

1) **Introduction of Members and Guests**

Victor Hermosillo / Carl Schuetz

Welcome, Introductions (type Name, Affiliation, Address in Chat).

2) **IEEE Patent and Copyright Policy**

Review patent & copyright policy requirements

3) **Approval of Minutes of Previous Meeting**

Victor Hermosillo / Carl Schuetz

Approval of Minutes of F20, online meeting. Sent to all members and guests via e-mail.

motion for approval: Terry Woodyard

second :Pat Di Lillo

minutes approved by consensus

4) **Membership**

	ROLE AS MEMBERS	ROLE AS GUESTS	ROLE AS CORRESPONDING MEMBERS	REQUIRED* FOR QUORUM COUNT	TOTAL
HVCB Committee Roster	45		15	≥ 50% membership at meeting (≥ 24 members)	
Attendance Recorded On-line	42	22	3	Quorum met	67

*Quorum Count includes: Active Members, Chair, Secretary and reflects excused members

Excused members (4): Denis Dufournet, Helmut Heiermeier, Anne Bosma, Joanne Hu

5) **Chairman's Report**

Victor Hermosillo / Carl Schuetz

Chairman (Victor Hermosillo): vfhermosillo@ieee.org (724) 483-7875
 Vice-Chairman (Carl Schuetz): carl.schuetz@ieee.org (262) 506-6962

- Entity PAR submitted “Guide for the Application of Alternating Current High-voltage (Rated above 72.5 kV) - Short-circuit-current-restricting Circuit Breakers”. Proposal to be re-assigned to HVCB SC WG C37.04, C37.09, C37.010 discussion.
- WG chairs need to email minutes of their WG meetings to the subcommittee secretary no later than May 7th.

6) **Reports of Working Groups**

a) **Technical Paper Reviews**

Kirk Smith

One paper submitted for publication.

b) **ASC C37 Power Switchgear Report**

John Webb

More details will be reported in Main Committee (MC) meeting. NEMA presently working on CB control cabinet standard “Purchasing Specification Guidelines” and looking for users to contribute.

Work is beginning on a new standard for metering cabinets and C37.54 Conformance Test Procedure for Draw-Out CB.

c) HVCB Document Status

Document	Title	Subcommittee	WG Chair	PAR	IEEE Status	Comments
PC37.01	Standard for High Voltage Direct Current Circuit Breakers Above 3200 Vdc	HVCB	Joanne Hu	PAR approved May 15, 2020	PAR expires Dec.31, 2024	Formerly PAR 2880
C37.04-2018	Standard for Ratings and Requirements for AC High Voltage Circuit Breakers with Rated Maximum Voltage above 1000 V	HVCB	Stephen Cary		Approved 12/05/2018	Published on May 31, 2019.
PC37.04-2018 Cor 1	Standard for Ratings and Requirements for AC High Voltage Circuit Breakers with Rated Maximum Voltage above 1000 V	HVCB	John Webb	PAR approved 02/13/2020	PAR expires 12/31/2024	Draft issued. First ballot, comment review.
C37.06.-2009 ANSI	IEEE Standard for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis - Preferred Ratings and Related Required Capabilities for Voltages Above 1000 V	HVCB		Included in PC37.04	Document expired	
C37.06.1-2018	Recommended Practice for Preferred Ratings for High-Voltage (>1000 volts) AC Circuit Breakers Designated Definite Purpose for Fast Transient Recovery Voltage Rise Times	HVCB	Sushil Shinde			Published in 2018
C37.09-2018	IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis	HVCB	Xi Zhu			Published on April 11, 2019.
PC37.09-2018 Cor 1	IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis	HVCB	Jan Weisker	PAR approved 02/13/2020	PAR expires 12/31/24	PAR SG (Jan Weisker) to lead review. Draft issued. First ballot, comment review.
C37.010-2016	Application Guide for AC High-Voltage Circuit Breakers > 1000 Vac Rated on a Symmetrical Current Basis	HVCB	TBD			Need to from PAR Study Group, Issue and approve PAR.
C37.011-2018	IEEE Guide for the Application of Transient Recovery Voltage for AC High-Voltage Circuit Breakers	HVCB	Denis Dufournet			Published in 2019.
PC37.012-2014	IEEE Application Guide for Capacitance Current Switching for AC High-Voltage Circuit Breakers	HVCB	Roy Alexander	PAR approved 12/03/20	PAR expires 12/31/2024	Published in 2014.
PC37.012a- Amendment	IEEE Application Guide for Capacitance Current Switching for AC High-Voltage Circuit Breakers	HVCB	Roy Alexander			Published on Aug. 7, 2020

HVCB Switchgear Subcommittee Agenda, 04/21/2021, 3:45-5:30 PM CST, on-line

P62271-37-013-2015	Standard for AC High Voltage (rated above 1000 V) Generator Circuit Breakers for Use With Generators Rated 10 MVA or More	HVCB	Mirko Palazzo	PAR approved 12/07/2016	PAR expires 10/01/2022	WG established and work continues on document.
62271-37-082-2012	Standard for High-voltage switchgear and control gear - Part 37-082: Measurement of sound pressure levels on AC HVCB	HVCB	Leslie Falkingham		Document Expires 12/31/2022	Chair to submit PAR
C37.015-2018	IEEE Guide for the Application of Shunt Reactor Switching	HVCB	Anne Bosma			Published on Mar.15, 2018
C37.016-2018	Standard for AC High Voltage Circuit Switchers Rated 15.5kV through 245kV	HVCB	Peter Meyer			Published on Feb.14, 2019
PC37.016-2018 Cor 1	Standard for AC High Voltage Circuit Switchers Rated 15.5kV through 245kV	HVCB	Neil McCord	PAR approved 02/13/2020	PAR expires 12/31/2024	Several technical errors needing revision identified.
PC37.017-2010	IEEE Standard for Bushings for High-Voltage [over 1000 V (ac)] Circuit Breakers and Gas-Insulated Switchgear	HVCB-GIS	Devki Sharma			Published on Jan. 29, 2021
PC37.10-2011	IEEE Guide for Investigation, Analysis, and Reporting of Power Circuit Breaker Failures	HVCB	Neil Hutchins	PAR approved Dec.3, 2020	PAR expires Dec.31, 2024	
C37.10.1-2018	IEEE Guide for the Selection of Monitoring for Circuit Breakers	HVCB	Dave Mitchell			Document published in 2018.
PC37.11-2014	Standard Requirements for Electrical Control for AC High-Voltage (>1000V) Circuit Breakers	HVCB	John Webb	PAR approved 02/08/2019	PAR expires 12/31/2023	
C57.148	IEEE Standard for Control Cabinets for for HVAC Switchgear	HVCB/joint	Devki Sharma			TF disbanded
C37.12-2018	IEEE Guide for Specifications of High-Voltage Circuit Breakers (over 1000 Volts)	HVCB	John Webb			Published in 2018
C37.12.1-2018	IEEE Guide for High Voltage (>1000V) Recommended Practice for Circuit Breaker Instruction Manual Content	HVCB	Ken Edwards			Published in 2018
C37.20.6-2015	4.76 kV to 38 kV Rated Grounding and Testing Devices Used in Enclosures	ADSCOM joint HVCB/SA	T. W. Olsen			Published in 2015
C37.59-2018	Requirements for Conversion of Power Switchgear Equipment	ADSCOM joint HVCB, SA, and LVSD	Dean Sigmon			
PC37.122-2010	Standard for High Voltage Gas-Insulated Substations Rated above 52 kV	Joint SUB/SWG HVCB	Ryan Stone	PAR approved 03/08/2018	Document Expires 12/31/2020	Co-sponsored with Substation Committee. Balloted successfully in 2021-awaiting publication.

HVCB Switchgear Subcommittee Agenda, 04/21/2021, 3:45-5:30 PM CST, on-line

PC37.122.2-2011	Guide for the Application of Gas-Insulated Substations Rated 1 kV to 52 kV	Joint SUB/SWG HVCB	Eldridge Byron	PAR approved 06/03/2019	Document Expires 12/31/2021	Co-sponsored with Substation Committee.
PC37.122.3-2011	IEEE Guide for Sulphur Hexafluoride (SF6) Gas Handling for High-Voltage (over 1000 Vac) Equipment	Joint SUB/SWG HVCB	Billy Lao	PAR approved 09/05/2019	PAR expires 12/31/2023	Not listed as a co-sponsored effort
PC37.122.10	Guide for Handling Non-Sulphur Hexafluoride (SF6) Gas Mixtures for High Voltage Equipment	Joint SUB/SWG HVCB	George Becker	PAR approved 06/03/2019	Document Expires 12/31/2023	Co-sponsored with Substation Committee.
PC57.16	IEEE Standard for Requirements, Terminology and Test Code for Dry-Type Air-Core Series Connected Reactors	Joint TF HVCB/TC	David Caverly	PAR approved 02/05/2016	Document Expires 2021	Moved to ADSCOM
PC57.142	Guide to Describe the Occurrence and Mitigation of Switching Transients Induced by Transformers, Switching Device and System Interaction	Joint TF HVCB/TC	James McBride	PAR approved 03/23/2017	Revision ongoing	Moved to ADSCOM

Note: Only those working groups highlighted and with PAR information are currently active.
 WG highlighted w/out PAR information have completed work and are not disbanded

7) Reports of AdsCom WG/TF/Study Group

C37.100.1 Common Requirements for High Voltage Power Switchgear Rated Above 1000 V John Webb

Progress being made, altitude correction factors changed in IEC 62271 that conflict with present C37.100.1 values.

TF to review Shunt Reactor (inductive load) Switching Sushil Shinde
Released the shunt reactance switching survey at today's meeting. Survey will be extended to end of August. For the next two months every Thursday from 1-2 ET time has been reserved for any survey user to ask questions and receive assistance.

C37.122.10 Guide for Handling Non-SF6 Gas Mixtures for HV Equipment George Becker
WG decided to have one guide for multiple gases. Work continues and a new chair has been instituted, Billy Lao (made at last meeting). A question was asked of the chair if the guide was to include SF6. The response was no, separate gases are contained in this document with SF6 retaining it's own document.

C57.16: IEEE Standard for Requirements, Terminology and Test Code David Caverly
for Dry-Type Air-Core Series Connected Reactors
TRFCOM document supported by SWGRCOM. Quorum achieved, PAR extended to 2022. New Annex B-1 and existing annexes reviewed. Motion made to clean up document and proceed to ballot. Motion approved and target is to be balloted in the Fall.

C57.142: Guide to Describe the Occurrence & Mitigation of Switching David Caverly
Transients Induced by Transformers, Switching Device, & System Interactions
Jointly sponsored by TRFCOM and SWGCOM. Report to Subcommittee.
Met this morning with a quorum achieved. A PAR extension requested, guide has expired. Work reviewed, motion made and approved to go to ballot. If ADSCOM approves the WG is seeking TRFCOM approval to go to ballot. Chair will ask for ballot approval at tomorrows ADSCOM meeting.

Documents from iMeet was requested by an attendee. Chair responded that permission to download has been given and will check into the issue.

Technology and Innovation Subcommittee

Nenad Uzelac

The T&I SC met on April 19th.

A review of work progress on the three present projects was made:

- Requirement for >200% voltage in open position, white paper (M. Chhabra)
- Special applications for switchgear: HVCB Generator synchronization; effects of renewable energy: harmonics, short circuit current, X/R ratio, overvoltage; power factor testing of HVAC circuit breakers; disconnect switch transients. (S. Shinde)
- Switchgear asset management: condition assessment and life cycle management (no lead)

8) CIGRE Reports

Report to Subcommittee

Nenad Uzelac

New Technical Brochures:

A3.30: Overstressing of substation equipment

A3.36: Application and Benchmark of Multi Physic Simulations and Engineering Tools for Temperature Rise Calculation

A3.38: Shunt capacitor switching in distribution and transmission systems

Paper to be published in Electra:

A3.31: NCIT with digital output

Active WG:

A3

A3.39: Application and field experience with Metal Oxide Surge Arresters

A3.40: Technical Requirements and Testing Recommendations for MV DC switching equipment at distribution levels

A3.41: Interrupting and switching performance with SF6-free switching equipment

A3.42: Failure analysis and risk mitigation for recent incidents of AIS instrument transformers

A3.43: Tools for lifecycle management of T&D switchgear based on data from condition monitoring systems

A3/A2/A1/B1.44: Limitations in Operation of High Voltage Equipment Resulting of Frequent Temporary Overvoltage's

A3.45: Methods for identification of frequency response characteristic of voltage measurement systems

B3

B3.58 - Knowledge Transfer of Substation Engineering and Experiences

B3.59 – End-of-Life Treatment of SF6-containing Electrical T&D Equipment (>1kV) in Substations

B3.60 - User Guide for Non-SF6 Gases and Gas Mixtures

WG B3.61 - Asset Health Based Risk Management in Existing Substations

JWG B1/B3/D1.79 - Recommendations for dielectric testing of HVDC gas insulated system cable sealing ends

JWG B1/B3.74 - Recommendations for a performance guideline of Polymer Insulated Busbars

CIGRE has a new website for equipment, group A3: <https://a3.cigre.org/>

The CIGRE USNC website has updates for active study groups.

For CIGRE Updates go to <https://cigre-usnc.tamu.edu/study-committees/>

9) **Old Business**

Motion was made to disband C37.017 WG by: Devki Sharma

Second by: Georg Becker

Discussion: none

Motion passed by consensus

Motion to disband C37.012a WG by: Terry Woodyard

Second by: Mike Skidmore

Discussion: none

Motion passed by consensus

10) **New Business**

a) Technical presentation

None

b) Documents Approved by RevCom

Documents published: none

c) 62271-37-013 Standard for AC High Voltage (rated above 1000 V) Generator Circuit Breakers for Use With Generators Rated 10 MVA or More

Chair: Victor Hermosillo for **Mirko Palazzo**

Secretary: **Matt Westerdale**

No meetings during this session. Document has been completed and submitted to IEC for review. Responses are expected by end of May and proceed to IEEE ballot after that.

d) 62271-37-082-2012 Standard for Sound Pressure Levels in Switchgear

Chair: **Leslie Falkingham**

Secretary: **Carl Schuetz**

Dual logo standard. Standard should go to ballot in its current form before F21 meeting, WG will have to address any comments. HVCB SC will request through IEEE SA for IEC to align the document expiration date so that it expires within both organizations at the same time.

e) C37.01 HVDC Circuit Breaker Standard

Chair: Steven Chen for **Joanne Hu**

Secretary: **Steven Chen**

IEC status of HVDC standards and document content addition reviewed. The next targeted content development is clauses on ratings and technical requirements. WG acknowledged that further data is needed to support those sub-clauses.

A request to distribute a MVDC network survey was made to gain more information regarding planned projects. The WG secretary will work with the submitter to determine the best way to distribute the survey.

- f) C37.04-2018 Corrigendum 1. Standard for Ratings and Requirements for AC High Voltage Circuit Breakers with Rated Maximum Voltage above 1000 V
Chair: **John Webb**
Secretary: **Jan Weisker**
Ballot for the Corrigendum already made. Online meeting held to resolve comments before next re-circulation. Ballot will be re-circulated by May 6, 2021.
- g) C37.09-2018 Corrigendum 1. IEEE Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis
Chair: **Jan Weisker**
Secretary: **John Webb**
First ballot w/17 comments. Comment resolution made by e-mail, second ballot had 100% approval.
- h) Ad-hoc Committee of C37.04-2018 and C37.09-2018.
Chair: **Terry Woodyard**
Secretary: **John Webb**
Work concluded w/all identified items assigned a response and volunteers that will follow the content resolution. This list is intended to be passed down to the C37.04 and C37.09 working groups.

Entity PAR discussion: The HVCB Sub-Committee (SC) chair explained an entity PAR request has been received by the HVCB Main Committee (MC) for a current-limiting CB “guide” that seems to fit the scope of C37.04 and C37.09. The HVCB MC Vice-Chair expressed an opinion that it seemed a good place to put this request is in the existing HVCB document structure.

HVCB MC Chair provided considerations for the SC.

- IEEE standards Association (SA) Corporate can sponsor the document
- SWGCOM can create an entity method document
- SWGCOM can create an individual method document(s)

Current limiting HV CB would be larger and costlier than present CB. Could be economically feasible if fault level increases beyond capability of installed equipment and prevents the need for equipment upgrade.

Conceptual HVDC CB can limit current and interrupt fault current, new technology could be applied to an AC system.

HVCB SC chair asked if C37.01 would be willing to include the requirements of a current limiting CB into their scope. An annex/addendum in C37.01 could be created and would need collaboration w/C37.04 and C37.09 for content outside of scope. C37.010 could have the application considerations added.

Testing for current-limiting function could fall within the scope of C37.302 “IEEE Guide for Fault Current Limiter (FCL) Testing of FCLs Rated above 1000 V AC”.

MC chair expressed an opinion that an exact solution would not be needed at the present time.

The MC Secretary added that the entity request covers CB of rated voltage 72 kV and above.

Information was given that CIGRE committee A3-23 produced a document in June 2012, TB497 Fault Current Limiters that describes the current limiting functions of various components based on prior technology.

The MC chair concluded by stating a direction (motion) is sought from HVCB to absorb the content of the entity PAR into existing documents during the Main Switchgear Committee Meeting.

Motion made to form one SG to create two PAR amendments C37.04 and C37.09
by: John Webb

Second by: Terrance Woodyard

Discussion: none

Motion passed by consensus.

The SG chair was appointed by the HVCB SC chair: Terrance Woodyard

Secretary: John Webb

- i) C37.012a Amendment. IEEE Application Guide for Capacitance Current Switching for AC High-Voltage Circuit Breakers

Chair: **Roy Alexander**

Secretary: **Brian Roberts**

Report to Subcommittee-none, WG disbanded

- j) C37.10 IEEE Guide for Investigation, Analysis, and Reporting of Power Circuit Breaker Failures

Chair: **Neil Hutchins**

Secretary: **Todd Irwin**

Assignments have been given to sub-groups, seeking recommended changes by mid-August. The work goal is to ballot by the end of the year.

- k) C37.016-2018 Corrigendum 1. Standard for AC High Voltage Circuit Switchers Rated 15.5kV through 245kV

Chair: **Neil McCord**

Secretary: **TBD**

No meeting, no report

- l) C37.11 Standard Requirements for Electrical Control for AC High-Voltage (>1000V) Circuit Breakers

Chair: **John Webb**

Secretary: **Tony Riccuiti**

Went to ballot and passed approval w/239 comments. Comments being addressed by CRG's. Chair expressed the WG thoughts that some content is more appropriate to be transferred to C37.04 when an amendment for C37.04 is initiated.

- m) C37.122 Standard for High Voltage Gas-Insulated Substations Rated above 52 kV
Chair: **Ryan Stone**
Secretary: **Jennings Graham**
Final comment resolution is complete w/100% approval of re-ballot.
- n) C37.010-2016 Application Guide for AC High-Voltage Circuit Breakers > 1000 Vac Rated on a Symmetrical Current Basis
Chair: Carl Schuetz
Secretary: Victor Hermosillo
PAR SG met today to discuss the need for a PAR and draft a report to the HVCB SC. The SG concluded this work, passed a motion to request PAR formation and provided a report of their recommendation contained within the WG meeting minutes.
Motion made to create a C37.010 WG by: Carl Schuetz
Second by: John Webb
Discussion: none
Motion passed by consensus.
WG chair appointed by the HVCB SC chair: Andy Keels
- o) C37.012. IEEE Application Guide for Capacitance Current Switching for AC High-Voltage Circuit Breakers
Chair: **Roy Alexander**
Secretary: **Luke Collette**
Meeting held and documents divided into several sections that has a team to make contributions for each section.

Future Meetings

- a) Fall 2021: Peppermill Resort, Reno, NV, Oct. 10th to 14th.
- b) Spring 2022: Disney's Grand Floridian Resort, Orlando, FL (in negotiation).
- c) Fall 2022: Portland, OR (in negotiation)

11) **Adjourn**

Motion: Pat Di Lillo
Second: John Webb
Meeting Adjourned

Reported by:
Victor Hermosillo & Carl Schuetz

		Attendance	
Roy	Alexander	RWA Engineering	Member
Mauricio	Aristizabal	Hitachi ABB Power Grids	Member
George	Becker	POWER Engineers Inc.	Member
			Corresponding
W.J. (Bill)	Bergman	Bergman& Associates Ltd.	Member
Arben	Bufi	Meiden America Switchgear, Inc.	Member
Eldridge	Byron	Schneider Electric	Member
Stephen	Cary	Eaton	Member
David	Caverly	Trench Ltd.	Member
Steven	Chen	Eaton Corporation	Member
Andrew	Chovanec	GE Power	Guest
Lucas	Collette	Duquesne Light	Member
Michael	Crawford	Mitsubishi Electric	Member
Jason	Cunningham	Southern States, LLC	Member
Patrick	Di Lillo	Consolidated Edison Co. of NY, Inc.	Member
Federico	Di Michele	CESI S.p.A.	Guest
Jeffrey	Door	The H-J Family of Companies	Member
Doug	Edwards	Siemens Industry, Inc.	Guest
Sergio	Flores	Schneider Electric Inc. USA	Member
Raymond	Frazier	Ameren	Member
John	Hall	Tennessee Valley Authority	Member
Jeremy	Hensberger	Mitsubishi Electric Power Products Inc.	Member
Victor	Hermosillo	GE Grid Solutions	Chair
Jennifer	Hunter	MEPPI	Guest
Todd	Irwin	GE Grid Solutions	Member
Christopher	Jarnigan	Southern Company Services	Member
Thomas	Keels	kEElectric Engineering	Member
Paul	Leufkens	Power Projects Leufkens	Guest
Yingjie	Ling	GE	Guest
Hua Ying	Liu	Southern California Edison	Member
Albert	Livshitz	CE Power Engineered Services	Member
Russell	Long	Retired	Member
Peter	Marzec	S&C Electric Co.	Guest
Steven	May	Southern Company	Member
Henning	Milnikel	Siemens	Guest
Dave	Mitchell	Mitch and Associates	Member
			Corresponding
Jeffrey	Nelson	Tennessee Valley Authority	Member
Thomas	Pellerito	DTE Energy	Member
Andrew	Peterson	ABB	Guest
Mark	Peterson	Xcel Energy	Guest
John	Phouminh	PEPCO HOLDINGS, INC.	Member
Craig	Polchinski	MEPPI	Guest
Anthony	Ricciuti	Eaton Corporation	Member

Bobby	Rich	Dominion Energy	Member
Leonel	Santos	Schneider Electric	Guest
Daniel	Schiffbauer	Toshiba International Corporation	Member
Carl	Schneider	Schneider Electric	Guest
Devki	Sharma	Entergy	Member
Sushil	Shinde	Hitachi ABB Power Grids	Member
Michael	Skidmore	AEP	Past Chair
Christopher	Slattery	FirstEnergy	Guest
			Corresponding
Robert	Smith	Retired	Member
Don	Steigerwalt	Duke Energy	Member
Donald	Swing	Powell Industries	Guest
Francois	Trichon	Schneider Electric	Guest
Jim	van de Ligt	Spark Power Corp.	Guest
Jeffrey	Ward	Doble Engineering Company	Member
John	Webb	ABB	Member
Jan	Weisker	Siemens AG	Member
Matt	Westerdale	Bureau of Reclamation	Guest
Terrance	Woodyard	Siemens Industry Inc.	Member
Richard	York	Mitsubishi Electric Power Products Inc.	Member
Marcus	Young	Mitsubishi Electric Power Products, Inc.	Guest
Wei	Zhang	Hitachi T&D Solutions, Inc.	Member
Xi	Zhu	GE Energy Management	Member
Stan	Billings	Retired	Guest*
Keith	Flowers	Siemens	Guest*
Jala	Hemanth		Guest*

* Guests not recorded in 123sign-up attendance system