

Annex D Dry Type Transformers Subcommittee

October 26, 2016

Vancouver, British Columbia Canada

Chair: Charles Johnson (absent)

Vice-Chair: Casey Ballard

Secretary: David Stankes

D.1 Introductions and Approval of Agenda and Minutes

The Subcommittee met on October 26, 2016 at 1:30 PM in the Jr. Ballroom A,B Room of the Sheraton Vancouver Wall Centre Hotel.

There were 13 of 24 members present (therefore we had a quorum of 50+%), and 19 guests present, 3 guests requested membership. The attendance roster will be kept in the AMS.

The agenda was approved unanimously after a motion from David Walker and a second from Rick Marek.

The minutes of the Atlanta, Georgia meeting were approved unanimously after a motion from David Walker and a second from Dhuru Patel.

D.2 Chairs Remarks

The Vice-Chair described new deadlines for days allowed before submitting meeting minutes:

Working Group: 15 days

Subcommittee: 30 days

Main Committee: 60 days

Vice-Chair reviewed the new “essential patent claim” disclosure statement/requirements, and reminded WG and TF Chairs to review this at the beginning of every meeting.

Vice-Chair announced that Malia Zaman is the new IEEE Standards Technical Community Program Manager. Malia has replaced Erin Spiewak who has assumed a new position within IEEE. There will be a one year transition period as Malia assumes her new role. Malia’s contact information is posed on the Transformer Committee Standards Development webpage.

D.3 Working Group/Task Force Reports

The next order of business was the presentation of the reports of the various working groups and task forces. See the following sections for the individual reports:

D.3.1 IEEE PC57.12.01 - Dry Type General Requirements

Chair Casey Ballard

The working group met in the Port McNeill Room of the Sheraton Vancouver Wall Centre Hotel

The meeting was called to order at 1:45 PM by Chairman Casey Ballard

The meeting was convened with 34 participants, 15 of them requested membership. Quorum was reached as this was the first meeting of WG. The attendance was reported in the AMS.

Introductions were made by all participants.

The agenda was approved unanimously being no negative votes.

The Task Force minutes of the Atlanta, GA, March, 21, 2016 meeting was approved unanimously being no negative votes.

The chair made a call for patents using the request recommended by IEEE TC. No patents were claimed.

Old business

- The chair noted that he has distributed the Draft 1 of the document well in advance of the WG meeting and all changes that TF agreed upon in Atlanta Spring 2016 meeting were included in this Draft.
- Then WG started discussion on the open questions.
 - a) Cooling ratings – Section 5.1
 - The chair mentioned that C 57.12.01 uses the cooling indexes that are different from IEC and oil type IEEE standards. Harmonization with IEC was proposed and supported by the TF.
 - The usage of IEC terminology is straight forward with the exception of the case of sealed transformers. After discussion and several proposals, D. Patel volunteered to review IEC and CSA standards and develop a proposal for the WG consideration.
 - b) Words “power” and “kVA” in the text of the Standard.
 - C57.12.00 revision uses “kilovoltamperes” when describing transformer’s capability.
 - The motion was made by D. Walker: “Replace word “power” with word “kilovoltampers”. This was seconded by V. Tendulkar. In the discussion, P. Hopkinson proposed to use the full word just in the titles of the Chapters and to use the abbreviation ”kVA” otherwise. The motion was amended and WG approved the amended motion unanimously.
 - c) Maximum system voltage – Table 5.
 - Suggestion was made to add the column “Maximum System Voltage” to table 5. After discussion about what maximum system voltage means, the differences between the system voltages in the USA and Canada, M. Gromlovits made a motion that was seconded by J. Antweiler: “Include maximum system voltage column in Table 5, but revise the values of the maximum voltages. In the discussion, R. Thompson and C. Ballard agreed that to have the clear separation of systems by maximum voltages is a positive improvement that will help in the selection of the transformer voltage class. Motion passed with 15 members-to-be voted for, 1 abstained (D. Patel) and no negative votes.
 - V. Tendulkar volunteered to review IEC standards and provide the proposal for the WG consideration.
 - d) Fuzzy figures 3 and 4.
 - Updated figures are available and will be included in the next Draft.
 - e) SC thermal limits – Table 15.
 - R. Marek provided the proposal to change the temperature limits for Cu and Al transformer conductors that are in line with IEC.
 - The comment was made that 200 deg. C limit for Al conductor is too low as it is on the level of normal loading winding temperature. WG agreed with this.
 - D. Patel commented that IEC based their limits on the consideration of the potential cracking of the cast resin insulation.
 - R. Marek and D. Patel agreed to review the physical properties of the different Cu and Al alloys used in the winding conductors and provide the proposal for the WG consideration.
 - f) SC thermal limits – Section 7.1.

- R. Marek proposed to use IEC calculation equations for the average winding temperature after SC instead of IEEE ones from section 7.1. He thinks that the results between IEEE and IEC are pretty close, but IEC version is much less cumbersome.
 - D. Walker agreed with this and volunteered to provide an example comparing those 2 calculation methods.
 - C. Ballard will request whether the IEC equations can be borrowed for C57.12.01.
- g) BIL – Table 5.
- The chair informed about a survey on proposed changes in main BIL levels: 95 kV vs. current 60 kV or 75 kV vs. 60 kV for 15 kV transformers; 75 kV vs. current 45 kV for 8.7 kV transformers. Out of 14 received replies, votes split 50/50.
 - D. Patel composed the Table with comparison of the correlation of LF test voltages and BIL test voltages with nominal system voltage for different voltages. He showed that the change to 95 kV BIL for 15 kV system and to 75 kV BIL for 8.7 kV system would place the correlation coefficients for the respective voltage systems out of a normal range. That is why he voted against changes, but may agree with moving from 60 kV to 75 kV level.
 - P. Hopkinson commented that traditional rationale behind the selection of BIL test voltages is not sufficient anymore as we discuss how to improve a reliability of transformers (both dry-type and oil-type). Many failures can be associated with fast switching transient voltages and respective resonances; BIL test may not address this type of the stresses.
 - Phil made a presentation on the failure investigation of several transformers feeding data center. The root cause was identified as a voltage resonance at switching transient voltage. The factory BIL test is done with no load and wasn't generating the same resonance. Test decisions need more discussions.
 - Protection solutions are available to prevent or mitigate fast transients and resonance: shielding, damping, circuit energization / de-energization control.
 - Phil thinks that dry-type transformers may have the same test levels as oil-type transformers of the same voltage class, but Phil agrees with D. Patel and V. Tendulkar that the increase of the BIL test level alone may not solve the discussed problems.
 - Phil will continue the discussion on the adequate transformer testing in other Sub-Committees.
 - J. McBride informed that Dielectric Test Subcommittee will continue the discussion aimed to address the fast transients and resonances in transformers: maybe test with steep front wave, etc.
 - The chair proposed separation the discussion on the test modification (which this WG will follow) from our current decision on the BIL levels in Table 5 of the standard. We would need to agree on what we want to do until the next WG meeting in Spring 2017.

New business

- No new business.

Next meeting: Spring 17, New Orleans, LA, April 2-6, 2017

With no further business, the meeting was adjourned at 3 PM by the chair.

Chairman: Casey Ballard

Secretary: Sasha Levin

D.3.2 IEEE PC57.12.60 - Dry Type Thermal Aging

Chair Roger Wicks

The meeting was called to order at 9:30 AM by Chairman Roger Wicks. Introductions were made and attendance sheet was circulated.

The meeting was convened with 34 people in attendance / 8 members present (No Quorum reached.). Two of the guests present requested membership.

Because of lack of Quorum, the minutes from spring 2016 WG meeting could not be approved. The Chairman will circulate these unapproved minutes to the members of the WG in an effort to approve minutes electronically.

The Chairman reviewed the proposed Agenda. The Agenda was slightly different than the one circulated earlier to the WG in that it added the review of “essential patent claim”.

The Chairman posted the new “essential patent claim”. No one at the meeting presented any essential patent claims.

Old Business / Review of last meeting:

1. Partial discharge as a trending test

Summary of problem - Partial Discharge measurements can be used as an indication of movement within a winding or separation of solid insulation elements leaving voids or air leading to highly electrical stressed areas. This can be especially important when testing solid cast coils.

At last meeting the WG discussed PD as an indicator of transformer health and its use as a trending test to be included in the Annex of the document. Tim Mai had volunteered to submit a proposal toward this end. The Chair presented Tim’s’ proposal, and summary of its review by the WG is as follows.

- The Chair commented that the written proposal reads more like a requirement, as it describes Pass/Fail limits and was suggested to be in main body of document.
- Dihru Patel commented that PD measurement may be influenced by environmental factors such as temperature. Chair agreed that the standard in general may not always include the level of detail needed to conduct tests by someone not in transformer industry and who does not routinely conduct these types of tests.
- The WG agreed that that submitted document is a good start for discussion on PD, but we should plan to limit its use to data collection (trending) at this point in time.

2. Major Insulation materials and method for changes

Summary of problem - 12.60 currently defines how to evaluate a new insulation system, but does not have any direction for how to modify one.

- Reviewed a proposal for an updated list of materials that would be considered as Major insulation. The biggest change to this list is the inclusion of Varnish as a Major. Previously it had been considered a Minor insulation, and changes were allowed using Chemical Compatibility Testing (CC) aka Sealed Tube Test.
- Reviewed a proposal by Solomon Chaing (flowchart) that utilized a method of chemical analysis to determine if a material can be substituted. (If materials is shown to be chemically the same using DSC, TG, IR, it may be substituted without any additional testing.)
- Casey Ballard noted that the exact criteria used by UL to determine chemical equivalency is not well identified. The WG agreed that this must be better defined prior to adding this proposal into the Working Draft of the document. He will work with Mark Raymond of UL to get clarity on this.

3. **Ratioing up or down from a test Electrical Insulation System (EIS) that was tested at a particular BIL level**

- a. Casey Ballard had volunteered to review proposal as last meeting. He determined that ratioing down may be feasible, although ratioing up would not. Details would be presented at 12.01 meeting, as this is an issue being addressed in this standard. Thought that 12.60 would refer to 12.01 when dealing with this issue.
- b. Casey also agreed to develop an example which could be included in the document (for ratioing down).

1. **Extension of cold shock testing**

A discussion regarding the possible extension of Cold Shock testing to all types of dry-type transformers was held. Currently cold shock is only required for solid-cast and resin-encapsulated transformers only.

- a. At spring meeting, a motion was approved to modify Clause 4.6, striking reference “solid-cast and resin-encapsulated designs only” in the working Draft document.
- b. Mark Gromlovits noted that adding this requirement would require manufacturers to have special test equipment.

2. **Review of IEC 61857-41**

Document has been approved as a new item work proposal, and has been assigned to Working Group 6 (Insulation system testing) of IEC TC112. During recent meetings in Frankfurt of TC112 and TC14, this document was broadly discussed, and a taskforce has been proposed for work between IEC TC112 and IEC TC14 personnel. It was also stated (by TC14), that this work should take into account IEEE C57.12.60 wherever possible.

- Broad discussion regarding dielectric strength used to evaluate new EIS with proposed IEC test proposal, and its lack of ability to take into account power frequency and partial discharge found in an actual transformer.
- Rick Marek proposed that it is difficult to use a model to simulate an actual transformer.
- Dhiru thought there was some merit to the new IEC proposal, but that an additional (single point) test on actual full size transformer may be needed.
- Chairman suggested that the IEC test may be useful as a replacement to Sealed Test as method to approve changes to a system.
- A call for volunteers was made for membership in IEC taskforce to review how new proposed 61857-14 document between TC 112 and TC 14. Casey Ballard, Rick Marek and Ashley Reagan volunteered to participate.

The meeting was concluded at this point due to no more time.

It was confirmed that the WG would meet again at the spring 2017 Transformer Committee Meeting in New Orleans.

Meeting was adjourned at 10:45AM

Chair: Roger Wicks

Co-Chair: Dave Stankes

D.3.3 IEEE PC57.12.58 - Dry Type Transient Analysis**Chair Roger Wicks**

This WG did not meet in person in Vancouver, but the document is out for ballot and expected to be completed on time.

D.3.4 IEEE PC57.12.91 - Standard Test Code**Chair Derek Foster (absent)****Vice Chair David Walker presented minutes from meeting**

The Working Group met in the Port McNeill meeting room

There were 7 members out of 15 members and 1 guests present. A quorum was not reached.

The agenda and minutes from Atlanta meeting will need to be approved by email vote.

Patent Disclosure -No patents were noted.

Old Business

- Looking for volunteers for section 11 – Temp test, section 12 Short Circuit tests and section 13 – audible sound level measurements. Review in New Orleans
- Section 12 – short circuit test will be discussed at the next meeting in New Orleans.
- Section 13 – audible sound-level measurements Find out what they did in 12.90
- IEC 60076-10 was just published in 2015. In TC14. David Walker to review IEC and C57.12.90. Discuss in New Orleans.

New Business

- Tim-Felix Mai's proposed by email that we consider adding language about transformers with load tap changers (similar to C57.12.00 and C57.12.90). Casey Ballard will bring up in new business in 12.01. If C57.12.01 adds LTC language then C57.12.91 will add LTC testing language.
- Tim-Felix Mai proposed by email that the corrections for altitude in C57.12.91 Section 11.7.3 were inconsistent with both C57.96 and IEC 600076-11. In fact, the corrections are 10X smaller in C57.12.91 than in either of the other sources. Tim Proposed either correcting the formula in C57.12.91 or simply adopting the simpler language from the IEC and C57.96 sources. It was also pointed out that the reference for this issue should be in C57.12.91 which is a standard rather than C57.96 which is a guide. After discussion it was agreed by members present to adopt the language from C57.96 for corrections for altitude in the case of testing $\leq 100\text{m}$ and operation $> 1000\text{m}$ and also the case of testing $> 1000\text{m}$ and operation $\leq 1000\text{m}$. Because of the lack of a quorum this will be balloted by email.
- Casey Ballard presented some issues that had been mentioned at previous meeting but where no decisions were made:
 - There is no mention of environmental testing in either C57.12.01 or C57.12.91 that is equivalent to IEC C or E ratings and some customers are asking for this. In those cases they are using IEC standards since no IEEE standards exist. Casey Ballard to bring up this issue in the next C57.12.01 meeting. If C57.12.01 add these test requirements then C57.91 will need to add test definitions. In the interim we will review the IEC CD and existing standards to better understand the requirements in the IEC standards. If we adopt these requirements it was felt that we should be similar to the IEC requirements. It was felt that these tests would fall into the "other" test category and could be put into an annex to C57.12.91

- There was previously a suggestion that C57.12.91 specify how to do temperature tests with a harmonic load. It is mentioned in other standards such as C57.18.10. After discussion the members present agreed that this should not be in C57.12.91 and that it was not a practical and cost effective test to do. Especially given the wide variety of harmonic spectra that might need to be simulated. This will be settled by an email vote.

With no further business, the meeting was unofficially adjourned at 5:41 pm.

The Working Group will meet again at the Spring 2016 meeting in New Orleans.

Chairman: Derek Foster

Vice Chairman: David Walker

Secretary: Henry Blake Cooke

D.3.5 IEEE PC57.16 – Dry Type Reactors

Chair Art Del Rio

The working group for the revision of C57.16 met in the Port McNeill room of the Sheraton Vancouver Hotel on Tuesday October 25, 2016, at 3:15 PM.

The meeting was called to order at 3:15 PM by the WG Chair Art Del Rio.

There were a total of 17 participants: 6 Members and 11 Guests out of which 1 Guest requested membership.

- The meeting was opened with the introduction of participants and the circulation of attendance rosters and mandatory call for potentially essential patents.
- 6 of the current 10 WG Members were present and quorum to carry out business was met.

Meeting notes:

- **Meeting Agenda**
 - Meeting agenda, which was circulated by email among members and guests on October 18, 2016, was presented to the participants.
 - Motion to approve the agenda was made by Klaus Pointner and seconded by Robert Ballard.
 - There were no objections or comments and the agenda was approved unanimously.
- **Minutes from previous meeting**
 - The minutes from the S16 meeting in Atlanta, which were circulated on October 18, 2016 by email, were presented to the participants.
 - There were no objections or comments and the S16 meeting minutes were approved.
- **Old Business:**

Annex D

1. The existing Scope and Purpose sections of the C57.16 standard were discussed. The following comments were made:
 - a. On the second paragraph, the Scope states that: “with some restrictions” the standard is applicable to filter reactors, and other types of series-connected air-core reactors. Clarification on the specific restrictions is required in order to address and remove such restrictions.
 - b. The Purpose of the standard also refers to “some restrictions” in the application of the standard to filter reactors and other types of reactors.
 - c. The list of devices for which the standard does not apply need to be revised to remove “Arc Suppression Coils” since they already included in the neutral grounding devices category. Also, year of the standard should be removed from the references in the Scope section.
 - d. The Scope refers to the annexes within the standard that should be removed.
 - e. The inclusion or not in the Scope of converter reactors used in the AC side of multilevel converters needs further discussion especially for MV-DC applications.
2. Open item: Charles Johnson volunteered to compile meeting minutes from old meetings related to the 2011 revision and send them to the Chair as background information and to share the existing recent history on the C57.16 standard with others. **Carry over to next meeting.**
3. The Chair will request from Ms Malia Zaman (Standards Program Manager) the MSWord document version of the 2011 revision in order to start the changes. The document will be distributed to the WG Members and Guests before the next meeting in New Orleans.
4. A volunteer for the role of Secretary was requested at the meeting. The position remains open and a request will be done at Subcommittee level for a volunteer.

No new businesses were presented.

Meeting adjournment:

Motion to adjourn the meeting by Klaus Pointner, seconded by Mike Sharp, the meeting was adjourned at 4:00 PM.

Next meeting: Spring 2017, New Orleans, LA, April 2-6, 2017.

Respectfully submitted,

Chairman: Art Del Rio (a.delrio@ieee.org)

Secretary: TBA

D.3.6 IEEE PC57.124 – Dry Type Partial Discharge Guide

Chair Tom Prevost (absent)

Rick Marek presented minutes from meeting

PC57.124, Revision of IEEE Recommended Practice for the Detection of Partial Discharge and the Measurement of Apparent Charge in Dry-Type Transformers

October 25, 8:00 am

This was the first meeting as a WG with 40 in attendance and 13-16 requesting membership. Introductions were made and the patent call resulted in one claim by H. Shertukde for patent # 6178386. P. Hopkinson requested an addition to the agenda concerning the rationale for establishing 10 pc as the limit for cast coil transformers. A motion to approve the amended agenda was made by M. Gromlovits and seconded by R. Ballard. Having approved the addition, the Chair explained that the scope of the document was for procedure only and limits were given IEEE Std C57.12.01. Therefore the agenda addition was out of scope for this document.

Agenda:

- Welcome & Chairs Remarks for First Meeting of WG
- Introduction of Attendees – request for membership
- Approval of Agenda
- Call for patents
- Review of Scope & Purpose
- Other Transformer Committee Documents re PD
 - C57.113- 2010
- Scope and Purpose Statement for revised C57.124
- Submittal of PAR
- Next steps
- New Business
 - Discussion of PD acceptance levels
- Adjourn

In the Chair's remarks:

- He noted that the document was last revised in 1999 and then reaffirmed in 2004, which is a long time ago. When the PD limits were reduced recently to match more closely with IEC standards, the SC requested that the referenced procedure, C57.124 be revised to make sure the new requirements could be supported by the test procedure.
- He reviewed C57.12.01 changes in limits and the added procedure
- All members will receive a copy of C57.12.01
 - D. Gross noted that IEC 60270 was revised this year and the upper cutoff frequency was changed from 500kHz to 1MHz.
- The scope and purpose defined in last TF meeting was reviewed
 - Approved by SC and Committee
 - Key was wide band apparent charge
- J. Britton is HVTT chair and compared IEC to IEEE
 - Group met to develop PD document for general apparatus
 - May include diagnostic pattern recognition
 - Will need support from equipment manufacturers and looking for interest and support
 - This is a parallel group

- A. Naderian proposed adding on site testing as part of scope noting this is requested more especially for very large dry units and possible establishing TF
 - Chair did not think field testing should be included and that it may fit better in C57.152
- J. Britton then qualified that pattern recognition would be general for all equipment and not specific to transformers
 - D. Gross added these would be generic patterns
- B. Larzelere noted TC met in Frankfurt two weeks ago and it was decided that 60270 needs to have pattern recognition added to that document and that there is a lot of information from a CIGRE study group. As an example a cable showed 100pc but was actually due to connections and not the cable insulation.
- Chair said PD on bushings and instrument transformers, C57.113 has patterns in an annex and specific to the apparatus. What is needed is generic patterns.
- T. Hochanh noted that it is important to obtain the pattern at the inception voltage.... And suggested referring to the PD in bushing and instrument transformers standard.
 - The Chair noted that the patterns in this document are quite generic and could be added to C57.124
- H. Shertukde stated that rather than pattern recognition it should be called data interpretation.
 - D. Gross agreed that the term pattern recognition should be avoided
 - The Chair agreed
- Chair stated 60270 and 60076-3 will be provided to the members and Erin agreed this could be done.
- B. Larzelere noted that as a member of the ANSI TAG you have access to these documents and others and the cost was only a few hundred dollars
- The Chair compared C57.124 to C57.113
 - C57.124 needs major revision
 - C57.12.01 already provides procedure
 - Some parts of C57.113 could be referenced
- Chair showed the dielectric test table from C57.12.01 noting that PD was a routine test for cast coil but optional for resin encapsulated
- The Chair noted that there are eight different connections shown in C57.124 and questioned if all were needed, but he needs input from the dry-type manufacturers and request that these be carefully evaluated when reviewing the document.
- H. Shertukde commented that the Navy and Army are requesting PD during impulse test and proposed adding a circuit for this test.
 - Chair does not feel scope includes type of test since it is not specifically wide band
 - D. Gross agreed that this document is not suitable for that test and that pc is not the correct measurement.
 - Chair suggested that this could be provided as an informative annex and he requested H. Shertukde to provide wording which he agreed to do.
- The Chair noted again that this was the first meeting but the members need to determine the content and more discussion is warranted after reviewing the document before the next meeting.
- Chair said the PAR has not yet been submitted but he will submit it soon and an approved PAR is expected by the next meeting.
- There was no new business
- No new business
- Meeting adjourned at 9:10 AM

D.3.7 IEEE PC57.12.51 - Dry Type Product Standard "> 500kVA Ventilated"
Chair Sanjib Som

- Meeting came to order at 11:02 AM 10/24/16.
- Started attendance sheet around the room.
- Chair reviewed the new patent statement - no patent issues.
- Only 8 members present out of 26 hence there was no quorum.
- Total participants were 24 (16 guests).
- Chair mentioned that this will probably be the last meeting before balloting starts.
- Last meeting minutes could not be approved due to lack of quorum.
- Chair showed the previous minutes on the screen for attendees to review - no comments.
- Previous comments from Atlanta were shown on the screen - no additional comments.
- Chair asked for comments on the title shown in the PAR document - no initial comments.
- Robert Ballard (Casey) asked if we were going to ask for a PAR amendment, chair said yes. Casey also asked if there is intention to ask for extension. Chair clarified there is no intent.
- Casey requested that we review PAR requirements for the group to see - discussion followed.
- We reviewed the new title - chair clarified voltages for several guests.
- Blake Cooke pointed out the word safety still remained in the scope - chair addressed the issue.
- The statement "recommended practice" was also reviewed, chair addressed same.
- Casey asked about combining C57.12.50 and C57.12.51 - he said the subcommittee approved this previously.
- Chair pulled up the Atlanta minutes - he confirmed that the group agreed to combine C57.12.50 and C57.12.51.
- Chair pointed out that we were trying to get the PAR submitted and to focus on that effort in this meeting.
- The group agreed with the chair that the "heavy lifting" on the document is done - it is nearly ready.
- Casey reviewed C57.12.50 scope and purpose - discussion followed.
- More discussion surrounding kVA - chair mediated discussion between Robert Thompson(Bob), Diru Patel (Dhiru), Casey and others.
- Suggestion made to remove low voltage 208Y/120 - 4160Y inclusive - discussion followed.
- Diru asked that "500kVA and smaller" along with the last sentence in the scope be removed.
- Discussion regarding consistency with C57.12.01 - Casey quoted purpose and scope for the group, we reviewed both and insured that every type of transformer was now included.
- The group reviewed the scope one final time and agreed it was ok.

- In the purpose the group agreed to change to 5KV class low voltage and 1.2KV class to 36KV class.
- Chair changed scope, purpose and title to include ventilated transformers.
- Casey reiterated proper steps for a PAR - PAR must also go through the WG.
- Casey asked "do we need to have a PURPOSE in this document, it seems redundant".
- The group voted unanimously to simply remove the PURPOSE.
- A bit more discussion on submitting the PAR.

The final version of title and scope is provided below, this will circulated among members for approval.

Title	Guide for mechanical interchangeability of ventilated dry type transformers
Scope	<p>This standard sets forth characteristics of ventilated dry type transformers relating to performance, limited electrical and mechanical interchangeability, as well as recommended practice for installation of the equipment described, and to assist in the proper selection of such equipment. Specific rating combinations are described up to base of 7500 kVA, high-voltage class from 1.2 kV to 36 kV inclusive, and low-voltage class up to 5 kV.</p> <p>This standard does not apply to other types of transformers such as specialty, sealed dry-type, pad-mounted dry-type, instrument, step and induction voltage regulators, arc-furnace, mining, testing, welding, and rectifier transformers.</p>

The meeting adjourned at 12:15.

Respectfully submitted,

Chairman: Sanjib Som

Secretary: Mark Gromlovits

D.4 Old Business

D.4.1 Status of Dry Type Transformers Standards

Chair reviewed status of standards activity including:

- IEEE PC57.12.51 - The Chair expressed concern regarding timing for the completion of PC57.12.51, as PAR expires in 2018. This document is in need of a PAR revision and ballot be sent out for comments prior to Spring 2017 meeting in order to comfortably meet 2018 deadline.
- IEEE PC57.12.58 - This document has been sent out for ballot and expected to be completed on time.
- IEEE 259 - David Stankes volunteered to review this document with Sub Committee Chair to determine path forward in support of document revision. Revision Due date of 12/31/20.
- IEEE C57.16 - Art Del Rio pointed out that this document is listed as "Inactive" in WG / Task Forces table on Dry-Type Transformers Subcommittee webpage. Vice Chair agreed to investigate updating this to "Active" status.

D.5 New Business

D.5.1 UL/IEC MVDT Thermal aging

- Roger Wicks provided update regarding Future IEC 61857-41 New Work Proposal, a test procedure for the thermal evaluation of an electrical insulation system, for use in dry-type, cast-coil and resin encapsulated transformers operating at voltages of 1 kV and above. This review was part of the C57.12.60 meeting minutes that was delayed to the end of the SC meeting due to expected length of discussion.
- Roger pointed out that although he is Chair of IEC TC 112, the technical committee this standard would fall under, he was not made aware that this new work proposal would be submitted prior to it being entered this past summer.
- Roger said that this NWP was discussed at length at recent TC 112 meeting held in Frankfurt, and that it was agreed that both TC 112 (Systems) and TC 14 (Transformers) would work together in the development of this procedure, taking into account work being conducted in IEEE C57.12.60 WG.
- Ken McKinney (UL) confirmed that UL will certify to IEEE C57 transformer standards, which now only references use of MV electrical insulation systems approved per IEEE C57.12.60. Ken said, however, that UL is interested in working with both IEEE and IEC and will continue to do so.
- Roger pointed out that current C57.12.60 may not be written a way that it can be easily followed by those who do not routinely run tests described in the standard, and that better examples and clarification may be needed.
- Roger felt that there was merit to the test procedure described in the Future IEC 61857-41 document, and it may be useful as a screening test or a method to approve new minor insulations inside of 12.60.

There was some discussion regarding the relationship between IEEE and IEC, as this was brought up during October 3, 2016 UL Round Table discussion regarding the new IEC 61857-41 test procedure. At the meeting it was described that IEEE would no longer be interested in cooperating with IEC. Casey Ballard had reviewed this with Erin Spiewak (IEEE) and presented the following summary of his discussion.

- IEEE will continue to cooperate and work with IEC in the effort of standards development. This is demonstrated by recent promotion of Erin Spiewak to new IEEE role, where part of her responsibility will be to investigate how IEEE and IEC can work better together.
- Confirmed that IEC / IEEE dual logo projects will continue.
- Described that IEEE has decided not to engage as member of (future) US TAG's, but will continue to maintain participation in current TAG's. The decision to not participate in future US TAG's is in support of IEEE desire to expand relevance outside of US, and participation in US TAG (only) did not support this goal.
- Rick Marek described that IEC and IEEE standards do not always align. Rick asked that the IEC 60076-11 CDV (Dry-type Transformer) be circulated to members of the IEEE Dry-type SC to help show differences between it and corresponding IEEE documents.

D.5.2 IEEE PC12.57.51

A motion to approve the wording in the new PAR was made by Casey Ballard (with minor editorial change relating to spacing) and seconded by Vijay Tendulkar. This motion passed unanimously. The Subcommittee subsequently approved sending the revised PAR to Revcom for approval.

D.5.3 C57.16 Secretary

The Chair made a call for volunteers to be the Secretary of C57.16. Ulf Radbrant graciously volunteered.

D.6 Adjournment

With no further business, the meeting was adjourned at 2:35 PM.

Vice Chairman: Casey Ballard

Secretary: David Stankes