in contrasting color to indicate open contacts.

Clause 6.2 Line 30
David and Karla will propose additional language to cover hermetically sealed equipment in C37.74.
Proposed language: Provisions shall also be made to add insulating medium, liquid or gas, with the unit energized, unless the unit has been designed by the manufacturer to not be fillable in the field by the owner or a third-party designee.

Clause 6.4 Line 530
Is this clear that for replacing the unit needs to be deenergized. WG agrees it is ok.

Clause 6.7 Line 576
The title of this subclause is 'Independent manual operation' but includes requirements for _dependent_ manual operation and requirements that are applicable for any type of manual operation handles. Also, if lines 558-570 are "additions" to C37.100.1; they should be a list. (additions: -list)

Consider changing the title to 'Manual Operation' and formatting into a list.

Question, why is dependent operation not allowed? It was suggested to Change the first sentence to say “Dependent manual operation of fault making contacts is not permitted.”

The Chair stated we should leave it alone as it is. This will not impact any single-phase devices on the market already.

Options: 1) leave it as is which keeps the first sentence that says "Dependent manual operation of gang operated switches is not permitted" Or 2) remove the first sentence. (5) members voted for #1 and (6) voted for #2. The sentence will be removed.

Clause 7.7.9.2, Line 1388
Subclause 4.1 measures 3m of water to the BASE of the DSG. 7.7.9.2 measures to the TOP of the DSG.

Suggestion is to Fix the conflict.

The chair stated, "The 35 kPa gauge corresponds to approximately 3 m head of water above the top of the DSG." Is incorrect. Recommends deleting statement. WG did not have an issue with this.

Table 5, Line 539

Table 5 contains temperature rise limits.
- Section 1 indicates that metal parts in contact with oil are limited to 90°C total temperature
- Section 3 indicates that "connections" in oil are limited to 100°C total temperature.

This seems like a contradiction. If connections can reach 100°C in oil, why cannot metal parts in oil? Or if the 100°C number is in error, we should lower the number in section 3 to 90°C.

The chair checked IEC and other standards and found this in all of them. A comment was made that in IEC 62271-1 there is no reference to oil in the insulating media section 1. The WG will remove oil from Table 5 section 1 also remove footnote e.

Table 2, Line 483

What is meant by the term "fuse shorting bar" is not clear to me. Can these ratings only be present if you are not using a fuse or if the fuse is replaced during a short circuit?

The fuse standard calls it a different device than a fuse when the blade is used instead of a fuse. It needs a second rating if a shorting bar is in the fuse holder. The working group agreed that the statement in the current standard is clear and is a typical way of testing fused ways to ensure all components in that line conform to the short time rating. Comment was rejected.

Clause 5.2.1.5, Line 461
Why is the rated short-time withstand current duration fixed for 1 second?

Suggestion: make it as a preferred rating, so if needed longer or shorter duration should be possible. As mentioned in the IEEE C37.100.1 0.5s, 1s, 2s and 3s.

The chair stated legacy has been 1 second so why would we want to go below 1 second. Clause 7.7.4.5.2, Line 1016 Calls out for FI and short-time current may be either 150% of the longest clearing time of the device at its rated short-circuit current or 1 s.

Change the sentence to say "When an automatic fault interrupter, rated in accordance with IEEE Std C37.62TM, is used as the switching device in a switched way, the minimum rated duration of the short-time current shall be 1 s."

David Beseda, Harm Bannink, Edwin Almeida will assist the Chair in 7.7.4.5.1 to look at the short-time rating in the whole document.

Clause 7.7.5.7, line 1258

replace the whole paragraph and make it aligned with the IEEE C37.30.4. It is stated in the current C37.74 2014 in a note that it will follow the discussion in the IEEE 1247-2005, in the IEEE C37.30.4 is clear mentioned and I agree, that this not possible to simulate these conditions with lump elements so only possible with the correct transformer.

Suggestion:
Because of the variety of transformers and associated circuits, it is not possible to define a rated no-load transformer breaking current. Due to the non-linearity of the transformer magnetizing current, it is not possible to correctly model the switching of transformer magnetizing current using linear components in a test laboratory. Tests conducted using an available transformer will only be valid for the tested transformer and cannot be representative of other transformers. If a special test is necessary, test circuits and test procedures must be agreed between user and manufacturer.

WG will remove the circuits, keep the notes and reference C37.30.4.

Table 3, Line 502
where is Class 1,2,3 coming from and what does it mean? Do we have clear definitions? This has always been there so WG agreed to leave alone.

Rows 38 and Row 39 same comment as above.

Clause 6.6, Row 547
Ground connector shall be able to withstand short time current for a period of 1 sec. Should this also be mentioned in the test descriptions?

Chair states there is a lot of ambiguity in this. How do you test then? How many locations. Should this be left as is? WG agreed.

Clause 6.2, Line 580
Looking at IEEE Std 386, the title states 2.5kV trough 35kV, are we not missing 38kV in this case?

Suggestion is to make note that accepting lower voltage or referring to another document altogether?

There are general notes for derating in tables etc. This is not being changed.

Table 6, Line 713

"Test No. 3, specifically 3a and 3b, as I believe there might be a discrepancy in the test parameters. It seems that there is a different criterion mentioned for this test that aligns more closely with covering the short-time current and peak withstand current tests as outlined in C37.100.1 Section 7.7, rather than treating it as a combination of 3a (7.7.4.3) and 3b (7.7.4.5).
To clarify, 3a appears to focus on a sequence of peaks, while 3b seems to address only symmetrical aspects."
This revised message is more structured and detailed, making it easier for the recipient to understand your concerns about the test criteria.

Suggestion: only one test number 3 and call it short-time withstand current and peak withstand tests.

WG stated that C37.100.1 says short time and peak test. You can do it as one test, obtain your asymmetric, and then do the short time after the symmetric is met. In C37.74 the devices may be subjected to peak fault currents from upstream reclosers. The confusion may be in using the same language of the peak test. Commenter is ok with this now.

Clause 7.7.4.3, Line 1019

"I think the test name 'Peak withstand current test' doesn't fully capture the essence of the test. Because there are several peak withstands tests in a sequence, the suggestion would be to add a sequence to it. In that case, it could be called 'Peak withstand sequence current test.'" And the name can be misinterpreted because there is a peak withstand test in IEEE C37.100.1.

Suggestion: rename "peak withstand test current test" to "Peak withstand sequence current test"

WG agrees with this. The chair will determine where to do this. The chair suggests switching position of the words sequence to read "Peak withstand current sequence test."

Clause 7.7.3, Line 718
This was rejected.

Table 7, Line 753
Editorial. Accepting this.

Table 7, Line 753
At test sequence 4 there is a "N" for fused load break way. But there is a description at 7.7.4.4. how is the test performed… should this not be applicable?

Suggestion: Change from N to Y and refer to 7.7.4.4 for testing.

The chair agrees with the commenter. WG agrees that in the column for test procedure we will add 7.7.4.4. In fuse load break where we have N or NA we will change that to Y with asterisk and add it to informative note under the table.

Clause 7.7.4, Line 973
Title short circuit withstand current tests doesn't cover the full scope of this chapter.
Suggestion: call it "Short-circuit tests", like 7.6.2.3

The chair thinks there is an attempt to distinguish between short circuit tests which include peak, short time and fault making vs short circuit withstand tests which focus on peak and short time tests.
The WG agreed the differences are nuanced, and the naming was causing confusion. There were suggestions for the term "short circuit withstand current" be replaced or removed.
It was suggested to remove "withstand" and then just call out each of the tests independently.
Another suggestion was to remove "withstand" keep on short-circuit test which includes (short-time, peak and fault making tests). WG agreed.

Chair had sent out the comment spreadsheet Continuation on 10/12/23

Clause 7.4.2, Line 742

Test sequence No. 1 through 5 should be 1 through 8
Suggestion: change to no. 1 through 8

Rejected since steps 1 through 5 is the sequence and 6 through 8 is verification.

What is dielectric preconditioning? It is a hi-pot test. Line #729 explains why it is performed only with fuses. This is to ensure the operation of the fuse does not negatively impact the dielectrics of the DSG.

Clause 7.6.2.3, Line 974
The commentor suggested fault making test be mentioned in the test scoop.

The WG agreed.

Clause 7.7.4.3, Line 1031
The peak is described in such a way that it is fixed how the test should be conducted, but is it fair that the same test is conducted every time (9 times in total)? I believe that indicating that the peak must be achieved in every test should be sufficient.

Suggestion: remove point d.

This makes it sound like one phase will be getting the peak current on first shot of the set all the time. There seems to be a disconnect in the interpretations. Wording needs a bit of cleaning up. It was asked if it seemed a fair test hit only one phase all the time with the peak. A participant suggested the standard is doing the worst case, but not most probable.

WG worked on the wording and came up with in e) remove the first major loop wording. The peak current of all nine tests shall not be less than the rated peak withstand current. In the interest of time the Chair will take this and work with an ad hoc for recommendation.

Figure 4, Line 1010
The requirement described under Figure 4 for fault-making tests should be moved to Chapter 7.7.4.6 Rated fault-making current test.

Suggestion: move requirement " for fault making tests ….. Withstand current." to chapter 7.7.4.6

This wording is in C37.30.4 which is referenced. Do we even need this repeated here? WG agreed to delete it.

Clause 7.7.6.1, Line 1298
Missing how to test, what maximum current for the resistance, where to measure? Direct across the contact? Bushings?

Suggestion: Make the description clearer.

Current document references 8.1 (routine testing procedure) for design test. A new section for contact resistance test 7.7.11 has been added, referencing subclause 7.5.1 of IEEE C37.100.1. There were questions whether the values in 100.1 aligned with C37.74? Karla Trost and David Beseda will review the reference document to ensure no conflicts.

Clause 4.1, Line 391
The statement, "Exposure to chemical or electrochemical reactions may be encountered in a subgrade environment. “These chemicals may contribute to mild corrosive reactions" should not be in the Normal service conditions unless we are prepared to provide additional input on how to address these conditions from a testing standpoint.

Suggestion: Either delete lines 391 and 392, or move this statement to Special (unusual) service conditions and add the following sentence, "Design tests to validate suitability for a subgrade environment with exposure to chemicals should be agreed upon by the user and manufacturer".

C37.75 has this under unusual service conditions. Subclause 4.1.2 should be inserted in 3.9.3 with the following additions. We will delete lines 391 and 392. Chair to review 4.2 to align with language of C37.75.

Clause 7.7.3.6.1, Line 965
Subclauses 7.7.3.6.1 and 7.7.3.6.2 don't have any information that is not already included in Subclause 7.6.4 of C37.100.1-2018. We should remove these subclauses and just reference C37.100.1 in 7.7.3.6\

Suggestion: Remove 7.7.3.6.1 and 7.7.3.6.2. For Sub-Clause 7.7.3.6 Determination of the ambient air temperature, insert the following text "Subclause 7.6.4 of IEEE Std C37.100.1-2018 is applicable".

WG agrees.

Table 3, Line 525
Are notes "a" and "b" necessary?
Suggestion: Move the to the appropriate test clauses

Delete the first one and the second will be looked at by the AD Hoc team looking at the short-time sections.

7.3.3, Line 738
Condition of DSG following short-circuit tests.

Suggestion: This should rather read 'Condition of DSG following short-circuit withstand tests".
A suggestion is to remove “withstand” and then just call out each of the tests independently. .
There is an Ad Hoc group that should be looking at this.

Partial Discharge Pre-stress voltage
The WG agreed to harmonize with C37.62.

IEEE C37.301 referenced for partial discharge will be expiring with no plans for updating. The initial recommendation is to remove every reference to C37.301 from our document. One suggestion was to reference the IEC standard instead. Chair will create an Ad Hoc to look into this.

9. Decision on asking RODE permission to proceed to Ballot once WG reaches consensus.

   The WG voted to go to ballot upon the completion of the WG comment resolution.

   i. Moved by Ian and seconded by Caryn. (11) voted yes.
   ii. WG needs consensus on accepting the comments.
   iii. Comment resolution group for the ballot was formed: Mohit, David, Kennedy, Jon Neujahr from Eaton, Eric Li and Victor Savulyak, will reach out to Edwin and Paul.

10. Any other business

    i. The WG will have another on-line meeting to be held once the Chair can find a good time.
    A comment was made that the WG needs to see a copy of all that we have done first before it can give the OK to go to ballot.

11. Next in person meeting
    WG meeting planned for Spring ’23 Switchgear Committee Mtg. (Mar. 31 – Apr. 3, ’24)
    Westin Hotel Ft. Lauderdale, FL

12. Adjournment at 5:30 PM on 10/9 and 9:49 on 10/12

Name (Printed)	Employer	Sign-in Initials Session 1	Sign-in Initials Session 2	Sign-in Initials Session 3
Caryn Riley (Voting-Member)	Georgia Tech/NEETRAC	X		X
Francois Soulard (Voting-Member)	Hydro-Quebec	E	E	E
Frank DeCesaro (Voting-Member)	DeCesaro Consulting Services, LLC	X	X	X
Harold Hirz (Voting-Member)	Vesco	X	X	X
Ian Rokser (Voting-Member)	Eaton	X	X	X
John Kapitula (Voting-Member)	ABB	X	X	X
Karla Trost (Voting-Member)	G&W Electric	X	X	X
Kennedy Darko (Chair)	G&W Electric	X	X	X
Travis Johnson (Secretary)	Xcel Energy	E	E	E
Harm Bannink (Voting-Member)	G&W Electric	X	X	X
Jeffrey Gieger (Voting-Member)	ABB/Elastimold	X	X	X
Victor Savulyak (Voting-Member)	Kema Labs	X	X	X
Edwin Almeida (Voting-Member)	Southern California Edison	X	X	X
David Beseda (Voting-Member)	S&C Electric Co	X	X	X
Rahul Jain (Voting-Member)	S&C Electric Co			
Kelsey Bush (Voting-Member)	ABB/Elastimold	X	X	X
Joseph Stemmerich (Voting-Member)	Trayer Engineering Corporation	X	X	X
Stephen Pell (Guest)	Siemens	X	X	
Grant Ringham (Guest)	BC Hydro			
Christopher Borck (Guest)	Eaton's Power Systems Division	X		X
Christopher Morton (Guest)	PowerTech Labs			
Larry Putman (Guest)	Powell Industries			
Paul Found (Guest)	BC Hydro	X	X	
Samuel Andris (Guest)	KEMA Labs	X	X	
Ganesh Balasubramanian (Guest)	Eaton	X	X	
Andreas Bartels (Guest)	Powell Industries		X	
Ngoc Bui (Guest)	SDG&E			
Sudarshan Byreddy (Guest)	Burns & McDonnell			

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

James Wenzel (Guest)	Eaton			
Kate Cummings (Guest)	G&W Electric Co	X	X	
Dave Dart (Guest)	Noja Power	X	X	
Nnadozie Eronini (Guest)	Megger	X		
Charles Worthington (Guest)	Hubbell	X		
Alex Cochran (Guest)	G&W Electric Co	X		
Mark Feltis (Guest)	Schweitzer Eng	X	X	
Cody Marshall (Guest)	Schweitzer Eng	X	X	
Connie Yin (Guest)	G&W Electric Co - Canada	X	X	
Andrew Fernandes (Guest)	Trayer Eng	X	X	X
Paul Barnes (Guest)	UL Solutions		X	
Ben Hatfield (Guest)	Trayer Eng		X	
Distin Sullivan (Guest)	Hubbell	X	X	
Dan Busilan (Guest)	Dominion Energy	X		
Ricky Herring (Guest)	Siemens	X	X	X
Brenan Kirkpatrick (Guest)	SCE	X	X	
Ryan Kowdley	PG&E	X	X	
Abe Shocket	ABB	X		X
Albert Livshitz	Qualus services	X	X	

Key: **X – present**
E – excused