

INTERNATIONAL IECEx SYSTEM

EVOLUTION AND ROLE OF THE UNITED NATIONS, UNECE

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Abstract - From its humble beginnings in 1996 to address an industry need for closer cooperation among Test Houses worldwide, to overcome wasteful duplication of testing and assessment in the Ex Field at that time, IECEx has emerged to become an essential compliance assessment tool for all industries worldwide where flammable or combustible materials are used, stored or transported that present a risk of fire or explosion.

Situations where flammable substances in the form of gas, vapour, dust, fibres, or flyings are used, processed, stored or transported in quantities considered to present an explosion hazard have been labeled as “Hazardous Locations”, “Hazardous Areas”, “Explosive Atmospheres” and so on but one common symbol for such is “**Ex**”

Ex is not an industry of its own but rather a facet of just about every industry known to mankind. Whether it be Transportation including aerospace, Furniture manufacture, Automotive Manufacture + Repair, Production of Pharmaceuticals, Food processing, the Grain industry, the Coal Mining industry and of course Oil and Gas, Petrochemical and Chemical, all of these utilize flammable substances in quantities that may give rise to an explosive concentration being present, either continuously, during normal operation or due to abnormal situations.

IECEx is the International System solely dedicated to providing Internationally recognized Certification Schemes as verification of compliance with International Standards. IECEx now operates three Separate International Certification Schemes covering a large number of industrial sectors addressing Equipment, Service Providers and Competent Persons. The United Nations via its UNECE concluded its project, to consider a Common Regulatory Objective covering Ex Equipment, Services and Persons, of the past few years, to determine that use of International Standards such as those produced by IEC TC 31 and supported by Certification under the IECEx system demonstrates world’s best practice for ensuring safety in the Ex related fields.

This UNECE decision led to the publication of its “*Common Regulatory Objective*” Publication early in 2011

This joint IECEx-UNECE paper sets out to provide information on:

- a) *IECEx update* - status at the beginning of 2012 - with enhanced services under the Certified Equipment and Certified Services Schemes catering to engineering, contractors, inspectors along with an update on the status of Personnel competency certification;

- b) *Role of the UNECE* – and that of the United Nations - in standardization, and in promoting safety in industries worldwide where flammable or combustible materials are used, stored or transported that present a risk of fire or explosion and to facilitate trade in this important sector.

This paper will also see how IECEx is continuing along its path working towards its Vision to be

“The Global Centre of Excellence in the Ex field”

Index of Terms

IEC – International Electrotechnical Commission

IECEx – Conformity Assessment System of the IEC for Certification to Standards relating to equipment for use in explosive atmospheres

ISO/IEC – Joint publications of the International Organisation for Standardisation (ISO) and IEC

UNECE – United Nations Economic Commission for Europe

QMS – Quality Management System

NOTE: The views expressed herein are those of the authors and do not necessarily reflect the views of the United Nations

I. INTRODUCTION: THE AIMS OF OUR JOINT ACTIONS

Mines, offshore platforms, chemical, petro-chemical and energy plants are amongst the world’s most risky environments. Unsurprisingly, each of these environments are associated in our minds with several tragic accidents, which have resulted in casualties, environmental degradation and human suffering and economic losses.

This does not need to be so. Safety in these and other high risks sectors, characterized by a high likelihood of explosions, is an attainable goal, if it becomes a shared priority for all stakeholders involved, and if sufficient resources are allocated to it by industry and policymakers acting cohesively and decisively, at local, regional and global levels.

The aim of the IEC and of the United Nations involvement in this sector is to act as catalysts for a broad and global coalition of forces aiming at ensuring the safety of all industries worldwide where flammable or combustible materials are used, stored or transported that present a risk

of fire or explosion. As we will discuss in the next pages, this action will contribute to be one of the UN's most important goals: protecting workers, consumers, and more broadly, all citizens and human beings, and all forms of lives, from hazards. Additionally, promoting development that is in keeping with the needs of present and future generations.

In the next pages we describe the roles of these two different organizations, coming together to meet a common and shared priority: *to ensure the safety of "all industries worldwide where flammable or combustible materials are used, stored or transported that present a risk of fire or explosion" and to facilitate trade in this important sector.*

II. THE CURRENT SITUATION: KEY PLAYERS AND CHALLENGES

Explosion protection is an essential part of the overall risk management to be conducted to ensure safety in industrial processes using or producing hazardous materials like – for example – flammable liquids, gas, or vapors or combustible dusts. While Oil and Gas is one such obvious industry along with coal mining there are many others where flammable or combustible materials are used in quantities sufficient to cause a fire or explosion; for instance, in the chemical, gas stations, transport industry, facilities for handling and storage of grains, woodworking areas and sugar refineries and many others.

The equipment used in plants where these processes are carried out and the overall design of the plants where explosions may occur is increasingly based on a single engineering approach and on the fundamental principles of explosion protection, which have been applied for over 100 years.

These principles are codified in international standards such as the International Electrotechnical Commission (IEC) 60079 series, and conformity assessment best practice such as the Joint IEC/ISO - International Organization for Standardization (ISO) System No. 5¹ for product certification schemes as defined in the ISO/IEC Guide 67. These standards and best practice are also at the basis of product certification systems – such as the IECEx, the IEC System for Certification to Standards relating to Equipment for Use in Explosive Atmospheres (IECEx)².

The significance of the international standards upon which the industry relies can be seen by the increased participation in IEC Technical Committee, TC 31: Equipment for explosive atmospheres, which included 46 countries as of January 2012, either participating or observing.³

Many national and regional regulations already use the technical requirements contained in the international standards drawn up by IEC TC 31, which, in cooperation with ISO, also develops standards covering non-electrical equipment (mechanical). These International Standards are increasingly adopted by participating countries either in full, without any variation, or in part, with supplementary

requirements contained in national standards.

Countries use these standards in their regulations in different ways, including:

a) by making standards mandatory through a legislative act;

b) by making compliance with the standards a means of proving compliance with the essential health and safety requirements laid out in the legislation:

Under this approach, equipment that complies with the provisions of the standards is "deemed to comply" with the requirements specified in the regulations.

There can be no doubt that international standards are in this sector a shared and common basis for all stakeholders, including the industry, the regulators, as well as conformity assessment and accreditation bodies.

However, and notwithstanding the above, national laws and regulations are still diverging, and at times indeed conflicting in their requirements. In addition, many regulatory environments emphasize the mandatory approval by domestically recognized notified bodies of all imported equipment.⁴

This makes it difficult to open markets for explosion-protected equipment and services and is against the interest of both industry and consumers. Indeed, repeated testing does not necessarily lead to additional safety, but it certainly does lead to additional costs. It means - indeed paradoxically – that equipment subjected to re-testing becomes so costly that it is unaffordable precisely for those countries that need safe and reliable equipment the most.

Mandatory national certification also results in very high costs for international trade. Recently, one large manufacturer of equipment used in explosive environments reported that it required over a thousand certificates to be able to export the whole range of products to worldwide markets. This meant it incurred very high costs due to the large number of factory audits (approx. 8-10 Ex-audits per year and factory location) which were compounded by the costs of certification, amounting to more than 100.000 Euro per product, with 1 to 2 years of delay to reach global markets.⁵

It should also be noted that certification costs, unlike import tariffs, are sunk costs, i.e. costs that have already been incurred and cannot be recovered. In fact, costs born by a producer for certification and testing of equipment or products, so as to be able to place them on international markets, can in no way be recovered if the equipment fails to meet the standards or requirements. Indeed the producer will in this case lose the whole of the costs incurred in producing and – if required - shipping the goods or equipment to a laboratory, and conducting all the necessary preparatory processes.

For this and other reasons, while costs of repeated testing and certification are large for all producers, they have a disproportionate impact on producers from developing and transition economies as well as SMEs

⁴ For an extensive analysis of regulations applied in this sector in major markets, please see: UNECE "Compilation of regulatory approaches used in various countries" available at <http://www.unece.org/fileadmin/DAM/trade/wp6/SectoralInitiatives/EquipmentForExplosiveEnvironment/SIEEE-QuestionsRepliesE.pdf>

⁵ Dr. Gerold Klotz-Engmann, Presentation at the 20th session of the Working Party on Regulatory Cooperation and Standardization Policies, available at: <http://www.unece.org/fileadmin/DAM/trade/wp6/documents/2010/Presentations/Klotz-Engmann.pdf>

¹ ISO/IEC Guide 67, "Conformity assessment: Fundamentals of product certification", 2004.

² See below.

³ See:

http://www.iec.ch/dyn/www/f?p=103:7:0:::FSP_ORG_ID:1232

(Small to Medium Enterprises). These countries in fact lack adequate testing facilities and internationally accredited certifying bodies, meaning that the local industry faces even higher costs.

The UN promotes the participation of developing countries and countries in transition in international trade, as a means of promoting the diversification of their industrial basis, and their socioeconomic development.

III. ANSWERING REGULATORY AND INDUSTRY NEEDS: THE IECEx SYSTEM

The inaugural meeting of a new International IEC Committee to commence work on the implementation of an idea for an International Certification Scheme dedicated to the highly specialised field of Ex took place in London 7-9 May 1996. This meeting attended by experts from 11 Countries was the result of an identified industry need, worldwide, for a mechanism to address wasteful duplication of testing and certification of Equipment for use in areas where flammable materials, may exist in quantities that may give rise to an explosion hazard.

This London 1996 meeting followed earlier work of IEC Working Group WGEx formed following the IEC Technical Committee 31, decision to request IEC to develop the nucleus for an International Certification Scheme to facilitate International Trade of Ex Equipment while preserving the necessary level of safety.

From this the IECEx Scheme was born using what has become known as the "IECEx Model" for operating certification schemes at an international level. We will take a little close look at this Model further in this paper.

Since its humble beginnings in late 1990's, there have been numerous papers written and presentations given on IECEx, so while some of the background information included in this paper may be a repeat of previous information, it is still important to understand the context within which the IECEx System (as it is now known) and its individual Certification Schemes operate to appreciate why the UNECE has now become an important stakeholder in IECEx operations.

While the initial demand driver for IECEx was *"to provide an internationally standardized way of conducting Ex equipment testing and Certification, in order to facilitate global trade of Ex products"*, along the way to developing the IECEx Certified Equipment Scheme, industry and regulators worldwide soon saw the benefits of a "Standardised way of doing Ex certification" for other Ex related functions such as Ex Services, eg Certification of Repair Workshops and Certification of Persons deemed Competent in Ex activities.

When we refer to 'industry' we do include Equipment Manufacturers + Sellers along with end Users, eg Oil+Gas producers, Mining Companies etc, as well as Service providers such as consultants, Inspectors, Ex Repair and Overhaul Workshops and so on.

The desire by industry and Regulators to move IECEx into areas other than the Testing and Certification of Equipment centres around the acceptance that to ensure safety in "Ex Areas" the following broad areas must be properly addressed.

- a) Area classification
- b) Equipment Selection
- c) Equipment installation
- d) Maintenance, repair and overhaul of Equipment

e) Inspection

Each of the above items must be addressed separately. Decisions taken on each of these stages should be recorded and documented to provide a "rationale" to decisions taken as well as acting as a reference for any future changes in installation design or changes to the processes themselves.

While it is very easy to demonstrate the importance and criticality of the areas a) to e) the past has seen more attention given to b) *Equipment Selection* and less to the others. As Ex installations become larger, more complex and greater in number, industries have been paying greater attention to details surrounding items a), c), d) and e) than they did in the past. The consequences of "things" going wrong", as we have seen with events of the recent past, justify this renewed attention by industry and governments.

A single international focus for assessment and certification of Ex related services and personnel involved is further supported by new and updated International Standards as published by IEC Technical Committee TC 31, addressing Ex installation, inspection, repair and of course area classification along with many others. These are reflected in the IEC 60079 series of Standards along with the emerging ISO/IEC 80079 series of non-electrical Standards from the work of the relatively new Sub-Committee SC 31M. Harmonisation or adoption of these Standards at Regional or National levels has greatly improved in recent years and further assists this global approach to International Certification.

Further justification for industry's request for IECEx to cover Ex Services and Personnel has been the fact that while Regional systems such as the ATEX Directive and various National Approval/Regulatory Systems have focused on the compliance of Equipment with Safety requirements addressing "Point of Sale" requirements, eg what is required to allow products to be offered for sale, very little attention has been given to what is required after the product has been purchased.

Of course, there are various "Occupational Health and Safety" legislation, in many countries aimed at ensuring that "Employers provide a safe working environment" which while places responsibility for safety upon employers, this does leave employers and other organizations to their own devices to determine the mechanisms or processes needed to ensure that their "Duty of Care" has been sufficiently covered. Use of a System that is considered "Internationally Accepted Practice" by the international Ex community, such as the IECEx Schemes, provides a compelling argument for anyone needing to justify an approach taken to address their "Duty of Care" responsibilities.

While almost all National and Regional Ex approval and certification systems have been developed by Regulatory and Governments, IECEx stands out as the single global Ex Certification system developed by the very Industries it serves with the aim of "Standardising" the approach to Ex testing and certification at a level that provides for international confidence in both the processes used and the competence of the Bodies performing this task.

IV. CONFORMITY ASSESSMENT

In referring to a previous paper presented by one of the Authors *"International IECEx Certification Scheme – IECEx 2007 Update of New Initiatives and Compliance Tools for the Oil and Gas Industry"* we are reminded that a single International Standardised way of doing Ex certification

must first begin with a clear understanding of terminology, e.g. testing / certification / inspection / accreditation etc.

Again, we are reminded of the International Standards published jointly by ISO and IEC and in particular ISO/IEC 17000 [1] where we see the term “Conformity Assessment” as the overarching label for activities associated with determining whether defined requirements have been met. This term is defined in ISO/IEC 17000 [1] as

ISO/IEC 17000 Extract:-

2.1

conformity assessment

demonstration that **specified requirements** (3.1) relating to a **product** (3.3), process, system, person or body are fulfilled

NOTE 1 The subject field of conformity assessment includes activities defined elsewhere in this International Standard, such as **testing** (4.2), **inspection** (4.3) and **certification** (5.5), as well as the **accreditation** (5.6) of **conformity assessment bodies** (2.5).

NOTE 2 The expression “object of conformity assessment” or “object” is used in this International Standard to encompass any particular material, product, installation, process, system, person or body to which conformity assessment is applied. A service is covered by the definition of a product (see Note 1 to 3.3).

From the Note 1 we see that Conformity Assessment includes activities such as:

- Testing
- Inspection
- Certification
- accreditation

with “the object of conformity” encompassing:

- materials
- products
- installation
- process
- system
- person
- body

The International Standardisation process provide industries with a number of tools to assist in developing and maintaining effective conformity assessment systems. Some of the more well know standards and guides include:

- **ISO/IEC 17025** *General requirements for the competence of testing and calibration laboratories*
- **ISO/IEC Guide 65** *General requirements for bodies operating product certification systems*
- **ISO/IEC 17021** *Conformity assessment – Requirements for bodies providing audit and certification of management systems*
- **ISO/IEC 17024** *Conformity assessment –*

General requirements for bodies operating certification of persons

- **ISO/IEC Guide 67** *Conformity assessment — Fundamentals of product certification*

These international standards are prepared and maintained via the International Committee on Conformity Assessment known as CASCO which is a cooperation between ISO and IEC which sees these Standards and Guides carry dual ISO and IEC Logos. Further information on the work of CASCO can be found by visiting the ISO or IEC websites at www.iso.org or www.iec.ch respectively.

Before proceeding lets take a moment to properly understand what is meant by the more common Conformity Assessment activities of “testing” and “certification”.

Testing

In referring to ISO/IEC 17000 [1] we note clause 4.2

ISO/IEC 17000 Extract:-

4.2

testing

determination of one or more characteristics of an object of conformity assessment, according to a **procedure** (3.2)

NOTE “Testing” typically applies to materials, products or processes.

Traditionally in the Ex field, “testing” was long regarded as the determination of a physical quantity by measurement or application of a process, e.g. measurement of Flamepaths of an Ex d enclosure, testing to determine reference pressures and so on, whereas the inspection of a product for workmanship, compliance of labeling requirements were previously not regarded as a testing function, rather more of an inspection activity and best left to the certification body rather than test laboratory.

Introduction of ISO/IEC 17025 which replaced ISO/IEC Guide 25 did provide some correction by broadening the definition of “testing” and then in more recent times, introduction of ISO/IEC 17000 [1] to provide further clarity.

What is the significance of this delineation between physical testing and examination/inspection? Well consider for a moment the approach to be taken by a testing laboratory or Certification Body when evaluating Ex equipment protected by Intrinsic Safety for compliance with IEC 60079-11 [2], where the majority of evaluation is by circuit analysis, determination of component ratings and referring to reference curves. Is this activity testing or assessment?

Believe it or not this relatively straightforward issue has caused many problems among Laboratory accreditors and continues to do so.

There are still some laboratory accreditation bodies that consider assessment of IS (Intrinsic Safety) equipment and systems as an activity outside the scope of a laboratory’s accreditation. Further, despite international cooperation among laboratory accreditors there still exists differences of opinions and different approaches suggesting that results from assessments such as IS assessments cannot be included within the body of an accredited test report! Which raises the question **do all laboratory accreditation bodies check the competence of Testing Staff to conduct IS**

assessments? A question that IECEx continues to seek an answer. For assessments of Laboratories by IECEx, operating under the IECEx Scheme, IECEx assessment teams carry out such assessments on Laboratories it recognises.

This is by no means a criticism of the laboratory accreditation system but rather a clarification that while at the base structure level, accreditation bodies use the same International Standard, ISO/IEC 17025, the application of this generic Standard to specialised fields like Ex can differ greatly. It is due to this and other reasons that from the beginning, the International industry insisted and continues to, that IECEx operates its own system of evaluating and qualifying Laboratories and certification Bodies, seeking to become IECEx Accepted Test Labs (ExTLs) and Certification Bodies (ExCBs).

The IECEx assessment process for the evaluation and acceptance of Ex Testing Laboratories does take into account the existence of national accreditation providing there is evidence that IECEx technical requirements have been addressed but IECEx still conducts its own site assessment of the Testing Laboratory's facilities. To further facilitate this IECEx continues to invest in regular meetings and dialogue with ILAC (the International Laboratory Accreditation Cooperation) through the IEC/ILAC/IAF (International Accreditation Forum) Policy Panel, in a bid to prevent duplication of assessments between IECEx and ILAC member accreditors.

The major difference between assessments of Ex Test Laboratories by the IECEx Scheme and those conducted by national accreditors, is that IECEx takes a holistic approach by assessing a Testing Laboratory for the ability to conduct testing and assessment to the full Standard as opposed to accreditation that normally looks at accrediting to conduct a particular test. To assist the IECEx process, IECEx maintain a suite of IECEx Technical Guidance Documents (TGDs) [3] that serve as a "check list" for IECEx assessment Teams when assessing Ex Test Laboratories. Some accreditation bodies are now even using these TGDs as internal guidance for their accreditation assessments.

For the IECEx Scheme, the activity of testing is very clear, it includes all aspects of the physical testing and evaluation of samples that represent production, including where necessary, assessment, circuit analysis and visual checking/inspection. To ensure this approach is common across all IECEx Test Houses, IECEx maintain a library of Standard Test Report Forms, known as "ExTR Blank Forms". While mainly for use by IECEx Test Labs, manufacturers are finding value in using these as internal report forms as part of design reviews and preparation for compliance testing.

Certification

Having looked at testing now lets direct our attention to "Certification" with a look at the definition in ISO/IEC 17000, [1] Clause 5.5.

ISO/IEC 17000 Extract:

5.5

certification

third-party **attestation** (5.2) related to products, processes, systems or persons

NOTE 1 Certification of a management system is sometimes also called registration.

NOTE 2 Certification is applicable to all objects of conformity assessment except for **conformity assessment bodies** (2.5) themselves, to which **accreditation** (5.6) is applicable

For completeness let us also look at the definition of the word "attestation"

ISO/IEC 17000 Extract:

5.2

attestation

issue of a statement, based on a decision following **review** (5.1), that fulfillment of **specified requirements** (3.1) has been demonstrated

NOTE 1 The resulting statement, referred to in this International Standard as a "statement of conformity", conveys the assurance that the specified requirements have been fulfilled. Such an assurance does not, of itself, afford contractual or other legal guarantees.

NOTE 2 First-party and third-party attestation activities are distinguished by the terms 5.4 to 5.6. For second-party attestation, no special term is available.

These definitions provide us with much wider scope and application than that previously used or envisaged within the Ex field. For instance, while the scope for certification has long been regarded as confined to tangible products, e.g. the motor, luminaries, enclosures etc wider use of the activities that underpin certification are now included, starting with Ex Repair Services and moving to installation, inspection and area classification and then to more recent developments Personnel Certification.

V. CERTIFICATE OF CONFORMITY AND TEST REPORT – THE MESSAGES THEY CONVEY

A look at the terms "Testing" and "Certification" would not be complete without spending a moment to understand the message, meaning and standing of the outputs to the two processes, i.e. the Test Report and the Certificate of Conformity. Table 1 below provides a summarized collection of key aspects for both a Test Report and Certificate of Conformity as instruments used in the general application of Conformity Assessment as reflected in the ISO/IEC Conformity Assessment Standards and Guides.

Of key interest is the *Message* that is conveyed to the reader of a Test Report compared to the reader of a Certificate of Conformity.

TABLE 1
KEY DIFFERENCES BETWEEN A CERTIFICATE OF CONFORMITY AND TEST REPORT

	Certificate of Conformity	Test Report
Message	The message conveyed by a Certificate of Conformity is that the Certification Body attests that the manufacturer or service provider have adequate systems in place that provide the necessary confidence that products and services produced/provided will continue to comply with the Standards or Specifications listed on the Certificate of Conformity. Hence on-going assurance. A Certificate of Conformity can only be issued when Compliance is demonstrated.	The message conveyed by a test report to the reader, is that the sample(s) specified were subjected to test/assessment and the results of those tests/assessments recorded therein. There is no warranty or assurance concerning the future supply of samples and products. A Test report may be issued to show either “pass” or “failure” results of tests.
Limit on its life	Yes. This limit may be stated on the certificate itself or in the Certification Procedures. For IECEX Certificates of Conformity, the rules clearly require on-going surveillance of the manufacturer or service provider in order to demonstrate continued compliance. To deal with the life of the certificate, rather than specify a date of expiry, the IECEX uses the electronic “On-Line” system with each certificate being identified with its “Status” as <ul style="list-style-type: none"> • Current • Suspended • Cancelled <p>There is a fourth Status this being “Draft” which is the stage at which the IECEX Certification Body is preparing the certificate ready for formal issue. At this status, the certificate cannot be viewed by the public.</p>	As a test report is a record of results taken at a given time the test report itself does not generally have an expiry date or limit to the life of the test report. However, bodies and organizations wishing to use a test report generated many years ago may need to answer some important questions such as:- <ul style="list-style-type: none"> • Changes to standards or specifications between now and when the test were conducted? • Any changes to testing practices? • Confidence that the samples tested previously still represent samples produced today?
Coverage	All production products falling under the scope of the Certificate, thereby providing assurance that products produced in production continue to comply with the Standards and Specifications listed on the Certificate of Conformity.	Only the samples subjected to the test and assessments. No assurance of units produced after testing.
Ownership	At all times, it is the Certification body that remains the owner of the Certificate of Conformity, with the manufacturer or service provider regarded as a “Holder” of the certificate. In this sense the certificate can be suspended or cancelled by the Certification Body where the certificate holder fails to continue to meet requirements of the certification scheme.	Test reports remain the property of the legal entity that entered into contract with the Test Laboratory, generally the manufacturer.

VI. THE INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC) and OVERVIEW OF THE IECEX SYSTEM

IECEX is in fact a System operating within the International Electrotechnical Commission (IEC) being the international organisation responsible for Standardisation in the electrical and electronic fields.

Founded in 1906, IEC was formed as a result of the resolution of the Chamber of Government Delegates at the International Electrical Congress of St Louis, USA, in September 1904.

The object of the Commission is to promote international cooperation on all questions of standardisation and related matters in the fields of electrical and electronic engineering and thus promote international understanding. The IEC's Vision and Mission as published, is reproduced below

VISION – Worldwide use of IEC Standards and conformity assessment systems as the key to international trade

MISSION – IEC's mission is to be globally recognized as the leading platform for standards, conformity assessment systems and related services needed to facilitate international trade and enhance user value in the fields of electricity, electronics and associated technologies.

Comprising a global reach of 163 Countries (81 Members and 82 Affiliates) the IEC provides a truly global platform for developing either Standardised Technical requirements via Standards or Standardised Certification Activities such as IECEX. Figure 1 outlines the IEC Structure from which we see the Conformity Assessment Activities as one of the key pillars of the IEC.

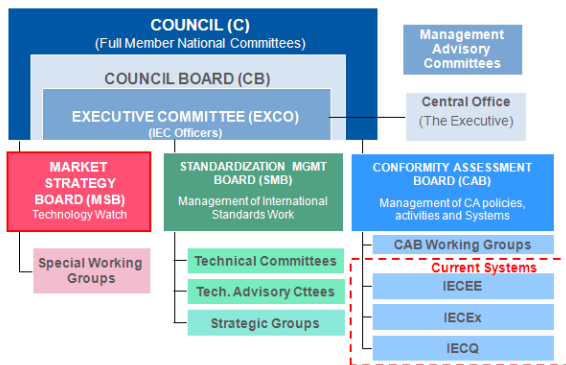


Fig. 1 Overview of the IEC Structure

Further information on IEC can be found by visiting the IEC Website, www.iec.ch

From Figure 1 we also see that IECEX is an operation that exists within the IEC and hence bound by the IEC Statutes and Rules which centre around Transparency and Equity with no single interest permitted to dominate the decision making process. IECEX day to day operations are coordinated by a dedicated Secretariat responsible for both Administrative and Technical issues. The Secretariat reports to the IECEX Management Committee with overall responsibility for the operation of IECEX according to the IEC Statutes and Rules. While the IEC remains the single

legal entity, IECEX does operate similar to that of a subsidiary company with its own structure, as approved by the IEC Board for Conformity Assessment, known as CAB (Conformity Assessment Board). Figure 2 shows the IECEX Structure comprising a mix of Managerial, Administrative and Technical Committees comprising of worldwide Ex experts including the IECEX Executive that act between annual meetings of the IECEX Management Committee. The IECEX governance structure is further detailed in the IECEX Basic Rules, IECEX 01 [4]

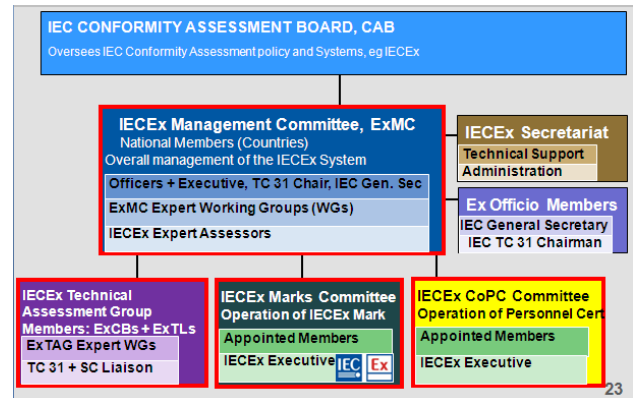


Fig. 2 IECEX System – Overview of Structure

While the initial aim of the IECEX System and its Schemes was to ease international trade of Explosion Protected Equipment (termed Ex equipment) by eliminating the need for duplication of testing and certification, its role has since become much broader by providing the International Community with a dedicated Compliance Tool to provide assurance that Ex equipment and Services meet International Ex Standards.

The IECEX System comprises the following three separate Global Certification Schemes:

- The IECEX Certified Equipment Scheme
- The IECEX Certified Service Facilities Scheme
- The IECEX Certificate of Personal Competence Scheme, (CoPC)

IECEX Certifications are issued by Certification Bodies that are approved by the IECEX Management Committee (via formal balloted voting) following a successful on-site assessment by an IECEX assessment team. These Certification Bodies are known as "ExCBs" with those operating in the IECEX Certified Equipment Scheme being required to either operate their own IECEX approved Test Lab (ExTL) or IECEX agreement for them to operate with a defined ExTL.

VII. The IECEX 'Model' for Ex Certification

All IECEX Certification Schemes have been developed using a Standard model comprising:

- One Single Set of Rules and Operational Procedures for ALL ExTLs and ExCBs to follow
- All ExTLs and ExCBs undergo the same qualification process to join IECEX
- Common Test Report and Certificate Format issued by ALL ExTLs and ExCBs

- Use of the Internet “On-Line” System for both the registration of issued Reports + formal issue of IECEX Certificates

The IECEX Certified Equipment Scheme (Rules of Procedure – IECEX 02 [5]):-

This IECEX Scheme is an International Certification Scheme covering product that meets the requirements of International Standards, e.g. IEC Standards prepared by IEC TC 31.

The IECEX Certified Equipment Scheme provides an International Certificate of Conformity to cover either:

- Completed Ex equipment and Systems
- Ex Components
- “One-Off” or limited items, via *IECEX Unit Verification*

Manufacturers seeking to obtain an IECEX certificate of conformity for items a) and b) require the successful testing of Samples by an ExTL along with the successful on-site factory audit of the production facilities, noting that each production site (where more than 1) must be assessed by an ExCB according to the IECEX rules. Once the IECEX Certificate is issued then on-going surveillance assessment of the manufacturers production sites commence at intervals, not more than

- 12 months where ISO 9001 certification is not maintained
- 18 months where ISO 9001 certification is maintained

Figure 3 provides an overview of the certification stages for IECEX Certificates of Conformity covering Completed Ex Equipment and Systems or Ex Components.

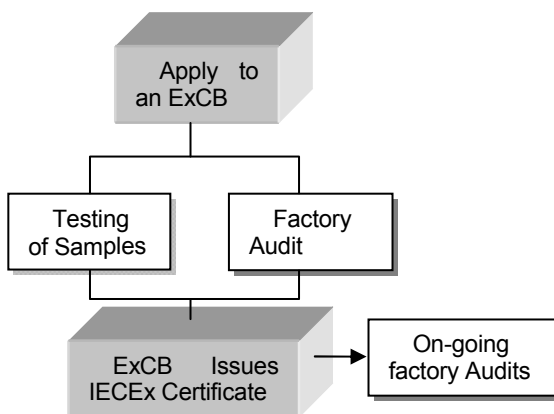


Fig 3 Outline of Certification Stages for a) and b) above

When it comes to IECEX Unit Verification, a more recently introduced feature, the purpose here is to cover specific Ex products that are identified by Unique serial number or other means to identify the specific product.

This feature provides for situations where “one off” or customized products are required which may not result in normal mass production runs.

For IECEX Unit Verification each and every item to be covered must both be assessed by the ExCB /ExTL as well as being listed on the IECEX Unit Verification Certification.

As a result, assessment of the manufacturer’s quality system is not required as each and every item to be covered is listed on the certificate and any further items to be covered must be covered by a new certificate. Figure 4 provides an outline of the Certification stages for Unit Verification Certification.

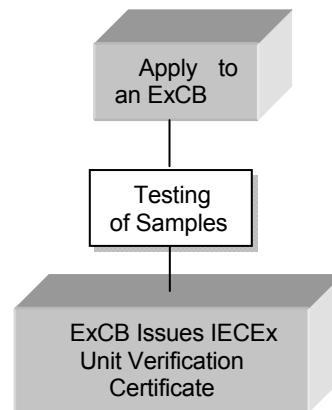


Fig. 4 Outline of Certification Stages for c) above

Certificates issued under all 3 Options above are issued as “Electronic Certificates” and are live on the IECEX Website. This enables full public access for viewing and printing. Visit the IECEX “On-Line Certificate” System.

The IECEX Certified Service Facilities Scheme (Rules of Procedure – IECEX 03 [6]):-

This IECEX Scheme is an International Certification Scheme that covers the assessment and the on-site audit of organizations that provide a Repair and Overhaul service to the Ex industry.

Due to the very high capital investment made by industry in Ex equipment, it is usually much more economical to repair rather than to replace it with new. This also has obvious environmental benefits.

The challenge for industry is to ensure that all the very unique Ex safety features, included in the design and manufacturing of Ex equipment, are not compromised during the repair process.

Ex Repair and Overhaul Facilities and Workshops, certified under the IECEX Certified Service Facilities Scheme, provide industry with the assurance that repairs and overhaul to Ex equipment will be undertaken according to the strict requirements of the IECEX Scheme for compliance International Standard IEC 60079-19 [7]

Like the IECEX Certified Equipment Scheme only “Electronic Certificates” are issued via the “On-Line” system thereby giving industry full access to both the viewing and printing of certificates thereby providing industry with an instant check of any claims for IECEX certification by distributors or manufacturers.

Ex Service Facilities that achieve IECEX Certification are required to demonstrate compliance with stringent IECEX requirements including:

1. Operational procedures and repair techniques meeting IECEx Technical requirements encompassing IEC 60079-19 [7]
2. Possess and maintain in operating condition necessary facilities and equipment including test equipment and traceability of measurements
3. IECEx quality system requirements, based on ISO 9001 [8] [ISO 9001 certification is **NOT** a pre-requisite to seeking IECEx Certification]
4. Competent personnel with current competencies related to Ex equipment Standards, repair techniques and certification requirements
5. Others necessary for proper servicing of Ex equipment

IECEX Process Summary - To summarise, Figure 5 shows the following items associated with assessment and certification of Ex Repair Workshops:

- **Assessment Report**
 - ⇒ Demonstrates that Repairer complies with IEC 60079-19 [7]
- **Facilities Audit Report (FAR)**
 - ⇒ Verify QMS meets IECEx Requirements (OD 014) [9]
- **IECEX Certificate of Conformity (CoC)**
 - ⇒ Demonstrates Capability of the Repairer to consistently comply

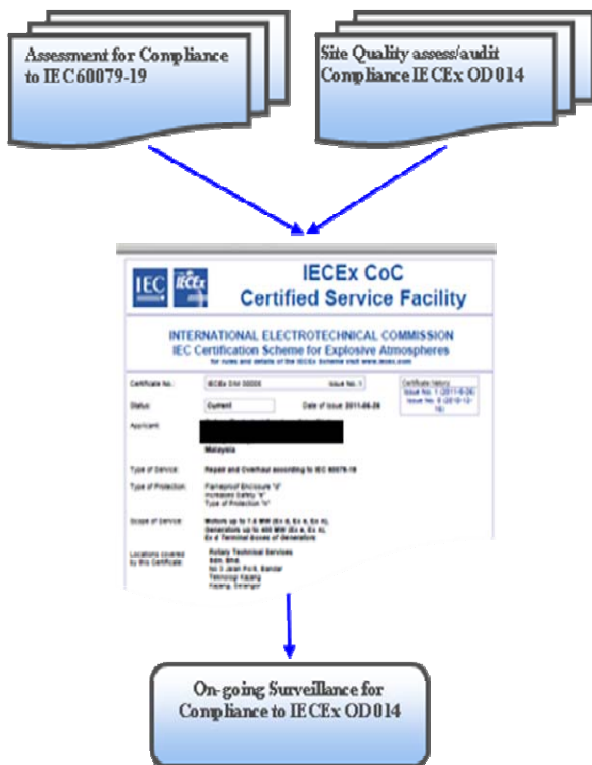


Fig. 5 Outline of the IECEx Certified Service Facility (Repair Workshop) Certification process

Choice of the term “Service Facility” assists in clarifying that a repair organization can be covered for repair activities carried out within their own Repair Workshop or

on-site as is most often the case.

Work in the development of the IECEx Certified Service Facility Scheme has been closely paralleled with the excellent work of IEC SC31J in their revision of IEC 60079-19 [7] in particular the Maintenance Team.

Additional work is underway within IECEx to address the assessment and certification of Service providers providing the following Ex services, in addition to Repair:

- a) Area Classification
- b) Installation Design and Selection
- c) Installation and/or Maintenance Service
- d) Inspection Service

Development of this Scheme highlighted the need to consider a consistent process for the determination of competencies of personnel involved in the repair and assessment of repaired equipment. A question also raised during the work associated with the revision of the first edition of IECEx 01 [4]. This consideration gave thought to the broader question of “how to determine and identify the competence of Ex workers, whether they be installers, inspectors, designers, repairers etc”. Hence the idea for the new IECEx CoPC Scheme was born.

The IECEx Certified Personal Competence (CoPC) Scheme (Rules of Procedure – IECEx 05 [10]):-

The IECEx Scheme for certification of personnel competencies in explosive atmospheres, launched in 2010, is the result of demand by the international community for a single International Scheme of assessing and issuing Certificates of Personal Competence to individuals that demonstrate Competence against 1 or more of the 10 current IECEx Units of Competence.

To be clear we must understand what is meant by “Competence”. Under the IECEx Scheme, competence is defined as:

Competence = the demonstrated ability to apply knowledge

Over the years we have seen various individuals and organizations provide specific Training Courses which include an assessment at the end of the Course and issuing of a document such as “Statement of Attainment” “Statement of Attendance” and so on.

Such Training Courses have been and continue to be of great value to industry after all dedicated Tertiary Courses, Degree, Diploma etc covering Ex are rather rare. The great benefit of individual training courses, offered by the army of trainers is that courses can be tailored to suit specific needs of both the person seeking training and their employers.

As vital to the industry as Training is, we must understand that attendance at say a 5 day training course does not automatically mean the person is now “Competent” rather Competence is all about demonstrating the ability to apply knowledge.

This distinction between “Knowledge” and “Competence” is most important and as such led to a very significant decision being taken by the IECEx Management Committee when developing the new IECEx Certificate of Personal Competence Scheme (CoPC) to not provide training, nor to specify any set training course.

Rather, the IECEx CoPC Scheme only deals with the assessment and evaluation of a person in order to seek the objective evidence to demonstrate the person is

competent according to the specified IECEx Unit of Competence. The IECEx CoPC Scheme does NOT specify any type training that must be undertaken.

The IECEx CoPC Scheme is developed using the International Standard ISO/IEC 17024 as its platform with IECEx 05 setting out the Rules of how the CoPC Scheme operates, including the requirements for bodies seeking to be accepted as IECEx CoPC Certification Bodies, there are a number of IECEx Operational Documents that provide clear details concerning the process, stages and specification for conducting IECEx CoPC assessments, including

OD 501 - Operational Document - Assessment procedures for IECEx acceptance of Certification Bodies (ExCBs) for the purpose of issuing and maintaining IECEx Certificates of Personnel Competencies (CoPCs)

OD 502 - Operational Document - Application for an IECEx Certificate of Personnel Competencies (CoPC), documentation and information requirements

OD 503 - Operational Document - ExCB Procedures for issuing and maintaining IECEx Certificates of Personnel Competencies

OD 504 - Operational Document - Specification for Units of Competency Assessment Outcomes

From the above OD 504 is the IECEx Document that details the Assessment outcomes of the currently defined 10 Units of Competence. Figure 6 lists the current 10 Units of Competence used with the IECEx CoPC Scheme

Unit Ex 001 – Basic principles of protection in explosive atmospheres
Unit Ex 002 – Perform classification of hazardous areas
Unit Ex 003 – Install explosion-protected equipment and wiring systems
Unit Ex 004 – Maintain equipment in explosive atmospheres
Unit Ex 005 – Overhaul and repair of explosion-protected equipment
Unit Ex 006 – Test electrical installations
Unit Ex 007 – Perform visual & close inspection
Unit Ex 008 – Perform detailed inspection
Unit Ex 009 – Design electrical installations
Unit Ex 010 – Perform audit inspection of installations

Fig. 6 List of current IECEx Units of Competence

Key features of the IECEx CoPC Scheme are:

- IECEx does not provide Training nor specify any training course

- Assessment of persons includes assessment of experience, knowledge and demonstrated ability via questions and practical tasks
- A person may apply for 1 or more of the IECEx Units
- IECEx Certificates issued by IECEx approved Certifiers are issued via the “On-Line” Certificate System
- Certificates include photo for identification
- A wallet sized photo ID card is issued with every certificate
- Re-certification is required every 3 years

Figure 7 Shows an example of an actual issued IECEx CoPC Certificate, noting that all issued certificates appear on the IECEx website meaning that if the certificate does not show on the IECEx website, it does not exist.

It should also be noted that within each Unit of Competence an Applicant may select certain limitations so that the Certification fits to what he or she only needs, for example being Certified as Competence for installation work but limiting this to certain protection techniques.



Fig. 7 Copy of an issued IECEx CoPC Certificate

VIII. THE IECEx “ON-LINE” CERTIFICATE OF CONFORMITY SYSTEM

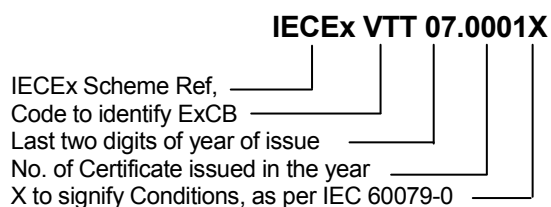
Under the IECEx Scheme paper original certificates do not exist. Rather IECEx ExCBs, through individual password protocols enter the on-line system based at the IEC Central Office in Geneva and create a new certificate, in draft form and then once all certification stages have been completed, according to IECEx Operational Document OD 009 and the IECEx Scheme Rules of Procedures, IECEx 02, the ExCB re-enters the password protected area and changes the status of the certificate from “DRAFT” to “CURRENT” at the instant that this change has been saved, by the ExCB, the certificate then can be accessed by the public area of the IECEx Internet site where industry can view, download and print copies of the certificate.

Since the original developments of the On-Line Certificate system a series of upgrades and new features were developed to further enhance the practical application

of the IECEx On-Line system with these including

- Greater transparency of changes to certificates by inclusion of separate Issues of Certificates as individual items including a history block to track certificate changes
- Improved search functions including introduction an active search facility.
- Enhanced registration systems for the registering of IECEx Test reports and Quality Assessment Reports.
- Enhanced statistical reporting

An important point to note is the IECEx Numbering system which while complying with the Marking requirements of IEC 60079-0 [11] General requirements, includes a format that readily identifies that the certification reference Number is related to an IECEx certificate. The following example of an issued IECEx Equipment certificate reference number best demonstrates this



An IECEx Mark of Conformity

A further major enhancement has been provision of an IECEx Conformity Mark, that may be included on the Product itself or packaging provided the Product is covered by an IECEx Certificate of Conformity and the manufacturer holds a current and valid IECEx Mark License Certificate.

The purpose of the Mark is to provide clear visual notice that a product is covered by an IECEx Certificate of Conformity. Figure 8 provides a graphical example of the IECEx Conformity Mark



Fig. 8 Graphical example of the IECEx Conformity Mark

IX. FEATURES OF A SHARED REGULATORY FRAMEWORK IN THE Ex SECTOR

In spite of the many achievements of the IECEx system and its global reach, the industry and the regulators still lack a comprehensive and shared regulatory framework that satisfactorily addresses all the concerns outlined earlier in this paper.

The approach now jointly proposed by UNECE and IECEx in partnership with the industry and the policymakers, embraces the work of the standardization community and of the IECEx system of certification to standards.

The adoption of a shared regulatory framework at a

global level in this sector aims at:

- Increased safety for workers, communities living in the vicinity of plants, and the natural environment;
- Lower costs for international trade;
- More opportunities for SMEs and producers from countries with economies in transition and developing countries.

To attain these objectives, the shared regulatory framework needs to include the following elements:

- A detailed description of essential requirements for producers of equipment used in environments with an explosive atmosphere, as well as for owners and operators of plants in which these are used;
- A precise reference to the international standards where these requirements are laid out;
- How compliance with these standards should be assessed if relevant prior to the placement of the equipment on the market;
- How a continued surveillance of the equipment, as well as of the plants and facilities where they are used should be ensured.

These elements are the cornerstone of regulatory cooperation within the framework of the United Nations, as based on the approach outlined in UNECE Recommendation “L” (UNECE, 2001)⁶. See also figure 9. It enshrines the international model – i.e. a set of principles and procedures that countries can implement to approximate technical regulations among themselves in one specific sector.

At the core of the model is the concept of common regulatory objectives (CROs). CROs should be jointly drafted by countries wishing to approximate their regulations in once specific sector, and should address legitimate Government concerns for the sector concerned with regard to public health, safety, environmental protection and other relevant national interests.

Recommendation L prescribes that CROs should be preferably defined with reference to international standards, and should specify how to assess compliance with these standards. If relevant, CROs should include a list of conformity assessment bodies that are recognized as competent, and detail ways through they should be accredited. Additionally, and to recognize that increasingly conformity assessment is only one way of ensuring compliance, CROs should include market surveillance provisions.

⁶ Recommendation L was adopted by the Working Party on Regulatory Cooperation and Standardization Policies (then called the Working Party on Technical Harmonization and Standardization Policies) at its eleventh session in October 2001.

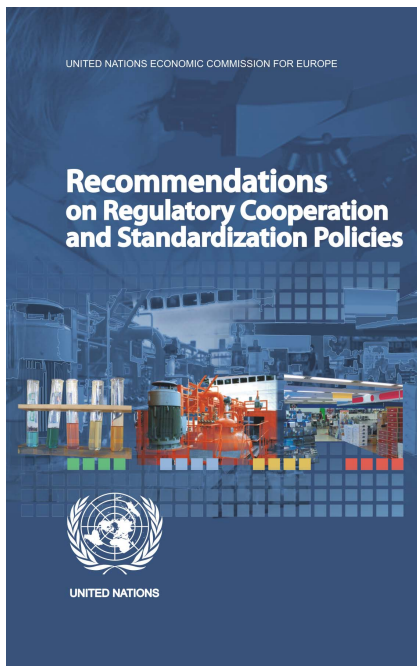
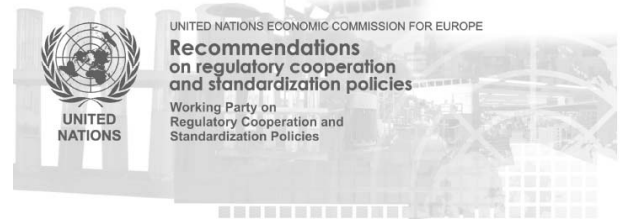


Fig. 9 Cover from the United Nations UNECE publication Regulatory Cooperation



International Model for Technical Harmonization Based on Good Regulatory Practice for the Preparation, Adoption and Application of Technical Regulations via the Use of International Standards^{1, 2}

Recommendation “L” promotes a “reference-to-standards” approach, which is also one of the cornerstones of the European regulatory model, described in the box below.

The flexibility of the “reference to standards” approach as embodied in the “New Approach” and in “Recommendation L”:

- indicates what has to be achieved, but not the details of the corresponding technical solutions;
- presents different options for conformity assessment;
- does not necessitate regular adaptation to technical progress;
- allows regulators to take advantage of available expertise and best practice internationally;
- facilitates industry’s participation in international trade networks.

STEPS REQUIRED TO ESTABLISH A COMMON REGULATORY FRAMEWORK

Recommendation L sets out a clear roadmap for countries wishing to align their regulatory frameworks in a specific sector. This roadmap is at the basis of the approach that the UNECE Working Party on “Regulatory Cooperation and Standardization Policies” decided to follow when it established a “Sectoral Initiative on Equipment for Explosive Environments” (SIEEE) in September 2008.

Its basic elements are as follows:

1. Identifying a need for harmonization of technical regulations. The need might be identified through the following mechanisms:

- Studies by specialists documenting high costs of trading internationally in a sector
- Initiatives by one or more countries to harmonize their technical regulations at an international level
- Complaints from foreign or national business operators

2. Call for participation. At least three countries wishing to harmonize their technical regulations with other countries should issue a “Call for Participation” to all United Nations Member States through the UNECE secretariat. The Call should contain the information needed to formulate CROs (cf. Annex B of the Recommendation). Countries wishing to participate in the work under such a

The EU’s “New Approach”

The EU’s “New Approach” was introduced in a European Council resolution of May 1985. It is based on the principle that “the objectives being pursued by the Member States to protect the safety and health of their people as well as the consumer are equally valid in principle, even if different techniques are used to achieve them”.

The main concept behind this European regulatory model and of the corresponding regulatory processes is the following:

- European Commission directives define the “essential requirements” for goods, which primarily cover health and safety issues.
- Once the essential requirements have been defined, the European standards bodies are tasked with developing the corresponding technical specifications whose application would enable the essential requirements of the directives to be met. Compliance with these standards will provide a presumption of conformity with the essential requirements. The specifications are referred to as “harmonized standards”. Such standards must offer a guarantee of quality with regard to the essential requirements of the directives.
- A producer thus has several options for showing proof of conformity with the essential requirements, as follows:
 - Products manufactured in conformity with harmonized standards are presumed to be in conformity with the essential requirements.
 - Standards are not mandatory, and a producer may choose other ways to show proof of compliance.

Call should respond to the secretariat within three months of its transmission by the UNECE secretariat. Countries that have expressed an interest can begin the technical harmonization process three months after transmission.

3. Setting up an open-ended task force. Based on the responses to the Call, an open-ended task force composed of interested countries is set up jointly to develop CROs on safety, health, environmental protection and other legitimate Government concerns about the products or group of products in question.

4. Agreeing on the working procedures. The task force should inform the UNECE secretariat about their work, which will be made publicly available through the appropriate means (such as the Internet).

5. Drafting the CROs. CROs are a mutually agreed document registered by UNECE and made publicly available. By drafting CROs, the interested countries define:

- A statement of the scope of the proposed initiative
- Product requirements
- Reference-to-standards clauses
- Compliance clauses
- Market surveillance and protection clauses

6. Registering CROs in the UNECE Registry. The UNECE secretariat records existing CROs on its website.

7. Incorporating CROs into national legislation

A country that has agreed on CROs should announce to the UNECE Secretariat its intention to implement them nationally. The country then submits them to the process stipulated in its own legislation for adopting the technical requirements specified in the CROs. These technical requirements are generally transposed into national statutes adopted according to the legislative and/or administrative procedures in force in each country. They can therefore be of a varying legal nature and require varying timeframes for adoption. The UNECE secretariat records national implementation of CROs – if any – on its website.

8. Applying CROs to trade procedures. Countries that have agreed on CROs must ensure that products which comply with them can be placed on their market for free circulation without being subject to any additional product or conformity assessment requirements (such as testing or certification).

Products covered by the scope of a CRO would carry some means (e.g. a certificate of conformity) demonstrating either that the supplier claims conformity with the CRO or that conformity has been assessed. In either case, documented evidence should be provided with the product. The type of such evidence should be specified in the CRO. All claims of compliance must include the reference to the applicable CRO, for example, the registration number allocated by UNECE for the applicable CRO.

Countries having agreed on CROs are responsible for market surveillance on their territory and have the right to withdraw products from their national markets if the products are not in compliance with the CRO.

WP6 EX SECTOR INITIATIVE – WORK LEADING TO PUBLICATION OF CRO

The UNECE Working Party on “Regulatory Cooperation and Standardization Policies” is currently engaged in a number of sectoral projects based on the International Model for Technical Harmonization.

These projects include the

- Telecom initiative,
- “Earth Moving Machinery initiative”,
- “Initiative on Equipment for Explosive Environments” and
- Initiative on Pipeline Safety.

They represent the highest possible degree of regulatory cooperation and aim at establishing fully harmonized technical regulations within the respective sectors.

These projects exist alongside other initiatives by the Working Party aimed at promoting regulatory cooperation at the horizontal level, in key policy areas including among others: applying risk management to regulatory frameworks, promoting convergence in the design and implementation of market surveillance policies, maximizing the contribution of standards to sustainable development.⁷

The Sectoral Initiative on Equipment for Explosive Environments (SIEEE) informally started its work in 2007 by gathering details of the regulatory systems applied in different countries through a questionnaire. The answers received documented the fact that - as said in paragraph 2 above – notwithstanding the wide application of standards by all stakeholders – costs of trade in the sector remained wide and regulatory regimes were still widely divergent.⁸

The 2008 Meeting of the Working Party on Regulatory Cooperation and Standardization Policies adopted the proposed Terms of Reference and formally set up the SIEEE. The SIEEE developed a first draft of the CROs that were discussed at two successive meetings held back to back to the meetings of the IECEX to ensure a maximum involvement of relevant stakeholders.

The current version of the CROs, see figure 10, developed by the Sectoral Initiative was approved by the Working Party at its 2010 Annual Session. They were later published as a bound volume.⁹

⁷ Participation in the activities and meetings of the Working Party is open to any individual or organization from any of the United Nations Member States. For more information, please see: <http://www.unece.org/trade/wp6/welcome.html>

⁸ See the UNECE “Compilation of regulatory approaches used in various countries” quoted above.

⁹ Also available online at : http://www.unece.org/fileadmin/DAM/trade/wp6/SectoralInitiatives/EquipmentForExplosiveEnvironment/SIEEE_CRO.pdf

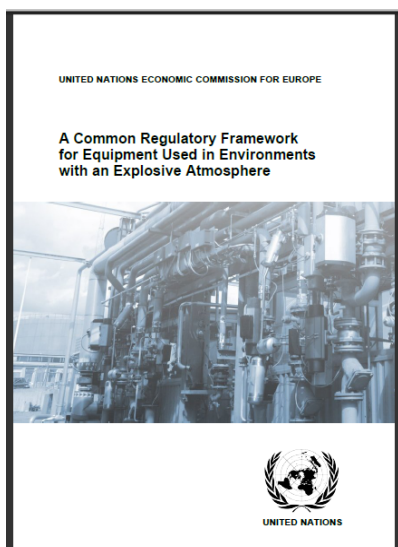


Fig. 10 Cover page of the new United Nations UNECE Publication "Common Regulatory Objective" associated with Ex

The current version of the CROs is of course a living document. It will be revised as required, and as needed to respond to the active participation and comments received by countries participating in the UNECE initiative.

In 2011, again back to back to the meetings of the IECEx system, the SIEEE organized a meeting of regulators from each of the major markets of equipment for environments with an explosive atmosphere. At the meeting, the regulators agreed that the sector needed a globally harmonized regulatory framework and that this goal was attainable in the medium to long term.¹⁰

THE UNECE CROS

The UNECE CROs centre around the following:

- a) Use of Ex Equipment Suitable for use in Ex areas to ensure worker and plant safety are maintained
- b) Ex Equipment is serviced and repaired in a manner that ensures the Ex protection is maintained
- c) Personnel working in Ex installations or have an impact on such, eg designers, inspectors etc posses the necessary skill and competence to discharge their duties to keep Ex plants safe

In this sense, the UNECE CROs nominate compliance with IEC TC 31 Standards supported by Certification issued according to the IECEx Schemes as a recommended model of world's best practice.

PROMOTIONAL ACTIVITIES PLANNED TO PROMOTE THE CROS

With respect to the "basic steps" described in paragraph 4 above, the SIEEE has in fact completed the process described up to point 6. A common regulatory framework has been designed. It remains now to ensure that it is implemented in national legislation, and that it is reflected in internationally applied trade procedures.

¹⁰ See press release : <http://www.unece.org/index.php?id=26114>

To attain these goals, the SIEEE will in the next few months continue to actively partner with the IECEx at all levels. In particular:

- Continue to revise the CROs to take into account comments from members as they are received. In particular, an analysis of the CROs, which compares the UNECE CROs, the IECEx system, the ATEX directive and Russian regulatory requirements will provide a useful start to this work¹¹
- Enlarge the scope and complete the CROs, in particular by strengthening the part relating to "market surveillance".
- Organize awareness-raising and training activities to promote the adoption of the CROs, especially in countries that do not currently have a fully fledged regulatory system in this area.

In order to continue these activities, a broader support from industry and institutional partners is being sought.

X. ON-GOING COOPERATION WITH IECEx

The current focus of cooperation with IECEx and the International community is the promotion of the CROs initially among Developing Countries but equally to developed countries.

The first of this promotion is the planned 2012 International Conference in Dubai which is being jointly organized and by:

- UNECE
- IECEx
- Standards Authority of the United Arab Emirates

The dates of this event being 20+21 March 2012. Similar events in other regions are being planned.

In addition to promotion, the on-going cooperative effort includes monitoring the adoption of these CROs along with feedback and revision of the CROs to ensure they maintain relevance to both government and industry.

Through the proven success of the UNECE / IECEx cooperation, UNECE will continue to participate in the annual IECEx meetings as an important Stakeholder.

XI. CONCLUDING COMMENTS

In noting the rapid rise in development and take up of IECEx Certifications, whether they be Certificates covering Equipment, Certificates covering Repair Workshops or Certificates covering Personal Competence, it is interesting to note that while the highly specialized field of Ex is seen as one that is heavily regulated via a mix of State / National / Regional Regulations, there is NO single regulation anywhere in the world that states that an IECEx Certificate is mandatory.

So the question "If IECEx certification is not mandated by Legislation why do we see significant annual increases in the number of certificates being issued"?

¹¹ This paper has been submitted by the delegation of the Russian Federation: <http://www.unece.org/fileadmin/DAM/trade/wp6/SectoralInitiatives/EquipmentForExplosiveEnvironment/Ex-CROs-Analysis.pdf>

When it comes to Equipment Certificates one explanation could be that while the various regulatory regimes require some form of product evaluation/testing why not have the testing undertaken under the Internationally recognized IECEx System with the testing satisfying both the local regulatory requirements along with the IECEx, hence a “two for one” situation. Test it once to satisfy both local requirements and IECEx.

When it comes to Certification of Ex Repair Workshops and then Certification of Ex persons, IECEx Certificates provide an excellent vehicle for industry to satisfy their obligations of “Duty of Care” in the absence of any regulated certification or approval system.

XII. ACKNOWLEDGEMENTS

While both the IEC and the United Nations UNECE are both well respected and organizations that enjoy a great deal of success, their work and achievements are the result of the many contributions from the World wide network of experts that come together to contribute to the development and operation of the System. It is this network of world wide experts that has taken the IECEx from “Idea” to “Concept” to “reality” and then to “Success”,

Many of the industry organizations involved in the development, management and operation of the IECEx Scheme, are now listed as IECEx certificate holders utilizing the very system they have developed.

Concerning the opportunity to present this paper and assistance with its preparation, both Authors wish to offer a special note of thanks to:

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- Mr. Patrick Leroux – TOTAL, Chairman PCIC Europe
- Mr. Kerry McManama – UL, IECEx Chairman
- Dr Uwe Klausmeyer – PTB (IECEx Immediate Past Chairman)

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XIII. REFERENCES

Documents referenced in this paper include:

- [1] ISO/IEC 17000: Conformity assessment — Vocabulary and general principles
- [2] IEC 60079-11: Explosive atmospheres – Part 11: Equipment protection by intrinsic safety “i”
- [3] IECEx Technical Guidance Documents
- [4] IECEx 01: IEC Scheme for Certification to Standards relating to Equipment for use in Explosive Atmospheres (IECEx Scheme) – Basic Rules

- [5] IECEx 02: IEC Scheme for Certification to Standards relating to Equipment for use in Explosive Atmospheres
IECEx 02- Equipment Certification Scheme covering equipment for use in explosive atmospheres – Rules of Procedure
- [6] IECEx 03: IEC Scheme for Certification to Standards relating to Equipment for use in Explosive Atmospheres (IECEx Scheme) – IECEx Certified Service Facilities Scheme covering repair and overhaul of Ex equipment – Rules of Procedure
- [7] IEC 60079-19: Explosive atmospheres – Part 19: Equipment repair, overhaul and reclamation
- [8] ISO 9001: Quality management systems— Requirements
- [9] OD 014: Quality management system requirements for IECEx Service Facilities involved in repair, overhaul and modification of Ex equipment
- [10] IECEx 05: IECEx Scheme for Certification of Personnel Competencies for Explosive Atmospheres – Rules of Procedure
- [11] IEC 60079 – 0: Electrical apparatus for explosive gas atmospheres – Part 0: General requirements