

# Distribution Transformer Subcommittee Task force / Working Group Report

Document #: C57.12.32

Document Title: Enclosure Integrity

Chair: Dan Mulkey Vice-Chair Jerry Murphy

Secretary Jeremy Van Horn

Current Draft Being Worked On: 2.6 Dated: August 2018

Meeting Date: 10/16/2018 Time: 8:00 AM

Attendance:	Members	<u>33</u>
	Guests	<u>25</u>
	Total*	<u>58</u>

\* For details of attendance, please refer to AMS system of the Transformers Committee

## Before the meeting:

1. An email vote was called on 6/20/2018 by Dan Mulkey in response to the open motion made by Mike Thibault in the 03/27/2018 meeting in Pittsburgh which was tabled. The vote closed on 6/29/2018.

The motion was to include a vacuum test along with the pressure test with the following parameters:

- Apply 10 feet of pressure (4.5 psi)
- 1 foot of water submersion
- 7 days of vacuum, 7 days of pressure
- Pass criteria: the final gauge reading is the same as the initial (within 0.1 psig) and no observable water leaks

The motion **failed** with 20 opposed, 15 in favor and 1 abstention. 36 of 48 members voted.

2. An email motion was made by Igor Simonov and seconded by Guisepe Termini to accept the addition of 3.2.1 Design Submersibility Test:  
An email vote was called on 6/30/2018 by Dan Mulkey on the motion. The vote closed on 7/13/2018.

The motion **failed** with 29 opposed, 12 in favor and no abstentions. 41 of 48 members voted.

### **3. ENCLOSURE DESIGN**

#### **3.2 Submersibility Testing**

##### **3.2.1 Design-Submersibility-Test**

The assembled piece of equipment shall be pressurized to 49 kPa (gauge) (7 psig) and then submerged so that the topmost portion of the equipment is 30 cm (12") underwater. Once the initial bubbles from trapped exterior air have dispersed, the submerged equipment shall be observed for pressure loss and bubble formation for a minimum of 10 minutes. Pass criteria is no bubble formation and with no loss of internal air pressure greater than 0.7 kPa (gauge) (0.1 psig). Pressure monitoring shall be with a gauge accuracy of  $\pm 0.1\%$  or better.

NOTE—Since the equipment is internally pressurized, increasing the submersion depth would reduce the stress on the equipment unless the water depth exceeded 10 m (33 ft).

##### **3.2.2 Production-Submersibility-Test**

Each piece of assembled equipment shall pass a suitably designed leak test.

- 1) → Pressurized and then submerged in water without air bubbles streaming, or
- 2) → Pressurized and tested with chalk dust, or
- 3) → Pressurized and held for suitable time without any loss of pressure

<sup>¶</sup> Based on withstand without permanent distortion pressure in IEEE C57.12.39, Standard for Distribution Transformer Tank Pressure Coordination  
<sup>¶</sup> Based on Accelerated sealing life test in IEEE 386, Standard for Separable-Insulated Connector Systems for Power Distribution Systems Rated 2.5 kV through 35 kV

# Distribution Transformer Subcommittee

## Working Group Report

### Meeting Minutes / Significant Issues / Comments:

1. Dan Mulkey called the meeting to order at 8:03 AM.
2. Introductions were performed.
3. Membership changes were noted:
  - a. Removed: Sanjib Som
  - b. Added: David Blew, Justin Minikle, Michael Morgan, Babanna Suresh, Ben Garcia
4. Quorum was verified. The working group consisted of 49 members, requiring 25 for quorum. 31 members were confirmed at the time of counting. 33 members were confirmed afterwards through the roster.
5. Steve Shull made a motion, seconded by Igor Simonov for approval of the minutes. No opposition was raised so the minutes were unanimously approved.
6. Dan Mulkey made a call for any essential patent statements and responses. None were raised.
7. Steve Shull made a motion, seconded by Mike Thibault for approval of the agenda. No opposition was raised so the agenda was unanimously approved.
8. Status of Standards:
  - a. C57.12.28 Standard for Pad-Mounted Equipment – Enclosure Integrity, Published July15, 2014, Revision Due: 12/31/2024
  - b. C57.12.29 Standard for Pad-Mounted Equipment – Enclosure Integrity for Coastal Environments, Published August 8, 2014, Revision Due date 12/31/2024
  - c. C57.12.30 Standard for Pole-Mounted Equipment – Enclosure Integrity for Coastal Environments, Published September 20, 2010, Revision Due: 6/17/2020
  - d. C57.12.31 Standard for Pole Mounted Equipment – Enclosure Integrity, Published September 20, 2010, Revision Due: 6/17/2020, Corrigenda approved May16, 2014
  - e. C57.12.32 Standard for Submersible Equipment – Enclosure Integrity, Reaffirmed 3/7/2008, Revision Due: 12/31/2018, PAR expiration: 12/31/2019
9. Old business:
  - a. Dan Mulkey informed the group that the motion to add a design submersibility test had failed through an email vote. The vote had occurred between the Spring 2018 meeting in Pittsburgh and this Fall 2018 meeting in Jacksonville.
10. New business:
  - a. Dan Mulkey informed the group that the draft standard of C57.12.32 had been sent for MEC review. The review had been delayed due to a lost email, but has now been completed with some comments for the group to review.
  - b. A **motion** was made by Ed Smith and seconded by Babanna Suresh to approve Draft 2.6 for ballot and form a comment resolution group to make the resulting changes, including the MEC comments, prior to the Spring meeting. The motion passed unanimously with 32 in favor and none opposed.

The following members agreed to join the comment resolution task force: Dan Mulkey, Justin Minikel, Jerry Murphy, Jeremy Van Horn, and Ben Garcia.

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- c. Dan Mulkey asked the working group if it would be better to combine the C57.12.30 and C57.12.31 documents into one standard for the next revision, or if they should be kept separate. Justin Minikel offered to help combine the documents if the group decided to do that. A few points for consideration were raised in the ensuing discussion:
  - i. The documents are currently referenced in other standards such as C57.12.20; if the documents change those references may be out of date. Combining into one document will require that a new standard number be generated and assigned to the new document.
  - ii. Users often specify which standard they want when purchasing transformers; if the standards are combined it will introduce ambiguity as to what the user is looking for.

A **straw poll vote** was taken amongst the working group about whether to combine the standards into one document on the next revision cycle or to keep them separate. The majority of the group voted in favor of keeping them separate, with 3 members voting to combine.

The scope and purpose of C57.12.30 and C57.12.31 were reviewed:

- iii. It was discussed whether or not to include control cabinets into the scope of the C57.12.30 revision. The scope currently has the words 'not limited to' which may mean it's already covered. Control cabinets are typically not in excess of 600V.
- iv. Justin Minikel informed the working group that the Switchgear subcommittee is working on a PAR to include Enclosure Integrity into Switchgear.
- v. It was confirmed that the scope of the pole-mounted Enclosure Integrity standards includes platform mounted transformers as well.

A **motion** was made by Mike Thibault and seconded by Igor Simonov to submit a PAR for both C57.12.30 and C57.12.31 separately without changing the scope of the documents. The motion passed with unanimous approval.

A **task force** was formed to take the C57.12.32 standard once it has been balloted and apply the changes to the C57.12.30 and C57.12.31 documents. The task force included the following members: Justin Minikel, Babanna Suresh, Jeremy Van Horn, Jerry Murphy, and Dan Mulkey.

11. The meeting was adjourned at 8:39 am.

12. The next meeting will be held on March 26, 2019 in Anaheim, CA, USA

Copies of any handouts and/or subgroup reports will be made available as separate items but referenced by these minutes.

The following attendees requested membership and will be added to membership for the Fall 2018 meeting:

- Martin Bachand
- David Blew
- Douglas Craig
- William Elliot
- Matthew Enders
- Kenneth Hampton

## **Distribution Transformer Subcommittee Working Group Report**

- Juan Ramirez
- James Ratty
- Pedro Salgado
- Robert Tinsley

Submitted by:     Jeremy Van Horn

Date:             10/16/2018