The essential guide to the mandatory knowledge, skills and competencies required for personnel designing for or working in hazardous areas

*Based on IEC60079-14 Ed 4.0 and IEC60079-0*
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Introduction

The question is often asked “What is meant by competence?” Competence is commonly regarded to be the ability to perform the activities within an occupation or function to the standards expected in employment. This definition makes reference to standards. Thus, competence is equated to an ability to perform to the expected standard. Hence, competence assessment entails measuring a person’s performance against a standard.

Reference UK Health & Safety Executive Research Report 086: Competence assessment for the hazardous industries

Electrical installations in hazardous areas possess features (protective measures) specifically designed to render them suitable for operations in such atmospheres. These protective measures aim to reduce to an acceptable level the likelihood that the electrical equipment or installation could become a source of ignition.

In order for these protective measures to be effective electrical apparatus must be correctly designed, installed, tested, maintained and used in accordance with its specified characteristics in addition to any relevant harmonised or national standards imposed.

The need for verifiable training and competence in the field of explosion protection and mitigation has been highlighted by the ATEX Directives for the Protection of Workers in Potentially Explosive Atmospheres.

Intertek offer a full training and competency assessment scheme to meet the requirements of the latest edition of IEC/EN 60079-14.
About the Standard IEC/EN 60079-14

The Standards used in the application of the Directive (and the IEC ‘global’ Standards) provide detailed guidance as to the level and type of training and competency required for workers in hazardous environments.

IEC/EN 60079-14 Edition 4 specifies in some detail the requirements for people involved in the application design, selection and installation of equipment or plant used in hazardous (potentially explosive) atmospheres.

Great emphasis is put on the necessity to verify the training, experience and skills of people who may have an effect on the compliance of an installation which is reinforced with a general drive for verifiable ‘competence’ in the field of explosive atmospheres.

It should be noted that installation requirements are equally applicable to many manufacturers who assemble certified ATEX or IEC/EN equipment to form an assembly as it is to companies installing apparatus into a plant. The IEC 60079-14 and IEC 60079-17 standards identifies the various roles that require training and the level of training required.

Management and design functions now have specified training requirements in addition to clarifications on the type of training for equipment installers (referred to as ‘operatives’). Historically, it has predominantly been the ‘hands on’ installers who were directed to receive appropriate training, but the requirements now consider all of the people who have an influence in the final integrity of the assembly or plant installation including those with a pure executive function.

Enforcement

The guidance provides a specification for both providers of installation services (including manufacturers of assemblies) and buyers of installation services (or assemblies). It is likely that the competence levels defined in the standard will be written into many companies’ specification contracts for verification of contactor competence.

Evidence of competence (and/or training) could be requested (by an end client or by the regulatory authorities) for the designers of assemblies, the people who build the assembly and the people involved in the management process.

Contracting companies who are involved with hazardous area plant will have needed installation qualifications (frequently CompEx) for their electrical installation engineers/technicians, but now - in addition they may be asked for
their Designers and Managers (Responsible People) training and competency records.

**Mandated knowledge and skill requirements**

**General**
Competencies shall apply to each of the explosion protection techniques for which the person is involved. For example, it is possible for a person to be competent in the field of selection and erection of Ex’i’ equipment only and not be fully competent in the selection and erection of Ex’d’ switchgear or Ex’e’ motors. In such cases, the person’s management shall define this in their documentation system.

**Responsible Persons**
Responsible persons who are responsible for the ‘processes’ involved in the design, selection and erection of explosion protected equipment shall possess, at least, the following:

a) General understanding of relevant electrical engineering;
b) Understanding and ability to read and assess engineering drawings;
c) Practical understanding of explosion protection principles and techniques;
d) Working knowledge and understanding of relevant standards in explosion protection;
e) Basic knowledge of quality assurance, including the principles of auditing, documentation, traceability of measurement and instrument calibration.

Such persons must confine their involvement to the management of competent Operatives conducting selection and erection duties and not engage themselves directly in the work without ensuring their practical skills at least meet the requirements.

Responsible Persons are required to be able to demonstrate their competency and provide evidence of attaining the knowledge and skill requirements specified above, relevant to the types of protection and/or types of equipment involved.

Typical staff that may require this training include Plant Engineers (those with an executive function), Project Managers, Maintenance Managers, Procurement Managers, Quality Assurance and Contract Managers.
Operatives

Operatives (practitioners) are considered to be people who are involved in the selection, installation and inspection of equipment. Operatives required training under the old Standard/system for installation, but the new Standard greatly emphasises the need for an assessment of the persons ‘skills’. This necessitates practical training and evaluations such as the ‘CompEx’ scheme where trainees are expected to assemble equipment (for example glands) that will then be taken apart and examined by assessors.

Operatives shall possess, to the extent necessary to perform their tasks, the following:

a) Understanding of the general principles of explosion protection;

b) Understanding of the general principles of types of protection and marking;

c) Understanding of those aspects of equipment design which affect the protection concept;

d) Understanding of content of certificates and relevant parts of IEC/EN 60079-14;

e) General understanding of inspection and maintenance requirements of IEC/EN 60079-17;

f) Familiarity with the particular techniques to be employed in the selection and erection of equipment referred to in IEC/EN 60079-14;

g) Understanding of the additional importance of permit to work systems and safe isolation in relation to explosion protection.

Operatives shall be able to demonstrate their competency and provide evidence of attaining the knowledge and skill requirements specified as above relevant to the types of protection and/or types of equipment involved. They shall also be able to demonstrate their competency with documentary evidence in the:

- Use and availability of documentation;
- Production of job reports to the user;
- Practical skills necessary for the preparation and installation of relevant concepts of protection;
- Use and production of installation records.
Electrical Designers (design and selection)

The requirements for personnel involved in the process of designing plant or equipment for use in potentially explosive atmospheres (including equipment that may be located in the safe area but have functionality involved in the safe explosion prevention or mitigation) are new and should be given serious consideration.

The requirements will obviously be applicable to companies who design plant (new plant or modifications) but are equally applicable to project engineering companies or manufacturers who may provide rigs, skids or assemblies that may or may not utilise certified hazardous area equipment.

Designers shall possess, to the extent necessary to perform their tasks, the following:

a) Detailed knowledge of the general principles of explosion protection;
b) Detailed knowledge of the general principles of types of protection and marking;
c) Detailed knowledge of those aspects of equipment design which affect the protection concept;
d) Detailed knowledge of content of certificates and relevant parts of IEC 60079-14;
e) Understanding of practical skills for the preparation and installation of relevant concepts of protection;
f) Detailed knowledge of the additional importance of Permit to Work systems and safe isolation in relation to Explosion Protection;
g) Detailed knowledge of the particular techniques to be employed in the selection and erection of equipment referred to in IEC/EN 60079-14;
h) A general understanding of Inspection and Maintenance requirements of IEC/EN 60079-17.

Designers shall be able to demonstrate their competency and provide evidence of attaining the knowledge and skill requirements specified above, relevant to the types of protection and/or types of equipment involved. They shall also be able to demonstrate their competency with documentary evidence in the:

- Production of documentation;
- Production of Designers certificates to the user;
- Practical skills necessary for the preparation and compilation of relevant design details for the concepts of protection and systems involved;
- Update and production of installation records as specified in 60079-14.
Assessment of training and competence

The installation standard states that the competency of Responsible Persons, Operatives and Designers shall be verified and attributed, at intervals relevant to national regulations or standards or user requirements, on the basis of sufficient evidence that the person:

a) Has the necessary skills required for the scope of work;

b) Can act competently across the specified range of activities; and

c) Has the relevant knowledge and understanding underpinning competency.

A verification of ‘practical skills’ is necessary for people involved in the preparation and installation of equipment.

Verified and attributed training translates to having training records for all staff that demonstrate that the training provided covers the scope specified by the standard and was provided by a competent training authority. CompEx is the foremost nationally recognised personnel competency validation scheme for operatives in hazardous areas with over 27,000 certificates issued to date.

Where no nationally recognised or accredited scheme exists, the training provider should be carefully evaluated and the training provider’s evidence of competence should also be held on file. In the UK, most ATEX Notified Bodies offer training for designers and responsible people and are a possible source of appropriate training.

Internal company training and competence records may be used to demonstrate compliance if the internal training provider and assessor can be demonstrated as competent and with suitable expertise and knowledge. The mechanism for ensuring that the training provided is in line with current Standards and practices should also be recorded.

The frequency of re-training (updating) is not currently specified and is scheme dependant (for example, CompEx requires re-training within a 5 year period). Individual companies should be aware of the changes to legislation and Standards that are applicable to them and should determine if additional training is required. The company’s quality system should address this, together with the management and verification of training records and a mechanism to ensure that only appropriately trained (competent) people are allocated tasks that may impact on a hazardous area installation.

There have been many significant changes over the last few years that are relevant to installation that introduce new protection concepts, new equipment selection methodologies and new equipment groupings (for example IIIA, IIB and IIIC for dust).
It is important to ensure that any training provided is supplemented with a mechanism for updating the people involved where such changes occur, or having more frequent refresher training.

**Introducing ModulEx for product designers**

The ever evolving IEC60079 series of standards continue to pose great challenges to product designers. In indentifying this Intertek has introduces a series of training modules specifically aimed at supporting the needs of product designers.

The modules cover the fundamental of explosion protection, the Essential Health and Safety Requirements (EHSR) of the ATEX Directive (94/9/EC), and how the concepts of protection from the IEC standards are used. This will ensure equipment design managers, engineers and similar can come to the best rationale for selection of concepts of protection for their equipment.
How can Intertek help?

Intertek is an ATEX Notified Body, DSEAR/ ATEX implementation specialist and Hazardous Locations Training Centre including offering CompEx and ModulEx. We have a dedicated ATEX/IEC/CompEx Training facility in the UK as well as the capabilities to offer training and competency assessment globally. We offer both open and bespoke training, and through our unique systems can ‘tie in’ with a company’s management systems to ensure that all staff are verified and attributed as competent and ‘remain’ competent through regular updates and refresher training.

Mobile CompEx

Designed for use outside of the United Kingdom, Intertek is the first CompEx centre to offer the scheme to a global market through their mobile CompEx Assessment Rigs. Based closely on our principal centre in the UK our mobile rigs are transported in a 20ft (6m) container and assembled at a suitable location on or near your site.

For more information on Intertek’s training services for hazardous location staff, or to begin your project right away,

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