10.2 Distribution Transformer Subcommittee Report

Ken S. Hanus - Chairman
ken.hanus@ieee.org

The Distribution Transformer Subcommittee has a total of 8 active working groups, 6 of those met in Costa Mesa.

Subcommittee Meeting Wednesday March 22, 2006 at 9:30 am
26 Members
15 Guests
41 TOTAL
2 Requests for membership

10.2.1 Chair's Remarks & Announcements:

Review of Administrative Committee meeting highlights

- Future Meetings
- Main Committee membership
- Transformer Standards Activity
- A request for patent disclosure concerns was made with none being indicated.
- The Unapproved Memphis minutes were approved with no corrections.

10.2.2 Working Group Reports

10.2.2.1 C57.12.20 Overhead Distribution Transformers

Alan Wilks & Tommy Cooper Co Chairs
awilks@ermco-eci.com & Tommy.cooper@faypwc.com
PAR Status: N/A
PAR Expiration Date: No current active PAR, to be applied for after April 3, 2006
Current Standard Date: 2005
Current Draft Being Worked On: D1
Meeting Time: 09:30am, Monday, March 20, 2006
Attendance: 46 Total
20 Members
24 Guests
2 Request for membership

Alan Wilks called the WG C57.12.20 meeting to order at 9:30, introductions were made and rosters were circulated. The minutes of the fall 05 meeting in Memphis were reviewed and approved. Alan then reminded everyone of the IEEE policy on patents and asked if anyone had any patents to declare, none were declared.

Old Business: Alan then recommended that 2 members be removed from the roster and 1 member we need to wait until we heard from him, his recommendation passed.

New Business: Alan then went over the proposed wording of Dielectric tests from The WG on LF Tests. The wording was “For single-phase transformers with a BIL of 150 KV or less that

have only one high-voltage bushing, the high-voltage neutral terminal permanently connected to ground, and no secondary windings permanently grounded, no applied voltage test is required. These transformers shall receive an induced-voltage test between the HV terminal and ground with duration of 7200 cycles but not less than 15 seconds. This voltage shall be 1000 volts plus 3.46 times the rated transformer winding voltage, but in no case shall the line-to-ground voltage developed exceed 40,000 volts for 125 KV BIL or 50,000 volts for 150 KV BIL. An applied potential test shall be applied to all windings that are not permanently grounded." Alan will go back to the WG for clarification of the test frequency.

Tommy then went over the proposed new PAR and everyone agreed to him applying for the PAR.

Alan then started on a list that he had compiled on all of the comments that were not covered in the last revision of C57.12.20. The first three things were considered to be irrelevant, the next four pertained to the definitions of a "fault" and a "test" in section 3 as used in section 9. After much discussion and everyone agreeing that the wording needed to be changed, Alan assigned the case to a task force of Marcel Fortin, Tim Olson and Barrientos Israel to come up with a recommendation on the wording by the Fall 06 meeting in Montreal.

The next comment about the definition of an internal fusible element should be left as is. Saumen Kundu's comment about section 6.2 should be part of C57.12.00 and .90. Comment by Bill Hopf about the 25°C oil level to be left alone. Comment by Chuck Simmons on 7.1.3 about voltage to be left as is in C57.12.00. The comment by Mike Pehosh about fully insulated neutral bushing to be left as worded in C57.12.34. Comment by Don Platts about tie down lugs not within scope of C57.12.20. Comment by Chuck Simmons definition of a standard hookstick to be solved by either Tommy or Alan surveying PRD manufacturers on their particular pull ring sizes. The first comment by Ignacio Ares on section 7.2.5.1 resulted in Ignacio to look up the wording comparison to C57.91. On the second comment by Ignacio on adding another Dual Voltage was defeated because he was the only one using that voltage.

The meeting was adjourned at 10:40 am.

10.2.2.2 C57.12.38 Single-Phase Padmounted Distribution Transformers
Combined C57.12.25 & C57.12.21
Ali Ghafourian & Ignacio Ares Co Chairs
aghafourian@ermco-eci.com & Ignacio_ares@fpl.com
PAR Status: Approved 12/08/1998 (For combining Standards C57.12.25 & C57.12.21) PAR changes were submitted and will be approved next week. The PAR change centered on the dropping of the delta loop transformers and to cover only 240/120 secondary volts.
PAR expiration Date: 12-31-2009
Current Standard Date: 1995
Current Draft Being Worked on: D6, Dated: March 2006
Meeting Time: 11:00am, Monday, March 20, 2006
Attendance: 41 Total
48 Members
5 Guests

6 Request for membership

Introductions were made and roster was circulated.

The IEEE Patent Disclosure information was discussed and there were no patents noted that pertain to these standards.

The unofficial minutes of the last meeting held in Memphis, TN in October of 2005 were approved with no corrections.

The WG then discussed the new draft D6 which incorporated the changes made to the previous draft D5.3 as follows:

- Changes in scope: Low Voltage changed from 480 volts and below to 240/120 volts.
- Figures 5 and 6 were for delta connected transformers were deleted.

The group then discussed other proposed changes and corrections to the current draft D6 as follows:

- On table 2, add missing footnote reference b (the require connector rating should be specified) for 16340 GrdY/9430 high voltage rating.
- There was a also a comment made that the information in table form under 4.1 should have a table number. A similar comment was also made as to adding a title to figures 1-4 at the top because the titles do not necessarily match. A suggestion was made to add titles similar to those found in the scope. Another suggestion was to add the words live front or dead front to the figure titles as pertinent. After some discussion the WG decided to include the figure titles as found in the scope.
- A comment was made that the scope should be first with the purpose second and that the comment about PCB's should be part of the purpose and not the scope.
- A comment was made to drop the second sentence of 4.1, but after some discussion, the WG agreed to leave it as is in the standard.
- A concern was raised about the dimension to the edge of the tank. The present standard does not show any dimension from HIA to the top of the sill. Draft 6 incorporates a 3" minimum dimension.
- Also, a concern was also raised on type one transformer, dimension from X1 to the outside of the tank that the dimension of 3" shown is not adequate. After some discussion, the working group decided to keep the 3" dimension and let the user specify a larger dimension if needed.

10.2.2.3 C57.12.28, C57.12.29, C57.12.31 & C57.12.32 Cabinet integrity Standards

Bob Olen & Dan Mulkey Co Chairs
bolen@cooperpower.com & dhm3@pge.com
Meeting Time: March 21, 2006 Time: 8:00 AM
Attendance: 39 Total
22 Members
17 Guests

The minutes from the October 25, 2005, in Memphis, Tennessee were approved as submitted.

A request was made for disclosure of any patents that may be related to the work of the WG, and there were no responses to the request for disclosure.

The PAR process was started by Bob Olen as per agreement at the last meeting. The submittal was halted due to concerns that rather than issue a new standard that must be maintained, it would be better if the coastal version was combined into one standard with the "normal" version. After discussion with the chairs, the standards coordinator, and the subcommittee chair, it was decided that it was OK to proceed as the working group had proposed. The working group then proceeded to discuss the scope, purpose, and general outline of C57.12.31 and the proposed coastal pole-bolt version

The term "enclosure" had been brought up in several other working groups and its use in these standards was discussed. It was the general consensus to leave "enclosure" but to add a definition as it pertained to these standards. Brian Klaponski suggested the following:
Enclosure – refers to all external carbon steel parts that are exposed to the weather (for the "normal" standard)
Enclosure – refers to all external substrate parts that are exposed to the weather (for the "coastal" standard)

C57.12.28 Pad-Mounted Equipment Enclosure Integrity
PAR Status: No current PAR
PAR expiration Date: N/A
Current Standard Date: September 30, 2005
Current Draft Being Worked on: N/A

C57.12.29 Pad-Mounted Equipment Enclosure Integrity for Coastal Environments
PAR Status: No current PAR
PAR expiration Date: N/A
Current Standard Date: November 10, 2005
Current Draft Being Worked on: N/A

C57.12.31 Pole Mounted Equipment Enclosure Integrity
PAR Status: No Current PAR
PAR expiration Date: N/A
Current Standard Date: 2002 Published March 7, 2003
Current Draft Being Worked on: N/A

Reviewed first rough draft.
Discussed title, scope, and purpose
Discussed the included equipment:
"switchgear" versus "switches" – members should discuss with other parties

Added capacitors
Added sectionalizers

The Salt Spray Test is to be removed following the .28 standard
Items that still need to be done:

Need English units moved back into text – Chairs will do first run

Need to check order of Scope & Purpose [Complete – OK as is]

PAR – will be submitted following the next working group meeting.

C57.12.32 Submersible Equipment Enclosure Integrity
PAR Status: Approved by NESCOM N/A
PAR expiration Date: N/A
Current Standard Date: 2002 Published March 7, 2003
Current Draft Being Worked on: N/A

Status: On hold for now. It can either be reaffirmed or a PAR taken out by 2007

Work to be done:
English units moved back into text
Scope – change "(with exception of network protectors)" to "and network protectors"
Need to check order of Scope & Purpose [Complete – OK as is]

C57.12.XX Standard for Pole-Mounted Equipment – Enclosure Integrity for Coastal Environments
PAR Status: NONE
PAR expiration Date: N/A
Current Standard Date: NONE
Current Draft Being Worked on: NONE Dated : NONE

Discussed Title, Scope, and Purpose

Reviewed first rough draft.

Made the same changes as in C57.12.31 ("Normal" Pole-Mount)

PAR – will be submitted after the next working group meeting
Quickly reviewed document with the coastal testing of C57.12.29 merged into C57.12.31

Items that still need to be done:
Work on stainless steel galling considerations

The meeting was adjourned by 9:15 AM.

10.2.2.4 C57.12.34 Three-Phase Padmounted Distribution Transformers

Ron Stahara & Steve Shull Co Chairs
rjstahara@msn.com & sshull@empiredistrict.com

PAR Status: New PAR required for next revision
PAR expiration Date: N/A
Current Standard Date: Published March 8, 2005 (2004 date on document)
Current Draft Being Worked On: N/A See Below
Meeting Time: March 20, 2006 Time: 1:45 PM
Attendance: 45 Total
19 Members
14 Guests
12 Guests Requesting Memberships

Ron Stahara called the meeting to order, introductions were made, and an attendance roster was circulated. Ron reviewed the IEEE Patent Policy and asked the group if there were any patents that needed to be disclosed. None were announced to the group. The minutes were reviewed and approved as written.

The remaining time in the meeting was spent discussing the report provided by Brian Klaponski on proposed impedance ranges for 75 through 500 kVA transformers. The report as shown below calculates minimum impedances based on short circuit requirements of C57.12.00-2000, applying tolerances and then back calculating into an absolute minimum impedance.

C57.12.34 Impedance Report

This report is being written on the basis of the short circuit requirement defined in the current IEEE test requirement C57.12.00-2000. This report does not take into account secondary fault considerations of low voltage equipment such as typical panelboards because that is to be subject of a separate discussion.

Table 14 of C57.12.00-2000 (page 38) defines the maximum required per unit short circuit withstand capability of 3 phase transformers 15 kVA to 500 kVA as follows. I have added to this table an implied impedance:

		Implied Impedance
15 to 75 kVA	40 times	2.5%
112.5 to 300 kVA	35 times	2.857%
500 kVA	25 times	4.0%

Above 500 kVA the standard says that the per unit withstand is limited by the transformer impedance; therefore, there is not an issue.

Currently C57.12.34-2004 allows an impedance range in clause 7.1 as follows:

kVA	Impedance Voltage
75	1.10% – 5.75%
112.5 – 300	1.40% - 5.75%
500	1.70% - 5.75%

This means that transformers manufactured with impedances less than the implied impedances shown in the first table above are not required to withstand a short circuit that they may experience in the field. My recommendation is to raise the lower limits of the impedances to agree with the first table above while also taking into account impedance tolerances in clause 9.2 of C57.12.00-2000.

This would suggest a table as follows:

kVA	Impedance Voltage
75	2.70% - 5.75%
112.5 – 300	3.10% - 5.75%
500	4.35% - 5.75%

End of Report

The ensuing discussion brought about several points as to the correct answer, including –

- Impedance values should be based on sound engineering technical calculations which can be documented as to where the numbers come from
- Raising the minimum impedances to what was shown in the report may lead to voltage regulation issues
- Most users will specify there own impedance minimums based on there own system parameters
- The minimum impedances in the document should provide clear requirements for users with minimal technical support
- If the committee is not able to produce values based on sound engineering calculations then maybe no values should be listed
- Committee members agree there is a need for these values but no one can give specific instances of where the lack of impedances has led to problems

Guiseppe Termine made a motion to accept the impedance ranges in the report and it passed 16-7. It was also discussed to include a statement along with the motion to state the basis of the impedance values and that users may need to evaluate other requirements such as voltage regulation, system impedance or available fault current to the end user.

The meeting adjourned at 3:00 pm.

10.2.2.5 C57.12.35 Bar Coding For Distribution Transformers
Lee Matthews & Giuseppe Termine Co Chairs
lmatthews@howard-ind.com & Giuesseppe.termine@peco-energy.com
PAR Status: APPROVED Dated: March 4, 2005
PAR expiration Date: December 31, 2009

Current Standard Date: 1996 (R2004)
Current Draft Being Worked On: Draft #2, Dated: October 6, 2005
Meeting Time: March 21, 3:15 PM
Attendance: 26 Total
15 Members
11 Guests
2 Guest Requesting Memberships

The meeting was called to order on March 21, 2006 at 3:15 p.m. in the Emerald 2/3 Room of the Costa Mesa Hilton Hotel in Costa Mesa, CA.

The meeting began with introductions of those in attendance.

The chairman asked if anyone was aware of any patents that might affect the development of this standard. No patent claims were made.

The minutes of the previous meeting were approved.

The revisions in Draft 3, from comments at the previous meeting, were reviewed. No additional comments were received.

The proposed Abstract and Keywords were reviewed. They were approved as presented.

The chairman asked that any additional comments, for consideration in the next Draft be provided by July 31, 2006.

The meeting was adjourned at 3:35 P.M.

10.2.2.6 C57.12.36 Distribution Substation Transformers
John Rossetti & David Aho - Co Chairs
jrossetti@mlgw.org & daho@cooperpower.com
PAR Status: PAR Approved June 2002
PAR expiration Date: December 2006
Current Standard Date: NEW Standard Under Development
Current Draft Being Worked On: D10
Meeting Date: March 21, 2006 Time: 11:00AM
Attendance: 42 Total
17 Members
25 Guests
3 Guest Requesting Membership

The unapproved minutes from the F05 Memphis meeting were approved. The patent policy was discussed and no issues were identified.

Balloting closed 3/17/06, with 77% of ballots returned and 86% were affirmative. There were 11 negative ballots and a total of 90 comments.

The original PAR scope is not in agreement with the balloted document. A PAR revision will be submitted after April 3rd to get the wording of the scope to agree with the document. The overall scope of the products or ratings covered will not change. This should resolve a variety of comments received regarding the scope.

The majority of the comments are editorial in nature. Of the 90 comments, 38 have been reviewed so far.

The remainder of the meeting focused on addressing a handful of specific comments that required input from the working group. A consensus was reached on how best to deal with the issues raised. A ballot resolution task force will be created to address each comment. Each balloter should have access to all comments via "My Ballot", these will also be posted on the Transformer committee website. Everyone was asked to review the comments and provide input where possible.

Specific Ballot Comments Reviewed:
1.1 Scope: 50 Hz is currently not included but will be added to match original intent.

2.0 There was a comment about the IEEE DOT not being a standard and it shouldn't be listed as a normative reference. Not sure where this comment comes from as we didn't find the reference.

3.0 Need to check with IEEE editorial review concerning the need to reference the specific year. By using a specific year you can lock in references to specific tables.

Table 4.2 appears to have some possible typos and we have to review the history that may provide an explanation of how we got to these voltages.

Table 4.3 had several technical comments about the voltages. Need to go back through the past revisions and look at making the voltages consistent.

4.7 Comment suggest the desire to test as Class I transformers, but this is just the opposite of what we are doing with this standard and it will not be included.

5.1.7 Pressure Relief does not recommend positioning of the relief vent for personnel safety. Suggestion was to add a statement to cover this. The WG did not think this belongs and that the comment refers to a control cabinet that may not even exist. It is not in other standards and was decided to leave out of this one.

5.2 Comment about bushings not being IEEE standards and while true it is not a limitation as manufacturers are making everything required.

5.3 In enclosures we talk about "a degree of protection" and the comment suggested a reference to a NEMA enclosure rating. There is not an applicable rating for transformer enclosures.

5.7 Under grounding provisions there was a comment requesting 2, 4, or 6-hole pads based on minimum through fault current. The suggestion was to add details with respect to how this is done with specific withstand time. It was thought this was not applicable.

5.13.2 Secondary lead termination and arrangement suggestion was made to cover specific equipment enclosures, minimum volume requirements, lighting, condensation control, terminal strip requirements, etc. The WG did not agree this belongs in a standard and should not be included.

5.15 Insulating liquid limitations exist and are not intended to be part of this document.

5.16 Suggestion was to include a statement that if the user wants to test to C57.91 then they must request to use the loading guide with these transformers. It was thought that a statement could be added to simply clarify this statement.

10.2.2.7 C57.15 Step-Voltage Regulators
Craig Colopy & Gael Kennedy Co Chairs
ccolopy@cooperpower.com & grkennedy@nppd.com
PAR Status: APPROVED Date: June 9, 2005
PAR Expiration Date: December 31, 2009
Current Standard Date: C57.15 – 1999 – Published April 2000
Current Draft Being Worked On: Draft 5.1 Dated: October 2005
Meeting Date: WG did not meet in Costa Mesa

10.2.2.8 C57.12.37 Electronic Reporting of Test Data (formerly P1388)
Richard Hollingsworth & Thomas Callsen Co Chairs
rhollin@howard-ind.com & Thomas.Callsen@ExelonCorp.com
PAR Status: Submitted for editorial review and balloting
PAR Expiration Date: December 2005
Current Standard Date: Published under IEEE Std. 1388-2000
Current Draft Being Worked On: 11d Dated: October 2005
Meeting Date: March 20, 2006 Time: 8:00am
Attendance: 20 Total
9 Members
11 Guests
3 Guest Requesting Membership

After the welcoming statements, introductions were made. The rosters were passed around.

The patent policy was reviewed and no one responded that they had any patents that would affect this document.

The PAR status was reviewed. The PAR will be voted on at the March meeting. So far, there have only been two comments. Both comments were for approval.

In anticipation of the existing PAR being approved, the working group started to formulate the "Scope" of the next PAR request. The "Scope" will include the Step-Voltage Regulator and Dry type.

It was mentioned that the Step-Voltage Regulators have two different types and will require not only the defined product type, but also the ANSI type.

Dry type transformers also come in two types, LVGP and MVGP.

It was decided that the Step-Voltage Regulator and Dry Type will be defined through, and separated from the existing document, separate paragraphs.

A comment was made that the fluid on a Dry Type transformer should be air instead of none. Air is a fluid. Other comments felt like this definition would confuse people more than clarify the cooling medium.

Angela Ortiz commented that there are options for correcting and adding to an existing PAR. There is an option for an "amended" standard. It was reported that it will be a second document that will carry a suffix of "a".

The committee is requesting on one time slot at the next meeting.

10.2.2.9 C57.144 Guide to Metric Conversion of Transformer Standards
Tim Olson Chair
tolson@hydro.mb.ca
PAR Status: Active
PAR Expiration Date: April 2006
Current Standard Date: New Document
Current Draft Being Worked On: D5 Dated: March 10, 2004
Meeting Date: Time:
Meeting Times: ***DID NOT MEET***

10.2.3 Subcommittee Old Business:
None reported

10.2.4 Subcommittee New Business:
None reported