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| IEC/TC OR SC:<br><b>31</b> | SECRETARIAT:<br><b>GB</b> | DATE:<br><b>2019-11-05</b> |
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Please ensure this form is annexed to the Report to the Standardization Management Board if it has been prepared during a meeting, or sent to the Central Office promptly after its contents have been agreed by the committee.

**A. STATE TITLE AND SCOPE OF TC**

Are there any new or emerging trends in technology that will impact the scope and work activities of the TC? Please describe briefly.

Do you need to update your scope to reflect new and emerging technologies? If yes, will these changes impact another TC's scope or work activities?

If yes, describe how these will impact another TC(s) and list the TC(s) it would impact

**IEC TC 31 Equipment for explosive atmospheres**

**Scope**

TC 31 - To prepare and maintain international standards relating to equipment for use where there is a hazard due to the possible presence of explosive atmospheres of gases, vapours, mists or combustible dusts.

**B. MANAGEMENT STRUCTURE OF THE TC**

Describe the management structure of the TC (use of an organizational chart is acceptable) (should be integrated by CO automatically) and, if relevant (for example an unusual structure is used), provide the rationale as to why this structure is used.

Note: Check if the information on the IEC website is complete.

When was the last time the TC reviewed its management structure? Describe any changes made. When does the TC intend to review its current management structure? In the future, will the TC change the current structure, for example due to new and emerging technologies, product withdrawal, change in regulations etc. Please describe.

Make sure the overview includes:

- any joint working groups with other committees,
- any special groups like advisory groups, editing groups, etc.

**IEC/TC 31 has three subcommittees**

- SC 31G Intrinsically-safe apparatus
- SC 31J Classification of Hazardous Areas and installation requirements
- SC 31M Non-electrical equipment and protective systems for explosive atmospheres

The committee TC 31 was established in July 1948 to address the need to develop techniques for ensuring electrical equipment would not provide an explosion risk when used in explosive atmospheres involving gases, vapours and mists. The scope has been progressively expanded to include classification, installation requirements and combustible dusts. Most recently the scope has been expanded to include non-electrical equipment as a joint ISO-IEC development.

Over the more than 70 years of its operation there have been a variety of sub-committees established and disbanded when changes have occurred to working procedures and priorities.

The following shows the scope for the main committee and each of the current subcommittees:

SC 31G - To prepare and maintain international standards relating to intrinsically safe electrical apparatus and systems for use where there is a hazard due to the possible presence of explosive atmospheres of gases, vapours, mists or combustible dusts.

SC 31J - To prepare and maintain international standards relating to the use of equipment including area classification, the selection and installation, inspection and maintenance, repair, overhaul and reclamation of equipment where there is a hazard due to the possible presence of explosive atmospheres of gases, vapours, mists or combustible dusts.

SC 31M - To prepare and maintain international standards relating to non-electrical equipment and protective systems for use where there is a hazard due to the possible presence of explosive atmospheres of gases, vapours, mists or combustible dusts.

Note: For the purposes of this sub-committee 'non-electrical equipment' is defined as – "equipment which can achieve its intended function mechanically".

For the purposes of this sub-committee, 'Protective system' is defined as –"devices other than components of the equipment which are intended to halt incipient explosions immediately and/or to limit the effective range of an explosion".

TC 31 and its subcommittees maintain relationships with a number of other committees:

|   |   |   |
|---|---|---|
| Component committees<br>(TC 31 and its subcommittees -<br>role of customer) | TC 2  | Rotating machinery  |
|   | TC 14   | Power transformers  |
|   | TC 20   | Electric cables   |
|   | TC 21   | Secondary Cells and batteries   |
|   | TC 22   | Fuses   |
|   | TC 27   | Industrial electroheating and<br>electromagnetic processing                 |
|   | TC 34   | Lamps and related equipment   |
|   | TC 35   | Primary cells and batteries   |
|   | TC 36   | Insulators  |
|   | TC 38   | Instrument transformers   |
|   | TC 39   | Electronic tubes  |
|   | TC 47   | Semiconductor devices   |
|   | TC 49   | Piezoelectric and dielectric devices<br>for frequency control and selection |
|   | TC 55   | Winding wires   |
|   | SC 61D  | Appliances for air-conditioning for<br>household and similar purposes       |
|   | TC 65   | Industrial-process measurement,<br>control and automation                   |
|   | TC 70   | Degrees of protection provided by<br>enclosures                             |
| TC 86   | Fibre optics  |   |
| TC 101  | Electrostatics (there is a joint WG<br>with this committee)     |   |
| TC 104  | Environmental conditions,<br>classification and methods of test |   |

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|  | TC 18            | Electrical installations of ships and of mobile and fixed offshore units |
| Other system committees (TC 31 and its subcommittees – role of a supplier) | ISO/TC 197 WG 13 | Hydrogen Detectors   |
|  | IECEX            | ExMC, ExTAG, ExPCC and ExSFCC  |
|  | IEC TC 105       | Fuel cell technologies   |
|  | PCIC             | The Petroleum and Chemical Industry Committee of IEEE                    |

### C. BUSINESS ENVIRONMENT

Provide the rationale for the market relevance of the future standards being produced in the TC.

If readily available, provide an indication of global or regional sales of products or services related to the TC/SC work and state the source of the data.

Specify if standards will be significantly effective for assessing regulatory compliance.

The standards of this Technical Committee are used in any industry where explosive atmospheres of gas, vapour, mists and dusts may be present. Typical industries include oil and gas, chemical, plastics, grain, pharmaceutical, shipping, mining and coal industries.

The standards produced cover the life-cycle of equipment through design, manufacture, installation, maintenance and repair. There are also standards dedicated to installations such as those on area classification and inspection, as well as a quality standard for manufacturers of Ex equipment. They also address the competence of personnel involved in explosive atmospheres.

Improved safety in environments where explosive atmospheres may occur is of primary concern, but there is also need for uniform operational practices in these areas to promote free trade of the products used and to assist economic development.

Risk management has taken on a greater emphasis in the business environment and is an underlying principle in many OHS regulatory requirements. This approach is being increasingly addressed by TC 31.

A paper published by IECEx put the annual value of the Ex market at tens of billions of US dollars in new equipment alone.

The TC 31 standards contribute to safer and more efficient operations in the industries concerned, and prevent loss of life and destruction to the environment. Major environmental problems can occur as a result of explosions rupturing vessels, for example, an explosion on a super tanker or an oil rig, and the resultant release of materials into the environment due to that explosion.

### D. MARKET DEMAND

Provide a list of likely customers of the standards (suppliers, specifiers, testing bodies, regulators, installers, other TC/SC's etc.). Do not specify company names, only categories of customers.

The market demand of the TC 31 standards continues to expand, with the increased adoption of the standards throughout the world.

They are used by a variety of people such as designers, manufacturers, installers, maintenance and repair personnel, equipment users, regulators, standards bodies, accreditation bodies, certifiers and testing bodies.

Other IEC and ISO committees need to utilize the standards developed by TC 31. Formal liaisons have been put in place, to avoid duplication and contradiction, and to ensure good cooperation is achieved.

The standards produced by TC 31 are now widely adopted throughout the world, frequently without modification. In many instances they form the basis for legislated requirements in this field. This particularly occurs in applications such as coal mines, and ship and offshore installations. Many countries also have mandatory requirements for equipment used in explosive atmospheres in above-ground industries.

Most countries in the world now use the TC 31 standards; either unchanged or with some defined national differences. The IECEx System Bulletin provides a useful reference for the defined differences. The only major body of standards with significant differences are those produced in the USA. However, the USA is actively involved in the work of TC 31 and is gradually moving closer to adoption of the IEC standards. The US Coastguard now accepts IECEx certificates which use the TC 31 standards.

The above has seen the use of the standards for local and regional certification and for international certification using the IECEx System which is growing rapidly.

The standards are also extensively used by multinational companies. These may be users such as those in the petrochemical industries, or manufacturers building or marketing their products throughout the world.

The above impacts on the work of the committee through:

- greater pressure on TC 31 to produce acceptable documents in shorter time frames, but at the same time recognising industry needs for a longer period of stability in the standards produced;
- larger and more active representation at meetings and more critical comments on documents as countries or groups of countries seek to have their practices and preferences included;
- the required precision of these standards as they are used for certification and testing;
- pressure to expand the scope of the standards produced by the committee.

In 2011 the United Nations published 'A Common Regulatory Framework for Equipment Used in Environments with an Explosive Atmosphere'. Referred to as Common Regulatory Objectives (CROs) these were developed through the United Nations Economic Commission for Europe. These CROs recognised the TC 31 standards and the IECEx System which uses those standards as best practice. The CROs state that 'Any Member State that has no regulatory framework in the explosive equipment sector can use the model as a blueprint for legislation.' As a result, an increased use of TC 31 standards in those member states can be expected. TC 31 will be examining methods to encourage the implementation of the CROs and subsequent adoption of TC 31 standards.

In the past few years the IECEx System has implemented the IECEx Scheme for Certification of Personnel Competencies (CoPC) and certification of Ex Service Facilities (Ex SF). Many of the competencies specified in these schemes use the TC 31 standards as a basis. These schemes are creating a lot of interest and are likely to lead to an increase in the use of TC 31 standards. TC 31 is currently in the process of developing a standard on competencies that could be used by IECEx.

#### E. TRENDS IN TECHNOLOGY AND IN THE MARKET

If any, indicate the current or expected trends in the technology or in the market covered by the products of your TC/SC.

The technology used in the protective design standards is fairly mature and stable. Hence significant development is not required in these areas. However, there is still a need to cater for trends in areas such as electronic devices, fibre optics, manufacturing techniques and materials development.

Liaison has been established with:

IEC TC 2 *Rotating machinery*

IEC TC 18 *Electrical installations of ships and of mobile and fixed offshore units*

IEC SC 22G *Adjustable speed electric drive systems incorporating semiconductor power converters*

IEC TC 27 *Industrial electroheating and electromagnetic processing*

IEC TC 34 *Lamps and related equipment*

IEC TC 61D *Appliances for air-conditioning for household and similar purposes*

IEC SC 65A *Industrial-process measurement control and automation - System aspects*

IEC SC 65B *Industrial-process measurement control and automation - Measurement and control devices*

IEC SC 65C *Industrial networks*

IEC TC 72 *Automatic electrical controls*

IEC TC 101 *Electrostatics*

IEC TC 105 *Fuel cell technology*

IEC TC 109 *Insulation co-ordination for low-voltage equipment*

IEC SC 121A *Low-voltage switchgear and controlgear* ISO/TC 21 *Equipment for fire protection and fire fighting*

ISO/TC 176/SC 2 *Quality systems*

ISO/TC 45 *Rubber and rubber products*

ISO/TC 45/SC 1 *Hoses (rubber and plastics)*

ISO/TC 67 *Materials equipment and offshore structures for petroleum petrochemical and natural gas industries*

ISO/TC 67/SC 8 *Materials equipment and offshore structures for petroleum petrochemical and natural gas industries - Arctic operations*

ISO/TC 70 *Internal combustion engines*

ISO/TC 197 *Hydrogen technologies*

The Petroleum and Chemical Industry Committee of IEEE

to help keep pace with trends in technology or to ensure the standards produced can meet the needs of the market.

There is a move towards use of Functional Safety methodologies for complex safety devices. This is starting to impact on TC 31 standards, for example, a standard on functional safety of fixed gas detection systems has been published.

The movement for exploration for oil and gas in the arctic and other very cold regions is expected to bring a further examination of how explosion protection techniques apply at very low ambient temperatures. TC 31 has established a working group to look at this topic and the potential impact on TC 31 standards. More recently this group has been investigating the impact of higher temperatures on protection methods.

The technology in industry is moving fast in the development of improved electrochemical cells and batteries. TC 31 has a working group which is investigating the impact of these developments on the TC 31 standards.

New technologies in luminaires including the rapid developments of LED light sources also need to be integrated in to the TC31 standards. TC31 has an established working group to coordinate changes in luminaires on an ongoing basis.

TC 31 established a working group that investigated the need for a standard on safety devices related to explosion risk. A technical Specification has now been published.

SC 31G has developed a standard using the concept of electronically controlling the spark duration; referred to as the "Power-i" concept. This concept can provide a significant increase of the available effective power taking into consideration the principles of type of protection Intrinsic Safety which a technique that is based on limited energy. 31G is also considering a document on the concept of the intrinsically safe ethernet.

There are a limited number of countries throughout the world with a comprehensive range of standards relevant for non-electrical equipment, although they have been available in Europe for some years. However, there is an increasing awareness of the risk that non-electrical equipment can present. The new standards on non-electrical equipment being produced by SC 31M are expected to fill a gap in the area of non-electrical equipment for explosive atmospheres.

With increasing requirements for high power as part of offshore facilities, there is a need to increase voltage levels associated with Ex equipment and installation. As the need for electrical power is increasing as well as the distances from offshore platforms to shore, it is expected that voltages will continue to increase. Based on this need, TC 31 has now formed a Working Group to identify modifications needed to existing standards.

The global agreements to reduce HCFC refrigerants will see a significant increase in flammable gas based refrigerants. The use of flammable refrigerants could drive the need for specific standards and a need to coordinate developments with other IEC and ISO committees in the future.

TC 31 has produced a document that permits certification of assemblies of equipment, for example skids. This had been requested by IECEx.

The market trend for demand for the standards of TC 31 is expected to continue to increase. It is anticipated that this trend will also occur for the new non-electrical standards that will be produced. As noted earlier, the impact of the UNECE CROs and the implementation the IECEx Scheme for Certification of Personnel Competencies are likely to lead to an increased demand for TC 31 standards.

**F. SYSTEMS APPROACH ASPECTS (REFERENCE - AC/33/2013)**

Does your TC/SC have a need for a systems approach?

If so:

- Will the Systems work be in a single TC or in multiple TCs?
- Will a Systems Evaluation Group (SEG), Systems Committee (SyC), or Systems Resource Group be required?
- Is your TC/SC work of relevance to ISO?
- Is or are there fora or consortia working in parallel to IEC? Is there a chance to integrate this work in your TC/SC?

This should not only be restricted to the customer/supplier relationships with other TC/SCs indicating types of co-operation (e.g. liaisons, joint working groups) but be of a more generic nature.

If there is no need for a systems approach as outlined in AC/33/2013, is it intended a TC would not be requested to report on general systems approach considerations such as customer/supplier relationships, liaisons, joint WGs, etc. as referenced in the system approach matrix illustrated in slide 14 of the presentation attached to AC/37/2006?

TC 31 and its sub-committees operate mainly in a systems role, producing standards that may be used in their entirety or that may be referenced by other committees. Often standards produced in one area of TC 31 may be used by other areas of TC 31, for example general requirement documents. We are working with ACOS to develop a Basic Safety Publication.

**G. CONFORMITY ASSESSMENT**

With reference to clause 6.7 of Part 2 of the ISO/IEC directives, are all your publications in line with the requirements related to conformity assessment aspects?

Will the TC/SC publications be used for IEC Conformity Assessment Systems (IECEE, IECEx, IECQ, IECRE)?

Will any of your standards include test specifications, reproducible test requirements, and test methods?

Are there likely to be special conformity assessment requirements generated by any standards projects? If yes, list which projects.

International certification using the IECEx System is growing rapidly.

In the past few years the IECEx System has implemented the IECEx Scheme for Certification of Personnel Competencies (CoPC) and certification of Ex Service Facilities (Ex SF). Many of the competencies specified in these schemes use the TC 31 standards as a basis. These schemes are creating a lot of interest and are likely to lead to an increase in the use of TC 31 standards.

Standards are under development to support certification and assessment of personal competence.

Following the IEC SMB decision to allow liaisons with conformity assessment bodies TC 31 has formalised the relationship with IECEx and a JWG has been set up to aid communications.

**H. 3-5 YEAR PROJECTED STRATEGIC OBJECTIVES, ACTIONS, TARGET DATES**

| STRATEGIC OBJECTIVES 3-5 YEARS   | ACTIONS TO SUPPORT THE STRATEGIC OBJECTIVES  | TARGET DATE(S) TO COMPLETE THE ACTIONS |
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| o continually improve the effectiveness and relevance of TC 31, and its subcommittees, | Ensure the TC Good Working Practice document provides the key to consistent and effective practices within TC 31 | Version 11 issued in January 2019.     |

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| project teams, maintenance teams and working groups  |  | Actions will be ongoing and coupled with periodic training of convenors using the Good Working Practice document.   |
|  | Ensure that there is a schedule of meetings published and maintained to assist TC 31 officers and convenors in planning for meetings | There is a schedule of meetings maintained on the IECEx website and linked from the IEC website, TC 31 dashboard.<br><br>The TC 31 Secretary maintains this schedule.   |
|  | Maintain close contact with IECEx to ensure TC 31 standards remain relevant for the IECEx System                                     | The TC 31 Chairman is a member of the IECEx ExMC and an ex-officio member of the IECEx ExTAG.<br><br>The members of the IECEx executive are now members of the TC 31 CAG (AG36).<br><br>JWG 50 has been established to regularly review and improve the processes that happen between the standards development/ maintenance organizations of IEC TC 31, SC 31G, SC 31J and SC 31M and the conformity assessment organization IECEx (EXTAG and Ex MC).<br><br>For many years, there is a standing agenda item at all TC 31 plenary meetings and full TC 31 CAG meetings for an IECEx Update. This is planned to be ongoing. |
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| Investigate the issues associated with the influence of environmental factors in adverse service conditions related to equipment, installation and maintenance in the IEC 60079 series and ISO/IEC 80079 series. | Implement the outcomes of the investigation into existing standards (where needed) and new standards                                 | IEC TS 60079-43 on adverse service conditions developed by WG 39 was issued 2017 and continues to be developed.   |
| Broader coverage and integration of requirements for underground coal mines (Group I) into the standards produced by TC31.   | Develop plan for integration of requirements into existing and new standards   | SC 31J WG 1 formed to investigate options in this area for electrical installations.<br><br>SC 31M issued ISO/IEC 80079-38 on equipment and   |

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|   |   | <p>components for explosive atmospheres in underground mines and are planning a second edition.</p> <p>SC 31M are developing a standard on reciprocating internal combustion engines which will include use in explosive atmospheres in underground mines.</p>  |
| Inclusion of gas detection standards for toxic gases and oxygen within the IEC 60079-29 series even though these topics are outside of the scope of TC31. | Form a joint Working Group with ISO/TC 146/SC 2 <i>Air quality - Workplace atmospheres</i>  | JWG 45 formed 2015  |
|   | Plan new series of gas detection in workplace atmosphere standards not in the 60079 series. | <p>ISO/IEC 62990-1 Workplace Atmospheres - Part 1 Gas detectors - Performance requirements of detectors for toxic gases – Published 2019</p> <p>ISO/IEC 62990-2 Workplace Atmospheres - Part 2: Gas detectors – Selection, installation, use and maintenance of detectors for toxic gases and oxygen. To be published 2020</p> <p>EC 62990-3 ED1 Workplace atmospheres – Part 3: Gas detectors - Electrical apparatus for the detection and measurement of oxygen - Performance requirements and test methods</p> |
|   | Work closely with MT 60079-29.  | MT 60079-29 and JWG 45 meetings held together whenever possible.  |
|   |   |   |
|   | SC 31M has taken over responsibility for ISO 16852 on flame arresters                       | MT 16852 is carrying out review.  |
|   | SC 31M has taken over responsibility for ISO 6184, Parts 1-4,                               | AHG 6 set up to determine how this material should be integrated into existing SC31M documents or to develop new standards.   |
| Note: The progress on the actions should be reported in the RSMB.   |   |   |