Minutes of **C37.09 Amendment 1 Working Group**
Fall 2022 meeting
October 18, 2022, Burlington, Vermont

Attendance 63 people were in attendance
26 members participated (of 35 at that date)
37 guests participated

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Welcome/Call to Order
Jan Weisker called the meeting to order at 4:15 pm

Introductions & Membership
The attendees introduced themselves along with their affiliation.

26 members out of 35 were present for the meeting which met the quorum requirements.

Mandatory Information
The essential patent claim slide was presented. No essential patent claims were voiced during the call.
IEEE Copyright slide was presented.

Approval of Minutes of last Meeting
Motion to approve - John Webb
2nd – Andy Keels

Review of the Item List and work done so far
Since the Spring 2022 meeting proposals for several items have been received.

There was an opportunity for someone to request current limiting HVCB to be added to the standard. There was no response.

A list of items received so far was displayed to the working group.

Item 3
Ted Burse explained Item number 3 by giving a presentation. (Dual-rating, low-temperature test sequence) TL and TLL are not defined in the standard.
Mauricio explained that TL and TLL were options to give the manufacturer an opportunity to test at two ratings during the same cycle.
Victor elaborated the IEC requires the cycle to be repeated completely to get a second rating.

Discussion settled that the procedure has a purpose but needs to be better defined.

Victor Hermosillo, Mauricio Aristizabal, Sergio Flores, and Ted Burse agreed to draft a proposal to address Item 3.

Item 3 and item 17 (Andrew Chovanec) to commonly propose a "low and high temperature test" subclause

Item 4
Section 4.5.5 – Proposal to ignore breakdowns that occur during preliminary tests as in 4.5.5 to be extended to 4.5.6, 4.5.7, 4.8.5.4.3
There were no objections to the addition.
Originally it was written for medium voltage which is why it wasn't present.

Item 5
Inductive load switching. Currently it is not addressed in C37.04.
Discussion proposed that Item 5 should be included in 37.04

There is a task force that meets on 10/19/22 to address inductive load switching.

Item 6
Clause 4.8.2.3.3
No objection to the proposed solution.

Item 7
No objections to keeping 18 degree
Item closed

Item 8
No objections to the proposed correction on changing the list to a) and b).

Item 11
Mike Crawford explained that altitude isn't mentioned. There was some discussion on how altitude affects cooling. The group accepted the proposed language.

Item 12
After some discussion, the proposed changes were accepted.

Item 13
There was discussion regarding whether pressurized technical air would behave the same way as SF6.
There was general acceptance from the working group to add a test to verify the integrity of the vacuum interrupter. This test would be verification of the condition after a type test.
There was a question of whether this test is needed if a hi-pot test would discover a compromised vacuum interrupter. An explanation was given that the pressurized insulating medium would be sufficient for the interrupter to pass the high pot test even if had leaked into the interrupter.
There was some discussion of whether a different test would be sufficient to detect a vacuum interrupter failure.

There was too much discussion to settle on this topic. It was determined to continue to work on a proposal with volunteers from the group and present again at a later meeting. Harm Bannink, Jan Weisker, Dan Schiffbauer, Neil McCord will work to develop a proposal.

Items 14 and 15
Neil McCord requested this proposal be sent to him, so he can harmonize 100.2 with this proposal. This item will be revisited after 100.2 evaluated for revision to harmonize.

Item 17
High temperature testing. Andy Chovanec noted that high temperature testing was not included. He copied and modified the low temperature testing section to cover high temperature testing.
Neil McCord stated that C37.016 has high temperature test requirements if we would like to use it for this standard.
Leakage rate is defined in C37.016.

There was a question whether testing at -40 and -50 could result at passing one then failing the other. Should that be spelled out in the standard.

The low temperature working group is going to coordinate with Andy since they are similar. This will combine Items 3 and 17

Item 21
There was much discussion regarding the tolerance. There was a consensus to leave the item as is and not change.

Minutes of **C37.09 Amendment 1 Working Group**
Fall 2022 meeting
October 18, 2022, Burlington, Vermont

Time Schedule
A planned time schedule was presented to the working group. The PAR expires December 31, 2025.

Adjourn the Meeting
Motion to adjourn: Michael Christian
2nd John Webb

Meeting adjourned at 5:57

Reported by:
Chris Jarnigan

Attachments:

(1) WG membership and attendance

(2) Agenda

(3) Item List after meeting

Attendance

Role	First Name	Last Name	Company Name	S22	F22
Chair	Jan	Weisker	Siemens Energy	x	x
Secretary	Christopher	Jarnigan	Southern Company Services	x	x
Member	John	Webb	ABB	x	x
Member	Koustubh	Ashtekar	JST POWER EQUIPMENT	x	x
Member	Arben	Bufi	Meiden America Switchgear, Inc.	x	x
Member	Eldridge	Byron	Schneider Electric	x	
Member	Stephen	Cary	2 Phase Solutions	x	
Member	Steven	Chen	Eaton Corporation	x	x
Member	Michael	Christian	ABB	x	x
Member	Lucas	Collette	Duquesne Light Co.	x	x
Member	Michael	Crawford	Mitsubishi Electric	x	x
Member	Sergio	Flores	Schneider Electric US, Inc.	x	x
Member	Robert	Hanna	JST Power Equipment	x	x
Member	Jeremy	Hensberger	Mitsubishi Electric	x	x
Member	Todd	Irwin	GE Grid Solutions	x	
Member	Thomas	Keels	kEElectric Engineering, PLLC	x	x
Member	Carl	Kurinko	Hitachi Energy	x	x
Member	Vincent	Marshall	Southern Company	x	x
Member	Kevin	McGlown	JST Power Equipment	x	
Member	Sumitabha	Pal	Schneider Electric	x	x
Member	Craig	Polchinski	Mitsubishi Electric Power Products, Inc.	x	
Member	Anthony	Ricciuti	EATON	x	x

Member	Leonel	Santos	Schneider Electric	x	
Member	Victor	Savulyak	KEMA	x	x
Member	Carl	Schuetz	ATC	x	x
Member	Jeffrey	Scott	Ameren	x	x
Member	Devki	Sharma	Entergy	x	
Member	Michael	Skidmore	Skidmore	x	x
Member	Jacob	Walgenbach	Siemens	x	x
Member	Casey	Weeks	Siemens Energy, Inc.	x	x
Member	Terry	Woodyard	Siemens Industry, Inc.	x	x
Member	Richard	York	Mitsubishi Electric	x	x
Member	Samuel	Zaharko	MEPPI	x	x
Member	Herman	Bannink	G&W Electric	x	x
Member	Neil	Mc Cord	KEC Precision LLC	x	x
Member	Vernon	Toups	Siemens Energy Inc	x	x
Guest	Elizabeth	Bray	Southern Company	x	
Guest	John	Brunke	Power Engineers	x	
Guest	Andrew	Chovanec	G&W Electric	x	x
Guest	Jason	Cunningham	Southern States, LLC	x	x
Guest	Patrick	Di Lillo	Consolidated Edison Co. of New York, Inc.	x	x
Guest	Bruce	Fennell	Nashville Electric Service	x	
Guest	Benjamin	Hohnstadt	DTE	x	
Guest	Roy	Hutchins	Georgia Power Company	x	x
Guest	Bharatwaj	Jagadeesan	Southern States LLC	x	
Guest	Chang Hoon	Lee	HYOSUNG	x	
Guest	Leo	Lopez	WIKA Instrument Corporation	x	x
Guest	Peter	Marzec	S&C Electric	x	
Guest	Paul	Masterson	Meiden America Switchgear	x	
Guest	David	Mitchell	Southern States	x	x
Guest	Raj	Nayar	Siemens	x	
Guest	Miklos	Orosz	Circuit Breaker Technology & Support LLC	x	x
Guest	Thomas	Pellerito	DTE ENERGY	x	
Guest	Rakesh	Ranjan	Esgee Technologies Inc.	x	
Guest	Jennifer	Santulli	IEEE-SA	x	
Guest	Daniel	Schiffbauer	Toshiba International Corporation	x	x
Guest	Matthew	Siena	Duke Energy	x	
Guest	Joseph	Usner	AEP	x	x
Guest	Lukas	Zehnder	Hitachi Energy Switzerland Ltd.	x	
Guest	Danish	Zia	UL LLC	x	
Guest	Andrew	Monroe	Southern Company	x	
Guest	Donald	Steigerwalt	Duke Energy		x
Guest	Marcus	Young	Mitsubishi Electric		x

Guest	Mauricio	Aristizabal	Hitachi Energy	x
Guest	George	Becker	Power Engineers Inc.	x
Guest	Ted	Burse	Powell Industries, Inc.	x
Guest	Kenneth	McKinney	Underwriters Laboratories	x
Guest	Truett	Thompson	Siemens	x
Guest	Mina	Youssef	Eaton Corporation	x
Guest	Li	Yu	EATON	x
Guest	R Kirkland	Smith	TCARA	x
Guest	Xin	Zhou	Eaton	x
Guest	Victor	Hermosillo	GE Grid Solutions	x
Guest	Changhoon	LEE	Hyosung	x
Guest	SangTae	Kim	HICO America	x
Guest	Hyoungjin	Joo	Hyundai Electric & Energy Systems Co., Ltd.	x
Guest	Samuel	Andris	KEMA Labs	x
Guest	Federico	Di Michele	CESI SpA	x
Guest	Peter	Glaesman	PCORE Electric Company	x
Guest	Adrian	Lopez	Powell Industries	x
Guest	Jennifer	Hunter	MEPPI	x
Guest	Dan	Wolfe	MEPPI	x
Guest	Darin	Jensen	Meiden American Switchgear	x
Guest	Steven	May	Southern Company	x
Guest	Craig	Bryant	Duke Energy	x
Guest	Nadia	HASNAOUI	GE	x

PC37.09 Standard Test Procedure for AC High-Voltage Circuit Breakers with Rated Maximum Voltage above 1000V - Amendment 1

Chair: Jan Weisker

Secretary: Chris Jarnigan

IEEE Switchgear Meeting, October 18, 2022 – Burlington/VT

Agenda

- Welcome/Call to Order
- Introductions & Membership
- Mandatory Information
- Approval of Minutes of last Meeting
- Review of the Item List and work done so far
- Time Schedule
- Adjourn the Meeting

Introduction & Membership

Chair: Jan Weisker

Secretary: Chris Jarnigan

Members

Koustubh	Ashtekar
Arben	Bufi
Eldridge	Byron
Stephen	Cary
Steven	Chen
Michael	Christian
Lucas	Collette
Michael	Crawford
Sergio	Flores
Robert	Hanna
Jeremy	Hensberger
Todd	Irwin

Thomas	Keels
Carl	Kurinko
Hua Ying	Liu
Vincent	Marshall
Kevin	McGlown
Sumitabha	Pal
Craig	Polchinski
Anthony	Ricciuti
Jon	Rogers
Leonel	Santos
Victor	Savulyak
Carl	Schuetz

Jeffrey	Scott
Devki	Sharma
Michael	Skidmore
Jacob	Walgenbach
John	Webb
Casey	Weeks
Terry	Woodyard
Richard	York
Samuel	Zaharko

33 Members - Quorum = 17

Mandatory Information

https://development.standards.ieee.org/myproject/Public/mytools/mob/slideset.pdf

https://standards.ieee.org/wp-content/uploads/2022/02/ieee-sa-copyright-policy.pdf

Approval of MoM

Minutes of C37.09 Amendment 1 Working Group
Spring 2022 meeting
April 12, 2022, Orlando, Florida

Attendance 59 people were in attendance
30 Attendees applied for membership (in addition to Chair & Vice Chair)
29 guests participated

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1) The meeting was called to order by Chair, Jan Weisker at 16:15 EDT
2) Introduction of members and guests, Chair mentioned that during initial meeting of a working group any attendee may apply for membership. Although John Webb is serving as temporary secretary for the initial meeting, it is desired to assign a permanent secretary for the balance of the work and a call for volunteers was issued.
3) Presentation of Behavior rules

   https://standards.ieee.org/wp-content/uploads/import/documents/other/Participant-Behavior-Individual-Method.pdf

4) Review of Patent Slides – *No issues were voiced by the meeting attendees*
5) Discussion of Copyright Rules – *No issues were voiced by the meeting attendees*

   Agenda was presented
6) Chair indicated that iMeet Central working group space is requested but not ready
7) PAR review, work to be done was explained
8) The Excel spreadsheet which was the output of the PAR Study Group was reviewed and each open item identified for Amendment 1 was identified with a lead person and supporting team. The work list is attached as an annex to these minutes.
9) Schedule presented
10) Meeting adjourned at 18:00 EDT.

11) Next meeting to be held at Fall Switchgear Committee Meeting or sooner by electronic means at discretion of chair

Reported by:
John Webb (acting Secretary)
jcwebb@ieee.org

Attachments:
(1) WG membership and attendance
(2) Agenda?
(3) Item List

Project Status PC37.09 Amd1

1) First Meeting, April 12, 2022, Orlando/FL
2) Proposals for several items received

Item List Review

New item came up:

- PAR request for Entity Std. on current limiting HVCB
- Was rejected by Switchgear committee
- Considered to be included in C37.04 and .09 as appropriate
- No elaboration so far

- What would be the content to be added?

Item List Review

Item List Review

#3

Presentation by Ted Burse

Item List Review

#4

4	Technical	18	4.5.5	Text to ignore breakdowns that occur during preliminary tests can be ignored	add same text to all clauses where impulse voltages are applied to open vacuum interrupters (4.5.6, 4.5.7, 4.8.5.4.3)	Jan Weisker	Jan Weisker

4.5.5 Full-wave lightning impulse withstand voltage tests

These tests are conducted on circuit breakers, under dry conditions, to verify their ability to withstand their rated full-wave lightning impulse withstand voltages. In these tests, both positive and negative, lightning impulse voltages having an average peak value equal to or greater than the rated full-wave lightning impulse withstand voltage, as specified in IEEE Std C37.04, shall be applied to the terminals of the circuit breaker.

Note that some insulating materials retain a charge after an impulse test. For these cases, care should be taken when reversing the polarity of the test voltage. To allow the insulating materials to discharge, the use of appropriate methods, such as the application of impulses of the reverse polarity at lower voltages (50% to 75% of rated value), are recommended.

When testing switchgear incorporating an open vacuum interrupter, for each polarity, a maximum of 25 preliminary impulse tests may be performed at up to and including the rated withstand voltage. The number and level of preliminary impulses is to be stated by the manufacturer. Breakdowns that are observed during these preliminary tests shall be disregarded for the purposes of the withstand statistics used to determine the pass or fail performance of the equipment.

Item List Review

#4

4.5.7 Chopped wave lightning impulse withstand voltage tests

4.5.8 Switching impulse voltage withstand tests

4.8.5.4.3 Condition check after meeting service capability tests

- Add this text at the end of 4.5.6, 4.5.7 and 4.8.5.4.3
- When testing switchgear incorporating an open vacuum interrupter, for each polarity, a maximum of 25 preliminary impulse tests may be performed at up to and including the rated withstand voltage. The number and level of preliminary impulses is to be stated by the manufacturer. Breakdowns that are observed during these preliminary tests shall be disregarded for the purposes of the withstand statistics used to determine the pass or fail performance of the equipment.

Item List Review

#5

5	Technical	Shunt reactor swithcing interruption ratings?	Clarify that there are no ratings	Joanne Hu	Jan Weisker, Victor Hermosillo

4.11 Inductive load switching

No rating is assigned in IEEE Std C37.04. This switching test duty is optional and applicable to circuit breakers that are used to switch high-voltage motor currents and shunt reactor currents. Switching of inductive loads (high-voltage shunt reactors) is described in application guide IEEE Std C37.015™-2017 [B30]. Reactor switching is an operation in which small differences in circuit parameters can produce large differences in the severity of the duty. The results from any one series of tests cannot simply be applied to a different set of conditions.

When inductive load switching tests are required, IEC 62271-110 shall be used. In addition to the requirements of subclause 6.114.9 of IEC 62271-110:2012 [B13], the test report shall include a chopping number of the circuit breaker or, when this is not possible, it is allowed to provide the chopping number in a separate document.

NOTE—The requirement to provide a chopping number is not applicable to vacuum breakers.

Proposal – no change, clear enough

Optional: Update reference to latest IEC 62271-110 (20xx)

Item List Review

#6

6	Editorial	28	4.8.2.3.3	The variable " T " is not defined in the equation. From 62271-100, it is defined as "the duration of one cycle of rated frequency"	Include the definition of " T " in the text.	Tony Ricciuti	Tony Ricciuti

- In C37.09, clause 4.8.2.3.3, (Page 28) several equations are provided that include the variable "*T*". However, the variable "*T*" is not defined in the clause.

- I propose to replace the list of variable definitions on page 29:
  - *t*a100s is the minimum arcing time of terminal fault test duty T100s
  - Δ*t*a1, Δ*t*a2, Δ*t*a3 are the relevant time parameters to be selected from Table 2 and Table 3
  - *d*α is 18°

- With:
  - *t*a100s is the minimum arcing time of terminal fault test duty T100s
  - Δ*t*a1, Δ*t*a2, Δ*t*a3 are the relevant time parameters to be selected from Table 2 and Table 3
  - *d*α is 18°
  - *T* is the duration of one cycle of rated frequency

Item List Review

#7

7	Technical	29	4.8.2.3.3	References to "dα = 18° " is directly copied from 62271-100 as the Angle difference used for determination of arcing times, and is based on 1ms at 50Hz, but 1ms at 60Hz is 21.6°. This may not be an issue for laboratory capabilities, however.	Replace with "18° for 50Hz, or 21.6° for 60Hz"	Tony Ricciuti	Tony Ricciuti, Terry Woodyard, Jan Weisker

Chairman‘s comment

Clarify during F’22 if a change is necessary, typically labs can handle degree and time domain

Also, in IEC 18-degree step is applied for 60 Hz as 0.83 ms

Item List Review

#8

8	Editorial	29	4.8.2.3.3	References to c1) and c2) do not exist in the paragraph that begins with "If the behavior of the circuit breaker is such that the required conditions of item c1) and item c2) are not fulfilled…" There are 3 required conditions described in b), d) and e) on page 28.	Change " item c1) and item c2)" to " items b), d) and e)"	Tony Ricciuti	Tony Ricciuti

- In C37.09, clause 4.8.2.3.3, (Page 29) the paragraph that begins with: "If the behavior of the circuit breaker is such that the required conditions of item c1) and item c2) are not" is referencing items "c1)" and "c2)". However the list of conditions on Page 28 do not include items "c1)" and "c2)". This is a typographical error. After reviewing Draft 5 that the working group used to develop this revision of C37.09
  - (see the attached word document – page 2 line 1134 which I highlighted in yellow shows the original references were "1) and 2)") The final approved revision of C37.09 replaced the numbering of these items with a) and c), which I highlighted in blue and purple) You can compare the items on my attached word document, between page 1 and page 4.

- I propose to replace the first sentence of that paragraph:
  - If the behavior of the circuit breaker is such that the required conditions of item c1) and item c2) are not

- With:
  - If the behavior of the circuit breaker is such that the required conditions of item a) and item c) are not

Item List Review

#8

a) One operation when arc extinction occurs in the first-pole-to-clear at the end of a major current loop in the first phase with the required asymmetry criteria and with the longest possible arcing time.

b) The longest possible arcing time t_{arc1} for the first-pole-to-clear is achieved when the following condition is met:

$$t_{arc1} = \left(t_{a100s} - T \times \frac{d\alpha}{360°} \right) + \Delta t_{a1}$$

c) One operation when arc extinction occurs at the end of an extended ma
second phase with the required asymmetry criteria and with the longest po

d) The longest possible arcing time t_{arc2} for the last-pole-to-clear for circuit t
used in noneffectively grounded neutral systems is achieved when the follo

$$t_{arc2} = \left(t_{a100s} - T \times \frac{d\alpha}{360°} \right) + \Delta t_{a2}$$

4.8.2.3.3 Arcing time for three-phase test duty T100a

Change the item list after the fourth paragraph as follows:

The intention is to achieve a series of three valid tests, and the duty is satisfactory if the following conditions are met. There is no preferred order to demonstrate the three valid tests:

a) One operation when arc extinction occurs in the first-pole-to-clear at the end of a major current loop in the first phase with the required asymmetry criteria and with the longest possible arcing time.

Change the item b) to main text under item a):

~~b)~~ The longest possible arcing time t_{arc1} for the first-pole-to-clear is achieved when the following condition is met:

$$t_{arc1} = \left(t_{a100s} - T \times \frac{d\alpha}{360°} \right) + \Delta t_{a1}$$

Change the item c) to item b):

b) ~~c)~~ One operation when arc extinction occurs at the end of an extended major current loop in the second phase with the required asymmetry criteria and with the longest possible arcing time.

Item List Review

#11

11	Technical	14	4.4.2	This prohibits continuous current tests from being conducted at LaPem Temp test have to be conducted under standard ambient conditions	Remove subclause c)	John Webb	J Webb, T. Woodyard, Mike Crawford

C37.09-2018 4.4.2 – Comment that requirements may exclude some labs:

- C37.09-2018 does not specifically mention anything that would exclude any lab, EXCEPT for the reference to C37.04 Usual Service Conditions
- C37.04-2018 section 4.1.2 point d) states “The altitude does not exceed 1000m above sea level.”
- Continuous current tests are not heavily affected by altitude in my humble opinion; therefore, I recommend we add a statement to C37.09-2018 Section 4.4.2 stating “Altitude correction is not necessary but the test altitude should be noted in test report if above 1000m”

Item List Review

#12

12	Technical	51	4.8.4.3	T100s can be performed separately into T100s(a) and T100s(b). However, no description how to perform these and no requirements for T100s(a) regarding closing at voltage peak and voltage zero (leads to asymmetry current).	follow IEC 62271-100.	Jan Weisker	Harm Bannink, Jan Weisker

- **proposed text additional to clause 4.8.4.3:**
- For these making tests, two extreme cases shall be achieved:
-

- Maximum peak current FxI
- Maximum pre-arcing, the making shall occur within 15° of the peak of the applied voltage.

Item List Review

#13

13	Technical	56	4.8.6.6	there are no requirements to test the integrity of Vacuum Interrupter (VI) unit in an enclosure filled with SF6	Jan Weisker	Harm Bannink, Henning Milnikel, Eldrige Byron

Proposed text additional to clause 4.8.4.3 (original text from the STL guide IEC 62271-200):

For vacuum interrupter Circuit-Breakers places in an SF6-filled enclosure, integrity shall be verified by performing a short-circuit interrupting test.

If performed three phase, the T10 circuit shall be used with both the source and the load neutrals earthed. If performed single phase, the T10 circuit shall be used and each pole shall be tested separately. The TRV shall be as for the three-phase test condition with a first-pole-to-clear factor of 1,0.

A successful interruption in each pole is evidence that the vacuum interrupter integrity is good.

Chairman's comment:

I think T10 is too specific here. Why not go for IEC approach, at least 50 % of rated voltage and at least 10 % of rated short circuit current.

Secondly, "SF6 filled" is also too specific.

Item List Review

#14+15

14	Technical	66	4.10.9.1.7	Predefined operations for test duty 1 and 2 of three-phase LC/CC tests class C2. but there is no maximum number of tests if breakers prevent accurate control.		Jan Weisker	Harm Bannink, Neil McCord, Jan Weisker

- **Predefined operations for test duty 1 and 2 of three-phase LC/CC tests class C2. but there is no maximum number of tests if breakers prevent accurate control. (To be in line with the IEC)**

- **proposed text additional to clause 4.10.9.1.7:**
  If the behavior of the circuit-breaker prevents accurate control, where the number of tests is defined for 24 the total number of tests is limited to 36 for each test-duty.

- **proposed text additional to clause 4.10.9.1.8:**
  If the behavior of the circuit-breaker prevents accurate control, where the number of tests is defined for 48 the total number of tests is limited to 72 for each test-duty.

- **proposed text additional to clause 4.10.9.1.9:**
  If the behavior of the circuit-breaker prevents accurate control, where the number of tests is defined for 80 the total number of tests is limited to 100 for each test-duty.

- **proposed text additional to clause 4.10.9.1.10:**
  If the behavior of the circuit-breaker prevents accurate control, where the number of tests is defined for 120 the total number of tests is limited to 159 for each test-duty.

- **Added for C1 to cover #15**

- **proposed text additional to clause 4.10.9.1.10:**
  If the behavior of the circuit-breaker prevents accurate control, where the number of tests is defined for 24 the total number of tests is limited to 36 for each test-duty.

Item List Review

#17

17	Technical	87	4.14	mention of high temp tests but not defintion/procedure	Check C37.016-2018, clause 7.11.5.3 for common clause	Andrew Chovanec	Henning Milnikel, Andrew Chovanec

Jump to word file

Item List Review

#21

21	Technical	28	4.8.2.3.3	The third asymmetry criteria (The product of the prospective short-circuit current peak value and the loop duration must be equal to or higher than 100% of the product of the specified values. Refer to Table 2 and Table 3" presents an impossible condition. If one of the previous asymmetry criteria is at the minimum of 90%, then even if the other criteria is at maximum of 110%, the product can only be 99%. This third asymmetry criteria requirement is not a part of the IEC 62271-100 test procedure on which it is based, so the requirement of the product is unprecedented.	Change the requirements to eliminate the impossible condition. Options could include: - reduce product to 99% - increase minimums to 91% - use other WG chosen values - eliminate this requirement	Tony Ricciuti	Tony Ricciuti, Terry Woodyard, Jan Weisker

Proposal to go for 91 % option

Item List Review

#24

24	Technical		4.4.5		clarify accessible spots for temperature measurements	John Webb	J. Webb, Henning M., Mike Crawford, Jake

C37.09-2018 4.4.5 comment - Measurement of temperatures, clarify accessible spots for temperature measurements

- Section 4.4.5 currently states "The measuring device shall be located at a point where measurement of the hottest accessible spot can be made. Measure ments shall be made at junction points of insulation and conducting parts to prevent exceeding temperature limits of the insulation. Holes that destroy the effectiveness of the test (such as in multiturn coils) shall not be drilled."
- I suggest the following rewrite of that statement: "The measuring device shall be located at a point where the hottest accessible spot can be made without damaging the device or adversely affecting the monitored temperature or current flow. The measurement spot shall be chosen based on analysis, engineering judgement, etc... Measurements shall be made at junction points of insulation and conducting parts to prevent exceeding temperature limits of the insulation. Holes that destroy the effectiveness of the test (such as in multiturn coils) shall not be drilled."

Schedule PC37.09 Amd1

1) First meeting, April 12, 2022, Orlando/FL
2) Second meeting, October 18, 2022, Burlington/VT
3) Collect proposals through 2022/2023
4) Review proposals/open points during F22 / S23
5) Prepare D1
6) Form ballot group by end of 2023
7) Initial Ballot beginning of 2024
8) Discuss Comments during S24 meeting/form CRG
9) Prepare D2
10) 1st recirculation and comment resolution before F24
11) Prepare D3
12) 2nd recirculation and finalization in 2024

(PAR expires December 31, 2025)

Motion to Adjourn

Thank you!

Item List - Amendment to C37.09

No	Category	Page	Sub-clause	Comment	Proposed Change	Proposer	To be prepared by	Status	Remark S22	Remark F22
1	Technical			Define Time interval between tests	as per IEC 62271-100; 6.106.1 (future 7.106.1)	Ted Burse				Find person in charge
2	Technical			T100a procedure is generally accepted	but give more guidance if circuit-breaker is not stable for min arcing time	Ted Burse				Find person in charge
3	Technical	84	4.3.18	Low-Temp Test – TL and TLL are neither defined in .09 or referenced in .04	Define TL and TLL	Ted Burse	Ted Burse	in progress	Contact Ted Burse	Issue clarified by Ted's presentation, common item with #17
4	Technical	18	4.5.5	Text to ignore breakdowns that occur during preliminary tests can be ignored	add same text to all clauses where impulse voltages are applied to open vacuum interrupters (4.5.6, 4.5.7, 4.8.5.4.3)	Jan Weisker	Jan Weisker	done		Proposal accepted
5	Technical			Shunt reactor swithcing interruption ratings?	Clarify that there are no ratings	Joanne Hu	Jan Weisker, Victor Hermosillo	in progress		Update after shunt reactor task force: Ratings would have to bedefined in .04. Testing refers to IEC 62271-110
6	Editorial	28	4.8.2.3.3	The variable " T " is not defined in the equation. From 62271-100, it is defined as "the duration of one cycle of rated frequency"	Include the definition of " T " in the text.	Tony Ricciuti	Tony Ricciuti	done		Proposal accepted
7	Technical	29	4.8.2.3.3	References to "dα = 18° " is directly copied from 62271-100 as the Angle difference used for determination of arcing times, and is based on 1ms at 50Hz, but 1ms at 60Hz is 21.6°. This may not be an issue for laboratory capabilities, however.	Replace with "18° for 50Hz, or 21.6° for 60Hz"	Tony Ricciuti	Tony Ricciuti, Terry Woodyard, Jan Weisker	done		Decided that no change required, 18 degrees are 1 ms at 50 HZ and .08 ms at 60 Hz
8	Editorial	29	4.8.2.3.3	References to c1) and c2) do not exist in the paragraph that begins with "If the behavior of the circuit breaker is such that the required conditions of item c1) and item c2) are not fulfilled…" There are 3 required conditions described in b), d) and e) on page 28.	Change " item c1) and item c2)" to " items b), d) and e)"	Tony Ricciuti	Tony Ricciuti	done		Proposal accepted
9	Technical			Requirement to perform all interruption tests in a minimum volume enclosure?	Requiremnt to be added?	John Webb	John Webb			
10	Technical			Double Earth Fault in IEEE	Test necessary?	John Webb	John Webb, Jan Weisker			
11	Technical	14	4.4.2	This prohibits continuous current tests from being conducted at LaPem Temp test have to be conducted under standard ambient conditions	Remove subclause c)	John Webb	John Webb, Terry Woodyard, Mike Crawford	in progress		Proposal accepted

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No	Category	Page	Sub-clause	Comment	Proposed Change	Proposer	To be prepared by	Status	Remark S22	Remark F22
12	Technical	51	4.8.4.3	T100s can be performed separately into T100s(a) and T100s(b). However, no description how to perform these and no requirements for T100s(a) regarding closing at voltage peak and voltage zero (leads to asymmetry current).	follow IEC 62271-100.	Jan Weisker	Harm Bannink, Jan Weisker	in progress	Note in Table 1 and bring definition of symmetrical and asymmetrical making	Proposal accepted
13	Technical	56	4.8.6.6	there are no requirements to test the integrity of Vacuum Interrupter (VI) unit in an enclosure filled with SF6		Jan Weisker	Harm Bannink, Henning Milnikel, Eldrige Byron	in progress		Reason behind proposal to be made more clear, new proposal to be prepared,
14	Technical	66	4.10.9.1.7	Predefined operations for test duty 1 and 2 of three-phase LC/CC tests class C2. but there is no maximum number of tests if breakers prevent accurate control.		Jan Weisker	Harm Bannink, Neil McCord, Jan Weisker	in progress		possibility to cover this in C37.100.2 to be evaluated
15	Technical	70	4.10.9.2.7	Predefined operations for test duty 1 and 2 of three-phase LC/CC tests class C1. There is no maximum number of tests if breakers prevent accurate control. The 6 distributed shots on one polarity is achieved by step of 30˚. This won't be possible in three phase tests. The second 6 shots for maximum arcing time at another polarity.		Jan Weisker	Harm Bannink, Neil McCord, Jan Weisker	in progress		Red part of the comment is covered by Corrigendum already possibility to cover this in C37.100.2 to be evaluated
16				Testing covering kpp=1.3 & kpp=1.5; Previously, IEEE always considered kpp=1.5 covering kpp=1.3. How to cover metal-clad switchgear (S1) applications if system is grounded (kpp=1.3)?	Clarify.	John Webb (ht. Ted Burse)	J. Webb and T Burse, Victor			
17	Technical	87	4.14	mention of high temp tests but not defintion/procedure	Check C37.016-2018, clause 7.11.5.3 for common clause	Andrew Chovanec	Henning Milnikel, Andrew Chovanec	in progress		cooperate with people of item #3, review wht is existing in C37.016, come up with common new text
18	Technical			add references to C37.100.2	Refer Cap Sw tests to 100.2	Neil McCord	John Webb, Neil McCord, Roy Alexander			
19	Technical			consider appropriateness of determining minimum clearing time	align .09 with -100 as related to min arcing time	Ted Burse	Ted Burse, John Webb, Harm Bannik, Terry Woodyard, Doug Edwards, Jan Weisker			
20	Technical			formulas for calculating assymetrical %DC for T100a 1ph need to be clarified	T100a 1ph needs to be clarifed as compared to TD 7 defintion in 1999 version	Sergio Flores	S. Flores, J. Webb, A. Chovanec		Informative Annex in 09? Move explanation to 010	

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No	Category	Page	Sub-clause	Comment	Proposed Change	Proposer	To be prepared by	Status	Remark S22	Remark F22
21	Technical	28	4.8.2.3.3	The third asymmetry criteria (The product of the prospective short-circuit current peak value and the loop duration must be equal to or higher than 100% of the product of the specified values. Refer to Table 2 and Table 3" presents an impossible condition. If one of the previous asymmetry criteria is at the minimum of 90%, then even if the other criteria is at maximum of 110%, the product can only be 99%. This third asymmetry criteria requirement is not a part of the IEC 62271-100 test procedure on which it is based, so the requirement of the product is unprecedented.	Change the requirements to eliminate the impossible condition. Options could include: - reduce product to 99% - increase minimums to 91% - use other WG chosen values - eliminate this requirement	Tony Ricciuti	Tony Ricciuti, Terry Woodyard, Jan Weisker	done		Skip the math behinf and treat I x t to have a separate tolerance
22	Technical			Entity Par submitted to cover Short-Circuit current-restricting circuit breaker rated above 72.5kV	This falls under scope of .04 and .09	Terry Woodyard	T. Woodyard, J. Webb	done		Input was requested, nobody spoke up
23	Technical		4.5.2 i)		expand allowance to take advantage of symmetry during chopped wave test	Mauricio	Mauricio, J. Webb			
24	Technical		4.4.5		clarify accessible spots for temperature measurements	John Webb	John Webb, Henning Milnikel, Mike Crawford, Jake Walgenbach	in progress		
25	Technical			Utilities are making C37.06.1 mandatory and it is presently a recommended practice	incorparate requirements into C37.04 and C37.09 as an optional rating	Neil McCord		done	Move to 04	no business for 09 as long as not defined in 04
26	Technical		4.8.2.9	4.8.2.9 is a poorly worded section, regarding unit tests and tests of a single pole of a three.phase circuit-breaker	The word "If" in a standard leads to disagreements. > The tests required to prove the concept are not listed. > Is one opening test required? > I have been asked to perform a three phase closing test based on this. It is not clear in this language why closing is needed. I will say that with tulip contacts in SF6 this is not necessary. > Should those tests have a real TRV. > Are these test three separate and independent currents?	Neil McCord	Neil McCord, Victor Savuliak			