

Annex E Transformers and Reactors for HVDC Applications Subcommittee

October 28, 2024, 4.45 pm local time – Hyatt Regency Saint Louis at the Arch, St. Louis, MO, USA

Chair: **Ulf Radbrandt (ulf.radbrandt@ieee.org)**

Vice Chair: **Les Recksiedler (lrecksiedler@mhi.ca) – not present**

Secretary: **Klaus Pointner (klaus.pointner@ieee.org)**

E.1 Introduction / Attendance / Approval of the Agenda / Essential Patent Issues

There was a total of 43 persons in the meeting, 16 members and 27 guests present. 5 new requests for membership were received.

Call for patents (essential patent claim) and IEEE copyright policy have been addressed.

Actual membership prior the Fall 2024 meeting is shown below:

Last Name	First Name	Role
Sean	Barker	Member
Casallas	Camilo	Member
Caverly	David	Member
Chiang	Solomon	Member
Czernorucki	Marcos	Member
Davis	Eric	Member
Ermakov	Evgenii	Member
Gaun	Alexander	Member
Heinzig	Peter	Member
Hernandez	Giovanni	Member
Kaineder	Kurt	Member
Plante	Sylvain	Member
Ploetner	Christoph	Member
Pointner	Klaus	Secretary
Radbrandt	Ulf	Chair
Recksiedler	Leslie	Vice-Chair
Hossain	Saif	Member
Sandsten	Lina	Member
Sharp	Michael	Member
Wong	Terry	Member
Ziomek	Waldemar	Member

16 members out of 21 members were present, thus quorum was met.

The agenda for this meeting, that was distributed via E-mail on Sept 25, 2024, was presented. No comments received. The agenda was unanimously approved.

The list of all attendees of the meeting is shown below:

FIRST Name	LAST Name	AFFILIATION	EMAIL ADDRESS	Request Membership
Paulo	Avelino	Hitachi Energy	paulo.avelion@hitachienergy.com	
Gilles	Bargone	FISO	gilles.bargone@fiso.com	Yes
Sean	Barker	Hitachi Energy	Sean.barker@hitachienergy.com	
Naveen	Bhardwaj	Trench Group	naveen.bhardwaj@trench-group.com	Yes
Alfredo	Carrizales	Prolec	juanalfredo.carrizales@prolec.energy	
Camilo	Casallas	Trench	Camilo.casallas@trench-group.com	
Antonio	Ceballos	Georgia Transformers	antonio.ceballos@gatransformer.com	Yes
Vivian	Chan	Hitachi Energy	Vivian.chan@hitachienergy.com	
Solomon	Chiang	The Gund Company	Schiang@thegundcompany.com	
Eunyoung	Cho	HICO America	echo@hicoamerica.com	
Domenico	Coris	Doble Engineering Co	dcosi@doble.com	
Juan Carlos	Cruz Valdes	PROLEC GE	juancarlos.cruz@prolec.energy	
Marcos	Czernorucki	Hitachi Energy	marcos.czernorucki@hitachienergy.com	
Eric	Davis	Consultant	Esetdavis@aol.com	
Peter	Dopplmair	Trench Group	Peter.dopplmair@trench-group.com	
Evgenii	Ermakov	Hitachi Energy	evgenii.ermakov@hitachioenergy.com	
Egui	Espita	Reinhausen	e.espita@us.reinhausen.com	
Alexander	Gaun	Coil Innovation	alexander.gaun@coilinnovation.at	
Jack	Harley	First Power Group LLC	jack.harley@firstpowergroupplcc.com	
Saif	Hossain	TRENCH Group	Saif.hossain@trench-group.com	
Patrycja	Jarosz	IEEE SA	P.jarosz@ieee.org	
Kevin	Juchem	Hitachi Energy	kevin.juchem@hitachienergy.com	
Kurt	Kaineder	Trench Austria GmbH	kurt.kaineder@trench-group.com	
Thrinadha	Katapalli	Virgina Transformer	katapalli_thrinadha@vatransformer.com	
Omar	Mendez	Prolec ge	Omar.mendez@prolec.energy	
Frank	Neder	Trench Group	Frank.neder@trench-group.com	
Sylvain	Plante	Hydro-quebec	Plante.sylvain.3@hydroquebec.com	
Christoph	Ploetner	Siemens Energy GmbH	christoph.ploetner@siemens-energy.com	
Klaus	Pointner	Trench Austria GmbH	Klaus.pointner@ieee.org	
Bertrand	Poulin	Hitachi Energy	bertrand.f.poulin@hitachienergy.com	
Thomas	Prevost	Weidmann	Tprevost78@gmail.com	
Ulf	Radbrandt	Hitachi Energy	Ulf.radbrandt@hitachienergy.com	
Michael	Sharp	Trench Limited	Mike.sharp@trench-grpup.com	
Muhammad	Sohail	Trench Limited	muhammad.sohail@trench-group.com	Yes
Karsten	Viereck	Reinhausen	K.viereck@reinhausen.com	
Dharam	Vir	Prolec GE	dharam.vir@prolec.energy	Yes
Peter	Werelius	Megger	peter.werelius@megger.com	

FIRST Name	LAST Name	AFFILIATION	EMAIL ADDRESS	Request Membership
Stefan	Wirth	Coil Innovation GmbH	stefan.wirth@coilinnovation.at	
Terry	Wong	Trench Limited	terry.wong@trench-group.com	
Malia	Zaman	IEEE SA	m.zaman@ieee.org	
Shibao	Zhang	Pure Electric	shibao.zhang@ieee.org	
Gigi	Zhang	HICO America	Jzhang@hicoamerica.com	
Waldemar	Ziomek	PTI Transformers LP	wziomek@ptitransformers.com	

Qualification for membership of the received requests will be checked and the applicants will be notified.


E.2 Approval of the minutes of the Spring 2024 meeting in Kansas City

The minutes of the spring meeting as distributed by E-mail on September 25, 2024 have been presented. No comments were given. The minutes have been unanimously approved.

E.3 Status of the Entity WG for development of the Guide for vibration testing of oil immersed HVDC converter transformer. (Chairman: Dr. Jun Deng)


The SC HVDC is sponsoring this Entity WG. Therefore, future work of this WG is reported to this subcommittee. The actual status of the WG is outlined in the presentation submitted by the WG chair Jun Deng prior to the Fall 24 meeting. Unfortunately, the WG chair could not come to this meeting but is encouraged to do so for the Spring 2025 meeting in Denver (CO). The 3rd WG meeting was held on October 19, 2024 at the Shuixiu Garden Hotel, Nanjing, Jaingsu, China.

Status Report:



WORKING GROUP STATUS OF IEEE PC57.132
"GUIDE FOR VIBRATION TESTING OF OIL-IMMERSED HIGH-VOLTAGE DIRECT CURRENT (HVDC) CONVERTER TRANSFORMER (± 160 KV DC TO ± 1100 KV DC)"

Jun Deng
 Working Group Chair
 October 19th 2024



CURRENT STATUS OF WORKING GROUP

Date and Location of Last Working Group Meeting:
 19th, October 2024, Nanjing, China (Third WG meeting)



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that a draft proposed by the WG for balloting is in the required shape to start the ballot process.

E.4 Dual logo standard IEC/IEEE 60076-57-129 (WG Chair: Waldemar Ziomek)

The WG meeting of this revision work took place in the time slot of the SC meeting, after the SC meeting has adjourned. Details can be found in the annex of these minutes.

- There will be two further WG meetings during this week in this hotel as indicated below:
- Thursday 10/31/2024 1:00pm to 5:00pm Room Mills 7 (4)
- Friday 11/1/2024 8:00am to 12:00pm Room Mills 7 (4)

E.5 CIGRE 2024 – Hot Topics

Klaus Pointner gave a brief report on the CIGRE 2024 meeting held in Paris from August 25, to August 30, 2024. Details of the presentation are summarized as follows:

SC HVDC – Fall 2024

- Cigre 2024 Session in Paris – hot topics
A short summary of the Cigre Paris 2024 session (August 25 to August 30) with focus on SC B4 - DC systems and power electronics, will be given by Klaus Pointner.
- Future work within this Subcommittee
Discussion of ideas of coming work within this SC. All ideas are welcome.
- New business
- Adjournment

SC HVDC – Fall 2024

Study Committees

Group A – Equipment

A1 [Power generation and electromechanical energy conversion](#)
A2 [Power transformers and reactors](#)
A3 [Transmission and distribution equipment](#)

Group B – Technologies

B1 [Insulated cables](#)
B2 [Overhead lines](#)
B3 [Substations and electrical installations](#)
B4 [DC systems and power electronics](#)
B5 [Protection and automation](#)

Group C – Systems

C1 [Power system development and economics](#)
C2 [Power system operation and control](#)
C3 [Power system sustainability and environmental performance](#)
C4 [Power system technical performance](#)
C5 [Electricity markets and regulation](#)
C6 [Active distribution systems and distributed energy resources](#)

Group D – New Materials and IT

D1 [Materials and emerging test techniques](#)
D2 [Information systems, telecommunications and cybersecurity](#)

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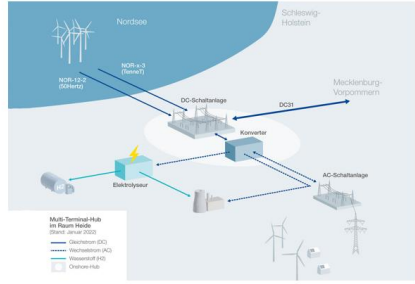
Hot Topics:

- Energy Transition / Integration of Renewables
- HVDC grid access / HVDC networks
- Mitsubishi released the first commercially available DC breaker – enabler for DC grids
- Workshop on (planned) HVDC grids held by B4
 - China, Germany and UK are planning (HV)DC hubs with multiple infeed
 - DC current breaking device required

Conclusion: HVDC remains booming for the coming years

SC HVDC – Fall 2024

Hot Topics:



SC HVDC – Fall 2024

- DC switching devices will bring a new reactor application

- DC side current limiting reactors with ratings up to 600mH (depending on topology and selectivity)
- Shall limit di/dt to ensure that S/C current is not harmful for the converters prior fault clearing occurs – speed of fault clearing (and the decision making process behind) is decisive
- Type of reactor may need to be addressed in the next revision of IEEE1277
- <https://www.promotion-offshore.net>

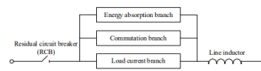
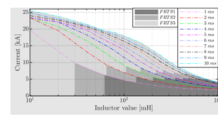
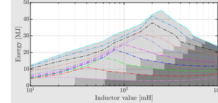


Figure 5-1 A generic representation of a DCCB



(a) Breaking current requirement



(b) Energy absorption requirement

© Promotion D4.5 Requirements for DC switchgear

**E.6 Future Work of this Sub Committee**

The chairman of the SC encouraged members and guest to propose work items and activities that shall be considered by this SC. Input is welcome – please contact the SC chairman directly.

E.7 Old Business

There was no old business

E.8 New Business

There is no new business

E.9 Adjournment

The meeting was adjourned at 05.15pm and handed over to the WG meeting IEC/IEEE 60076-57-129

Annex: Minutes of Meeting of the WG meeting “Dual logo standard IEC/IEEE 60076-57-129”

Minutes of Meeting

WG Rev. to IEEE Standard 60076-57-129 IEC/IEEE International Standard Power transformers-Part 57-129: Transformers for HVDC applications

October 28, 2024, 5:15 pm local time – Hyatt Regency St. Louis, Missouri

Chair: Waldemar Ziomek (wziomek@ptitransformers.com)

Secretary: Eric Davis (esetdavis@aol.com)

1. Attendance / Approval of the Agenda / Essential Patent Issues

The meeting took place in the course of HVDC SC meeting. Eighteen (18) of twenty-seven (27) members and twenty-two (22) guests for a total of forty (40) people attended. Six (6) guests requested membership. A quorum was in attendance. The list of attendees is shown below:

First Name	Last Name	Email	Company	Member/ Guest
Paulo	Avelino	Paulo.avelino@hitachienergy.com	Hitachi Energy	G
Gilles	Bargone	gilles.bargone@fiso.com	FISO	G
Sean	Barker	sean.barker@hitachienergy.com	Hitachi Energy	M
Naveen	Bhardwaj	naveen.bhardwaj@trench-group.com	Trench Group	G
Alfredo	Carrizales	juanalfredo.carrizales@prolec.energy	Prolec	G
Camilo	Casallas	camilo.casallas@trench-group.com	Trench Limited	M
Antonio	Ceballos	Antonio.ceballos@gatransformer.com	Georgia Transformer	G
Vivian	Chan	vivian.chan@hitachienergy.com	Hitachi Energy	M
Solomon	Chiang	schiang@thegundcompany.com	The Gund Company	M
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Thrindha	Katapalli	katapalli_thrindha@vatransformer.com	Virginia Transformer	G-RM
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Ali	Naderian	Ali.naderian@ieee.org	Trench Group	G
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Sylvain	Plante	plante.sylvain.3@hydro.qc.ca	Hydro-Quebec	M

First Name	Last Name	Email	Company	Member/ Guest
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Bertrand	Poulin	bertrand.f.poulin@hitachienergy.com	Hitachi Energy	M
Thomas	Prevost	tom.prevost@weidmann-group.com	Weidmann Electrical Technology	M
Ulf	Radbrandt	ulf.radbrandt@ieee.org	Hitachi Energy	M
Sebastian	Rehkopf	s.repkopf@reinhausen.com	Reinhausen	G-RM
Michael	Sharp	sharp.michael@siemens-energy.com	Trench Limited	M
Muhammad Abdullah	Sohail	Muhammad.sohail@trench-group.com	Trench Limited	G-RM
Dharam	Vir	dharam.vir@prolec.energy	Prolec GE	M
Peter	Werelius	Peter.werelius@megger.com	Megger	G-RM
Terry	Wong	terry.wong@trench-group.com	Trench Canada Limited	M
Gigi	Zhang	jzhang@hicoamerica.com	HICO	G
Shibao	Zhang	Shibao.zhang@ieee.org	PCORE Electric	G
Waldemar	Ziomek	wziomek@ptitransformers.com	PTI Transformers	M

G: Guest

G-RM: Guest – Requesting Membership

M: Member

2. Agenda

The agenda for the WG meeting was presented by the WG chair.

3. Status Report as presented by the WG chair

The WG Chair:

- Reviewed the scheduled meetings for this fall
 - WG Meeting – Monday 10/28, 4:45 pm – 6:00 pm
 - WG Meeting/IEC – Thursday, 10/31, 1:00 pm – 5:00 pm
 - WG Meeting/IEC – Friday, 11/1, 8:00 am – 12:00 pm
- Reviewed the approved PAR Scope of Work
- Reviewed the background for the PAR - The existing dual logo standard is valid until 2027.
- Reviewed the initial steps for the revision
 - Add a new clause 5.2.6 Operation of LCC
 - Add a new clause 5.2.7 Operation of VSC
 - Add a new clause 14 Monitoring Devices
- Provided updates from the IEC TC-14
 - Convenor – Frank Trautmann
- Discussed new additions to the revised standard
 - Review IEC Std 61378-3 Convertor Transformers Part 3: Application Guide and incorporate parts identified as useful

- Consider adding a standard for renewable energy collector transformer using a DC link
- Reviewed the proposed timeline
 - First draft – F24
 - First draft review and correction – S25
 - Ballot within SC – F25
 - Ballot Standard – S26
 - Submit to RevCom – F26

The slides shown by the WG Chair will be posted to the website.

4. Old Business

There was no old business

5. New Business

There is no new business

6. Adjournment

The meeting was adjourned at 5:40pm.