

Annex F Instrument Transformers Subcommittee

Chair: Ross McTaggart

F.1 Introductions

The attendees introduced themselves and reported affiliations.

F.2 Quorum

19 of 34 members were present - quorum attained

19 guests also attended

F.3 Agenda

An agenda was displayed for this meeting. No objections to the agenda were raised. A motion to approve was given by Pierre Riffon and was seconded by Randy Mullikin

F.4 Approval of minutes – New Orleans, LA meeting

Motion by David Wallace & seconded by Igor Ziger.

F.5 Status of C57.13 Standards

- Ross presented the status of the various standards handled by the ITSC.
- A PAR has been submitted for the revision of C57.13.2 approval of the PAR is expected in December. Thomas Sizemore is the chair this working group.
- Pierre Riffon is the chair of the working group revising C57.13.5 currently.
- Ross McTaggart indicated that the work on C57.13.7 covering milli-ampere CTs was in the balloting comment resolution process.
- The SSVT standard C57.13.8 development effort led by David Wallace is continuing.
- A working group is being led by Zoltan Roman to revise the PLC Caps and CCVT standard C57.13.

F.6 Working Group Reports

F.6.1 Working Group on Current Transformers with mA range (WG C57.13.7) - Chair: Henry Alton, Vice-Chair: Adnan Rashid

This WG did not meet in Louisville. The Standard is in the ballot resolution process and a PAR extension is expected in Dec.

F.6.2 WG on Station Service Voltage Transformers - D Wallace

The meeting of the C57.13.8 Working Group met at 8:00 AM as convened by Chair David Wallace. Roster sheets were circulated for attendees to sign in.

A total of 35 people were in attendance with 16 members and 19 guests. 16 out of 29 members were present, therefore quorum was met. Four guests requested membership.

The agenda was presented and accepted with no discussion.

The Patent Claims Statement was presented to the workgroup with no claims being identified.

The minutes from the New Orleans meeting were presented. The minutes were accepted by unanimous agreement

In old business, Clause 5.8 was discussed to determine what needed to be changed to reflect the actual accuracy requirements as they relate to the simultaneous load on the power winding. It was agreed that wording would be added to address this issue and placed in draft 4.1 for comment. It was also decided to add a statement indicating that the metering winding is an optional accessory.

In new business, the comments on Draft 3 were reviewed. A total of 42 comments were presented. During the meeting, 21 were addressed.

During the review, it was decided to send a survey out regarding the 173% Overvoltage statement in clause 4.1.7.3.

Time expired before all of the comments could be reviewed. The remaining comments will be sent out to the WG for acceptance or further comment. The comments that receive full acceptance will be placed into Draft 4.1. The remaining comments will be discussed at the Spring meeting in Pittsburg.

A motion to adjourn the meeting was offered by Thomas Sizemore and seconded by Marek Kornowski. The motion carried unanimously without discussion.

F.6.3 WG PD in Bushings & PTs/CTs PC57.160 - Thang Hochanh

Attendees: 68

Members attending: 20/33 - Quorum requirements were met.

Rosters: Circulated for members and guests.

Agenda: An agenda was presented and approved without objections for the meeting.

Essential Patent Claims: Text was displayed and the Chair inquired as to if anyone knew of essential patent claims. None were brought up during the meeting.

Minutes: Minutes were approved due for the Vancouver and New Orleans meetings. Motion to approve by David Wallace and this was seconded by Detlev Gross.

Items discussed based upon comments received:

A number of comments were received from 2 attendees for discussion as noted below.

Comments discussed from Robert Middleton:

- Under **Keywords** both voltage transformer and potential transformer appear. The text in the standard only refers to voltage transformer. – The unused keyword will be removed.
- Under **Normative References** IEC 60270 appears twice. – The second reference will be removed.
- Under **6.3.1** specific ranges are given for C1, C2 and C3. Large variations are possible for these capacitances. We see no need to specify a range. – This was previously discussed in the working group. The values given are as a typical reference, other values are possible. No change is to be made.
- Annex **C** needs more editing to improve the English. Also better referencing of the Figures is needed. - References will be updated. A review of the English used will be made for grammatical type issues.
- Clause **C2 in Annex C** references Annex 2 Figure 1.a? - Will be updated.

Comments discussed from Raja Kuppuswamy:

- Comments were mostly related to PD monitoring with online equipment which is a valid technique but outside of the scope of this guide.

Additional items discussed:

A call was made to move this guide into the balloting process once the discussed changes are implementing in the next draft. A motion was made by David Wallace and was seconded by Shibao Zhang.

Motion to adjourn: A motion was put forth by Marek Kornowski and was seconded by David Wallace.

F.6.4 Working Group on Revision of C57.13.5 "Standard of Performance and Test Requirements for Instrument Transformers of a Nominal System Voltage of 115 kV and Above.

The WG met on October 31, 2017, from 9:30 am to 10:45 pm. Seventeen (17) members and twenty (20) guests attended the meeting. Seven (7) guests requested membership. The meeting was chaired by Pierre Riffon, chair of the WG. Mr. David Wallace was the vice-chair.

This was the fourth WG meeting.

Attendance has been recorded in the AM system.

Required quorum was met, presence of at least 13 members was required.

Revision 1 of agenda has been reviewed was approved unanimously.

Request of approving the Minutes of New Orleans meeting minutes has been sent by Email. On November 1st, 2017, the majority of WG members have approved the minutes as written.

Call for patents has been made and no essential patent claims have been reported.

As the first item of business, the Chair proposed a new paragraph (clause 4.12 of D1.4) related to relaying accuracy designation when an anti-remanence gap is added within the magnetic circuit. The proposal was to add a "R" suffix after the C class designation. After discussion, it has been agreed that a test clause needs to be added in order to quantify the level of remanence. The test methodology will be based on the IEC methodology. This paragraph will be added in the next draft.

The second item of business was related to a proposal made by Zoltan Roman related to the temperature rise test methodology. He proposed to delete the limit of 20% regarding the ratio of dielectric losses to RI^2 losses for doing temperature rise test with superimposed current and voltage and to replace it by a rated voltage limit of 550 kV and above.

The Chair showed examples where doing test with superimposed voltage and current is worthless for some 800 kV CT technologies like SF₆ insulated CTs, hair pin or eye bolt designs. Their RI^2 losses are significantly higher than dielectric losses. The chair showed also other examples that top core oil-insulated CTs rated below 245 kV have very low dielectric losses compared to RI^2 losses and for those, a temperature rise test with rated current only is needed.

Mr. Zoltan Roman did also propose to delete the criteria of having a temperature rise test duration of 5 times the rated time constant. The chair showed, with an example, that this is needed for CTs having long thermal time constant. He also proposed to change the stability criteria from 1 K/hour to 3 K/hour. The Chair did strongly oppose to such change of the stability criteria, the 1K/hour is even not enough for CTs have long thermal time constant.

After discussion, it has been agreed that the two main items proposed by Zoltan will be surveyed within the WG e.g.:

- What will be the criteria for determining if the temperature rise test needs to be performed with superimposed current and voltage or with current only (dielectric losses level or just voltage rating)?;
- Regarding the temperature rise test duration, do we want to keep the five thermal time constant duration or should we move to another criteria.

The meeting adjourned at 10:30 am on October 31, 2017. The adjournment motion was made by Mr. M. Kornowski and was seconded by Mr. T. Sizemore. The motion was approved unanimously.

F.6.5 C57.13.9 Working Group for PLC Capacitors and CCVT's – Zoltan Roman

Zoltan Roman started the meeting as Chair with Mike Craven as Secretary.

Introductions were made.

This is the second meeting as a Working Group. There were 26 attendees and 18 members. 2 requesting Membership have just been added; they attended 2 consecutive meetings.

The patent notice was made and there were no patent claims by attendees.

The Minutes from the 4 April 2017 in New Orleans were approved with no one dissenting. (Motion made by Dave Wallace and seconded by Ross McTaggart.)

Zoltan Roman reviewed his updated schedule and plans to send Draft 1 and Draft 2 after the meeting to incorporate the meeting results. Latest changes will be color coded text.

As Old Business Zoltan reviewed points in the last meeting minutes. The main items of contention are:

- Table 5 test voltages are noted to be reconsidered in Draft 2. Discussion about a 3uS limit for the crest.

- 5.5.2 Dielectric tests by user, was debated. There is an apparent conflict recommending lower 75 and 65% voltage tests while also allowing 100% to be consistent with C57.13. This will be surveyed.

Next agenda item was to review new revisions compiled in Draft 2.

Still unresolved are:

- Table 7 PD extinction voltages were left in red text.

- Table 8 (added) PD limits in pC for capacitors was left in red text.

For these items and others in general, the attendees were asked to consult testing departments for recommendations, future discussions and resolution.

F.6.6 C57.13.2 Working Group for Conformance Test Procedures – Thomas Sizemore

Attendees: 22

Rosters: An initial roster was circulated for members and guests.

Agenda: An agenda was presented and approved without objections for the meeting. A motion was put forth by Marek Kornowski and was seconded by David Wallace.

Essential Patent Claims: Text was displayed and the Chair inquired as to if anyone knew of essential patent claims. None were brought up during the meeting.

Review of the current version of the standard:

The entire standard was reviewed by the attendees. Because the PAR is submitted but is not yet approved some votes could not be taken but items were identified for potential surveys. The details comments will be addressed in either the next draft or in a survey before the spring meeting.

- Randy Mullikin suggested the removal of the references to the applicability of this standard to use in recreational vehicles and mobile homes. Further he also suggested a sentence be added to reference the applicability of the main standard.
- Nigel McDonald suggested the removal of specifically dated references. In section 2 Normative References and other locations later in the document.
- David Wallace noted that on line 18 an reference 6 is in the text but does not appear as a footnote, etc.
- Stuart Chambers suggested review of lines 22 to 25 to determine if clearer language can be provided.
- Marek Kornowski suggested making a bulleted list of the requirements in section 5 Basis for Conformance.
- Marek Kornowski suggested that in section 7.3.1 the specific percentages be replaced by a reference to the accuracy table.
- Stuart Chambers noted that in section 7.3.2.1 the letters start with e instead of a.
- Igor Ziger suggested the addition of the 'R' remanence designation as is being discussed by the C57.13.5 WG. It was decided that for now we will wait to see what specific language and requirements come from the C57.13.5 effort.
- Igor Ziger suggested a survey be conducted about removing section 7.4 Temperature rise. May be moved to an additional tests section.
- Deepak Kumenria suggested a survey to remove section 7.5 Mechanical rating test.
- Igor Ziger suggested a survey to either remove or significantly revise section 8 Insulation system acceptance. Thomas Sizemore suggested it may have to be left in but revised at least to cover the case of low voltage varnished units.
- Deepak Kumenria suggested a survey to remove section 9 Production monitoring. Marek suggested that auditing, etc. by UL or CSA covers these requirements. Several other people discussed the merits. This section will be reviewed to ensure it is consistent with the scope and purpose.
- Nigel McDonald indicated the document referenced in the bibliography is no longer valid and that the replacement document is already referenced earlier. Remove the reference.

Motion to adjourn: A motion was put forth by Marek Kornowski and was seconded by David Wallace.

F.6 New Business

It was discussed if it was appropriate to initiate a Task Force to review accuracy requirements. No Chair for this work was identified but both Zoltan Roman and Igor Ziger have expressed an interest in a role if/when a task force is initiated. The next step will be to send a survey to the subcommittee asking if such a task force should be formed and comments will be sought regarding the range of topics this task force would look into. A request was made by Randy Mullikin to have the earlier presentations

made available for review. Steve Snyder asked if the authority to make changes lies solely with the Instrument Transformer Subcommittee or if other groups within IEEE have to approve. Both C37.10 and 3004.1 were identified as groups that should be interested parties in this work.

Diego Robalino indicated that C57.13.1 (field testing guide) is being revised and questioned if the ITSC should be involved in the review.

F.7 ITSC Adjournment

The meeting concluded after a motion to adjourn by David Wallace and seconding of this motion by Steve Snyder.

The next meeting will be at the Spring 2018 Transformers Committee meeting in Pittsburgh, PA