

Minutes of Meeting
IEEE Switchgear Liaison Task Force to WG for Revision of IEEE C57.16 -2011

Location: San Diego, CA
Macaw Room
Date: Tuesday October 8th, 2019 (2:00-3:45 PM)
Participants: 14 Attendees
7 Requesting Membership (Including Chair and Secretary)

Chair: David Caverly
Secretary: Lucas Collette

IEEE C57.16- 2011, IEEE Standard for Requirements, Terminology and Test Code for Dry-Type Air-Core Series Connected Reactors

1. Call to Order

Chair called to order and presented agenda.

2. Introductions and Circulation of Attendance Sheets

Introductions performed and attendance sheet circulated.

3. Liaison Task Force Status and Membership

Chair commented regarding the formation of the task force and since this was the first official meeting of the task force, those in attendance who would like to request membership should do so on the attendance sheet.

4. IEEE Patent Policy

Patent and copyright policy presented. No Patent claims identified.

5. Purpose of this Meeting and Agenda Review

Chair described the purpose of the task force and how the existing document (C57.16) does not include specific guidance on defining reactor ratings.

Agenda for the meeting was reviewed and the chair asked if there were any comments or additions. There were no responses for comments or additions to the agenda.

6. Brief Review of Minutes from last meeting

Minutes from the previous meeting were reviewed.

7. PC57.16 Timeline (Reminder)

Standard expires in 2021, and the PAR expires in 2020. It is anticipated an extension to the PAR will be requested.

8. Outline of first draft concept/approach of proposed revisions to of IEEE C57.16 Annex B
Chair reminded the task force that C57.16 is a product standard and not an application guide. The suggestion by the chair was presented to add an informative Annex that describes how capacitor bank reactors are sized.

9. Open Discussion on proposed concept/approach to revisions to Annex B

The following is a summary of the points discussed during the meeting with respect to the proposed Annex.

Question was raised as to whether HVCB documents already have the information proposed for Annex B?

- One response was that the mechanical short-time current rating is the only one that is of question as not being defined.
- Another response is that inrush current peak and frequency are defined by IEEE Std C37.04. For short-time current, circuit breakers use 2.6 times short-circuit current rating. It was suggested that these values could be used for the reactor as well.
- A comment was made as to whether the reactor ratings should be picked based on the breaker ratings or vice versa.

Question was raised as to whether a tutorial-like Annex in C57.16 or an entirely new document should be created.

- It was discussed that the proposed approach is to include an Annex in C57.16 which briefly describes the ratings/concerns and then references other existing documents for more detailed information.
- The Annex will also include details on how to apply the detailed information obtained from the reference documents.

Chair asked the Task Force if there were any objections to the approach of creating the tutorial-like Annex in the existing C57.16 document. There were no objections.

10. Annex F Draft Status & Invitation for input

Chair presented Annex F which includes information on reactor-limited fault TRVs. Chair noted Annex F is applicable to all reactors and not just those used in capacitor switching applications.

The chair asked for volunteers to review and provide comments on Annex F by 12/31/2019.

The following is a list of the volunteers:

- Craig Polchinski
- Michael Wactor
- Victor Hermosillo
- Marcus Young

11. Next Actions

Chair to present to the Transformer Committee the Task Force's plan to add an informative Annex that describes how capacitor bank reactors are sized.

12. New Business

No additional items added.

13. Next Meetings:

Chair announced the next meetings for the Transformer and Switchgear Committees

- Fall Transformers: Columbus, OH: Oct. 27-31, 2019
- Spring Transformers: Charlotte, NC: March 22-26, 2020
- Spring Switchgear: Reno, NV: May 4-8, 2020
- Fall Switchgear: Fort Worth, TX: Oct. 4-8, 2020
- Fall Transformers: Kansas City, MO: Oct. 18-22, 2020

14. Adjournment

Chair adjourned the meeting at 3:45 PM.

Reported by:

Luke Collette

Liaison Task Force Secretary

IEEE PES Switchgear Committee
ADSCOM C57.16 - Meeting Roster

Place / Date of meeting : SAN DIEGO / 10/8/19

Initial to denote attendance	Last name	First name	Company Name	Role	Request Membership
	Alexander	Roy	RWA Engineering	Guest	
	Boulus	Michael	PSE&G	Guest	
	Caverly	David	Trench Ltd.	Chair	
LPC	Collette	Lucas	Duquesne Light	Secretary	
	Hall	John	Tennessee Valley Authority	Guest	
JKW	Hermosillo	Victor	GE Grid Solutions	Guest	Yes
	Hester	Edward	Entergy	Guest	
	Hutchins	Roy	Southern Company Services	Guest	
	Peterson	Alan	Utility Service Corporation	Guest	
LHP	Polchinski	Craig	MEPPI	Guest	Yes
	Skidmore	Michael	AEP	Guest	
	Sullivan	Dustin	Hubbell Power Systems	Guest	
JLV	Weisker	Jan	Siemens AG	Guest	
	York	Richard	Mitsubishi Electric Power Products Inc.	Guest	
	Yu	Li	Eaton Corporation	Guest	

LING Jane GE Guest. Yes

WACTOR MICHAEL POWELL IND. GUEST

Coletta Justin Powell, Ind. guest

Claxton Matthew Powell, Ind. Guest

Bryant Craig Duke Energy Member

TOOLIS Elizabeth MEPPI Guest

Morris Young MEPPI Guest Yes

Mehraeen Shahab Louisiana State University Guest

Jerry Wen BC Hydro. Guest.

IEEE Switchgear Liaison Task Force to WG for Revision of IEEE C57.16 - 2011

IEEE Standard for Requirements, Terminology
and Test Code for Dry-Type Air-Core Series
Connected Reactors

San Diego, California // Tuesday, October 8, 2019

2:00 PM – 3:45 PM // Macaw

Meeting Chairman: Victor Hermosillo

Meeting Vice-Chairman: David Caverly

Secretary: Lucas Collette

Agenda

1. Welcome
2. Introductions and Circulation of Attendance Sheets
3. Liaison Task Force Status and Membership
4. IEEE Patent Policy
5. Purpose of this Meeting and Agenda Review

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Liaison Task Force (LTF) Status and Membership

- Spring 2019 Meeting – Burlington
 - Request was made to HVCB to establish LTF
 - motion made and carried within HVCB
- subsequent decision was made to move this LTF to ADSCOM
- ... So this meeting is the inaugural meeting of the LTF ...
- LTF Membership:
 - Anyone who attended in Burlington, or today, may become a member of the LTF by so requesting on today's roster sheet or by sending an email to the LTF Chair (D. Caverly) or Secretary (L. Collette)

Burlington Attendance

ADSCOM C57.16

	Last	First	Company	Role
<input checked="" type="radio"/>	Alexander	Roy	RWA Engineering	Guest ▼
<input type="radio"/>	Boulus	Michael	PSE&G	Guest ▼
<input type="radio"/>	Caverly	David	Trench Ltd.	Chair ▼
<input type="radio"/>	Collette	Lucas	Duquesne Light	Secretary ▼
<input type="radio"/>	Hall	John	Tennessee Valley Authority	Guest ▼
<input type="radio"/>	Hermosillo	Victor	GE Grid Solutions	Guest ▼
<input type="radio"/>	Hester	Edward	Entergy	Guest ▼
<input type="radio"/>	Hutchins	Roy	Southern Company Services	Guest ▼
<input type="radio"/>	Peterson	Alan	Utility Service Corporation	Guest ▼
<input type="radio"/>	Polchinski	Craig	MEPPI	Guest ▼
<input type="radio"/>	Skidmore	Michael	AEP	Guest ▼
<input type="radio"/>	Sullivan	Dustin	Hubbell Power Systems	Guest ▼
<input type="radio"/>	Weisker	Jan	Siemens AG	Guest ▼
<input type="radio"/>	York	Richard	Mitsubishi Electric Power Products Inc.	Guest ▼
<input type="radio"/>	Yu	Li	Eaton Corporation	Guest ▼

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IEEE Patent Policy

Instructions for the WG Chair

The IEEE-SA strongly recommends that at each WG meeting the chair or a designee:

- **Show slides #1 through #4 of this presentation**
- **Advise the WG attendees that:**
 - IEEE's patent policy is described in Clause 6 of the *IEEE-SA Standards Board Bylaws*;
 - Early identification of patent claims which may be essential for the use of standards under development is strongly encouraged;
 - There may be Essential Patent Claims of which IEEE is not aware. Additionally, neither IEEE, the WG, nor the WG Chair can ensure the accuracy or completeness of any assurance or whether any such assurance is, in fact, of a Patent Claim that is essential for the use of the standard under development.
- **Instruct the WG Secretary to record in the minutes of the relevant WG meeting:**
 - That the foregoing information was provided and that slides 1 through 4 (and this slide 0, if applicable) were shown;
 - That the chair or designee provided an opportunity for participants to identify patent claim(s)/patent application claim(s) and/or the holder of patent claim(s)/patent application claim(s) of which the participant is personally aware and that may be essential for the use of that standard
 - Any responses that were given, specifically the patent claim(s)/patent application claim(s) and/or the holder of the patent claim(s)/patent application claim(s) that were identified (if any) and by whom.
- The WG Chair shall ensure that a request is made to any identified holders of potential essential patent claim(s) to complete and submit a Letter of Assurance.
- It is recommended that the WG Chair review the guidance in *IEEE-SA Standards Board Operations Manual* 6.3.5 and in FAQs 14 and 15 on inclusion of potential Essential Patent Claims by incorporation or by reference.

IEEE Patent Policy

Participants have a duty to inform the IEEE

- Participants shall inform the IEEE (or cause the IEEE to be informed) of the identity of each holder of any potential Essential Patent Claims of which they are personally aware if the claims are owned or controlled by the participant or the entity the participant is from, employed by, or otherwise represents
- Participants should inform the IEEE (or cause the IEEE to be informed) of the identity of any other holders of potential Essential Patent Claims

**Early identification of holders of potential
Essential Patent Claims is encouraged**

Ways to inform IEEE

- **Cause an LOA to be submitted to the IEEE-SA (patcom@ieee.org); or**
- **Provide the chair of this group with the identity of the holder(s) of any and all such claims as soon as possible; or**
- **Speak up now and respond to this Call for Potentially Essential Patents**

If anyone in this meeting is personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance, please respond at this time by providing relevant information to the WG Chair

Other guidelines for IEEE WG meetings

- **All IEEE-SA standards meetings shall be conducted in compliance with all applicable laws, including antitrust and competition laws.**
 - **Don't discuss the interpretation, validity, or essentiality of patents/patent claims.**
 - **Don't discuss specific license rates, terms, or conditions.**
 - Relative costs of different technical approaches that include relative costs of patent licensing terms may be discussed in standards development meetings.
 - **Technical considerations remain the primary focus**
 - **Don't discuss or engage in the fixing of product prices, allocation of customers, or division of sales markets.**
 - **Don't discuss the status or substance of ongoing or threatened litigation.**
 - **Don't be silent if inappropriate topics are discussed ... do formally object.**

For more details, see *IEEE-SA Standards Board Operations Manual*, clause 5.3.10 and *Antitrust and Competition Policy: What You Need to Know* at <http://standards.ieee.org/develop/policies/antitrust.pdf>

Patent-related information

The patent policy and the procedures used to execute that policy are documented in the:

- ***IEEE-SA Standards Board Bylaws***
(<http://standards.ieee.org/develop/policies/bylaws/sect6-7.html#6>)
- ***IEEE-SA Standards Board Operations Manual***
(<http://standards.ieee.org/develop/policies/opman/sect6.html#6.3>)

Material about the patent policy is available at
<http://standards.ieee.org/about/sasb/patcom/materials.html>

**If you have questions, contact the IEEE-SA
Standards Board Patent Committee
Administrator at patcom@ieee.org**

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Liaison Task Force Purpose (Reminder)

- C57.16 is an IEEE Transformers Committee document
- ... however ... it's applicability includes Shunt Capacitor Reactors (aka Inrush / Outrush Reactors, aka “Damping Reactors” aka Transient Limiting Inductors (TLI's))
- the application, rating definition, and appropriate specification of these reactors is strongly influenced by the switching device
- a goal is to improve C57.16's guidance to users
- provide support from IEEE Switchgear experts and “align” on improving certain specific aspects of customer guidance provided by C57.16 ... in particular Annex B – Shunt Capacitor Reactors (and also Annex F) ... without “infringing on” CB Standards and Guides

This Meeting's Purpose / Objectives

- inaugural meeting
- define initial LTF membership (roster)
- discussion of possible approaches to Annex B revision
- arrive at an LTF consensus as to recommended approach (to be presented to the WG at transformers in 3 weeks)
- Volunteers to review/comment on Draft of new Annex F

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9. Open Discussion on proposed concept/approach to revisions to Annex B
10. Annex F Draft Status & Invitation for input

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11. Next Actions

12. New Business

13. Next Meetings

14. Adjournment

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- Changes ?
- Additions?

Roster Check

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Spring 2019
Burlington, Vermont
Minutes

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IEEE PC57.16 Timeline:

- Standard expires in 2021
- Par expires in 2020 (can be extended)
 - So we have :
 - 2 more meetings *without* a PAR extension
 - 4 more meetings *with* a PAR extension

Intention is to get a PAR extension

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IEEE C57.16 – 2011 Annex B Overview:

Annex B: Specific requirements for dry-type air-core shunt capacitor reactors

- **Content :**
 - briefly summarizes inrush/outrush, detuning applications
 - defines differences in ratings to other series reactors – effects of harmonics etc., thermal limit differences, test requirements, test methods and limits
 - general references to CB standards – but no specifics of where to find what
 - does not currently reference TR-16 PES Report on TLI's (which was published later)

IEEE C57.16 – 2011 Overview: continued

Annex B: Specific requirements for dry-type air-core shunt capacitor reactors

- **Issues:**

- no guidance re inductance definition/selection (nor any explanation of what is behind it, or why, or why it is evolving; peak current, I_{xf} , frequency)
- No explanation as to how to arrive at short time current ratings (combination of fault current and inrush/outrush currents)
- does not even mention TRV within Annex B(though it is addressed in Annex F (principally in the context of CLR's))
- provides only a couple of examples of typical arrangements (does not show neutral side reactors option)
- No reference TR-16 PES Report on TLI's

IEEE C57.16 – 2011 Overview: continued


Annex B: Specific requirements for dry-type air-core shunt capacitor reactors

Referenced Documents :

IEC 60871-1:2005, Shunt capacitors for a.c. power systems having a rated voltage above 1 000 V – Part 1: General.¹³

IEEE Std C37.06™-2009, IEEE Standard for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis—Preferred Ratings and Related Required Capabilities for Voltage Above 1000 V.^{14,15}

IEEE Std C37.012™-2005, IEEE Application Guide for Capacitance Current Switching for AC High Voltage Circuit Breakers.

IEEE Std C37.12™-2008, IEEE Guide for Specifications of High-Voltage Circuit Breakers (over 1000 Volts). 

IEEE Std 18™-2002, IEEE Standard for Shunt Power Capacitors.

IEEE Std 1036™-2010, IEEE Guide for the Application of Shunt Power Capacitors.

NEMA CP 1-2000 (R2008), Shunt Capacitors.¹⁶

Proposed Approach for Annex B Update

- some “reminders” from PC57.16 working group chair
 - this is a product standard – not an Application Guide
 - “Requirements, Terminology and Test Code for Dry-Type Air-Core Series Connected Reactors”
 - Annex B is a Normative Annex – be careful what we put in there
- often, shunt capacitor reactors (TLI’s) are specified by transformer engineers – not switchgear folks ... so they often are less familiar with the issues and guidance provided in MANY switchgear guides and documents ... so perhaps we need “a bridge”
- what is the best approach ?

Proposed Approach for Annex B Update

... an idea for discussion ...

- Make minimal changes to the existing Normative Annex B
- Add an additional INFORMATIVE Annex – e.g. Annex B-1 (informative) “Application Aspects of Shunt Capacitor Reactors (TLI’s)”
 - Something less than an Application Guide, but more than a typical (and the present) standard in terms of applications information, “what is behind the ratings”
 - describe the basic issues and what is behind them, outline the evolving nature, and then point to specific switchgear documents to get the current information
- Is this a good approach?

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Roster Check

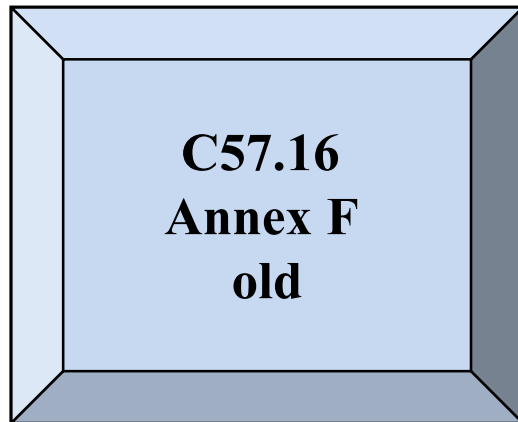
Proposed Approach for Annex B Update

DISCUSSION

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**Volunteers to review and
comment on Annex F ?**

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11. Next Actions

12. New Business

13. Next Meetings

14. Adjournment

Next Actions

- circulate draft of Annex F to LTF
- present outcome of today's meeting to Trx WG in 3 weeks

Fall Transformers: Oct. 27-31, 2019

- develop draft of Annex B and B1 & circulate to LTF for comments
- present B /B-1 drafts to Trx WG at Spring Trx meeting
- receive comments on Annex F and review at Spring Trx meeting

Spring Transformers: March 22-26, 2020

- Review comments on Annex F in LTF at Spring Swgr meeting
- present B /B-1 drafts to LTF at Spring Trx meeting

Spring Switchgear: May 3-7, 2020

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11. Adjournment

Thanks for your support !

Have a great week !!

... and Safe Travels to All ...