

Fact Sheet No.1

CompEx Modules EX12 ADE

Course

CompEx Ex12ADE: Application Design Engineers Course

Locations

ExVeritas Training Centres (Wrexham UK, Cork Ireland, Valletta, Malta,) or Hotel Conference Suite or other similar locations. At facilities, other than ExVeritas Training Centres, the minimum number of candidates will be six.

Title

Explosive Atmospheres: Gas, Vapours & Combustible Dusts atmospheres.

Maximum Number

The maximum number of candidates per course is ten.

Duration

5 days

Examined

Four Multi-Choice Examinations

Target Audience

Electrical and instrumentation Designers, Engineers e.g. Maintenance Engineers, Project Engineers etc.

Minimum Requirements

The Candidate has sufficient knowledge¹, skills² and experience to undertake the training and assessments.

¹ A minimum of an HNC/HND or BTEC National Diploma in a relevant engineering or technology subject (or national equivalent outside the UK).

² Understanding, interpreting and applying technical content for electrical/instruments application design.

Employment/Sponsorship Letter

A Company employment/sponsorship letter will also be requested in support of the candidates' technical qualifications, career history and current technical role. A template sponsorship form will be issued along with the booking forms. These letters can be downloaded from our website [JTL 7759 Rev 8 Employer_Letter_.docx](#)

Course Overview

The course is intended to give an in-depth awareness to the candidate with regards to explosive atmospheres formed by gases, vapours & mists and some insight to combustible dusts. It covers the application design and selection of electrical equipment for use in explosive atmospheres. As the persons attending the course are Designers/Engineers or at an equivalent senior level, the course covers the basic and more in depth elements of the installation requirements from a theoretical viewpoint.

All presentation material is in Microsoft PowerPoint, whilst electronic (hard copies are available at cost) hand-outs are available in either PowerPoint (three slides per page) some of the presentations are available in word documentation format. The format of the course notes is intended that they can be used as an aide-memoir tool in the future for the candidate.

Course delivery and all assessment material are currently in **English**.

English Language Proficiency Levels.

It is expected that attendees to CompEx courses have a suitable level of the English language associated with a technical discipline, sometimes identified as "Technical English". As English language learners acquire English as a second language, they progress through five language proficiency levels:

1. beginning,
2. early intermediate,
3. intermediate,
4. early advanced, and
5. advanced.

It is recommended that the minimum acceptable level of English for the CompEx Ex12 design course will be "advanced".

There are several modules available that cover topics such as:

Knowledge and Competency

Knowledge and Competency required for technical persons working in explosive atmospheres, as identified in the latest edition of IEC 60079-14.

Explosive Atmosphere

Definition of the three groups, surface temperatures, temperature classes, density of gases and vapours, properties of dusts, flammable range and explosive range. Ambient temperatures, Minimum Ignition Energy (MIE), Maximum Experimental Safe Gaps (MESG), an overview of the latest edition of IEC 60079-20-1.

Standards

Identifies the range of IEC (EN) standards the candidate should be aware of, how the standards are formatted and how often they are amended.

Area Classification

Understanding of the basic requirements of the latest editions of area classification for both gases and combustible dusts, i.e. IEC 60079-10-1, gases and vapours grading sources of release i.e. continuous, primary or secondary, zone types etc.

Protection Concepts

An overview of the concepts as applied to equipment for use in explosive atmospheres e.g.

- Electrical concepts - d, e, m, n, o, p, q, s, op, i and t;
- Principles of how the electrical concepts works;
- Intrinsic safety;
 1. I.S cable types,
 2. Assessment of I.S circuits, design criteria, cable calculations;
 3. Preparation of Descriptive System Documentation;
 4. Earthing Systems e.g High integrity earth and power earths;
- Two or more concepts on the same equipment. E.g. Ex de,

Ingress Protection

Introduction and explanation of the terminology used for equipment with regard to international (ingress protection) reference to the latest edition of IEC 60529 e.g. IP54 or IP67, which is the best and why.

Equipment Marketing/Selection

A detailed review of equipment marking on different types of equipment.

- European marking e.g. ATEX Categories as identified in Directive 2014/34/EU.
- International Electrotechnical Commission's Equipment Protection Levels e.g. Ga, Gb, Gc and Da, Db and Dc.
- Latest edition of IEC 60079-0 referencing equipment marking.

Design of equipment installed in gas/vapours and combustible dust environments

A detailed review of the requirements of latest edition of IEC 60079-14 with regards to the application design and installation practices of both electrical and intrinsically safe installations in explosive atmospheres.

Intrinsic Safety

Identifying the basis of safety of I.S. The safety factors applied to I.S. systems, safety parameters of associated apparatus and field instruments, use of Curves and table from IEC 60079-11 latest version. There are calculations based on power matching and Ohm's law covered during the day.

Documentation

A review of the documentation that should be referenced when designing, installing and maintaining electrical installations for use in hazardous locations. This would include but not limited to the following:

IEC standards (latest editions)

- IEC 60079-0: Explosive Atmospheres: General Requirements
- IEC 60079-10-1: Explosive Atmospheres: Area classification gas atmospheres
- IEC 60079-10-2: Explosive Atmospheres: Area classification combustible dust atmospheres
- IEC 60079-14: Explosive Atmospheres installation of electrical (also includes I.S.) systems
- IEC 60079-20-1: Explosive Atmospheres: Material characteristics for gas and vapour classification – Test methods and data

Certification

- EU (was EC) type and IECEx certificates. A review of a typical EC and IECEx type document. The use and identification of the letters used on a certificate number e.g. X and U conditions. Ambient temperature range limitations especially for luminaires.
- Declaration of Conformity (DOC).

User instructions

- System Descriptive Documents
- Loop Drawings
- Electrical Drawing
- General arrangement drawings (if applicable)
- Installation documentation

Assessments

In total, there are 6.75 hours of multi-choice written examinations to be completed;

Core paper, Marking paper, design paper and standards paper (two parts)

- 1) Core Paper Closed Book 30 questions- 45 minutes (Tuesday morning)
- 2) Marking Paper Closed Book 30 questions- 45 minutes (Wednesday morning)
- 3) Standards paper Open Book paper 1 40 questions 1 hour (Thursday afternoon)
- 4) Design paper Open Book 34 questions 3 hours (Friday morning)
- 5) Standards paper Open Book paper 2 40 questions 1.25 hours (Friday afternoon)

Ex12 ADE Course Agenda

The following is the typical agenda for the CompEx Ex12 ADE course. Topics and timings are subject to change.

Day 1: Monday

Introduction
Health and Safety
Class Introduction
IEC 60079-14 Standard Layout
Explosive atmospheres IEC 60079-20-1 (ISO/IEC 80079-20-1)
Homework Paper 1

Day 2: Tuesday

Review Homework Paper 1
Explosive atmospheres IEC 60079-20-1 (ISO/IEC 80079-20-1)
Area Classification: IEC 60079-10-1 and IEC 60079-10-2
Ingress Protection IEC 60529
ATEX -2014/34/EU (EPS Regulations SI 2016: No.1107)

CompEx Assessment No.1 Core Paper

Homework Paper 2

Day 3: Wednesday

Review Homework Paper 2
Concepts IEC 60079 Series
Documentation IEC 60079-14
Multiple Concepts + Ga Equipment IEC 60079-26
Classwork Standards question Paper 3 part 1

CompEx Assessment No.2 Marking Paper

Homework Paper 3 part 2 and/or Paper 5 part 1

Day 4: Thursday

Review Homework Paper 3 part 2 and/or Paper 5 part 1
CompEx Assessment No.3 Standards Paper 1
Intrinsic Safety: IEC 60079-11, IEC 60079-14, IEC 60079-25
Homework Paper 6 part 1

Day 5: Friday

Review Homework Paper 3 part 2 and/or Paper 5 part 1

CompEx Assessment No.4 Design

CompEx Assessment No.5 Standards Paper 2

Feedback

Finish



**Jones
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