

Minutes of Meeting
C37.100.7 Performance Evaluation of SF₆ Alternatives

Spring 2022, April 12

Chair: Daniel Schiffbauer
Vice Chair: George Becker
Secretary: Victor Hermosillo

Attendance:

Attendance: 58 participants

Members: 23/50

Guests: 35

Quorum not reached

Introductions:

Introductions were made throughout the room.

Review of IEEE compliance material:

Reviewed IEEE Patent and Copyright slides – no essential patent claims or copyright issues raised by the participants.

Motion to approve fall 2021 and March 2022 meeting minutes:

No quorum – no motion to approve fall 2021 meeting minutes.

No quorum – no motion to approve March 2022 meeting minutes

Working group timeline:

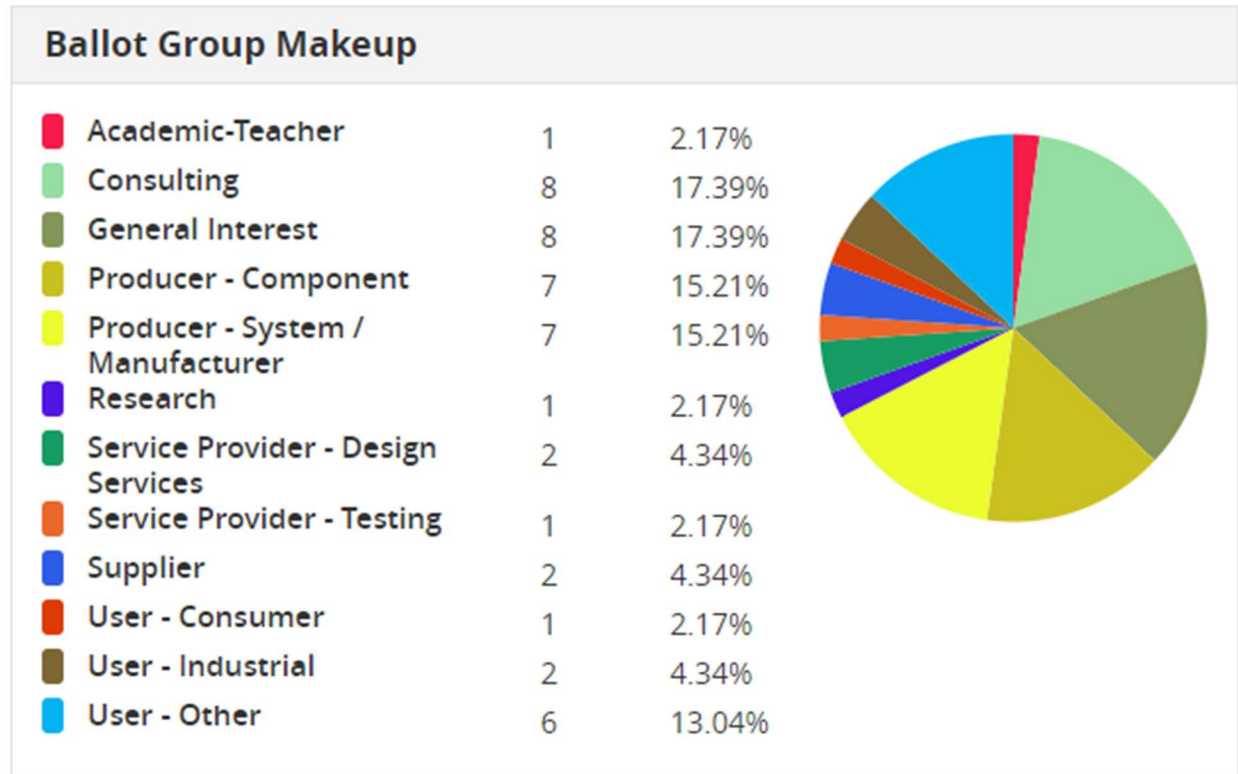
March 7:	WG vote to form a ballot pool - DONE
April 4 to May 4:	Invitation to join ballot group (~4 weeks) – IN PROCESS
April 18 to May 17:	Mandatory Editorial Coordination (MEC, ~4 weeks)
May 30 to June 28:	Initial ballot circulation (~4 weeks)
June 4 to June 15:	Initial CRG review, revise (2 weeks)
July 18 to Sept. 23:	subsequent recirculation cycles as needed
September 14:	Submission to REVCOM
October 13:	Backup submission to REVCOM

Comment was made that the timeline is aggressive and balloting may take longer than is available without a PAR extension. Chair replied that the decision to ask for an extension will be made after the first ballot results and comments are received.

Ballot invitation:

Ballot invitation opened on April 4 and closes on May 4.

Ballot group consists of 46 members as of 4/19/22 with the following makeup:



Subgroups:

- Chapter 8 subgroup to incorporate material from Cigre D1.67:
 - Work completed – able to be disbanded
 - not disbanded due to lack of quorum
- Permeation calculation review (Henning Milnikel, John Owens, Andres Laso-Rubio):
 - Feedback needed first week of May 2022
- Definitions, abbreviations and acronyms (Jim Stage, Dragan Tabakovic):
 - Will work from MEC document
- Reference check:
 - Caryn Riley volunteered
 - Will work from MEC document
- Comment resolution group:
 - George Becker
 - Andy Chovanec
 - Mike Crawford
 - Todd Irwin
 - Terry Woodyard

General Discussion:

Document Layout

- Document is now organized to be more guide-like. Each chapter opens with a brief introduction that describes the motivations. Immediately following is a summary of the guidance and reference to subsequent subchapters for more detailed information.

Uniform leakage and permeation (chapter 4)

- Chapter 4 now includes material on gas tightness testing along with some discussion on the relevance of uniform leakage and permeation.
- Even the smallest of leaks causes uniform loss of the gas mixture. This is because even the smallest of leaks is at least 10 times larger than is required for uniform flow. This claim is based on the Knudsen number, a dimensionless parameter composed of the mean free path of the gas and a characteristic dimension of the leak path (typically diameter).
- Draft 2.0 incorporates a permeation example that shows how different sealing systems may experience permeation of one gas component more than another and the influence on dielectric strength compared to uniform leakage. See Figure 10 from draft 2.0 below.

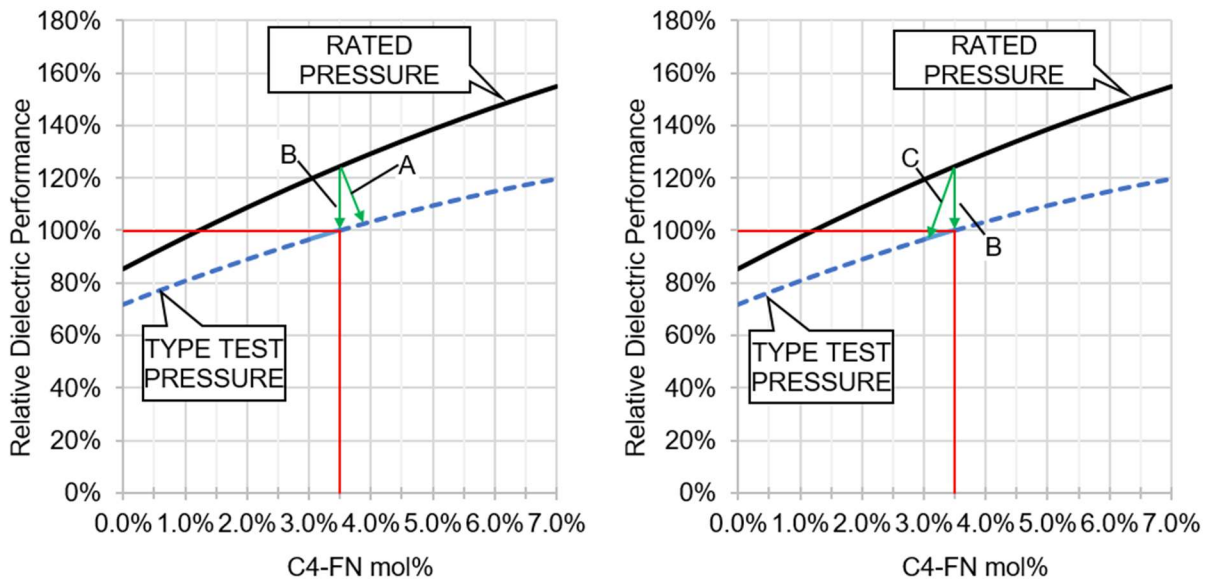


Figure 10 - Primary dielectric component has a lower (left) and higher (right) permeation rate than the other gas mixture components.

Switching and short circuit performance (chapter 7)

- Reviewed the summary of guidance related to switching and short circuit performance.
- Some guidance may be needed for capacitive switching of higher currents (1000's A) relative to decomposition. **Jan Weisker to provide some text by the first week of May 2022.**
- Some guidance may be needed relative to vacuum interrupters, T100 testing and test procedures intended to demonstrate insulation to ground in the presence of hot exhaust gases. **Jan Weisker to provide some text by the first week of May 2022.**

Motion to Adjourn Meeting:

Motion: Vernon Toups

Second: Andy Keels

Meeting was adjourned by the Chair.

Attendance:

Last Name	First Name	4/12/2022	Role
Aldakka	Qais		Guest
Almeida	Edwin		Member
Aristizabal	Mauricio		Member
Ashtekar	Koustubh	X	Guest
Atere	Suraj		Guest
Ayers	Roy		Guest
Baker	Daniel		Guest
Bannink	Herman		Guest
Barbera	Steven		Guest
Becker	George	X	Vice-Chair
Beecher	Zack		Guest
Beseda	David		Member
Bisewski	Bruno		Guest
Boulus	Michael		Guest
Boyce	Russell		Member
Brown	Steven		Guest
Brunke	John	X	Guest
Bufi	Arben	X	Guest
Burse	Ted		Guest
Byron	Eldridge	X	Member
Cary	Stephen		Guest
Chhabra	Mohit		Guest
Chiodo	Vincent		Guest
Chovanec	Andrew	X	Member
Cleaveland	Charles	X	Guest
Collette	Lucas	X	Guest
Collette	Dave	X	Guest
Connor	Brad		Guest
Cosby	Bianca		Guest
Crawford	Michael	X	Member
Crist	Daniel		Guest
Culhane	Michael		Guest
Cunningham	Jason	X	Guest
Darko	Kennedy	X	Member
Dhawan	Anil		Guest
Di Lillo	Patrick	X	Member
Di Michele	Federico		Guest
Door	Jeffrey		Guest
Duncan	Kirk		Guest

Last Name	First Name	4/12/2022	Role
Dwyer	Bernie		Guest
Edwards	Ken		Guest
Edwards	Doug		Guest
Eftink	Emily		Guest
Evans	Aaron		Guest
Fender	Karl		Guest
Fennell	Howard	X	Guest
Frazier	Raymond		Guest
French	Christopher		Guest
Frye	Richard		Guest
Gerzeny	Brian	X	Member
Glaesman	Peter		Guest
Glinsky	Ilya		Guest
Grahor	Lou		Guest
Hall	John		Member
Harley	Jackie	X	Guest
Hastreiter	Christopher		Guest
Heiermeier	Helmut		Guest
Heintzelman	Travis		Guest
Hensberger	Jeremy	X	Guest
Hermosillo	Victor		Secretary
Hester	Edward		Guest
Hohnstadt	Ben	X	Guest
Hu	Jingxuan (Joanne)		Guest
Hunter	Jennifer		Guest
Hutchins	Roy	X	Member
Hyjek	Katarzyna		Guest
Irwin	Todd	X	Member
Jacobs	Allan		Guest
Jagadeesan	Bharatwaj		Guest
Jain	Rahul	X	Member
Jarnigan	Christopher	X	Member
Jasinski	Joseph		Guest
Johnson	David	X	Member
Johnson	Travis		Guest
Jung	Wolfgang		Member
Kandel	Jackie	X	Guest
Keels	Thomas	X	Guest
Kim	SangTae		Guest
Kim	jungdae		Guest

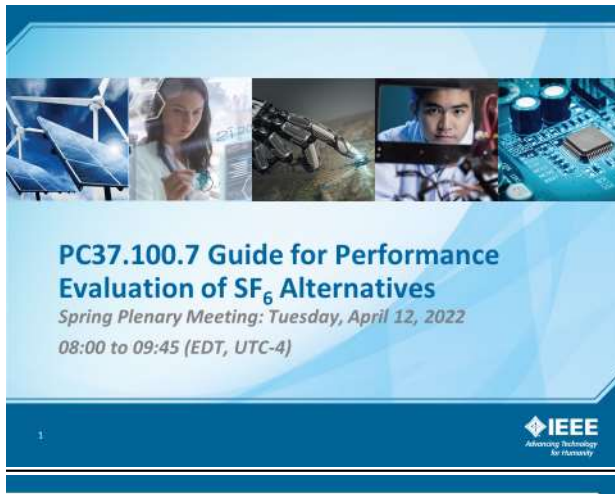
Last Name	First Name	4/12/2022	Role
Kowalik	Peter		Guest
Kurinko	Carl	X	Member
Lanning	Scott		Guest
Laso Rubio	Andres		Member
Lavrinoff	Benedict		Guest
Leccia	Brad		Guest
LEE	JOOHYUN		Guest
LEE	CHANG HOON		Guest
Lemmerman	David		Guest
Leufkens	Paul		Guest
Li	Wangpei		Guest
Ling	Yingjie		Guest
Liu	Hua Ying		Member
Lo	Benson		Member
Lopez	Leo	X	Guest
Ma	Chunming		Guest
Mannarino	Antonio		Guest
Mantilla	Javier		Member
Marshall	Vincent	X	Guest
Martin	Donald		Guest
Marx	Benjamin		Guest
Marzec	Peter		Guest
Mason	Douglas		Guest
Masterson	Paul	X	Guest
May	Steven		Guest
McCord	Neil		Guest
Meiners	Steven		Guest
Methling	Ralf		Guest
Midkiff	Jacob		Guest
Milnikel	Henning		Member
Monroe	Andrew	X	Guest
Moran	Ashley		Guest
Mucha	Martin	X	Guest
Mulakken	Nikil		Guest
Natale	Anthony	X	Guest
Nayar	Raj	X	Guest
Nelson	Jacob		Guest
Nelson	Jeffrey		Guest
ONeil	Brian		Guest
Owens	John		Member

Last Name	First Name	4/12/2022	Role
Palmer	Justin		Guest
Patel	Pathik		Member
Pattison	Mark		Guest
Pellerito	Thomas	X	Guest
Perrin	Damian		Guest
Peterson	Mark		Guest
Phan	Lise		Member
Phouminh	John		Guest
Polchinski	Craig		Guest
Pruitt	Al		Guest
Putman	Larry	X	Guest
Ranjan	Rakesh	X	Guest
Reid	Laura		Guest
Reit	Cristian		Guest
Ricciuti	Anthony		Guest
Rich	Bobby		Guest
Riley	Caryn	X	Member
Ringham	Grant		Guest
Roberts	Brian		Member
Rogers	Jon		Member
Rohr	Richard		Guest
Rokser	Ian	X	Guest
Rostron	Joe		Guest
Ruebensam	James		Guest
Salas	Oscar J.	X	Guest
Salinas	Alex	X	Guest
Santos	Leonel		Guest
Savulyak	Victor		Guest
Sazanowicz	Robert		Guest
Schaben	Chase		Guest
Schiffbauer	Daniel	X	Chair
Schuetz	Carl	X	Member
Schumann	Jon		Guest
Scott	Jeff	X	Guest
Sharma	Devki		Guest
Shiller	Paul	X	Guest
Shinde	Sushil		Member
Sicker	Robert		Guest
Siena	Matthew	X	Guest
Sims	Garett		Guest


Last Name	First Name	4/12/2022	Role
Skidmore	Michael	X	Member
Slattery	Christopher		Member
Stage	James		Member
Steigerwalt	Don	X	Member
Stemmerich	Joe	X	Guest
Stoller	Patrick		Member
Tabakovic	Dragan		Member
Tarleton	John		Guest
Tillery	Tim	X	Guest
Torres	Jean-Marc		Guest
Toups	Vernon	X	Member
Trichon	Francois	X	Member
Trost	Karla		Guest
Tuveson	Lars		Guest
Uzelac	Nenad	X	Member
van de Ligt	James		Guest
Waldron	Mark		Member
Ward	Jeffrey		Guest
Webb	John	X	Guest
Weeks	Casey	X	Guest
Weisker	Jan	X	Member
Wen	Jerry		Guest
Westerdale	Matt		Guest
Whitney	Michael		Guest
Wilkie	William		Member
Wirz	Torsten		Guest
Wolf	Robert		Guest
Woodyard	Terrance		Member
Xiao	Ang		Guest
York	Richard	X	Member
Youssef	Mina		Guest
Yu	Li		Member
Zaharko	Samuel	X	Guest
Zehnder	Lukas	X	Guest
Zhang	Wei		Member
Zhang	Jiong		Guest
Zhong	Jim		Guest

Attachments

Agenda



PC37.100.7 Guide for Performance Evaluation of SF₆ Alternatives
 Spring Plenary Meeting: Tuesday, April 12, 2022
 08:00 to 09:45 (EDT, UTC-4)


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IEEE Copyright and Patent Slides



Agenda

- ▶ Introductions
- ▶ IEEE slide overview
- ▶ Fall 2021 MoM
- ▶ March 2022 MoM
- ▶ Draft status and overview
 - Timeline
 - Ballot invitation
 - Disband subgroup of chapter 8
 - Permeation calculation subgroup
 - Definitions subgroup
 - References subgroup
 - Comment resolution subgroup
- ▶ Discussion of chapters 4 and 7
- ▶ Adjourn


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Fall 2021 and March 2022 MoM



2022 Timeline

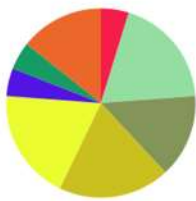
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Ballot Invitation


Ballot Group Makeup


Academic-Teacher	1	4.76%
Consulting	4	19.04%
General Interest	3	14.28%
Producer - Component	4	19.04%
Producer - System / Manufacturer	4	19.04%
Research	1	4.76%
Service Provider - Testing	1	4.76%
User - Other	3	14.28%



- Ballot invitation closes May the 4th (be with you)
- 21 ballot group members on Friday, April 8

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Subgroups

- ▶ Motion to disband chapter 8 subgroup
- ▶ Update from subgroup to review permeation calculations
- ▶ Definitions, abbreviations and acronyms subgroup – Jim Stage, Dragan Tabakovic
- ▶ References subgroup – need volunteers
- ▶ Comment resolution subgroup – need volunteers

Discussion of Chapters 4 and 7

- ▶ Chapter 4 - Gas tightness testing, uniform leakage and permeability
- ▶ Chapter 7 – review guidance to promote discussion

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Adjourn

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