

Annex F Instrument Transformers Subcommittee

**March 23, 2016
Atlanta, GA**

Chair Ross McTaggart

F.1 Introductions

The attendees introduced themselves and reported affiliations.

F.2 Quorum

19 of 30 members were present - quorum attained

Also 37 guests attended

F.3 Approval of minutes – San Antonio, Tx meeting

Motion by David Wallace & seconded by Vladimir Khalin

F.4 Review of Agenda

F.5 Status of C57.13 Standards

The status of the various standards handled by the ITSC was reviewed. C57.13 has been approved by RevCom and is awaiting publication. C57.13.5 has just started the revision process. Pierre Riffon is the chair of this effort. After the Memphis meeting a survey was sent out regarding whether C57.13.2 should be revised or withdrawn. The results of this survey were discussed. Eddy So and Vladimir Khalin expressed an interest in keeping the standard and in particular Eddy So noted that the standard is in used by NRC. It was determined that the standard will be revised but the start date and leadership was not settled in this meeting. A TF is being co-chaired by Zoltan Roman and Ross McTaggart to revise the CCVT standard and it held its first meeting here in Atlanta.

Working Group Reports

F.5.1 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 Atlanta. The Standard is ready for balloting

F.5.2 TF on Station Service Voltage Transformers - D Wallace

The meeting of this 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 42 people were in attendance with 20 members and 22 guests. 20 out of 26 members present, therefore quorum was met. Two guest requested membership.

A motion to accept the agenda was made by Pierre Riffon and seconded by James McBride. There was no discussion and the motion was accepted, unanimously.

Motion to accept the minutes of the previous meeting was offered by Vladimir Khalin and seconded by Thomas Sizemore. After brief discussion and agreement to correct the place of the last meeting from San Antonio to Memphis, the motion was accepted, unanimously.

Pierre Riffon made a presentation about the use of a Chopped Wave Test to assure the integrity of SSVTs. The presentation showed that there was good correlation between successful tests and field performance. Subsequently, Igor Ziger made a presentation about the use of an Internal Arc Test to accomplish the same purpose. This presentation provided information about the types of SSVT failures experienced. It indicated that the majority of failures were main insulation of the winding. The presentation concluded that the Internal Arc Test is not a desirable means to assure successful field performance SSVTs.

There was discussion of the continuing the requirement for the use a specific size wire as a fuse for testing. After some discussion, it was agreed, unanimously that the next draft of the standard would change the requirement from a specific wire size to a wire size determined by the manufacturer that will melt within 30 electrical degrees.

There had been 95% acceptance of the draft of section 6.21 in survey #1 conducted prior to the meeting. There was one comment about eliminating the inclusion of synthetic esters. After discussion, it was agreed to keep the reference to synthetic esters in section 6.21, subject to determining if there was standard for synthetic esters similar to the standard for natural esters.

A discussion was held in regards to the accuracy clause to be inserted into the standard. Due to the lack of time, it was agreed to send out a survey to the workgroup on the accuracy clause. The results of the survey will be discussed at the next meeting.

Draft 3 of the standard will be released to the workgroup for review and comments. The comments will be discussed at the next meeting.

A motion to adjourn the meeting was offered by Patrick Rock and seconded by James Bride. The motion carried unanimously without discussion.

The next meeting will be at the Fall 2016 Transformers Committee meeting in Vancouver, BC Canada.

F.5.3 WG PD in Bushings & PTs/CTs PC57.160 - Thang Hochanh

Attendees: 50

Members attending: 15/28

Agenda: An agenda was presented for the meeting.

Minutes: Motion approved David Wallace (1st) & Vladimir Khalin (2nd)

1. Items discussed based upon comments received:

- 6.4 Discussed moving the key from this section to earlier in this document. Decided to move it appropriately after reorganization of the document. Likely just before balloting.
- Comment (Shibao Zhang) regarding addition of figure number to resolve comments in 6.4 and 6.5.1 figure 4.a and 4.b. Explanation was provided to clarify text and drawings. Updated version of the draft contained resolution.

- 6.5. 1st paragraph - Clarification on comment regarding calibration. No change was required to resolve the question.
- 7.1 “Casing connection”. New text was accepted to clarify the connection to the primary and ground.
- 7.1 b2 – Comment (Pierre Riffon) regarding the second test object was discussed and proposed text accepted.

Figure 5a and 5b – New test circuit to be provided by Vladimir.

- Incorrect connection fig. 5a and fig. 5b (Pierre Riffon), due to copy and paste action, will be corrected.
- Incorrect connection fig. 7a and fig. 9 (Pierre Riffon), due to copy and paste action, has been updated in draft 5.4 .

2. Presentation by Detlev Gross:

Detlev presented several PD patterns and the physical explanation for the partials discharges. Several questions were answered as this presentation was made. The first portion of his presentation was made speaking very generically. The second portion of his presentation was providing a number of specific examples. Numerous comments were made from Thang and Bertrand.

Detlev has agreed to make his presentation available to the attendees and the patterns may be used as part of the guide.

3. Additional discussion after the presentation:

Mario Lucano asked about the value of C2 in section 6.3.1. A short discussion was initiated. The chair will propose a new text to the group at the next meeting.

Fall meeting 2016: This WG plans to continue working at the Vancouver meeting.

Next version of draft: A new draft is being prepared to incorporate all of the recent comments and also to modify the format to match the IEEE style guide.

F.5.4 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 March 22, 2016, from 9:30 am to 10:45 pm. Eight (8) members and forty-three (43) guests attended the meeting. Six (6) guests requested membership. The meeting was chaired by Pierre Riffon, chair of the WG. Mr. David Wallace was the vice-chair.

Attendance has been recorded in the AM system.

Required quorum was met, presence of at least 4 members was required.

This was the first WG meeting since 2009. IEEE C57.13.5 was published in 2009 and will expire in 2019. A revision is now needed.

The agenda has been reviewed and a motion to approve the agenda has been made by Mr. R. McTaggart and seconded by Mr. V. Khalin. The agenda was approved by all members present.

Mr. David Wallace will be the co-chair of the WG.

A PAR has been requested and was approved on March 3, 2016 by NESCOM. The PAR is expiring on December 31, 2020.

The chair did produce a first draft of the revision of C57.13.5. This draft (D1) was based on the document which was sent to RevCom for approval in 2009. This draft was distributed by email prior to the Atlanta meeting on February 8, 2016.

Only one reply was received regarding the generic names of C₂H₄ and C₂H₆ and discussed during the meeting.

Changes proposed in D1 have been reviewed one by one up to clause 10.9.2, several changes were mainly editorial in nature such as reference clause numbers and date of referenced standards.

Among the proposed major technical changes, the following items have been discussed:

- RIV tests will be limited to units rated 230 kV and above.
- Clause 4.3 "Requirements for accuracy and accuracy calibration systems" will be aligned with the requirements stated in the new edition of C57.13.
- Allowable leakage rates for gas-insulated instrument transformers at -40°C and -50°C will be reduced respectively to 1,5%/year and 3,0%/year.
- Ambient temperature range during testing will be changed to +10°C - +40°C.
- Number of reduced impulses waves. The number of reduced impulse waves with impulse voltage of 50% and higher is now limited to two in order to avoid insulation conditioning by applying several reduced-waves. After discussion, it has been agreed upon to allow more than two reduced impulses if the voltage level is lower than 50% of the full-wave level. This change will be implemented in the next draft.
- Leakage measurement will be limited to the cumulative test method. An annex based on the content of clause 10 of IEC 62271-306 (Guide for circuit-breakers testing and application) describing the test methodology will be added in draft 2.0.
- Details regarding chopped-wave test circuit and positioning of the chopping gap have been discussed and a reference to the latest edition of IEEE Std. 4 will be made. The additional requirement of not having a resistor in the chopping gap circuit will be kept.
- Impulse current measurement during impulse tests will not be required if there is no multiple capacitive grading layers.

- No short circuit withstand test will be required for CTs having a straight primary conductor and making a single turn. For the thermal aspect of these CTs, calculations have to be provided.

The chair invited the members and the guests to send comments on D1.

The meeting adjourned at 10:45 am on March 22, 2016. The adjournment motion was made by Mr. V. Khalin and was seconded by Mr. I. Ziger. The motion was approved unanimously.

The next meeting is planned to be held in Vancouver, BC, Canada, on October 25, 2016.

F.5.5 Task Force for PLC Capacitors and CCVT's

The Task Force held its first meeting at 11:00 AM. It was chaired by Zoltan Roman and Ross McTaggart

A total of 41 people were in attendance. 21 requested membership. As this was the first TF meeting, all were accepted as members.

The agenda for the meeting was presented and approved.

The numbering of the new standard has been discussed. Several proposals were made, the group agreed on IEEE C57.13.9. This will need to be verified with IEEE PSRC as the previous standard (ANSI C93.1) belonged to that group.

The title of standard C93.1 has been unanimously accepted as the title of the new standard.

The scope of the new standard has been discussed. The scope of the old standard has been accepted with the following suggestions:

- Specify the voltage range that should be covered by the standard (34.5kV and above was suggested by D. Wallace) and delete "high voltage"
- Delete the following part "secondary compensated-field adjustable CCVTs."

It has been agreed to submit a PAR before the next meeting.

The members agreed to harmonize the new standard with the current IEC and CSA CCVT standards. Some members asked to verify if it was possible to share these standards with the TF/WG members.

The meeting was adjourned shortly before 12:15PM.

The next meeting will be at the Fall 2016 Transformers Committee meeting in Vancouver, BC, Canada.

F.6 Special Presentation

Eddy So gave a presentation regarding the applicability of TCF/RCF in current applications. Limited questions were asked and the presentation will be made available to the members of the sub-committee. Zoltan Roman presented some experimental data regarding the accuracy classes for VTs. In a future meeting data regarding the accuracy classes for CTs and CVT will be presented.

F.7 New Business

Zoltan Roman brought up the issue of ferro-resonance in Europe. He asked if any of the utilities being represented had similar issues and how they dealt with such issues. Pierre Riffon noted

that grading capacitors have caused similar issues for Hydro Quebec in the past and this was at least partially dealt with by changes in how circuit breakers are specified. Igor noted that his company has provided simulations to explain to customers potentially at risk applications. Zoltan requested that a survey be sent regarding ferro-resonance and a review of case studies.

F.8 ITSC Adjournment

Motion to adjourn by David Wallace and seconded by Vladimir Khalin.

The next meeting will be at the Fall 2016 Transformers Committee meeting in Vancouver, BC, Canada.