

Appendix 1: Competency Pathway

Competency Pathway



Qualifications
Experience
Pre-Learning



Foundation Level



Core Practitioner Level



Advanced Roles



Foundation (ExF)
Training, NQ and Practicing Technicians & Non-Tech
Foundation: Theory

Foundation (ExF+)
Training, NQ and Practicing Technicians new to Ex
Foundation Plus: Theory and Practical

Functional Safety (FSF)
Operatives, Technicians, Engineers and Managers
Functional Safety: Equipment & Systems

Gases and Vapours (Ex01 - 04)
Electrical / Instrument Operatives & Engineers Install,
Inspect & Maintain: Gases and Vapours

Maritime Fuels (MTE01 - MTE04)
Electrical / Instrument Operatives & Engineers Inspect
& Maintain: LNG and Low Flashpoints

Dust (Ex05 - Ex06)
Electrical / Instrument Operatives & Engineers Install,
Inspect & Maintain: Dust Fibres & Flyings

Fuel Forecourts (Ex07 - Ex08)
Electrical / Instrument Operatives & Engineers Install,
Inspect & Maintain: Fuel Filling

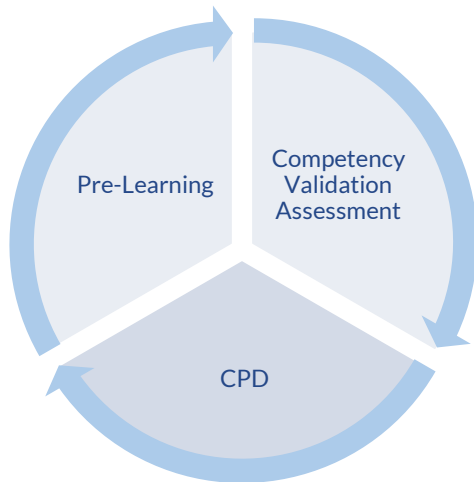
Water Utilities (Ex09 - Ex10) + Pre-learning
Electrical / Instrument Operatives & Engineers Operate:
Intake & Storage of Wastewater

Mechanical (Ex11)
Mechanical Operatives and Engineers
Install, Inspect & Maintain: Gases, Vapours and Dust

Application Design Engineer (Ex12)
Application Design Engineers
Specify Electrical Equipment in Ex Atmospheres

Responsible Person (Ex14)
Senior Managers & Supervisors
Managing People, Processes & Procedures

Learning Cycle



Candidates may elect to join at any stage of the competency pathway.

CompEx Recertification*

Recognised Practitioner (Ex01 RPP - Ex04 RPP)
Renewal Certification Short Course
Install, Inspect & Maintain: Gases and Vapours

* Recertification of modules other than Ex01-04 is achieved by undertaking original qualification again.

Industries

- Principal to all Ex environments

Entry Quals

- No entry qualification requirements

Entry Knowledge - Expected

- Understands general safe working practices
- Is aware of general H&S legislation and guidance

Entry Skills

- No practical skills required

Job Roles

- New to working in Ex environments
- Trainee, Newly Qualified & Practicing Technicians
- Non-Technical Personnel (on-site)

Entry Experience

- No prior experience of working in Ex environments

Entry Knowledge - Desirable

- Has a basic understanding of Ex environments
- Understands the necessity for safe working practices in Ex environments

Industries

- Principal to all Ex environments

Entry Quals

Qualifications consistent with a craftsperson in the areas of Electrical, Instrumentation or Mechanical disciplines, e.g. Min NVQ level 2

Entry Knowledge - Expected

- Understands general safe working practices
- Is aware of general H&S legislation and guidance

Entry Skills - Expected

- Practical skills in engineering assembly of a complexity consistent with a craftsperson in the subject areas of electrical, instrumentation or mechanical fitter.

Job Roles

- New to working in Ex environments
- Trainee, Newly Qualified & Practicing Technicians
- Other categories of Technical Personnel (on site)

Entry Experience

- No prior experience of directly working in Ex environments

Entry Knowledge - Desirable

- Has a basic understanding of Ex environments
- Understands the necessity for safe working practices in Ex environments

Entry Skills - Desirable

- Can identify, select and use appropriate practical skills, methods and procedures when working in Ex environments, as required for:
- Glanding and terminating industrial low voltage cables
- Installing and terminating certified Ex cable glands and conductors

Industries

- Principal to all Ex environments

Entry Quals

Guidance

RQF Level: 3

- National Vocational Qual (NVQ)
- National Diploma (ND)

Discipline:

- Electrical / Electronic
- Mechanical
- Non-Technical

Entry Knowledge - Expected

- Know the relevant legislative, regulatory, local requirements and procedures for safe working practice and systems of work in an industrial setting
- Is aware of general H&S legislation and guidance
- Interprets basic manufacturer's instructions and guidance

Entry Skills - Expected

- No practical skills required

Job Roles

Aspiring to or operating in

- Trainee, Newly Qualified & Practicing Technicians
- Non-Technical Personnel (on site)

Entry Experience

Guidance

- No prior experience of working in Ex environments

Entry Knowledge – Desirable

- Recognises typical Ex environments
- Has factual, procedural and theoretical understanding of Ex environments
- Is aware of the concept of functional safety and safety integrity levels (SIL)
- Understands the necessity for safe working practices in Ex environments and basic protection concepts used for certifying Ex equipment
- Is aware that working in Ex environments is regulated by industry standards and international standards.

Entry Skills - Desirable

- Can identify, select and use appropriate skills, methods and procedures when working in Ex environments.
- Can address well-defined but potentially complex problems and use appropriate investigation to inform actions.

Industries

- Principal to all Ex environments, with direct application in hazardous vapour and gas environments

Entry Quals

Guidance

Level 3, ECS Gold Card, National Diploma or equivalent

Discipline:

- Electrotechnical
- Instrumentation

** Subject to knowledge, skill and experience candidates may benefit from ExF+*

Entry Knowledge - Expected

- Knows the relevant legislative, regulatory, local requirements.
- Understands procedures for safe working practice and systems of work in an industrial setting
- Can read and interpret relevant engineering drawings, related specifications, quality standards and equipment manuals
- Understands the hierarchy of responsibilities in relation to reporting and decision-making

Entry Skills - Expected

- Practical skills in engineering assembly of a complexity consistent with that of a level 3 craftsperson
- Can apply safe working practices including safe isolation to meet the requirements of statutory and non-statutory regulations.
- Can safely install, inspect, test, commission, diagnose and correct faults in electrical plant, instrumentation, associated cabling, cabling supports and equipment.
- Can select, gland & terminate industrial type cables to a suitable component and associated cable tray in line with details on the appropriate specification.
- Can interpret manufacturers documentation for correct installation, maintenance and inspection.

Job Roles

Aspiring to or operating in

- Installation or Maintenance Electrician
- Electrical or Instrument Technician
- Engineers

Entry Experience

Guidance

- 2 + years' experience operating in a site / industrial environment
- Installing, inspecting, testing and/or maintaining equipment in an industrial setting

Entry Knowledge - Desirable

- Understands the need for and methods of achieving safe working practice in gas and vapour Ex environments.
- Has basic practical, theoretical and technological knowledge and understanding of gas and vapour Ex environments
- Has a basic understanding of the requirements, materials and equipment considerations, in relation to working in gas and vapour Ex environments

Entry Skills - Desirable

- Can select and install a variety of Ex certified cables glands and terminate conductors into equipment.
- Can understand the principles of electrical protection concepts including selection, installation and maintenance
- Understands intrinsically safe concept of protection and installation including the importance of documentation.
- Can inspect new and existing equipment in accordance with appropriate inspection techniques relevant to the different grades of inspection

Industries

- Maritime Ex environments involving Bunker Fuels, LNG and LPG (Low Flash point Fuels)

Entry Quals Guidance

Level 3 ECS Gold Card
National Diploma
or equivalent

Discipline:

- Electrotechnical
- Instrumentation

** Subject to knowledge, skill and experience candidates may benefit from ExF+*

Entry Knowledge - Expected

- Knows the relevant legislative, regulatory, local requirements
- Understands procedures for safe working practice and systems of work in a Maritime setting
- Can read and interpret relevant engineering drawings, related specifications, quality standards and equipment manuals
- Understands the hierarchy of responsibilities in relation to reporting and decision-making

Entry Skills - Expected

- Practical skills in engineering assembly of a complexity consistent with that of a level 3 craftsperson
- Can apply safe working practices including safe isolation to meet the requirements of statutory and non-statutory regulations.
- Can safely install, inspect, test, commission, diagnose and correct faults in electrical plant, instrumentation, associated cabling, cabling supports and equipment.
- Can select, gland & terminate industrial type cables to a suitable component and associated cable tray in line with details on the appropriate specification.
- Can interpret manufacturers documentation and certification standards for correct installation, maintenance and inspection.

Job Roles

Aspiring to or operating in

- Installation or Maintenance Electrician
- Level 3 Operatives
- Electrical or Instrument Technician
- Engineers

Entry Experience Guidance

- 2 + years' experience operating in a site / industrial environment
- Installing, inspecting, testing and/or maintaining equipment in an industrial setting

Entry Knowledge - Desirable

- Understands the need for and methods of achieving safe working practice in Maritime Ex environments.
- Has basic practical, theoretical and technological knowledge and understanding of maritime Ex environments
- Has a basic understanding of the requirements, materials and equipment considerations, in relation to working in Maritime Ex environments

Entry Skills - Desirable

- Can select and install a variety of Ex certified cable glands.
- Can understand the principles of electrical protection concepts including selection, installation and maintenance
- Understands intrinsically safe concept of protection and installation including the importance of documentation.
- Can inspect new and existing equipment in accordance with appropriate inspection techniques relevant to the different grades of inspection

Industries

- Dust Ex environments such as animal feed processing plants, timber mills, biomass processing plants and bakeries

Entry Quals Guidance

Level 3 ECS Gold Card
National Diploma
or equivalent

Discipline:

- Electrotechnical
- Instrumentation

** Subject to knowledge, skill and experience candidates may benefit from ExF+*

Entry Knowledge - Expected

- Knows the relevant legislative, regulatory, local requirements
- Understands procedures for safe working practice and systems of work in an industrial setting
- Can read and interpret relevant engineering drawings, related specifications, quality standards and equipment manuals
- Understands the hierarchy of responsibilities in relation to reporting and decision-making

Entry Skills - Expected

- Practical skills in engineering assembly of a complexity consistent with that of a level 3 craftsperson
- Can apply safe working practices including safe isolation to meet the requirements of statutory and non-statutory regulations.
- Can safely install, inspect, test, commission, diagnose and correct faults in electrical plant, instrumentation, associated cabling, cabling supports and equipment.
- Can select, gland & terminate industrial type cables to a suitable component and associated cable tray in line with details on the appropriate specification.
- Can interpret manufacturers documentation and certification standards for correct installation maintenance and inspection.

Job Roles

Aspiring to or operating in

- Installation or Maintenance Electrician
- Level 3 Operatives
- Electrical or Instrument Technician
- Engineers

Entry Experience Guidance

- 2 + years' experience operating in a site / industrial environment
- Installing, inspecting, testing and/or maintaining equipment in an industrial setting

Entry Knowledge - Desirable

- Understands the need for and methods of achieving safe working practice in dust Ex environments.
- Has practical, theoretical and technological knowledge and understanding of combustible dust Ex environments
- Understands the requirements, materials and equipment considerations, in relation to working in combustible dust Ex environments and also understands the benefits of good housekeeping

Entry Skills - Desirable

- Can select and install a variety of Ex certified cable glands.
- Can understand the principles of electrical protection concepts including selection, installation and maintenance
- Understands intrinsically safe concept of protection and installation including the importance of documentation.
- Can inspect new and existing equipment in accordance with appropriate inspection techniques relevant to the different grades of inspection

Industries

- Fuel Ex environments such as Petrol Filling Station Forecourts, associated fuel transfer, re-filling and storage

Entry Quals Guidance

Level 3 ECS Gold Card
National Diploma
or equivalent

Discipline:

- Electrotechnical
- Instrumentation

** Subject to knowledge, skill and experience candidates may benefit from ExF+*

Entry Knowledge - Expected

- Knows the relevant legislative, regulatory, local requirements
- Understands procedures for safe working practice and systems of work in a commercial or industrial setting
- Can read and interpret relevant engineering drawings, related specifications, quality standards and equipment manuals
- Understands the hierarchy of responsibilities in relation to reporting and decision-making

Entry Skills - Expected

- Practical skills in engineering assembly of a complexity consistent with that of a level 3 craftsperson
- Can apply safe working practices including safe isolation to meet the requirements of statutory and non-statutory regulations.
- Can safely install, inspect, test, commission, diagnose and correct faults in electrical plant, instrumentation, associated cabling, cabling supports and equipment.
- Can select, gland & terminate industrial type cables to a suitable component and associated cable tray in line with details on the appropriate specification.
- Can interpret manufacturers documentation and certification standards for correct installation, maintenance and inspection.

Job Roles

Aspiring to or operating in

- Installation or Maintenance Electrician
- Level 3 Operatives
- Electrical or Instrument Technician
- Engineers

Entry Experience Guidance

- 2 + years' experience operating in a site, commercial or industrial environment
- Installing, inspecting, testing and/or maintaining Equipment in a commercial or industrial setting

Entry Knowledge - Desirable

- Understands the need for and methods of achieving safe working practice in fuel filling Ex environments.
- Has practical, theoretical and technological knowledge and understanding of Ex fuel filling environments
- Understands the requirements, materials and equipment considerations, in relation to working in Ex fuel filling environments
- A working knowledge of the APEA "blue book" 4th edition 2018 (5th edition pending)

Entry Skills - Desirable

- Can select and install a variety of Ex certified cable glands.
- Can understand the principles of electrical protection concepts including selection, installation and maintenance
- Understands intrinsically safe concept of protection and installation including the importance of documentation.
- Can inspect new and existing equipment in accordance with appropriate inspection techniques relevant to the different grades of inspection

Industries

- Water Utilities Ex environments involving waste water, treatment and holding

Entry Quals Guidance

Level 3 ECS Gold Card
National Diploma
or equivalent

Discipline:

- Electrotechnical
- Instrumentation

** Subject to knowledge, skill and experience candidates may benefit from ExF+*

Entry Knowledge - Expected

- Knows the relevant legislative, regulatory, local requirements
- Understands procedures for safe working practice and systems of work in an industrial setting
- Can read and interpret relevant engineering drawings, related specifications, quality standards and equipment manuals
- Understands the hierarchy of responsibilities in relation to reporting and decision-making

Entry Skills - Expected

- Practical skills in engineering assembly of a complexity consistent with that of a level 3 craftsperson
- Can apply safe working practices including safe isolation to meet the requirements of statutory and non-statutory regulations.
- Can safely install, inspect, test, commission, diagnose and correct faults in electrical plant, instrumentation, associated cabling, cabling supports and equipment.
- Can select, gland & terminate industrial type cables to a suitable component and associated cable tray in line with details on the appropriate specification.
- Can interpret manufacturers documentation and certification standards for correct installation, maintenance and inspection.

Job Roles

Aspiring to or operating in

- Installation or Maintenance Electrician
- Level 3 Operatives
- Electrical or Instrument Technician
- Engineers

Entry Experience Guidance

- 2+ years' experience operating in a Water Industry Ex environment, installing, inspecting, testing and/or maintaining Ex Certified equipment

Entry Knowledge - Desirable

- Has practical, theoretical and technological knowledge and understanding of water industry Ex environments
- Understands the need for and methods of achieving safe working practice in water industry Ex environments.
- Understands the requirements, materials and equipment considerations, in relation to working in water industry Ex environments
- A working knowledge of WIMES and water industry related specifications

Entry Skills - Desirable

- Can select and install a variety of Ex certified cable glands.
- Can understand the principles of electrical protection concepts including selection, installation and maintenance
- Understands intrinsically safe concept of protection and installation including the importance of documentation.
- Can inspect new and existing equipment in accordance with appropriate inspection techniques relevant to the different grades of inspection

Industries

- Principal to all Ex environments, with direct application in hazardous gas, vapour and dust environments

Entry Quals Guidance

National Diploma , NVQ Level 3 or equivalent in a technical subject e.g. mechanical, operations, technical services, multiskilled engineering, maintenance

Discipline:

- Mechanical engineering
- Multiskilled engineering

Entry Knowledge - Expected

- Knows the relevant legislative, regulatory, local requirements
- Understands procedures for safe working practice and systems of work in an industrial setting
- Can read and interpret relevant engineering drawings, related specifications, quality standards and equipment manuals
- Understands the hierarchy of responsibilities in relation to reporting and decision-making

Entry Skills - Expected

- Can apply general safe working practices.
- Can accurately measure test components with micrometres, verniers and Dial Test Indicator and record results
- Can disassemble, clean, inspect and repair a range of mechanical components as per manufacturers specifications including rotating equipment such as fan assemblies, gearboxes, pumps and liner elements such as double acting pneumatic cylinders
- Can strip down, check dimensions, replace seals, and rebuild rotating equipment such as centrifugal pumps
- Can dismantle, assemble and hand torque flanged joints, including inspection of flanges, fault reporting, and securing a flanged pipework joint as per a specified drawing and within set tolerances

Job Roles

Aspiring to or operating in

- Mechanical, Electro-Mechanical & Multi-Skilled Craftpersons / Engineers
- Asset / Site Mechanical Maintenance Technician

Entry Experience Guidance

- 2 + years' experience operating in a site / industrial environment
- Installing, inspecting, testing and/or maintaining Equipment in an industrial setting

Entry Knowledge - Desirable

- Understands the need for and particular methods of achieving safe working practice in Ex environments.
- Has practical, theoretical and technological knowledge and understanding of Ex environments
- Understands the requirements, materials and equipment considerations, in relation to working in Ex environments

Entry Skills - Desirable

- Can safely assemble, install, maintain, test, repair and disassemble mechanical equipment and systems, working safely in Ex environments

Industries

- Principal to all Ex environments, with direct application in hazardous gas, vapour and dust environments

Entry Quals

Guidance

Minimum Academic route

- HNC
- HND
- Degree

Discipline: Engineering

**Or relevant demonstratable knowledge and experience.*

Entry Knowledge - Expected

- Has an understanding and is able to read and interpret engineering drawings
- Can interpret manufacturer's data for electrical equipment relevant to its application in an Ex area
- Evaluate the performance of equipment, assemblies or systems of relevance to application in Ex areas
- Should have a working knowledge of the relevant parts of IEC 60079 Part 14

Entry Skills - Expected

- No practical skills required
- Be able to analyse data effectively

Job Roles

Aspiring to or operating in

- EC&I Engineer
- EC&I Designer

Entry Experience

Guidance

- A good understanding of basic electrical application design practice.
- Have at least 2 years' experience working in Ex environments

Entry Knowledge - Desirable

- Have a level of understanding that is equivalent to or exceeds ExF
- Understand those aspects of equipment design which affect the installation of Ex equipment of IEC 60079 Part 14
- Understanding those aspects of equipment design which affect inspection and maintenance requirements of IEC 60079 Part 14

Industries

- Principal to all Ex environments, with direct application in hazardous gas, vapour and dust environments

Entry Quals

Guidance

Minimum Academic route

- HNC
- HND
- Degree

Discipline: Engineering

** Or relevant demonstratable knowledge and experience.*

Entry Knowledge - Expected

- Has a general understanding of relevant electrical engineering.
- Understands Safe systems of work including Permit to work
- Has a basic understanding of the importance of equipment inspection
- Aware of responsibilities under HSE COMAH (UK or equivalent)

Entry Skills - Expected

- No practical skills required
- Appreciation of the impact that installation, inspection and maintenance will have on plant/site operations.

Job Roles

Aspiring to or operating in

- Plant/Site/Engineering/ Maintenance Manager
- Supervisor/ Technical Authority/ Duty Holder

Entry Experience

Guidance

- 2+ years' experience of supervising or managing people, processes and procedures in Ex environments
- 2+ years' experience of electrical and/or mechanical equipment, systems and installations

Entry Knowledge - Desirable

- Can read and assess relevant engineering drawings
- Has practical understanding of explosion protection principles and techniques
- Has a working knowledge and understanding of the relevant standards in explosion protection.
- Has a knowledge of quality assurance, including the principles of auditing, documentation, traceability of measurement and instrument calibration