**INTERNATIONAL ELECTROTECHNICAL COMMISSION SYSTEM FOR**

**CERTIFICATION TO STANDARDS RELATING TO EQUIPENT FOR USE**

**IN EXPLOSIVE ATMOSPHERES (IECEx SYSTEM)**

**Circulated to: IECEx Management Committee (ExMC)**

**Title: Report from IECEx ExMC Working Group WG 19 Hydrogen Technologies**

Introduction

This document contains a report from the WG19 Convener, Dr Thorsten Arnhold on the activities of the Working Group since the 2022 IECEx Management Committee meeting.

This report is to be presented during the September 2023 meeting of the IECEx Management Committee in Edinburgh.

Recommendations from ExMC WG19 to the IECEx Management Committee are contained on Page 5 of this report.

IECEx Secretariat.

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**INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC) SYSTEM FOR CERTIFICATION TO STANDARDS RELATING TO EQUIPMENT FOR USE IN EXPLOSIVE ATMOSPHERES (IECEx SYSTEM)**

**Report of ExMC WG 19 – Hydrogen Technologies**

**BACKGROUND**

During the IECEx September 2021 Management Committee Meeting, agreement was reached to establish a new IECEx Working Group, ExMC WG19 “Coverage of Standards dedicated to Hydrogen Technologies” Re **Decision 2021/26**.

This decision enabled IECEx WG19 to start work with establishing connections with ISO/TC 197 “Hydrogen Technologies” experts and those from the Hydrogen Council as well as IEC TC 105 “Fuel Cells”

During 2022, ExMC accepted report ExMC/1868/R in which new Operational Document OD 290 was proposed with the meeting recording **Decisions 2022/11** and **2022/12** enabling a final draft for OD 0290 to be issued for formal voting via correspondence following the 2022 annual IECEx meetings. ExMC/1842B/DV was issued for voting via correspondence with OD 290 First Edition published November 2022 and ExTAG document, ExTAG/697/Inf issued in December 2022 to inform ExCBs of the need to use OD 0290 when processing applications for IECEx certification of Hydrogen dispensers to IEC 60079-46.

During the course of its work, WG19 has held the following formal meetings:

* 26th October 2021
* 27th January 2022
* 9th March 2022
* 22nd August 2023

**WORK SINCE LAST ExMC MEETING**

In addition to these WG19 meetings, Officers of WG19, Chairs of IECEx and IEC TC 31, held collaborative meetings with officers and experts from ISO TC 197 “Hydrogen Technologies” and IEC TC 105 Fuel Cells”, which proved to be most successful in developing an understanding of the market needs of both the Standards development and the Conformity Assessment sides.

Since the 2022 IECEx Annual meetings, work of WG19 experts has been focused on promotion of IECEx Services covering Hydrogen including participating in various fora dealing with Green Hydrogen as it appears that many involved in the work of Green Hydrogen may not be familiar with existing Safety standards and International Certification that have long covered equipment, services and persons associated where hydrogen maybe present.

Events and groups such as those being organized by the International Renewable Energy Agency and others are examples where IECEx WG19 members have been active.

Some events, including upcoming events include

* IRENA AFID (Alliance for Industrial Decarbonization) work and its Green Hydrogen Group with the Executive Secretary holding the role of Convener of 2 Small Working Groups (SWG2 – GH2 Safety Standards + Certification and SWG3 Regulations + Subsidies)
* Participation at the IRENA Innovation week, September 2023
* Presentations at the IRENA International Symposium on GH2 with the following experts participating
  + Mr Andrei Tchouvelev, CA ISO TC 197/SC1 Chair
  + Dr Martin Thedens, DE, IEC TC 31 Chair
  + Mr Paul Meanwell ZA, IECEx Chair
  + Dr Thorsten Arnhold DE, ISO TC 197 / IEC TC 31 / IECEx Expert
* QPS Conference where both the Dr Arnhold and Mr Meanwell will present
* Regular HazardEx articles prepared by Dr Arnhold and Mr Sinclair
* Others

Throughout the course of the year WG19 members have also provided input into the new edition to the IECEx Technical Capability Document, TCD that now includes ISO standards and OD 290 Annex A requirements.

Given the application of OD 290, WG19 held a recent meeting on 22 August 2023 to consider feedback and any need for updating OD 290, now that the first edition has been applied.

During this meeting it was noted that the status of developments of new International Standard ISO 19880-2 for Hydrogen Fuel Dispensers is progressing with the DIS/ISO 19980-2 attracting a large number of comments which are to be considered during the ISO/TC197 meeting planned for November 2023 in Vienna. Once these comments are dealt with an FDIS ISO 19880-2 is planned to be released, pending the outcome of the November 2023 TC 197 meeting.

With this in mind, WG19 believe that we will need to retain OD 290 for little time yet noting the demand for IECEx certification covering H2 dispensing equipment and the need to ensure a common application of IEC 60079-46 when doing so.

However, WG19 agreed that the first edition of OD 290 is now in need of adjustment and agreed to conduct work to address the following:

1. That ISO 14687 (H2 fuel quality) should not be included within the scope of IECEx certified Equipment scheme, noting other avenues such as IECQ and discussion within their IECQ WG14 as part of their environmental CA activities could be a possible solution.
2. That ExTAG WG1 be requested to develop ExTRs for ISO 19880-3, ISO 19880-5 and ISO 17268
3. That a Task Team be formed for the immediate revision of OD 290, using the draft revision prepared by Dr Munro (Annex A) and that this should be accomplished to align with the consideration of comments on DIS/ISO 19880-2 for later this year by ISO TC 197.
4. A Task Team be formed to conder the concerns from Edgar Wolff-Klammer, regarding the status of IECEx certificates issued prior to introduction of OD 290 Ed 1.0 and those issued according to OD 290 once ISO 19880-2 is finalised

In agreeing to prepare a revised draft of OD 290 for consideration by ExMC, the WG19 members noted the importance to work with and communicate with ISO/TC 197 experts currently working on the DIS/ISO 19880-2 comments.

Once WG19 have a draft prepared this will be circulated to ExMC for comments prior to preparing a final version seeking ExMC voting.

WG19 are pleased to inform the IECEx Management Committee of the participation of experts from ISO TC 197 on its WG19 group.

**RECOMMENDATIONS TO ExMC**

In light of the above and work to date, ExMC WG19 recommends to the ExMC the following:

1. Support for WG19 to revise OD 290 in light of both feedback on application of OD 0290 and to ensure alignment with the work of ISO/TC 197 regarding DIS/ISO 19880-2, as mentioned above.
2. That ISO 14687 (H2 fuel quality) should not be included within the scope of IECEx certified Equipment scheme, noting other avenues such as IECQ and discussion within their IECQ WG14 as part of their environmental CA activities could be a possible solution.
3. Support the WG19 request for ExTAG WG1 to prepare ExTR Blanks for ISO 19880-3, ISO 19880-5 and ISO 17268
4. Continuation of WG19’s work for IECEx coverage of products, systems, services associated with the use of Hydrogen, beyond those already covered by TC 31 Standards.
5. That all Members especially IECEx Certification Bodies, ExCBs be reminded of the linkage between IECEx Units of Competence used within the IECEx certificate of Personal Competence Scheme, CoPC and that of Unit 011 which is dedicated to Hydrogen safety.

Finally, I would like to thank the members of WG19 and experts and Officers of ISO TC 197, IEC TC 31 and IEC TC 105 for the excellent collaboration we continue to experience.

Prof. Dr. Thorsten Arnhold

Convenor of IECEx WG19

IECEx Liaison to ISO/TC 197/SC1

Att. Annex A Minutes of the ExMC WG19 Meeting held 22 August 2023

Annex A – Report of ExMC WG19 Meeting 22 August 2023

**ExMC WG19-013**

**IECEx ExMC WG19 Meeting Report**

**INTERNATIONAL ELECTROTECHNICAL COMMISSION SYSTEM FOR CERTIFICATION TO STANDARDS RELATING TO EQUIPMENT FOR USE IN EXPLOSIVE ATMOSPHERES (IECEx System)**

**Report of Meeting of IECEx ExMC Working Group WG19 – Hydrogen Technologies**

**Held remotely via ZOOM**

**on Tuesday 22nd August 2023**

**Session from 11:00 to 14:00 hrs (Time Zone = UTC)**

**Attendance**

**Dr Thorsten Arnhold -** (DE) R.Stahl+ Convener

**Kevin Wolf** (US) Intertek Testing Services

**Edgar Wolff-Klammer** (US) UL LLC

**Eduardo Galera** (BR) UL

**Jim Munro** (AU) Jim Munro International Compliance

**Jianping XU** (CN) NEPSI

**Ajay Maira** (AU) Ex Testing and Certification

**Klauspeter Graffi** (DE) TUV Rheinland

**Paul Meanwell** (ZA) KOMATSU + IECEx Chair

**Arpad Veress** (HU) IndEx

**Nick Hart** (GB) ISO/TC 197 Expert ITM Power Plc

**Scott Harding** (GB) Woodcock and Wilson

**Fred Lankamp** (CN) CNEx

**Francesco Esposito** (IT) IMQ

**Uli Jacobs** (DE) TUV SUD

**Colin Cameron** (GB) Mutech

**Minari Kogane** (JP) TIIS

**Ki-seuk Lee** (KR) KTL

**Dongjin Kim** (KR) KTL

**Jeong-il Kang** (KR) KOSHA

**Rob Kohuch** (CA) QPS

**Dave Adams** (CA) QPS

**Jessica Robertson** (invited) Chemours

**Chris Agius** IECEx Executive Secretary

**Mark Amos** IECEx Business Manager

**Geoff Slater** IECEx Compliance Manager

**MEETING AGENDA + REPORT**

1. **Opening and Welcome,** by Dr Thorsten Arnhold, WG19 Convener

Welcome and introductions

Dr Arnhold as WG19 Convener welcomed all experts and called for introductions from those new to the WG19.

He noted agenda WG 19-012A.

Dr Arnhold gave a power point presentation outlining the situation of use of Hydrogen (H2) highlighting the need to ensure safety and competence and the overall need for certification as a means to prove compliance with important standards, but the importance for a harmonised approach to testing and Certification as provided by IECEx.

The ppt is attached below as a pdf file.



1. **Actual situation in the countries regarding Hydrogen**

Short reports from the WG members

As an introduction to this topic C Agius, Secretary informed the meeting of current work within the International Renewable Energy Association (IRENA) as part of the AFID (Global Alliance for Industrial Decarbonisation) as agreed during the last COP 27 Conference in Egypt last year. He further mentioned that within this AFID there is a stream dedicated to Green Hydrogen (GH2) within which IEC and IECEx is very active, with CAgius officiating as Convener of 2 of the 4 Working Groups dedicated to Regulations and Standards dedicated to GH2, advising that the task of this AFID within IRENA is to prepare proposals that will be presented to the COP 28 Conference to be held later this year in Dubai.

C Agius further remarked that the main message being conveyed within the IRENA discussions is to raise awareness of existing Quality Infrastructure systems such as standards of IEC and ISO and certification under the IECEx, in an attempt to prevent duplication of existing systems.

The meeting also noted a new Canadian standard with Rob Kohuch advising that within CA regulators are still developing requirements and expects some movements in next few years.

1. **Status of Operational Document IECEx OD 290**

Status report and discussion concerning the application of IECEx OD 290 and consideration of any adjustments for ExMC to consider. Also to note work of ExMC WG2 concerning revised draft IECEx Technical Guidance Document, TCD.

The meeting noted the updated IECEx Technical Capability Document (TCD) as prepared by ExMC WG2 which will be discussed during the ExMC meeting in Edinburgh next month, noting that WG19 members provided input via correspondence earlier this year.

The meeting then considered the current OD 290 and received a proposed revised draft prepared by Dr Munro in which he advised of the following rationale behind his proposed changes:

* added some clarification on references
* suggested we should not certify equipment to ISO 19880-1, but it is nevertheless a useful standard
* suggested ISO 14687, Hydrogen fuel quality etc does not seem relevant for use to certify to under the IECEx Certified Equipment Scheme
* clarified the use of ISO 19880-3, ISO 19880-5 and ISO 17268 in certification of fuel dispensers. We should have ExTR blanks for these.
* updated Annex A to include all relevant requirements for fuel dispensers in the current DIS
* included other comments in the body of the draft OD
* included Annex B from the DIS showing examples of hazardous area classification, with clarification that the shaded area can be assumed to be Zone 1



The meeting took a detailed discussion concerning the application of the current edition 1 of OD 290, the suggested changes included in the draft prepared by Dr Munro and the content of ISO/DIS 19880-2.

The meeting also noted concerns and questions raised by Edgar Wolff-Klammer, regarding the status of IECEx certificates issued to IEC 60079-46 prior to introduction of IECEx OD 290 and also once ISO 19880-2 is finally issued. The meeting were reminded of the ExTAG/697/INF to cover the application of IECEx OD 290 but noted that this addresses the situation going forward but not retrospectivity for issued Certificates.

During detailed discussion, the meeting noted that there maybe value in splitting the IECEx OD 290 into separate parts to separate what maybe regarded as requirements of an administrative nature (eg requirements to be fulfilled by ExCBs and ExTLs to conduct this testing and certification work and technical matters that to ensure a consistent application by all ExCBs and ExTLs that align with ISO TC 197 WG19 as they prepare ISO 19880-2.

Following detailed discussion, the meeting arrived at the following agreement:

1. That ISO 14687 (H2 fuel quality) should not be included within the scope of IECEx certified Equipment scheme, noting other avenues such as IECQ and discussion within their IECQ WG14 as part of their environmental CA activities could be a possible solution.
2. That ExTAG WG1 be requested to develop ExTRs for ISO 19880-3, ISO 19880-5 and ISO 17268
3. That a Task Team be formed for the immediate revision of OD 290, using the draft revision prepared by Dr Munro and that this should be accomplished to align with the consideration of comments on DIS/ISO 19880-2 for later this year by ISO TC 197.
4. A Task Team be formed to conder the concerns from Edgar Wolff-Klammer, regarding the status of IECEx certificates issued prior to introduction of OD 290 Ed 1.0 and those issued according to OD 290 once ISO 19880-2 is finalised

**Regarding item 3)**

The meeting agreed to form the following Task Team to continue with the revision of OD 290 using the draft prepared by Dr Munro as the basis and

* To split the OD 290 into 2 Parts for now
* Coordinate with the work of ISO TC 197 WG19 (November 2023 their next meeting)

OD 290 – 1 General requirements

OD 290-2 Technical Requirements

**Task Team OD 290 Revision:**

Dr Munro = Convener

Fred Lankamp

Ajay Maira

Arpad Veres

Prof XU

Edgar Wolff

Eduardo Galera

Nick Hart

IECEx Secretariat

**Regarding Item 4)**

The meeting agreed to for the following Task Team to consider the updating of Certificates to later use of OD 290 and then the new ISO 19880-2, with the view to

Prepare a position for informing ExMC in Edinburgh

**Task Team IECEx Certificate Updating:**

TF Edgar Wolff-Klammer

Jim Munro

IECEx Secretariat

1. **Update report from ISO TC 197and SC1**

To receive an update of work within ISO TC 197 and SC1 in particular the development of ISO 19880-2 and undertake any discussion.

The meeting were informed of the status of new International Standard ISO 19880-2 which the DIS/ISO 19880-2 closed 1 August 2023, and that ISO comments received are to be considered at a meeting later this year following which it is planned to commence the consideration of the comments received with the view to prepare a FDIS.

From this status update, the meeting understood that there will be a need to maintain IECEx Operational Document OD 290 and hence the value of this meeting to consider any changes / improvements needed based on feedback received with the application of the first edition of OD 290.

Mr Hart informed that the next ISO 197 meeting is planned for November 2023 and that he is involved in the Electrolyser Standard. Mr Hart also informed of work on ISO/TR 15916:2015 and its updating. Mr Hart also noted some of the other activities ISO TC 197. The Convener also noted the work of ISO/TC 197/SC1.

1. **Status and Feedback from introduction of new IECEx Certificate of Personal Competence Unit, Ex 011 – Hydrogen Safety.**

To consider any feedback on the application of new IECEx Unit of Competence Ex 011. *Basic knowledge of the safety of hydrogen systems*”) according to ISO/TR 15916:2015.

Mr Amos from the Secretariat advised the meeting of the status of the new Unit 011 noting that to date there are 19 IECEx Certificates Covering the CoPC Scheme (Certificate of Personal Competence) informing that there are 2 IECEx Certification Bodies with Unit 011 now within their scope.

The meeting questioned the progress of having 2 ExCBs with Unit 011 and one additional ExCB undertaking the scope extension to add Unit 011.

The meeting raised the question whether there is a need for additional Units covering Hydrogen noting that we should seek feedback from the ExCBs and market.

1. **Consideration of status on Coverage of IEC TC 105 Fuel Cell Standards**

Discussions with IEC TC 105 Officers indicated a priority in the area of Personal Competence.

The meeting received a verbal update from C Agius, Secretary informing that TC 105 asked for a formal Liaison with IECEx and we sent back a positive response and now await a formal request following their consult within TC 105.

Mr Agius also informed that the initial level of interest from IEC TC 105 was in the area of IECEx CoPC Scheme for personal competence.

In discussion, the meeting noted that Unit 011 is very basic in nature and that we should check with TC 105 if there is a need for additional units for operators and the like.

Mr Amos commented that when discussing Unit 011 with TC 105 we should actually inform TC 105 of the full suite of Units of Competence under the IECEx CoPC Scheme as there are other Units of competence that may be of interest to the TC 105.

The meeting agreed on the need to contact TC 105 with the Secretariat agreeing to take this Action

**Action:**

IECEx Secretariat to contact IEC TC 105 to provide an understanding of the IECEx Systems and especially on the IECEx CoPC Scheme

The meeting then posed the question to ExCBs that are present in this meeting whom are already operating in the IECEx CoPC Scheme for Personal Competence when do they plan to apply for Unit 011, with Mr Jacobs of TUV SUD advising that this is expected to be submitted during the next quarter. Mr Graffi from TUV Rheinland informed that they ate planning to include this Unit 011 with Mr Amos agreeing to provide any information to ExCBs of what is required to satisfy IECEx requirements to include Unit 011.

Mr Galera of UL informed of them preparing to introduce Unit 011 within their scope.

The Convener then noted the remark of Mr Amos regarding the interconnection of all Units of the IECEx CoPC Scheme and asked that the IECEx Secretariat (Mr Amos) to provide some additional information as part of the ExMC WG19 Report to ExMC during the ExMC Edinburgh.

**Action**

Mr Amos to provide a supplementary report during the Edinburgh meeting on the interconnection of IECEx CoPC Units of Competence that maybe used along with Unit 011.

1. **Status of collaboration activities including**

IRENA, (International Renewable Energy Agency)

Hydrogen Council

The meeting noted the work of IRENA as mentioned thru the meeting and especially the upcoming and planned for 28th September 2023 in Bonn Germany as part of the IRENA Innovation week with a dedicated Symposium to Green Hydrogen focused on the necessity of Quality Infrastructure (Standards, Certification and Metrology) which will include presentations from the following experts:

* Mr Andrei Tchouvelev, CA ISO TC 197/SC1 Chair
* Dr Martin Thedens, DE, IEC TC 31 Chair
* Mr Paul Meanwell ZA, IECEx Chair
* Dr Thorsten Arnhold DE, ISO TC 197 / IEC TC 31 / IECEx Expert

So between IEC/TC 31, ISO/TC 197 and IECEx we will be well represented.

The Convener also informed of his role as the IECEx / ISO TC 197/SC1 Liaison officer and that he will be attending the next ISO TC 197 meeting in Vienna.

Mr Agius also informed of the connection with the Hydrogen Council thru Mr Andrei Tchouvelev and that Mr Tchouvelev will be present at the Edinburgh IECEx Meetings as well

1. **Marketing activities for Hydrogen**

The Convener informed the meeting of various promotional avenues such as:

* The IRENA innovation week
* QPS Conference where both the Convener and IECEx Chair will present
* The regular HazardEx articles prepared by the Convenor
* The 3 individual IECEx Animated videos. Accessible from the IECEx website [www.iecex.com](http://www.iecex.com)

1. **Other Matters**

Mr Kevin Wolf posed the question of how do we deal with National deviations to OD 290 as they may start to appear and how would we handle such.

Mr Agius noted that OD 290 is intended as an IECEx “Scheme Document” with the purpose of ensuring that ExCBs apply the IEC 60079-46 in a consistent manner and that once ISO 19880-2 is finally published that OD 290 will be quickly amended to make reference to ISO 19880-2 and not contain the requirements of ISO 19880-2. In addition at that time, the ExMC will need to decide at what time newly issued IECEx Certificates covering H2 Dispensers will only be permitted to be issued to ISO 19880-2 and not IEC 60079-46.

Separately, the Secretariat advised that the general topic of IECEx Bulletin and national differences will be discussed as part of the ExMC agenda.

The meeting noted this situation and agreed that future discussions will need to be had as we get closer to the publication of ISO 19880-2.

1. **Next meeting**

The meeting, noting that there is work to be done mainly with the revision of OD 290, the meeting felt that we could achieve the review of OD 290 via correspondence and to hold a meeting of this IECEx WG19 after the ISO/TC 197.

With difficulties trying to find a meeting date, it was agreed that we will work for now via correspondence and then consider a date for the next meeting early next year with the meeting agreeing that they leave this to the Convener and Secretary to call.

1. **Close**

Dr Arnhold, thanked everybody for an excellent and very productive meeting and declared the meeting closed at 1320 UTC time.