

Updates from Study Committee A3

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For power system expertise

Latest activities

- A3/B3 colloquium held in Birmingham in May 2023 focussing on The role and impact for T&D Substations and Equipment in delivering
 - Featuring guest speakers and a panel session on exploring the latest on SF6 alternatives
- SC A3 met during the Cairns 2023 Symposium on the 5th September 2023, chaired by Nenad Uzelac.
 - Presentations from the Utilities Advisory Board and on the activities of NGN and Women in Engineering.
 - Proposals were presented for new working groups and liaison activities with other organizations. Several topics were discussed including temperature rise limits – a question posed by TC17 – New WG proposals on Lifecycle Assessment and Digital twin were discussed, with considerable discussion on both topics.
 - JWG B3/A2/A3/C3/D1.66 call for working group members issued.
 - There was discussion around closer working with IEEE and CIGRE to ensure input and standardization across different standards bodies and outputs feed into these.
- Current Zero Club presented webinar on Switching in Alternative Gases on 17th February

Existing working groups

WG/JWG	Title	Convener	Secretary	UK Participation
WG A3.39	Application and field experience with Metal Oxide Surge Arresters	R. le Roux (IE)	F. Richter (DE)	
WG A3.40	Technical requirements and field experiences with MV DC switching equipment	C. Heinrich (DE)	T. Miyamoto (JP)	
WG A3.42	Failure analysis of recent AIS instrument transformer incidents	Z. Roman (US)	Fernando Lagos (BR)	
JWG A3.43/CIRED	Tools for lifecycle management of T&D switchgear based on data from condition monitoring systems	N. Gariboldi (CH)	J. Mantilla (CH)	
JWG B4/A3.80	HVDC Circuit Breakers - Technical Requirements, Stresses and Testing Methods to investigate the interaction with the system	J. Cao (CN)	J. Wang (CN)	
JWG C4/A3.53	Application Effects of Low-Residual-Voltage Surge Arresters in Suppressing Overvoltages in UHV AC Systems	J. He (CN)		
JWG A3/A2/A1/B1.44	Limitations in Operation of High Voltage Equipment Resulting of Frequent Temporary Overvoltages	B. Rusek (DE)		
WG A3.45	Methods for identification of frequency response characteristic of voltage measurement systems	E. Sperling (CH)	M. Freiburg (DE)	
WG A3.46	Generator Circuit-Breakers: review of application requirements, practices, in-service experience and future trends	P. Novak (DE)		
JWG B4/A3.86	Fault Current Limiting Technologies for DC Grids	Z. He (CN)		
JWG B3/A3.59	Guidelines for SF6 end-of-life treatment of T&D equipment (>1kV) in Substations	M. Hyrenbach (DE)		Mark Waldron Matt Barnett
JWG B3/A3.60	User guide for non-SF6 gases and gas mixtures in Substations	K.P. (Piet) Knol (NL)		
WG A3.47	Lifetime Management of Medium Voltage Indoor Switchgear	A. Maheshwari (AU)		Ian Naylor
WG A3.48	4th CIGRE reliability survey on transmission and distribution equipment	H.Ito (JP)		Matthew Iles
WG A3.49	Aging effects on accuracy class of Instrument Transformers	Roberto Tinarelli (IT)		*
WG A3.50	On-site calibration and verification of the accuracy of instrument transformers	Paolo Mazza (IT)		Rui Zhang
WG A3.51	Requirements for HV T&D Equipment operating under Abnormal Weather Conditions	Dr. Santosh Kumar Annadurai (IN)		Peter Curtis?
JWG C4/A3/B2/B4.75	Guide to procedures for the creation of contamination maps required for outdoor insulation coordination	Massimo Marzinotto (IT)		*

New Working Groups and Proposals

- WG A3.49: Aging effects on accuracy class of Instrument Transformers
- WG A3.50: On-site calibration and verification of the accuracy of instrument transformers
- WG A3.51: Requirements for HV T&D Equipment operating under Abnormal Weather Conditions
- JWG C4/A3/B2/B4.75: Guide to procedures for the creation of contamination maps required for outdoor insulation coordination
- JWG B3/A2/A3/C3/D1.66: Guidelines for Lifecycle Analysis in substations considering the Carbon Footprint Evaluation.
- B3/A3.67: Operational safety of Medium Voltage GIS in case of abnormal leakage
- WG C4.76: Overvoltage Protection in Switching Inductive Devices with Vacuum Circuit Breakers

New Publications

Ref.	WG	Title
<u>TB 921</u>	JWG C3/A3.53	Applying Low-Residual-Voltage Surge Arresters to Suppress Overvoltages in UHV AC Systems
<u>TB 914</u>	JWG B3/A3.59	Guidelines for SF6 end-of-life treatment of T&D equipment (>1kV) in Substations
<u>WBN041</u>	CZC	The fundamentals of current interruption in SF6 and its alternatives
<u>TB 873</u>	JWG B4/A3.80	Design, test and application of HVDC circuit breakers
<u>TB 871</u>	A3.41	Current interrupting in SF ₆ -free switchgear
<u>TB 830</u>	A3.36	Application and benchmark of multi-physics simulation tools and temperature rise calculations
<u>TB 817</u>	A3.38	Shunt capacitor switching in distribution and transmission systems
<u>TB 816</u>	A3.30	Substation equipment overstress management
<u>TB 757</u>	A3.35	Guidelines and best practices for the commissioning and operation of controlled switching projects
<u>TB 737</u>	JWG A3.32/CIREN	Non-intrusive methods for condition assessment of distribution and transmission switchgear
<u>TB 725</u>	A3.29	Ageing high voltage substation equipment and possible mitigation techniques
<u>TB 716</u>	A3/B5/ C4.37	System conditions for and probability of out-of-phase
<u>Electra Paper</u>	A3.31	Instrument transformers with digital output
<u>TB to be published soon</u>	A3.39	Application and field experience with metal oxide surge arresters

SF6 Alternatives Development

- C5-FK solutions not being progressed for HV applications, only MV
 - Limited suppliers using (in EU) with more looking to adopt vacuum interruption and natural origin gases (NOG)
- C4-FN solutions for GIS 420kV 63kA now commercially available, Live Tank solutions not yet commercially available above 145kV
 - Possible challenges with high DC time constant and special applications
- Vacuum solutions for GIS are a few years away for 420kV but are available at 145kV
- NOG solutions (breakers and backparts) are in first deployment across numerous voltages and ratings up to 145kV and 420kV respectively. AIS instrument transformers also available up to 420kV

Legislation

- European Parliament and the Council reached a provisional agreement on F-gas regulation update in October 2023. Vote on the final text will take place in 2024.

Scope of Application	New electrical switchgear utilising fluorinated greenhouse gases	Prohibition Date
Distribution up to 24kV	Complete Prohibition*	1 Jan 2026
Distribution between 24kV to 52kV		1 Jan 2030
High Voltage 52-145kV and >50kA	GWP of 1*	1 Jan 2028
High Voltage >145kV and >50kA		1 Jan 2032

- PFAS legislation may prevent use of PTFE in circuit breaker nozzles or other insulation components used in switchgear.
 - ECHA final proposal lists PTFE to be restricted (Oct 2023)
 - Before the restriction can be adopted, it will be scrutinised by the European Parliament and Council.
 - Research into alternatives is beginning but currently no available alternatives**

Upcoming events

- A3 Study Committee meeting on 22-23rd February in New Delhi
- A3 Utility Advisory Board meeting on 4th March and Strategic Advisory group on 5th March in Milan
- Paris 2024 in August!