



IECEx scheme for certification of personnel competence



Working in hazardous areas

People are the weakest link in most safety chains. Investigations typically conclude that the overwhelming majority of accidents are caused by a lack of competence, clear responsibilities and commitment. Unfortunately, accidents continue to occur in both industrialized and industrializing countries. Hazardous areas where explosive atmospheres may be present are no exception.

The IECEx System has introduced the IECEx scheme for certification of personnel competence, covering most aspects relevant to working with equipment in hazardous areas. This was originally developed at the request of industry, particularly the oil and gas sector where contract workers need to be assessed for their capability to work safely in many different parts of the world at any time.

Assessment and certification

While the IECEx scheme for certification of personnel competence is owned and operated by the IEC (International Electrotechnical Commission), the IEC does not issue IECEx certificates of personnel competence (CoPCs). The assessment of personnel competence against detailed requirements and the issuing of

certificates to successful candidates are performed by specialist organizations that are appropriately capable and equipped. Those organizations are independent of the IEC; they have been assessed and accredited against strict and comprehensive IECEx rules and comply with the requirements of the international standard ISO/IEC 17024, *Conformity assessment – General requirements for bodies operating certification of persons*.

Once accepted as an IECEx certification body (ExCB), an organization is subject to regular and ongoing surveillance audits that ensure continued capabilities and compliance with all requirements.

Training

In addition to relying on the ExCB to assess candidates and issue certificates, the IEC also expects ExCBs to maintain and update their capabilities; to work with organizations such as the IECEx recognized training providers (RTPs) that can prepare candidates for assessment and certification; and to promote the importance of competence as a key element in safe working. The IEC draws on the resources of the IECEx Management Committee, the IECEx Executive, the contributing experts and assessors, and the IEC Central Office to support the ExCBs in meeting these expectations.



Main objective: safety

The objective of the IECEx scheme for certification of personnel competence is to make the world a safer place and to use the principles of conformity assessment to provide employers and others with the confidence that the personnel working in or near hazardous areas containing explosive atmospheres have been independently certified as competent to do so according to the world's best practice requirements – the ExCBs are essential partners of IEC and providers to industry in this endeavour.

Due to commercial pressure, many companies have reduced the number of their competent experts in safety issues and transferred the obligations and safety critical tasks to external service providers. This reduces costs and gives them more flexibility. On the other hand, without enough own internal experts, it is very difficult if not impossible to control the competence and experience of external service providers and of new employees. Independent, third-party certification systems, such as IECEx, are based on the IEC 60079 series of international standards on explosive atmospheres.

Service providers for plant design, equipment selection, installation, inspection, maintenance, repair and overhaul are assessed and certified by independent external experts who help bridge the gap and can assist to minimize the risks and consequences of accidents. The IECEx scheme for certification of personnel competence offers an independent evaluation of the knowledge and skills of people who work in hazardous areas; they can be employees of the process companies as well as of external service providers.

To help you select the right partners for safety critical jobs, all CoPCs are available online on the IECEx website.

Why is the IEC 60079 series of standards used?

Standards for hazardous locations require the use of special equipment to avoid ignition of the atmosphere. If that special equipment is NOT selected, installed, operated or maintained correctly, it may not provide the expected explosion protection integrity and therefore render the installation potentially unsafe.

The use of competent persons to work on and near such equipment can ensure that it is designed, installed, inspected, used and maintained correctly and will therefore sustain the explosion protection integrity for the lifespan of the equipment.



Furthermore, most countries have legislation regarding safety in the workplace. In most cases the owner or operator is responsible for the design, selection, installation, operation, maintenance and safe operation of electrical equipment under their control. In the event of an incident, the responsibility of the owner or the operator of the plant is clear – hence it is in their interest to ensure that personnel involved are competent and continue to remain so.

International standards, such as the IEC 60079-10 series, IEC 60079-14, IEC 60079-17 and IEC 60079-19, define the expected competence of personnel for all aspects of electrical installations at all stages of their lifecycle.

Applying such standards and conformity assessment principles and processes to the measurement and verification of personnel competence provides an independent validation of the ability of personnel to apply their knowledge and practical skills to a required level of performance in workplace environments.

In summary, the IECEx scheme for certification of personnel competence provides certification that someone is competent to apply the IEC International Standards as listed on the IECEx certificate.

There are several references in IEC Standards that effectively require that only competent persons can carry out all work in and associated with explosive atmospheres.

IEC 60079-14, clause 4.5: Qualifications of personnel, states: *“The design of the installation, the selection of equipment and the erection covered by this standard shall be carried out only by persons whose training has included instruction on the various types of protection and installation practices, relevant rules and regulations and on the general principles of area classification. The competency of the person shall be relevant to the type of work to be undertaken (...).”*

Appropriate continuing education or training shall be undertaken by personnel on a regular basis.”

Also, IEC 60079-19, clause 4.4: Instructions for the repair facility, states: *“Repair facilities shall operate a Quality Management System.*

The repair facility shall appoint a person (responsible person) with the required competency (...), within the management organization, to accept responsibility and authority for ensuring that the overhauled/repared equipment complies with the certification status agreed with the user. The

person so appointed shall have a working knowledge of the appropriate explosion protection standards and an understanding of this standard.

The repair facility must have adequate repair and overhaul facilities as well as the appropriate equipment necessary and trained Operatives with the required competency (...) and authority to carry out the activities, taking into account the specific type of protection.”

In both standards, it is a requirement that competent persons undertake the work; and, in many countries, it is likely that the requirements given in both these standards are embraced by regulations or legislation, thus making competence mandatory.



How are personnel competence and service provider activities linked?

In parallel with the establishment of the IECEx certified service facilities scheme, and with additional pressure from industry, the IECEx System started to look at extending the principles to other activities undertaken in hazardous areas. It was soon recognized that any new scheme must rely on the competence of the individuals performing the activity. There was a need for a qualification that was transparent and transportable throughout the world, with independent certification based on evidence showing training, practical application and examined knowledge in the relevant aspects of the five-user directed standards within the IEC 60079 series (see above). To meet this need, the IECEx scheme for certification of personnel competence was set

up. It is now widely available around the world through the accepted IECEx ExCBs listed on the IECEx website.

The IECEx scheme for certification of personnel competence provides independent verification that a person holding an IECEx CoPC has the ability to apply his/her skills, knowledge, qualifications and experience to work safely in accordance with relevant international standards on explosive atmospheres. This can be especially important for contracting staff.

The scheme provides:

- IECEx personnel competence assessment report (IECEx PCAR)
- IECEx certificate of personnel competence (CoPC)





To obtain an IECEx CoPC, a person prepares an application and submits it to an approved ExCB.

The person will undergo knowledge tests and an assessment of qualifications and experience before receiving an IECEx certificate. Regular re-assessment ensures that the certified person maintains his/her competences and currency of knowledge with the relevant standards which may be revised and updated.

The IECEx CoPC is personal and valid across international borders.

As well as the certificate itself, the person obtains an identification card with photo, providing instant proof of certification on-site. The CoPC may be verified on the IECEx website.

This IECEx scheme for certification of personnel competence opens the way for a global scheme to provide consistency in the assessment of competent persons. It is structured to provide separation from any training schemes and therefore gives the highest level of integrity of assessment. The scheme recognizes that knowledge and skills could be obtained by any means such as tertiary education, internal company training, external private training, on the job mentoring, etc.

In determining if somebody is competent, it is usual that both the level of knowledge and the acquired skills are considered. This is always assessed in light of the expectation of the duties and responsibilities that will be assigned to the individual and the application of that knowledge and skill to the standards of performance required in the workplace.

The concept of competence focuses on what is expected of an employee in the workplace rather than the learning process but also embodies their ability to transfer and apply skills and knowledge to new situations and environments.

Competence includes all aspects of work performance and not only specific skills and is based on an appropriate evidence which should include proof of:

1. qualifications (off job): this may be a university degree, a diploma, craftsman/trade training that is generally achieved through an education system
2. experience (on job): apprenticeship, trainee programme, direct supervision or mentoring are examples of the typical experience that would be considered

3. recent and relevant training (both on and off the job): it is essential that knowledge and skills are maintained; to achieve this, a competent person would be expected to attend refresher training or seminars, etc.

Why is competence important in risk management and law?

Today most countries have legislation in terms of safety and in most cases the owner or operator is responsible for the design, installation, operation and maintenance of electrical and non-electrical equipment in plants and their safe operation. International standards clearly formulate the expected competence of personnel for all aspects of electrical and non-electrical installations as well as for use, maintenance and adequate repair and overhaul. In case of an incident, the responsibility of the owner or the operator in charge of the plant is clearly engaged. It is in his/her interest to ensure that personnel involved in above work are competent, especially when using outsourced labour. The difficulty up to now has been with the ability to identify a mechanism by which they can be confident that competent persons are carrying out the work. The IECEx scheme for the certification of personnel competence makes this much easier.

The difficulty confronting an owner or operator is the dilemma of what they can accept to prove that persons undertaking work in their plant are competent. They can accept the responsibility of deeming their own personnel as competent; however this does not address contracted persons. The other possibility is to rely on all personnel being considered competent through a company or national scheme. This may cover most situations but does not help if work is being done in other countries or the workers are from a different country.

The IECEx scheme for the certification of personnel competence has been established to provide a consistent approach to the assessment of the competence of personnel that work in Ex areas, in compliance with IEC International Standards as listed on the certificate.

It is intended to assess the person's competence and not that of an organization. This means that it will apply directly to each individual and is not referred or conferred through a company simply because that is where the person works.

It is not concerned with how the knowledge and skills are obtained but only uses an assessment of objective

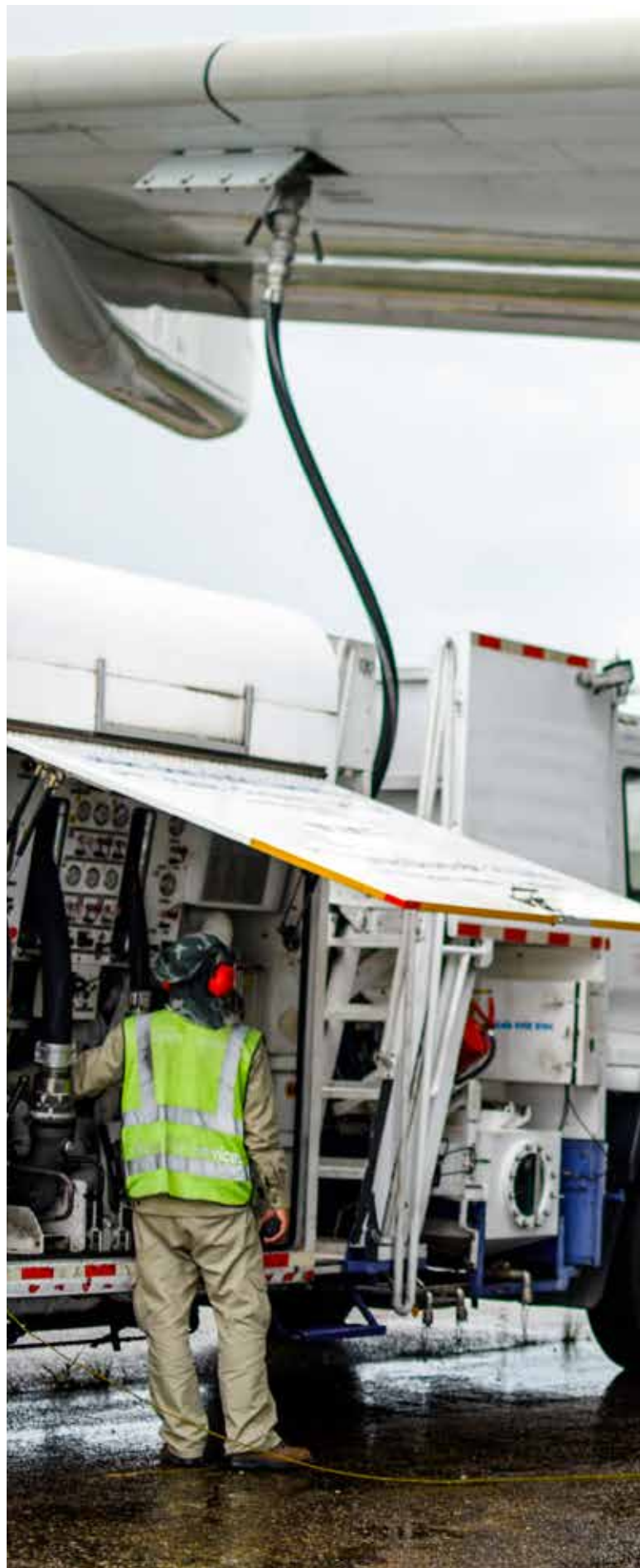
evidence. This means that it is not compulsory that training is undertaken as a part of the assessment process; it also helps to remove any conflict a training organization may have by removing them from the assessment.

This IECEx scheme addresses the certification of personnel competence involved in activities through eleven units of competence:

- Basic knowledge and awareness to enter a site that includes a classified hazardous area (Unit Ex 000)
- Applying the basic principles of protection in explosive atmospheres (Unit Ex 001)
- Performing classification of hazardous areas (Unit Ex 002)
- Installing explosion-protected equipment and wiring systems (Unit Ex 003)
- Maintaining equipment in explosive atmospheres (Unit Ex 004)
- Overhauling and repairing explosion-protected equipment (Unit Ex 005)
- Testing electrical installations in or associated with explosive atmospheres (Unit Ex 006)
- Performing visual and close inspection of electrical installations in or associated with explosive atmospheres (Unit Ex 007)
- Performing detailed inspection of electrical installations in or associated with explosive atmospheres (Unit Ex 008)
- Designing installations in or associated with explosive atmospheres (Unit Ex 009)
- Performing audit inspection of electrical installations in or associated with explosive atmospheres (Unit Ex 010)

Each unit of competence describes the competence required for a particular work function. It is envisaged that an individual's job description will probably require more than one of the specific units of competence. Unit Ex 001 can stand alone, but all other units require completion of Unit Ex 001 at least. Some other units also interlink, e.g. Unit Ex 008 which also requires completion of Unit Ex 007.

A person may have limitations of his/her competence in terms of type of equipment (an individual may be qualified for instrumentation but not electric motors, etc.), equipment group (mining, gas, or dust), type of protection (expertise in intrinsic safety but not flameproof, etc.) and voltage range (not everyone will have experience at 11 kV). Restrictions may also be applied to certificates for specific units and these are defined on the supporting PCAR.





You are a trained, skilled and experienced person and want to achieve IECEx certification for your competence – how do you begin and what do you need to do?

As a starting point we recommend you read guide IECEx 05A available on the IECEx website.

Other useful documents include:

- IECEx OD 504 which provides details of the various certification units defined by the type of work done; it also defines the assessment requirements for certification to each unit
- IECEx OD 503 which outlines the certification process

More information available from your choice of IECEx ExCBs or by email to info@iecex.com



Information about IECEx



IECEx certificates/reports



IECEx scheme for certification of personnel competence – Approved ExCBs



IECEx 05A, IECEx System – Guidance and instructions for applicants to obtain a certificate of personnel competence (CoPC)



IECEx OD 503, IECEx scheme for certification of personnel competence for explosive atmospheres - ExCB procedures for issuing and maintaining IECEx certificates of personnel competences



IECEx OD 504, IECEx scheme for certification of personnel competence for explosive atmospheres – Specification for units of competence assessment outcomes

About the IEC

Key figures

173

members and affiliates

>200

technical committees

20 000

experts from industry, test and research labs, government, academia and consumer groups

>10 000

international standards published

4

global conformity assessment systems

>1 million

conformity assessment certificates issued

>100

years of expertise

The IEC, headquartered in Geneva, Switzerland, is the world's leading publisher of international standards for electrical and electronic technologies. It is a global, independent, not-for-profit, membership organization (funded by membership fees and sales). The IEC includes 173 countries that represent 99% of world population and energy generation.

The IEC provides a worldwide, neutral and independent platform where 20 000 experts from the private and public sectors cooperate to develop state-of-the-art, globally relevant IEC International Standards. These form the basis for testing and certification, and support economic development, protecting people and the environment.

IEC work impacts around 20% of global trade (in value) and looks at aspects such as safety, interoperability, performance and other essential requirements for a vast range of technology areas, including energy, manufacturing, transportation, healthcare, homes, buildings or cities.

The IEC administers four conformity assessment systems and provides a standardized approach to the testing and certification of components, products, systems, as well as the competence of persons.

IEC work is essential for safety, quality and risk management. It helps make cities smarter, supports universal energy access and improves energy efficiency of devices and systems. It allows industry to consistently build better products, helps governments ensure long-term viability of infrastructure investments and reassures investors and insurers.



A global network of 173 countries that covers 99% of world population and electricity generation



Offers an affiliate country programme to encourage developing countries to get involved in the IEC free of charge



Develops international standards and runs four conformity assessment systems to verify that electronic and electrical products work safely and as they are intended to



IEC International Standards represent a global consensus of state-of-the-art know-how and expertise



A not-for-profit organization enabling global trade and universal electricity access

Further information

For further information, please visit the IEC website at www.iec.ch. In the “Who we are” section, you can contact your local IEC National Committee directly. Alternatively, please contact the IEC Central Office in Geneva, Switzerland or the nearest IEC Regional Centre.

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