

# Minutes of C37.04 Amendment 1 Working Group

Spring 2022 meeting

April 12, 2022, Orlando/Florida

**Attendance** 61 people were in attendance  
28 Attendees applied for membership (in addition to Chair & Vice Chair)  
31 guests participated

- =====
- 1) The meeting was called to order by Chair, John Webb at 14:00 EDT
  - 2) Introduction of members and guests, Chair mentioned that during initial meeting of a working group any attendee may apply for membership
  - 3) Presentation of Behavior rules
  - 4) Review of Patent Slides – *No issues were voiced by the meeting attendees*
  - 5) Discussion of Copyright Rules – *No issues were voiced by the meeting attendees*
  - 6) Agenda was presented
  - 7) Chair indicated that iMeet Central working group space is requested but not ready
  - 8) PAR review, work to be done was explained
  - 9) Chair indicated intend to conduct at least one virtual meeting before the F22 meeting in Burlington
  - 10) Review of item list out of PAR study group – Distribution of work, formation of Task forces dedicated to the single items. Underlined name denotes TF leader.

- Is “light” pollution level as “normal” for bushing creepage really correct? IEC uses Medium.  
TF: Arben Bufi, Todd Irvin, Mike Skidmore, Pat Di Lillo, Devki Sharma
- Definition of the terms  $T_L$  and  $T_{LL}$  was moved to PC37.09a
- Eliminate capacitive switching class ‘C0’ as was originally done in C37.04a (but C37.09a resurrected it).  
TF: Stephen Cary, Terry Woodyard, Jan Weisker, John Webb
- Service capability needs to be clarified?  
TF: Sergio Flores, Victor Savulyak
- Allow contact temperature in non-oxidizing atmospheres to match IEC levels  
TF: Eldridge Byron, Jeremy Hensberger, Dan Schiffbauer
- Remove interrupting time as a “Rated” value but rather a related time value. (and why not define in terms of minimum arcing time?). Define interrupting time in cycles not msec – for 50 Hz / 60 Hz breakers both may be 3-cycles, but at 50 Hz will not be 50 msec.  
TF: John Webb, Neil McCord, Terry Woodyard, Sergio Flores
- Certain portions of NEMA SG4 were incorporated into C37.04 as part of an earlier agreement with NEMA. During balloting several of these requirements were questioned but rejected by the working group. As requested during the amendment WG several portions will be revisited including Table 29 (HV bushing threading), Table 31 (CT Accuracy Classes), Annex E (free-standing CT’s), and Figures 12 & 13 (CT terminal numbering)  
TF: Andy Keels, Hua Liu, Dragan Tabakovic

The following items were raised during in the amendment study group but were considered possibly too aggressive for the timing of this amendment and are not currently in the PAR, but could be added if a task force can make a proposal acceptable to the working group.

- TRV Harmonization and clarification, e.g. T60  
TF: Neil McCord, Lucas Collette, Mike Crawford, Dan Schiffbauer, Craig Polchinski

## Minutes of **C37.04 Amendment 1 Working Group**

Spring 2022 meeting

April 12, 2022, Orlando/Florida

- Test to cover  $k_{pp}$  1.5 and 1.3  
TF: No current volunteers, revisit later.

Neil McCord proposed an additional item to require a defined pressure value (density) depending on minimum ambient temperature. Proposal was tabled pending a future presentation to make background more clear

11) Schedule presented: TF are expected to meet and prepare further discussion points, possibly recommendations during summer and present at regular Fall WG meeting.

12) Meeting adjourned at 5:35 EDT.

13) Next meeting to be held at Fall Switchgear Committee Meeting or sooner by electronic means at discretion of chair

Reported by:

Jan Weisker, Secretary (ad interim)

E: [jan.weisker@siemens-energy.com](mailto:jan.weisker@siemens-energy.com)

Attachments:

- (1) WG membership and attendance
- (2) Agenda Presentation

Role	First Name	Last Name	Company Name
Chair	Jan	Weisker	Siemens Energy
Secretary	John	Webb	ABB
Member	Arben	Bufl	Meiden America
Member	Eldridge	Byron	Schneider Electric
Member	Stephen	Cary	2 Phase Solutions
Member	Steven	Chen	Eaton Corporation
Member	Andrew	Chovanec	G&W Electric
Member	Michael	Christian	ABB
Member	Lucas	Collette	Duquesne Light Co.
Member	Sergio	Flores	Schneider Electric US,
Member	Robert	Hanna	JST Power Equipment
Member	Jeremy	Hensberger	Mitsubishi Electric
Member	Christopher	Jarnigan	Southern Company
Member	Thomas	Keels	kEElectric Engineering,
Member	Carl	Kurinko	Hitachi Energy
Member	Vincent	Marshall	Southern Company
Member	Craig	Polchinski	Mitsubishi Electric Power
Member	Anthony	Ricciuti	EATON
Member	Victor	Savulyak	KEMA
Member	Daniel	Schiffbauer	Toshiba International
Member	Carl	Schneider	Schneider Electric
Member	Carl	Schuetz	ATC
Member	Jeffrey	Scott	Ameren
Member	Devki	Sharma	Entergy
Member	Michael	Skidmore	Skidmore
Member	Donald	Steigerwalt	Duke Energy
Member	Jeffrey	Ward	Doble Engineering
Member	Casey	Weeks	Siemens Energy, Inc.
Member	Terry	Woodyard	Siemens Industry, Inc.
Member	Marcus	Young	Mitsubishi Electric
Guest	Herman	Bannink	G&W Electric
Guest	Paul	Barnhart	UL, LLC
Guest	Christopher	Borck	Eaton
Guest	John	Brunke	Power Engineers
Guest	Ngoc	Bui	San Diego Gas & Electric
Guest	Michael	Crawford	Mitsubishi Electric
Guest	Jason	Cunningham	Southern States, LLC
Guest	Patrick	Di Lillo	Consolidated Edison Co.
Guest	Bruce	Fennell	Nashville Electric Service
Guest	Roy	Hutchins	Georgia Power Company
Guest	Todd	Irwin	GE Grid Solutions
Guest	Bharatwaj	Jagadeesan	Southern States LLC
Guest	John	Kelly	USBR
Guest	Chang Hoon	Lee	HYOSUNG
Guest	Leo	Lopez	WIKA Instrument

---

Role	First Name	Last Name	Company Name
Guest	Peter	Marzec	S&C Electric
Guest	Paul	Masterson	Meiden America
Guest	Neil	Mc Cord	KEC Precision LLC
Guest	David	Mitchell	Mitch & Associates
Guest	Anthony	Natale	HICO America
Guest	Raj	Nayar	Siemens
Guest	Sumitabha	Pal	Schneider Electric
Guest	Rakesh	Ranjan	Esgee Technologies Inc.
Guest	Jeffery	Ricker	SCHNEIDER ELECTRIC
Guest	Leonel	Santos	Schneider Electric
Guest	Timothy	Tillery	HOWARD INDUSTRIES
Guest	Vernon	Toups	Siemens Energy Inc
Guest	Joseph	Usner	AEP
Guest	Richard	York	Mitsubishi Electric
Guest	Samuel	Zaharko	MEPPI
Guest	Lukas	Zehnder	Hitachi Energy

# Working Group C37.04a Amendment 1 to IEEE C37.04

Hilton Bonnet Creek Orlando, FL

11 Apr, 2022: 14:00 – 15:45 EDT

# Agenda

- Welcome and Introductions
- IEEE SA Copyright Policy
  - Distributed with Agenda – Please Review Prior to Meeting
- IEEE Patent Policy / Call for essential patents
  - Distributed with Agenda – Please Review Prior to Meeting
- Membership, Admin, (iMeetCentral)
- PAR Status & Timing
- List and Prioritization of PAR Items – Assignment to TF's
- Next steps / next meeting
- Adjourn

# IEEE SA 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

# 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](mailto:patcom@ieee.org)**

# 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>

# **IEEE SA COPYRIGHT POLICY**

---

**NOVEMBER 2019**



# INSTRUCTIONS FOR CHAIRS OF STANDARDS DEVELOPMENT ACTIVITIES

---

## At the beginning of each standards development meeting the chair or a designee is to:

- Show the following slides (or provide them beforehand)
- Advise the standards development group participants that:
  - IEEE SA's copyright policy is described in Clause 7 of the IEEE SA Standards Board Bylaws and Clause 6.1 of the IEEE SA Standards Board Operations Manual;
  - Any material submitted during standards development, whether verbal, recorded, or in written form, is a Contribution and shall comply with the IEEE SA Copyright Policy;
  - Instruct the Secretary to record in the minutes of the relevant meeting:
    - That the foregoing information was provided and that the copyright slides were shown (or provided beforehand).

# IEEE SA COPYRIGHT POLICY

---

**By participating in this activity, you agree to comply with the IEEE Code of Ethics, all applicable laws, and all IEEE policies and procedures including, but not limited to, the IEEE SA Copyright Policy.**

- Previously Published material (copyright assertion indicated) shall not be presented/submitted to the Working Group nor incorporated into a Working Group draft unless permission is granted.
- Prior to presentation or submission, you shall notify the Working Group Chair of previously Published material and should assist the Chair in obtaining copyright permission acceptable to IEEE SA.
- For material that is not previously Published, IEEE is automatically granted a license to use any material that is presented or submitted.

# IEEE SA COPYRIGHT POLICY

---

- The IEEE SA Copyright Policy is described in the IEEE SA Standards Board Bylaws and IEEE SA Standards Board Operations Manual
  - IEEE SA Copyright Policy, see Clause 7 of the IEEE SA Standards Board Bylaws <https://standards.ieee.org/about/policies/bylaws/sect6-7.html#7>  
Clause 6.1 of the IEEE SA Standards Board Operations Manual <https://standards.ieee.org/about/policies/opman/sect6.html>
- IEEE SA Copyright Permission
  - <https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/permissionltrs.zip>
- IEEE SA Copyright FAQs
  - <http://standards.ieee.org/faqs/copyrights.html/>
- IEEE SA Best Practices for IEEE Standards Development
  - [http://standards.ieee.org/develop/policies/best\\_practices\\_for\\_ieee\\_standards\\_development\\_051215.pdf](http://standards.ieee.org/develop/policies/best_practices_for_ieee_standards_development_051215.pdf)
- Distribution of Draft Standards (see 6.1.3 of the SASB Operations Manual)
  - <https://standards.ieee.org/about/policies/opman/sect6.html>

# Agenda

- ✓ Welcome and Introductions
- ✓ IEEE SA Copyright Policy
  - ✓ Distributed with Agenda – Please Review Prior to Meeting
- ✓ IEEE Patent Policy / Call for essential patents
  - ✓ Distributed with Agenda – Please Review Prior to Meeting
- Membership, Admin, (iMeetCentral)
- PAR Status & Timing
- List and Prioritization of PAR Items – Assignment to TF's
- Next steps / next meeting
- Adjourn



**Chair: John Webb**

**Secretary: Jan Weisker**

## **Members**

- Voting membership is granted to those participants attending the first meeting of a newly chartered Working Group upon their request to the Working Group Chair.
- A non-voting member [guest] becomes a voting member [member] by attending at least 2 of the last 4 meetings and upon sending a request for voting status to the Working Group Chair prior to the next meeting.

## **Guests (Non-Voting Member)**

- A non-voting member becomes a voting member by attending at least 2 of the last 4 meetings and upon sending a request for voting status to the Working Group Chair prior to the next meeting.
- A voting member who has not attended at least 2 of the last 4 meetings becomes a non-voting member.



# iMeetCentral

- iMeetCentral to be Project Repository & Coordination
  - <https://ieeesa.imeetcentral.com/>
- All members & guests will be given basic access.
- Attendees send e-mail with membership request:  
[jcwebb@ieee.org](mailto:jcwebb@ieee.org) & [Jan.Weisker@siemens-energy.com](mailto:Jan.Weisker@siemens-energy.com)

# PAR Status

- PAR Approval: 8Dec.'21, Expired: 31 Dec. '25
- **Scope:** This amendment will address items discovered by users related to discrepancies with other industry standards:
  - Harmonize pollution levels for normal service condition.
  - Improve definition of low temperature requirements.
  - Further define requirements for capacitive switching class C0.
  - Clarify required electrical service capability.
  - Harmonize temperature limits for contacts in non-oxidizing gases.
  - Improve definition of interrupting time.
  - Implement req. from IEEE C37.11 which are more properly in C37.04
  - Align material from NEMA SG-4 with current industry practices.

# Agenda

- ✓ Welcome and Introductions
- ✓ IEEE SA Copyright Policy
  - ✓ Distributed with Agenda – Please Review Prior to Meeting
- ✓ IEEE Patent Policy / Call for essential patents
  - ✓ Distributed with Agenda – Please Review Prior to Meeting
- ✓ Membership, Admin, (iMeetCentral)
- ✓ PAR Status & Timing
- List and Prioritization of PAR Items – Assignment to TF's
- Next steps / next meeting
- Adjourn

# PAR Items

- Is “light” pollution level as “normal” for bushing creepage correct? IEC uses Medium.
- Low-Temp Test – TL and TLL are neither defined in .09 or referenced in .04 (C37.09?)
- Eliminate capacitive switching class ‘C0’ ? Was originally not in C37.04a-2005 (but C37.09a resurrected it). Make Cap. Switching entirely optional, or keep C0? How to test for C0?

# PAR Items

- Improve definition of method for determining accumulation to determine service capability.
- Allow contact temperature in non-oxidizing [SF6 only?] atmospheres to match IEC levels.
- Define interrupting time in cycles not msec – for 50 Hz / 60 Hz breakers both may be 3 cycles, but at 50 Hz will not be 50 ms.

# PAR Items (NEMA CT info)

- ‘Shall’ for HV bushing threading (Table 29)?
- Annex E (Informative) on free-standing CT’s is actually in scope of Transformer Committee.
- Table 31 limits possible CT Accuracy Classes outside of Customer judgement. Some in C57.13 not in permitted list.
- Figures 12 & 13 make mandatory the numbering of terminals on bushing mounted CT’s and wiring.

# PAR Items (C37.11)

- Significant portion of C37.11 Clause 4 may be better in C37.04. Move from C37.11.
  - Current plan is for C37.11 to complete, and then if C37.04a agrees, start an amendment to remove duplicate material with submission to RevCom simultaneous with C37.04a



# TRV Changes & Info

- These items NOT in PAR, would need mod.
- Add informative Annex to explain TRV phenomena, basis and application (C37.011?)
- > 100 kV TRV T60 timing not harmonized with IEC, also some other values vary by small  $\Delta$ .
- How to cover MC Swgr (S1) if system is grounded ( $k_{pp} = 1.3$ ) C37.04 Table 9 for S1 specifies  $k_{pp} = 1.5$  or TRV. (C37.09 4.8.2.3.4 only? Maybe include in C37.010?)