

Distribution Transformer Subcommittee

Task force / Working Group Report

Document #: C57.12.28 & C57.12.29

Document Title: Enclosure Integrity

Chair: Dan Mulkey Vice-Chair Jeremy Van Horn

Secretary Audrey Siebert-Timmer

Current Draft Being Worked On: 1.4 Dated: Nov 2021 [Rev 3/2/22]

Meeting Date: Nov 16, 2021 Time: 8:00 AM CST

Attendance:	Members	<u>49</u>
	Guests	<u>30</u>
	Total	<u>79</u>

List of Members:

Scott Abbott (PPG)
Glenn Andersen (Fayetteville PWC)
Martin Bachand (Cloverdale Paint Inc.)
Darren Brown (Howard Industries)
Thomas Callsen (Weldy-Lamont Associates)
John Chisholm (IFD Corporation)
Rhett Chrysler (ERMCO)
Michael Dahlke (Central Moloney, Inc.)
Thomas Dauzat (General Electric)
William Elliott (Prolec GE)
Benjamin Garcia (Southern California Edison)
James Gardner (SPX Transformer Solutions, Inc.)
Carlos Gaytan (Prolec GE)
Ali Ghafourian (H-J Enterprises, Inc.)
Chris Guertin (Cloverdale Paint Inc.)
Said Hachichi (Hydro-Quebec)
Kenneth Hampton (Baltimore Gas & Electric)
Ramadan Issack (American Electric Power)
Gael Kennedy (GR Kennedy & Associates LLC)
Gary King (Howard Industries)
Brad Kittrell (Consolidated Edison Co. of NY)
Brian Klaponski (Carte International Inc.)
Andrew Larison (Hitachi Energy)
Alejandro Macias (CenterPoint Energy)
Justin Minikel (EATON Corporation)

Michael Morgan (Duke Energy)
Daniel Mulkey (Mulkey Engineering Inc.)
Jerry Murphy (Reedy Creek Energy Services)
Dwight Parkinson (EATON Corporation)
Ion Radu (Hitachi Energy)
Juan Ramirez (CELECO)
James Ratty (Electronic Technology Inc.)
Martin Rave (ComEd)
Pedro Salgado (Electronic Technology Inc.)
Jeffrey Schneider (Power Partners/Spire Power Solutions)
Avijit Shingari (Pepco Holdings Inc.)
Stephen Shull (BBC Electrical Services, Inc.)
Audrey Siebert-Timmer (IFD Corporation)
Igor Simonov (Toronto Hydro)
Edward Smith (H-J Family of Companies)
Travis Spooone (EATON Corporation)
Michael Thibault (Pacific Gas & Electric)
Alan Traut (Howard Industries)
Reinaldo Valentin (Duke Energy)
Jeremy Van Horn (IFD Corporation)
John Vartanian (National Grid)
Joshua Verdell (ERMCO)
Shelby Walters (Howard Industries)
Alan Wilks (Consultant)

List of Guests:

Rehan Ali (Siemens Energy)
Jerry Allen (Metglas, Inc.)
Gregory Ante (Southern California Edison)
Huan Dinh (Hitachi Energy)
Jeffrey Door (H-J Family of Companies)
Zoran Goncin (PTI Transformers)

Michael Gonzales (Southern California Edison)
Jane Hall (Cloverdale Paint Inc.)
Colby Lovins (Federal Pacific)
Tiffany Lucas, P.E. (SPX Transformer Solutions, Inc.)
Rosamisa Magee (PSE&G)
Timothy Menter (Lincoln Electric System)

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Aaron Meyers (EATON Corporation)
Kent Miller (T&R Electric Supply Co.)
Manoj Kumar Mishra (ASAsoft (Canada) Inc)
Rajkumar Padmawar (ASAsoft (Canada) Inc)
Chris Pitts (Howard Industries)
Jarrod Prince (ERMCO)
Robert Reepe (Georgia Power Co.)
Albert Sanchez (Knoxville Utilities Board)
Stefan Schindler (Maschinenfabrik Reinhausen)

Dan Schwartz (Quality Switch, Inc.)
Pugal Selvaraj (Virginia Transformer Corp.)
Jeremy Sewell (Quality Switch, Inc.)
Adrian Silgado (IFD Corporation)
Eric Theisen (Metglas, Inc.)
Timothy Tillery (Howard Industries)
Bruce Webb (Knoxville Utilities Board)
Helena Wilhelm (Vegoor Tecnologia Aplicada)
Michael Zarnowski (Carte International)

Meeting Minutes:

1. Dan Mulkey called the meeting to order at 8:00 AM CST.
2. Opening remarks and announcements
 - a. None were made
3. Dan Mulkey reviewed IEEE SA Copyright Policy and Essential Patent Claims. No issues were raised.
4. Membership changes were noted:
 - a. Added: Chris Guertin, Andrew Larison, Jeff Schneider, Avjit Shingari
 - b. Changed to Guest: none
5. Quorum was verified. The working group consisted of **59** members, requiring **30** for quorum. **39** members were confirmed through the WebEx poll. Attendance records later confirmed **49** members.
6. Dan Mulkey requested approval of the agenda. Jerry Murphy made a motion, second by Steve Shull. Agenda was unanimously approved.
7. Dan Mulkey requested approval of the minutes. Jerry Murphy made a motion, second by Steve Shull for approval of the minutes. Minutes were unanimously approved.
8. Status of Standards:
 - a. C57.12.28 Standard for Pad-Mounted Equipment – Enclosure Integrity, Published July 15, 2014
 - i. Expires: **12/31/2024**
 - ii. PAR expiration: **12/31/2024**
 - iii. Status: **in progress, draft 1.4**
 - b. C57.12.29 Standard for Pad-Mounted Equipment – Enclosure Integrity for Coastal Environments, Published August 8, 2014
 - i. Expires: **12/31/2024**
 - ii. PAR expiration: **12/31/2024**
 - iii. Status: **in progress, draft 1.4**
 - c. C57.12.30 Standard for Pole-Mounted Equipment – Enclosure Integrity for Coastal Environments, Published March 4, 2021
 - i. Expires: 12/31/2030
 - d. C57.12.31 Standard for Pole Mounted Equipment – Enclosure Integrity, Published February 26, 2021
 - i. Expires: 12/31/2030
 - e. C57.12.32 Standard for Submersible Equipment – Enclosure Integrity, Published Aug 8, 2019

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i. Expires: 12/31/2029

9. Old business:

- a. Dan Mulkey reviewed status of standards and noted that we have three meetings left to finish C57.12.28 and C57.12.29.
- b. Taskforce Report: Stainless Steel Definitions
 - i. **Taskforce Members: Will Elliot, Tiffany Lucas.**
 - ii. Dan Mulkey informed the group that proposed stainless steel definitions are now included into an annex as per the approved motion from the last meeting.
- c. Taskforce Report: Special Pad-mount Tests (pry-bar, wire probe)
 - i. **Taskforce Members: Gary King, Shelby Walters, Michael Zarnowski.**
 - ii. Concluded Snap-On torque wrench in Annex B is still available. Iron Man scales No. 1756T4 are no longer available but there are substitutions (i.e. Chatillon DG-200, No 118 Detecto Matic). Plunger springs are still available from MW Components however Figure B-3 needs to be modified to reflect the supplier datasheet.
 - iii. **Gary King made a motion to change Fig B-3 to match supplier datasheet (including changing the free length to 2.5 inches and along with changing units to lbf). Second by Marty Rave. Motion was unanimously approved.**
 - iv. **Dan Mulkey to propose wording next meeting to reference a generic spring sale rather than an Iron Man scale.**
- d. Taskforce Report: Coating Adhesion Test Methods
 - i. **Taskforce Members: Justin Minikel (chair), Jane Hall, Chris Guertin, Martin Bachand, Scott Abbott, Zoran Goncin.**
 - ii. Taskforce reviewed two primary test methods: tape adhesion and pull-off adhesion. Knife adhesion was mentioned briefly but the group concluded this test method was too subjective.
 - iii. Taskforce recommended to the group to keep existing tape adhesion test method as-is and adding a tape adhesion test after humidity exposure.
 - iv. Group discussed humidity exposure test.
 1. It was suggested to add a time limit (i.e. tape adhesion test to be performed X hours after humidity exposure)
 2. It was discussed that scratching the surface may change paint hardness and improve adhesion which may impact test results.
 3. It was mentioned that many other standards do adhesion tests after environmental exposure.
 4. It was suggested that humidity adhesion tests should be performed before adding this requirement to the standard.
 5. Jane Hall offered to perform a blind test on samples after humidity exposure from different manufacturers. This test would give us general idea on how various coating perform.
 6. Test variables were discussed including substrate preparation, substrate material and coating type / cure time. One suggestion was to use ACT test panels to reduce test variabilities. [ACT located in Hillsdale, MI manufactures a variety of panels for coatings testing.]
 7. A comment was made that coating performance should be the same regardless of type or application method.
 - v. **Taskforce to continue discussion and present proposed test plan to group at next meeting.**
- e. Taskforce Report: C57.12.38 Request on Tank Touch Temperatures
 - i. **Taskforce Members: Jerry Murphy (chair), Steve Shull, Dan Mulkey, Jeremy Van Horn, Justin Minikel, Jane Hall, Chris Geuterin, Scott Abbott.**
 - ii. Taskforce concluded that coating temperature limits far exceed transformer operating temperatures.

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- iii. The group then discussed safety implications of external transformer temperatures (specifically for pad mounted transformers)
 - 1. ASTM C1055 standard state that surface temperatures of 40.5°C are a hazard.
 - 2. Under standard operating conditions external tank temperatures will be way above 40°C (this does not include radiant heat from the sun).
 - 3. Discussed that as this is a human and environmental safety issue it should be captured in the standards somewhere.
 - 4. Tank surface temperature also impacts decal adhesion and corrosion rates.
 - 5. One suggestion was to include this safety warning in the 12.00 standard.
 - 6. A comment was made that the wire pry and probe test is directly related to safety.
 - 7. A comment was made that high temperature insulating fluids have other benefits like fire mitigation during a fault and are not necessarily used to increase transformer loading alone.
 - 8. A comment was made that DER penetration will also impact external tank temperatures.
 - 9. Group discussed possible mitigation methods including increasing the transformer size or the installation of guarding or fencing systems.
 - iv. **Taskforce to continue discussion and develop wording that can be used in the standard to inform users and manufacturers of this safety risk along with options for mitigating this risk. If anybody is interested in contributing, please contact Jerry Murphy.**
- f. Discussion continued from S21 meeting: Substrate Surface Preparation
- i. Tom Dauzat brought forward that surface cleaning for stainless steel cannot use carbon grit as it will impregnate the material resulting in pitting corrosion. Manufactures must only use glass or sand for surface preparation of stainless steels.
 - ii. Tom Dauzat commented that this requirement already exists in some industry standards.
 - iii. Group discussed and agreed that this should be included in the annex of the standard.
 - iv. **Dan Mulkey requested a taskforce to draft up wording summarizing substrate preparation requirements that can be included in the annex.**
 - v. **Taskforce Members: Tom Dauzat (chair), Martin Bachand, Jane Hall and Zoran Goncin.**
10. New business:
- a. No new business was discussed
1. C57.12.28 and C57.12.29 continued revision
- a. Dan Mulkey briefly showed the changes proposed in draft 1.4. All changes are summarized in meeting slides which will be posted on the website. Review of these changes will be the focus for the Spring 2022 meeting.
2. Next meeting: is planned for March 29, 2022, in Denver, Colorado USA
- a. The following attendees requested membership and will be added to membership for the Spring 2021 meeting: **Jane Hall, Robert Reepe.**
3. The meeting was adjourned at 9:14 AM CST.

Submitted by: Audrey Siebert-Timmer

Date: 11/16/2021