

Chair: Paul Found

Secretary: Karla Trost

Meeting Minutes

- 1. Call to Order** Paul
The meeting was called to order at 3:02PM Central time

- 2. Call for Patents/Copyrights** Karla
IEEE Patent and Copyright slides were shown.

- 3. Introduction of Members and Guests**
Self-introductions with affiliations were made in the chat.

- 4. Attendance and Quorum Check** Karla
22 members. Quorum requires 11.
There were 10 members present.

- 5. Review of Comment Resolution – Clause 7.3.7** Mark F
In the recently sent out May 19, 2022 minutes is the following:

Comments i-46/197/242/342 (Clause 7.3.7 / Lines 753-754) – Proposal to remove the IEC alternative.
 - Agree to remove.
 - It was pointed out that the SWC test being done in Clause 7 is equivalent as the Impulse Test (in 7.3.2). C. Hastreiter made a motion to change 7.3.7 to Dielectrics only and 8.2 of 37.90-2005. J. Mizener seconded. Motion passed.

I think we moved too fast on the second part of changing “7.3.7 to Dielectrics only” ...

The IEEE “SWC test” is IEEE C37.90.1-2012 (referenced in our clause 7.3.2). It does NOT contain an impulse test. It contains a fast transient test, with a waveform (top of Figure 2) that appears similar to the impulse waveform in IEEE C37.90-2005 (Figure 1). In comparing these two figures, notice that the waveform in Figure 2 of IEEE C37.90.1-2012:

 - is on a nanosecond scale (as opposed to a microsecond scale in Figure 1 of IEEE C37.90-2005)
 - and is a repeated waveform (every 200 microseconds for 15 milliseconds)

Our clause “7.3.3 Surge Immunity Test: IEC 60255-26:2013 Clause 7.2.7 applies and should be used in conjunction with IEC 61000-4-5:2014 (Table 1 - Test level: 4)”

appears to be much like the impulse test in IEEE C37.90-2005, especially then comparing the waveforms:

- Figure 2 of IEC 61000-4-5:2014
- Figure 1 of IEEE C37.90-2005

They are on the same microsecond scale, but applied differently:

- waveform of Figure 2 of IEC 61000-4-5:2014 applied via coupling capacitances referenced in IEC 60255-26:2013 Clause 7.2.7
- waveform of Figure 1 of IEEE C37.90-2005 “shall be directly applied to the relay terminals” (clause 8.3.4 Test method)

The signal generator for IEEE C37.90-2005 also has a greater source impedance (clause 8.3.1 Test voltage and waveform) than that for IEC 61000-4-5:2014 (Table 3). Makes sense, being that the IEEE C37.90-2005 impulse “shall be directly applied to the relay terminals.”

With all this in mind, I believe for our “7.3.7 Dielectric and Impulse Test,” we should keep the impulse test of IEEE C37.90-2005 and just get rid of the IEC alternative.

After discussion on Clause 8.5; the participants agreed to Mark’s proposal.

6. Comment Resolution Continuation

- Ad hoc to resolve comments I-159, I-328, I-346: **P. Agliata, C. Ambrose.**
 - This topic was not addressed.
- Clause 8 Sub-Team - Updates/ Discussion on comment resolution.
 - Comment i-426 (Clause 8.5/ Line 893)

- Review with WG - Proposal indicated below:

surge suppression components interfere with production testing of outputs (ie control cable to apparatus).

This shall be done for any circuit that lacks surge protection.

"Test per 8.2 of IEEE Std C37.90-2005. In order to identify material or workmanship defects, Series C test ac or dc test voltages should be applied on contacts, inputs, outputs, and any communication interfaces on the control."

This is in the production test section. We also call out as a design test.

Q: What are manufacturers doing today for dielectric testing? Is this a should or a shall (given the argument of surge suppression interference).

- Review with WG – discussion and decision:

Discussion seems to be that this should be performed and can be done at a subassembly level.

Clause 8.2 of IEEE Std C37.90-2005 applies. In order to identify material or workmanship defects, Series C test ac or dc test voltages shall be applied on contacts,

inputs, outputs, and any communication interfaces on the control. This test may be performed on the subassembly level where not feasible to perform at the control level.

- Clause 4 Comments: See Appendix 2 for resolution
- Clause 9 Comments: See Appendix 3 for resolution
- Other open Comments: (See Appendix 4) The group agreed that Paul and Karla will take a pass at the Appendix
- Need support to start editing the draft in response to the comments. J. Mizener and M. Feltis agreed to assist.

7. Next steps/ meeting(s):

The goal is to complete the Recirculation Ballot prior to the fall meeting therefore:

- Team to revise the document (goal – end of June)
- Working group review of document and comment resolutions
- Working group vote for recirculation in early August.
- Recirculation Ballot in September.

8. Adjournment The meeting was adjourned at 4:19PM Central Time.

Annex 1: Attendance

Role	First Name	Last Name	Company	5/26/2022
Chair	Paul	Found	BC Hydro	X
Member	Peter	Agliata	Hubbell Power Systems	
Member	Edwin	Almeida	Southern California Edison	X
Member	Chris	Ambrose	Federal Pacific (Div. of Electro-Mechanical Corp.)	
Member	Katherine	Cummings	G&W Electric	
Member	Frank	DeCesaro	DeCesaro Consulting Services	X
Member	Anil	Dhawan	ComEd	
Member	Mark	Feltis	Schweitzer Engineering Laboratories, Inc	X
Member	Christopher	Hastreiter	Eaton	X
Member	Travis	Johnson	Xcel Energy	
Member	Brendan	Kirkpatrick	Southern California Edison	
Member	Benson	Lo	Toronto Hydro	X
Member	Donald	Martin	G&W Electric Co.	X
Member	Peter	Meyer	S&C Electric Company	
Member	Jacob	Midkiff	Dominion Energy	
Member	Jeff	Mizener	Siemens Industry, Inc.	X
Member	Stephen	Pell	Siemens	
Member	Caryn	Riley	Georgia Tech/NEETRAC	X
Member	Ian	Rokser	Eaton Corp	
Member	Francois	Soulard	Hydro-Quebec	
Member	Nenad	Uzelac	G&W Electric	
Secretary	Karla	Trost	G&W Electric	X

Annex 2: Clause 4 Comments

Comment #	Category	Page	Subclause	Line	Comment	Proposed Change	Other1
I-208	Technical	5	4.1	476	what is the meaning of the statement, since all controls under this standard have to pass design tests?	Add: ...at the extremes of the defined service conditions.	Reject – does not add clarity. Tests are already to be performed across the range.
I-277	Editorial	5	4.1	480	Requirement has some ambiguity simply beginning the sentence with numeral 3.2. Per the IEEE Style manual Clause 13 (page 25 directly below Figure 1) "The term Clause should be used when referring to major clause headings (e.g., "see Clause 5") or at the beginning of a sentence. All other cross-references should be made by simply referring to the number (e.g., "see 5.1" not "see subclause 5.1")."	Subclause 3.2 of IEEE Std. C37.100.1	Agree
I-15	Editorial	5	4.1	482	Due to the word "water head" being used to describe the human condition of Hydrocephalus it could be viewed as insensitive or non-inclusive language.	Change "Water head..." to "The depth of water water...".	Revise. Use "head of water" to align with 74 and 62.
I-16	Editorial	5	4.1	484	The sentence beginning on line 484 is identical to the sentence that begins on line 474.	Delete the sentence beginning on line 484 since it is identical to the sentence beginning on line 474.	Agree
I-174	Editorial	5	4.1	484	The sentence "When the control is designed ..." also appears in the first paragraph of this subclause.	Remove this repeat sentence.	Review wording with I-16
I-458	Editorial	5	4	484	redundancy of sentence compared with sentence of line 475	remove line 484	Review wording with I-16
I-62	General	5	4.1	484	Duplicate sentence. This exact sentence is a repetition of the sentence starting on Line 474.	Delete sentence	Review wording with I-16
	Editorial	5	4.1	484	This text is redundant to the text in lines 474-476	delete lines 484 and 485	Review wording with I-16
I-209	Technical	5	4.1	485	Here, the same applies as for line 476	Add: ...at the extremes of the defined service conditions.	Review wording with I-16
I-175	Technical	5	4.2	486	The paragraph of subclause 4.2 doesn't have any action to take.	Remove entire subclause 4.2.	Reject, severe service conditions must be addressed. See other comments.
I-210	Technical	5	4.2	486	Should here clause 3.3 of C37.100.1 be applied?	Check as per comment	Review with I-175
I-459	Editorial	5	4.2	486	The subclause 4.2 does not specify whether there are any requirements for severe service conditions other than chemical and electrochemical reactions. Line 473 states that the apparatus standard normal service conditions apply when the apparatus and control are located together. Does the same apply for severe service conditions? C37.62 states that 3.3 of C37.100.1 applies to the apparatus. Does it also apply to the control?	clarify whether the apparatus applies for severe service conditions.	Replace 487/488 with a 3.3 of 37.100.1-2018 is applicable. For conditions not listed – agreement between user and manufacturer.

I-460	Editorial	5	4.2	487	Perhaps it would be accurate to change the sentence to "Exposure to chemicals may be encountered in a subgrade environment."	Remove "or electrochemical reactions" since the next sentence states the consequence being "mild corrosive reactions".	See above
I-84	General	5	4.2	487	How do we define "mild"?		See above
	Technical	5	4.2	488	This clause should have some required action	Add a sentence to the end of the paragraph that states "Where such exposure is expected, appropriate corrosion protection shall be considered"	See above

Annex 3: Clause 9 Comments

Comment #	Category	Page	Subclause	Line	Comment	Proposed Change	Other1
I-333	Technical	21	9	932	I did not understand the title of clause 9 "Shipping & Storage Material Requirements" and the text in subclause 9.1 helps a little bit. I think what clause 9 is all about is requirements for shipping or storage materials. The "or" allows for shipping containers to be different from storage containers, which is likely.	Change the title of clause 9 to "Requirements for shipping or storage materials"	Revise. Retitle as "Shipping & Storage Requirements"
I-393	Technical	21	9.1	937	Normal default storage conditions should be specified so that both purchaser and supplier know what is normally expected and what is unusual or special. Special specifications for every project will add extra cost for handling and packaging. Conditions for indoor, unconditioned, warehouse storage should be the norm unless otherwise specified.	add another sentence to the end of the paragraph that reads: "Unless otherwise specified, equipment shall be stored indoors, protected from the elements, in ambient temperature between -5C to +45C (+23F to +113F)."	Revise The user is responsible for defining user storage conditions and time frame required for the device. Unless otherwise specified, equipment shall be stored indoors, protected from the elements, in ambient temperature between -5C to +45C (+23F to +113F). The manufacturer (including other suppliers as appropriate) is responsible for providing suitable shipping and storage materials and labeling the shipping container for indoor storage when appropriate.
I-334	Technical	21	9.2	939	Use of the word "which" is inappropriate. The sentence clause that comes after the word "which" or "that" is the determining factor in deciding which one to use. If the clause is absolutely pertinent to the meaning of the sentence, you use "that." If you could drop the clause and leave the meaning of the sentence intact, use "which." Here, the sentence clause that follows is entirely important to what comes before the word "which". In addition, maintenance makes no sense if the equipment has not already arrived.	Change to "Batteries that require customer maintenance after delivery but prior to installation"	Accept <i>Confirm updated elsewhere</i>
I-247	Technical	21	9.2	941	"last date of charge' where the battery is at least 50% charged". Impossible to be granted by the asset manufacturer.	Remove "last date of charge' where the battery is at least 50% charged". Impossible to be granted by the asset manufacturer".	Reject the working group agrees this information is valuable to the users.
I-3	Technical	21	9.2	941	There is no added value to include the last date of charge.	add: "Battery shall clearly indicate the electrolytic materials of the battery"	Reject the working group agrees this information is valuable to the users.
I-199	Editorial	21	9.4	951	Be consistent in using the word "enclosure," instead of "cabinet."	Replace the word "cabinet" with: enclosure. The word "enclosure" is adequate and used throughout the document.	Agree

Annex 4: Other Open Comments

Comment #	Category	Page	Subclause	Line	Comment	Proposed Change	Other1
I-4	Editorial			41	The IEEE 2020 style manual states in part "Abstracts should be no longer than 15 lines, and should be written in the passive voice. Keywords should highlight key terms and phrases from the text of the draft standard, and should specify the designation number of the project."	Suggest deleting the entirety of the current abstract and replacing it with "Basic requirements intended to mitigate the effects of the harsh environments encountered by microprocessor based controls of distribution switchgear rated above 1kV up to and including 38kV are covered. Basic requirements include the design, testing and application of microprocessor-based controls. Microprocessor-based controls covered by C37.68 are normally intended to be applied in distribution switchgear which is normally mounted on power poles, in wet or dry vaults, or in padmounted switchgear enclosures." and adding "Keywords: Microprocessor-based controls, control, distribution switchgear, vault, dry vault, wet vault, polemount, submersible."	
I-252	Editorial	iii	Abstract	53	lines 53-54 and 55-56 seem repetitive and don't clearly explain the problem.	Rephrase to explain the that formerly the hydraulic and electromagnetic controls were integral to the equipment and now are separate. Also is the problem that they are separate or that they are more fragile?	
I-430	Editorial	iii	Abstract	54	2 spaces to be added	change "...distribution lines.The..." to "...distribution lines. The..."	
I-431	Editorial	iii	Abstract	55	words to be added and deleted	change "...and the electromechanical to microprocessor-based has..." to "...and electromechanical controls to microprocessor-based controls..."	
I-432	Editorial	iii	Abstract	57	add clarity to sentence	change line 57 and 58 to "...to the SAME harsh environmental, mechanical, and electrical conditions AS EXPERIENCED BY the electric utility distribution lines."	
I-433	Editorial	iii	Abstract	58	add clarity to sentence	change to "...The apparatus used for overhead pole-MOUNTED applications..."	
I-434	Editorial	iii	Abstract	59	There is redundancy in the sentence regarding the environmental conditions referred to in the previous sentence.	Change to "...applications is OFTEN SUBJECTED TO high winds, heavy precipitation..."	
I-435	Editorial	iii	Abstract	61	The sentence of lines 61 and 62 could be made a bit more concise	change to "...voltage disturbances, due to lightning surges and switching surges."	
I-436	Editorial	iii	Abstract	63	clarification	change "subject to moisture" to "subject to HIGH moisture (and possibly submersion) FOR EXTENDED PERIODS OF TIME."	
I-437	Editorial	iii	Abstract	63	clarification	change sentence on lines 63 and 64 to "Users must address the DIFFICULTIES THROUGH EFFECTIVELY locating and connecting the control..."	

I-438	General	iii	Abstract	69	Abstract versus Introduction (page ix). The 2021 IEEE SA Standards Style Manual explains that Introductions are a good place to state the history, purpose, and contents of the standard. The Abstract is a short synopsis, not longer than 15 lines but usually about a paragraph, used by bibliographical services for referencing the standard. I think these lines (lines 41 to 68) could be part of a good introduction	move the current content of lines 41 to 68 to the Introduction on page ix. Rework the Abstract to a paragraph or two.
I-5	Editorial			261	It would be a benefit for historical purposes to create an introduction that includes a description of the creation of this document including such things as who was responsible for the creation of it and what the need for the document was. (i.e. Why it was written.)	Suggest creating an introduction that includes a description of the creation of this document including such things as who was responsible for the creation of it and what the need for the document was. (i.e. Why it was written.)
I-328	Technical	1		334	Incorrect word used in sentence: " Lastly, this standard does not cover the design of the control enclosure such as mounting, latching, or user accessibility, or controls which are defined and tested per the switchgear equipment standard." The word which means that "are defined and tested per the switchgear equipment standard" is unimportant to the sentence (i.e., the text could be deleted from the sentence and not change the meaning of the sentence. This is not correct.	Change to " Lastly, this standard does not cover the design of the control enclosure such as mounting, latching, or user accessibility, or controls that are defined and tested per the switchgear equipment standard."
I-486	Technical	15		728	Note:A normal operation of a recloser is a 4 shot sequence (close, over current, lockout)	define TYPICAL operation
I-485	Technical	15		748	all levels are tested up to and including the highest level .	add note test all levels
I-488	Technical	15		751	note to hipot test not required for MOV's connection / grounded circuits	Hipot applies to isolated circuits only
I-487	Technical	20		893	new shop requirement of HiPot test cost	Design test should cover this.