

**INTERNATIONAL ELECTROTECHNICAL COMMISSION****TECHNICAL COMMITTEE NO 14: POWER TRANSFORMERS****Draft report of the meeting of IEC/TC 14
Fontainebleau, France
18th – 19th September 2019****1 Opening of the meeting**

The delegates were welcomed on behalf of the hosts by Franck Aragnou, Deputy head of R & D at the EDF Electrical Equipment laboratory. The Chair formally declared the meeting open.

Those present:

Ploetner	Christoph	Chair	Hipszki	Gyula	Hungary
Maghar	Mick	Secretary	Nador	Gabor	Hungary
Redgate**	Andrew	IEC CO	Kumar	Shyam	India
De smedt	Robby	Belgium	Baggini	Angelo	Italy
Beauchemin	Claude	Canada	Ghioldi	Gianmarco	Italy
Hochanh*	Thang	Canada	Giorgi	Gianfranco	Italy
Tenyenhuis	Ed	Canada	Mauri	Flavio Mario	Italy
Guo	Zhenyan	China	Zunino	Stefano	Italy
Han	Baojia	China	Konishi	Yoshinori	Japan
Liu	Jie	China	Shirasaka	Yukiyasu	Japan
Mi	chuanlong	China	Yamada	Shin	Japan
Shuai	Yuanming	China	Castellanos	Juan	Mexico
Wu	tianyi	China	Verhoeven	Rob	Netherlands
Zhang	zhongguo	China	Bjorgvik	Geir Morten	Norway
Zhang	xianzhong	China	Susa	Dejan	Norway
Brazdil	Jiri	Czech Republic	Peixoto*	Anabela	Portugal
Kubalik	Jaroslav	Czech Republic	Gradnik	Timotej	Slovenia
Pollari	Kai	Finland	Cuesto	Miguel	Spain
El assad	Hakam	France	Bengtsson	Claes	Sweden
Elleau	Christophe	France	Jonsson	Lars	Sweden
Mercier-Marical	Serge	France	Breckenridge*	Tom	UK
Riboud	Jean-Christophe	France	Jarman	Paul	UK
Thomas*	Franck	France	Walker	David	UK
Walter	Frédéric	France	Colopy	Craig	USA
Zouiti	Mohammed	France	Dix	Larry	USA
Heinz	Michael	Germany	Hopkinson	Philip	USA
Krämer	Axel	Germany	Marek	Richard	USA
Tepper	Jens	Germany	Prevost	Thomas	USA
Vuković*	Dejan	Germany	Rapp	Kevin	USA
Gyore	Attila	Hungary	Winstanley	Gerard	USA

* Day 1 only

** Day 2 only

2 Approval of the agenda

The draft agenda as circulated in document 14/1015/DA was accepted without change. Some of the items may be dealt with out of order.

3 Note the confirmation of the minutes of the meeting held in Glasgow, UK on 21 and 22nd September 2018

The report of the meeting as circulated in 14/990/RM was accepted as a true and accurate record of the proceedings.

Draft decision 2018/06 to close the liaison with IEC/SC 17C was not carried out as we are now working with them on mobile substations.

4 Information from IEC Central Office

The IEC representative reminded the delegates that the meeting was being held in accordance with the IEC Code of Conduct which can be found at http://www.iec.ch/about/brochures/pdf/tools/IEC_Code_of_Conduct.pdf. He then gave a presentation which is circulated as 14(Fontainebleau/IEC CO)1

5 Review of P-members participation

The IEC representative took a roll call of P-members present. Document 14/1024/INF shows the attendance and voting record of the P-members for the past three years. The same figures will be compiled for 2019 and this will allow IEC to decide if any members are to be reminded of their obligations.

6 Report from the Chair

The Chair gave his report which is circulated as 14(Fontainebleau/Chair)2.

7 Reports from working groups.

7.1 AHG 35 The functional classification of power transformers (Mr Angelo Baggini)

The convenor presented his report which was circulated in document 14/1023/INF.

Decision 2019/01

IEC TC 14 decides to extend the life of AHG 35 The functional classification of power transformers and requests it to continue its work on the modification of the Scope of TC 14.

7.2 AHG 36 Coordination of thermal requirements in existing standards (Mr Richard P Marek)

The convenor presented his report which was circulated in document 14/1023/INF. There was some discussion of the recommendations, which were broadly accepted.

The secretary was requested to notify IEC/TC 15 and IEC/TC 55 when a revision of IEC 60076-14 is being considered.

Draft decision 2019/02

IEC TC 14 accepts the report from AHG 36 and thanks Mr Marek and the members of the team for their work. Having completed its task, the AHG is formally disbanded.

Draft decision 2019/03

IEC/TC 14 decides to set the reference lifetime of a transformer at 180 000 hours for thermal purposes. TC 14 will request IEC/TC 112 to consider the withdrawal of IEC TS 62332-2:2014 *Thermal evaluation of combined liquid and solid components - simplified test*.

7.3 MT 60076-1 Power transformers - Part 1: General (Mr Paul Jarman)

The convenor gave his report which is circulated as 14(Fontainebleau/76-1)3. Some discussion took place on a suggestion from the NC of India to add repair guidelines to the document. The conclusion was that this would be beyond the scope of the document. Some information on test requirements after a repair may however be added to the document and this subject was passed on to the MT for further consideration.

7.4 MT 60076-2 Temperature rise for liquid-immersed transformers (Mr Dejan Susa)

The convenor presented his report which was circulated in document 14/1027/INF.

7.5 MT 60076-7 Loading guide for oil immersed power transformers (Mr Dejan Susa)

The loading guide was published in 2018 and there is nothing further to report.

7.6 MT 60076-14 Liquid-immersed power transformers using high-temperature insulation materials (Mr Richard P Marek)

There was nothing to report.

7.7 MT 60076-3 Power transformers - Part 3: Insulation levels, dielectric tests and external clearances in air (Mr Yukiyasu Shirasaka)

The report was circulated in document 14/1023/INF.

7.8 MT 60076-4 Guide to the lightning impulse and switching impulse testing - Power transformers and reactors (Mr Thang Hochanh)

The convenor gave his report which is circulated as 14(Fontainebleau/76-4)4.

7.9 MT 60076-5 Ability to withstand short circuit (Mr Jean-Christophe Riboud)

The convenor presented his report which was circulated in document 14/1023/INF.

Draft decision 2019/04

IEC/TC 14 decides to adopt the following category limits for IEC 60076-5 and requests the MT to apply those limits in the development of edition 4:

Category I up to and including 3 150 kVA

Category II from 3 150 kVA up to and including 31,5 MVA

Category III above 31,5 MVA

Draft decision 2019/05

IEC/TC 14 decides not to add any information about the normal frequency of short circuit events to IEC 60076-5

7.10 MT 60076-6 Reactors (Mr Rob Verhoeven)

The convenor presented his report which was circulated in document 14/1027/INF.

7.11 MT 60076-10 Determination of sound levels (Mr Christoph Ploetner)

The convenor presented his report which was circulated in document 14/1027/INF.

The proposed change to the standard is too large to be issued as a corrigendum and will need to be an Amendment.

Draft decision 2019/07

IEC/TC 14 decides to publish an amendment to IEC 60076-10-1:2016 and to proceed directly to the CDV stage

7.12 MT 60076-11 Dry-type transformers (Mr Michel Sacotte) INACTIVE
14/1023/INF

There was nothing to report.

7.13 MT 60076-15 Gas-filled power transformers (Mr Katsutoshi Toda) INACTIVE

There was nothing to report.

7.14 MT 60076-16 Transformers for wind turbine applications (Mr Tom Breckenridge – Joint with IEEE) INACTIVE

The document was published in 2018 and there was nothing to report.

7.15 MT 60076-19 Revision Rules for the determination of uncertainties in the measurement of the losses on power transformers and reactors (Mr Anders Bergman)

The CD for this project closed in March 2018 and the limit date for sending it to CDV is October 2019. It is likely that the project will be returned to the preliminary stage by IEC. The project can be re-started later if necessary.

7.16 PT 60076-20 Energy efficiency (Mr Michel Sacotte) INACTIVE

There was nothing to report.

7.17 MT 60076-21 Standard requirements, terminology, and test code for step-voltage regulators (Mr Craig Colopy – Joint with IEEE) INACTIVE

The document was published in 2018 and there is nothing further to report.

7.18 PT 60076-25 Power transformers - Part 25: Neutral grounding resistors - General design requirements and test procedures (Mr Hakam El Assad)

The convenor gave his report which is circulated as 14(Fontainebleau/76-25)5.

7.19 MT 60076-57-129 Power transformers - Part 57-129: HVDC converter transformers (Mr Mats Berglund – Joint with IEEE) INACTIVE

There was nothing to report.

7.20. PT 60076-57-1202 Liquid Immersed Phase Shifting Transformers (Mr Paul Jarman – Joint with IEEE) INACTIVE

There was nothing to report.

7.21 MT 60214 Tap changers (Mr Axel Kraemer – Joint with IEEE)

The convenor presented his report which was circulated in document 14/1027/INF.

7.22 MT 61378-3 Converter transformers - Part 3: Application guide (Mr Ugo Piovani) INACTIVE

There was nothing to report.

7.23 WG 32 Power transformers and reactor fittings (Mr Gianmarco Ghioldi)

The convenor presented his report which was circulated in document 14/1027/INF.

The New Work Item Ballot for IEC 60076-22-8 *Power transformers and reactors – Devices suitable for use in communication networks* did not have enough experts nominated to be accepted. If the deadline for further nominations closes without reaching the total, the secretary has been asked to recirculate the NP.

Draft decision 2019/06

IEC/TC 14 decides to resubmit the New Work Proposal for IEC 60076-22-8 for a two-month ballot.

7.24 WG 33 Suppression devices of DC magnetic bias of electric power transformers (Mr Zheng Xu)

The convenor presented his report which was circulated in document 14/1023/INF.

7.25 WG 34 Voltage Regulating Distribution Transformers (VRDT) (Mr Michael Heinz)

The convenor presented his report which was circulated in document 14/1026/INF.

7.26 JMT 5 Maintenance Team for revision of IEC 62199 Bushings for DC application and IEC 60137 Bushings above 1kV (Managed by SC 36A) (Jean-Christophe Riboud) INACTIVE

There was nothing to report.

7.27 JAHG 7 Transformer Bushing dimensional standardization (Managed by SC 36A) (Mr Flavio Mario Mauri)

The convenor gave his report which is circulated as 14(Fontainebleau/JAHG 7)6.

8 Review Liaisons**8.1 CLC/TC 14 Power transformers (Mr Flavio Mauri)**

Mr Baggini gave the report which is circulated as 14(Fontainebleau CLC/TC 14)7.

8.2 IEEE Transformers Committee (Mr Ed teNyenhuis)

Mr teNyenhuis presented the report which was circulated in document 14/1025/INF.

8.3 CIGRE SC A2 Power transformers and reactors (Mr Yukiyasu Shirasaka)

Mr Shirasaka presented the report which was circulated in document 14/1025/INF.

8.4 CIGRE SC D1 Materials and emerging test techniques (Ms Ivanka Hoehlein-Atanasova)

The report was circulated in document 14/1025/INF.

8.5 IEC/TC 10 Fluids for electrotechnical applications (Mr Kevin Rapp)

Mr Rapp presented the report which was circulated in document 14/1026/INF.

8.6 IEC/SC 17C High-voltage switchgear and control gear assemblies (Mr John Dlamini)

There was no report submitted. The New Work Item proposal for Mobile substations was not approved because only three countries agreed to participate. At the moment it is not clear what will happen to this project in the future.

8.7 IEC/SC 36A Insulated bushings (Mr Flavio Mauri)

Mr Giorgi gave the report which was circulated in document 14/1027/INF.

8.8 IEC TC 38 Instrument transformers (Mr Rajaram Ramchandra Shinde)

There was no report submitted. TC 14 is working with TC 38 on Station Service Voltage Transformers (SSVT) which will be a dual-logo IEC-IEEE standard. Mr Stefano Zunino is participating on the project as TC 14 representative.

8.9 IEC/TC 42 High Voltage testing techniques (Mr Axel Kraemer)

Mr Kraemer gave the report which was circulated in document 14/1027/INF.

8.10 IEC/TC 88 Wind energy generation systems (Tom Breckenridge)

IEC/IEEE 60076-16 was published in 2018 and there is nothing further to report.

8.11 IEC/TC 89 Fire hazard testing (Mr J Bjarne Sund)

There was no report submitted.

Draft decision 2019/08

IEC/TC 14 decides to close the liaison with IEC/TC 89 *Fire hazard testing*.

8.12 IEC/TC 95 Measuring relays and protection equipment (Mr Cornelius Plath)

The report was circulated in document 14/1026/INF.

8.13 IEC/TC 112 Evaluation and qualification of electrical insulating materials and systems (Mr R Marek)

Mr Marek gave the report which is circulated as 14(Fontainebleau/IEC TC 112)8.

8.14 IEC/TC 122 UHV AC transmission systems (Mr Yukiyasu Shirasaka)

Mr Shirasaka presented the report which was circulated in document 14/1025/INF.

8.15 ISO/TC 108/SC 5 Condition monitoring and diagnostics of machine systems (Mr Matthew Kennedy)

The report was circulated in document 14/1025/INF

8.16 IEC/ACTAD - Advisory Committee on Electricity Transmission and Distribution (Mr Yukiyasu Shirasaka)

Mr Shirasaka presented the report which was circulated in document 14/1025/INF.

8.17 IEC/ACEE, Advisory Committee on Energy Efficiency (Mr Yukiyasu Shirasaka)

Mr Shirasaka presented the report which was circulated in document 14/1025/INF.

Draft decision 2019/12

IEC/TC 14 decides to nominate Mr. Shirasaka for a further term as the member of ACEE representing TC 14.

9 Strategic planning

9.1 New documents

9.1.1 Development of new part IEC 60076-22-9 dealing with mechanical interface, EMC requirements, communication protocol for monitoring devices - proposal by France

Mr Elleau gave a presentation, circulated as 14(Fontainebleau/French NC)9, on behalf of the French NC suggesting a new Work Item on *Installation prerequisites and implementation requirements for any sensor or monitoring equipment for using on-line power transformer surveillance*. It was proposed to consider this as a new part of IEC 60076-22 *Power transformer and reactor fittings*.

After some discussion it was suggested that some of the material in the proposed document could be included in IEC 60076-1, while other parts will be considered by JAHG 7 and in the IEC 60076-22 series. The teams involved will carry out informal discussions to see whether this is feasible.

9.1.2 New Work Item Proposal by IEC/SC 17C to develop within a JWG the IS High Voltage Mobile Substation using Air and Gas-Insulated Switchgear Assemblies

This was covered under item 8.6.

9.2 Existing documents

9.2.1 Changes to introduce in IEC 60076-5 Ed4 – proposal by MT 60076-5

This was covered under item 7.9.

9.2.2 Corrigendum to IEC 60076-11:2018, clause 14.3.2.1 General (Temperature-rise test) – proposal by Poland

It was decided that an Interpretation Sheet would be more appropriate than a corrigendum. The secretary will ask the Polish Committee for information about the origin of the proposal and draft the document as per the proposal for further processing.

Draft decision 2019/09

IEC/TC 14 decides to produce an Interpretation Sheet for IEC 60076-11:2018, clause 14.3.2.1.

10 Update the Program of Work of TC 14 as displayed on the IEC website

There were no requests for extensions of target dates.

11 To review the stability dates of TC 14 publications

Draft decision 2019/10

IEC TC 14 decides to extend the stability dates of the following publications:

IEC 60076-5:2006 ED3	from 2019 to 2022
IEC TS 60076-19:2013 ED1	from 2019 to 2021
IEC TS 60076-20:2017 ED1	from 2019 to 2022
IEC 60214-1:2014 ED2	from 2019 to 2022
IEC TR 60616:1978 ED1	from 2019 to 2020
IEC 61378-1:2011 ED2	from 2019 to 2021
IEC 62032:2012 ED2	from 2019 to 2021

12 Review the Strategic Business Plan

The Secretary will make any necessary minor updates to the SBP and submit it to IEC for approval.

13 Any other business

There was no other business to discuss.

14 Date and place of the next meeting**Draft decision 2019/11**

TC 14 accepts the kind invitation from the Bureau of Indian Standards to hold their next meeting in New Delhi 15 to 17 September 2020.

15 Close of the meeting

The Chair thanked the delegates for their work, the host for their hospitality and declared the meeting closed.

Draft decision 2019/13

TC 14 thanks EDF, the French National committee and all the sponsors for hosting the meetings and the splendid hospitality.