QUALIFICATION SPECIFICATION

ECITB Level 3 Diploma in Installing Engineering Construction Plant and Systems (RQF)

Ofqual QN: 603/3140/9
QW Approval No.: C00/1232/3

Contains the following pathways:

- **Pipefitting**
- **Plating**
- **Mechanical Fitting**
- **Electrical Fitting**

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Revisions to this document

The table below sets out all revisions made to this document since it was first issued, and the dates on which the revisions were effective from.

Version	Revision	Page	Effective date
RV3-2	Section 1.4 'Language of Assessment' added	6	01.11.26
	Removal of ECITB address under Section 2.4 Further Information	11	

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Diploma in Installing Engineering Construction Plant and Systems (RQF)

1. Introduction

1.1 Objective and overview

The objective of this vocational competence qualification is to provide recognition that a candidate has demonstrated the required level of technical competence to be qualified to work as an installation craftsperson on engineering construction structures, plant and equipment in **one** of the following disciplines:

- Pipefitting.
- Plating.
- Mechanical Fitting.
- Electrical Fitting.

The candidate is required to select **ONE** discipline pathway **ONLY** when registering on the qualification**.** Successful completion of the qualification pathway will lead to the candidate being awarded an:

- ECITB Level 3 Diploma in Installation of Engineering Construction Plant and Systems (RQF) – Pipefitting.
    - **OR**
- ECITB Level 3 Diploma in Installation of Engineering Construction Plant and Systems (RQF) – Plating.
    - **OR**
- ECITB Level 3 Diploma in Installation of Engineering Construction Plant and Systems (RQF) – Mechanical Fitting.
    - **OR**
- ECITB Level 3 Diploma in Installation of Engineering Construction Plant and Systems (RQF) – Electrical Fitting.

The qualification is based on National Occupational Standards (NOS) and has been designed following consultation with industry employers and stakeholders on a qualifications strategy which allows for a wider use of off the job assessment and to further sector needs to improve transferability of skills across the different sectors that comprise the industry. The detail and scope of the assessment criteria within this qualification has been developed by the Engineering Construction Industry Training Board (ECITB) Standards Setting Organisation in conjunction with employers, trainers, and assessors through workshops and consultations.

1.2 Installation Craftsperson occupations

Pipefitters, platers, mechanical fitters and electrical fitters maintain the safety, integrity and effective operation of plant and systems in a wide range of industries of national importance including power (coal, gas, nuclear, wind and other renewables) and water infrastructure, petrochemical, oil and gas, and steel, food and drink processing.

Installation trades are overseen by a supervisor and work to required tolerances, the activities performed require a high degree of skill to ensure that the specifications within design, fabrication and installation drawings are achieved. They are responsible for the quality of their own work, possibly others' and ensuring work is completed safely and effectively, following procedures and completing essential documentation at all times. They

work on various types of plant, systems and installations dependent on their company and sector.

Individual role descriptions are as follows:

Mechanical fitters within the engineering construction industry are concerned with assembling, installing, maintaining and testing of often complex machinery and mechanisms. Typical equipment types encountered within the occupation are; engines, pumps, transmission systems, turbines, hydraulic and pneumatic actuators and associated systems. Mechanical fitters assume a through life responsibility for the machinery, systems and equipment within their charge, this includes initial assembly, installation and setting up, ongoing maintenance and testing and the eventual disassembly/decommissioning of the equipment at the end of its working life.

Pipefitters within the engineering construction industry are responsible for the fabrication, assembly, positioning, installation, and repair of piping systems. Engineering construction industry piping systems often carry water, steam, chemicals or fuel which may be used in cooling, heating, lubricating and other processes. The piping can vary in bore size and material type dependent upon the fluid it is designed to carry and the operating pressures and environments of these systems. The piping system design will also determine the method of jointing required and the pipefitter must ensure the integrity of the mechanical joints that are made. Methods of jointing can range from threaded, bolted and clamped solutions to, where required, the preparation of the pipe assembly to enable a more permanent welded joint. Loss of the containment through poor jointing may result in machinery and equipment failure, environmental damage or injury/loss of life. A pipefitter is often required to have additional training in other skills to carry out their role effectively.

Platers prepare steel and other metal plates and sections for the manufacture, installation, repair and maintenance of storage tanks, vessels and the other structures contained within oil and gas installations, power generating plants, chemical plants, refineries and food processing plants. Platers work on sheet materials having a thickness greater than 3mm, their work can also cover the production of the structural steelwork used in the construction of bridges, buildings and oil and gas installations. Platers must be able to read and interpret engineering drawings and are skilled in, the measuring, marking out, cutting, forming and joining of metal plate and structural steel of varying thickness and size. They may then be responsible for the assembly of manufactured items; this may include the use of lifting equipment before securing the manufactured items usually using tack welding or temporary mechanical fasteners. Platers use various methods to shape; plate, pipe and sections, these range from the more conventional methods involving traditional hand skills and tools associated with metal craft work to more complex methods which may necessitate the use of oxyfuel cutting equipment, plasma cutters, and hand controlled machines.

Electrical fitters are responsible for the installation, inspection, testing, commissioning and diagnosis of faults in electrical plant and its associated cabling and equipment. These activities are typically undertaken on equipment such as electrical distribution systems, generators, electric motors, heating, ventilation and air-conditioning systems. To achieve these functions the electrical fitter must be able to interpret technical specifications and drawings and, where necessary demonstrate the effective use of reasoning skills in the resolution of faults and problems. Whilst electrical fitters are required to use specialist tools and equipment they also routinely use traditional hand tools and test equipment during the execution of their duties. Electrical fitters undertake these tasks on sites such as petrochemical plants, upstream and downstream oil and gas installations, powers generating plants, chemical plants and food processing plants and other processing plants, which often necessitates them working in hazardous conditions.

1.3 Entry requirements

There are no mandatory entry requirements. However, due to the level and complexity of the subject, it is recommended that candidates should have attained GCSE grade "C/5" or above or RQF Functional Skills Level 2 or above in English (Language) and Mathematics or are able to demonstrate evidence of other suitable attainment or experience. A candidate's individual circumstances will determine if this qualification is appropriate and the Approved Centre will work with the prospective candidate and, where appropriate, employer to determine the candidate's suitability for the qualification.

1.4 Language of Assessment

This qualification is available and assessed in English only.

Centres must ensure, prior to registration, that candidates have a sufficient standard of English language competence to understand the qualification requirements, access learning and assessment materials, communicate effectively, and generate evidence that meets the required assessment standards. This applies particularly to candidates for whom English is not their first language.

A candidate's English language ability must be sufficient to enable them to demonstrate the required knowledge, skills, and behaviours independently, without the need for translation or language support that could compromise the validity or reliability of the assessment. Candidates must also be able to communicate effectively in workplace and assessment environments and carry out activities safely and appropriately in accordance with qualification requirements.

1.5 Achievement

This qualification consists of 9 mandatory units per pathway. A candidate must successfully meet the selected discipline pathway requirements in each of the specified units in order to attain this qualification. This specification details the learning outcomes and assessment criteria that a candidate must meet in order to demonstrate the acquisition of the knowledge, skills and behaviours (KSBs) to be awarded a vocational ECITB Level 3 Diploma in Installation of Engineering Construction Plant and Systems (RQF) in either Pipefitting or Plating or Mechanical Fitting or Electrical Fitting. Mandatory observation of the candidate by an Awarding Organisation (AO) assessor is required to achieve this qualification.

Typical types of engineering construction structures, plant and equipment for the assessment of each pathway in this qualification are listed in the ECITB AO's '*Approved Centre Qualification Requirements' document associated with this qualification*.

The contents of each unit within the qualification interrelate and the AO does not issue credit certificates for completion of standalone units.

1.6 Assessment

Assessment is through a combination of ECITB AO online knowledge tests; observed skills assessment in the 'live' workplace' or under approved simulated workplace conditions; portfolio of evidence; and a final recorded technical discussion.

1.7 Total Qualification Time (TQT), level & duration of qualification

The TQT for this qualification is 1619 hours, this reflects the lowest TQT pathway. However, the TQT for each particular unit is recorded below. The amount of time taken to achieve this Level 3 Diploma is typically 36 months.

Unit	Guided Learning (hours)	Total Qualification Time (hours)
IPS01	128	234
IPS02	80	140
IPS03	120	179
IPS04	170	278
IPS05	90	146
IPS06	200	276
IPS07	160	229
IPS08	100	158
IPS09	100	206
IPS10	100	139
IPS11	80	116
IPS12	100	212
IPS13	140	247

Note: Units IPS 06, 09, 12 & 13 are not in the Pipefitting pathway which makes up the overall qualification TQT.

There are no optional units contained in this qualification. However, not all units appear in all pathways. Please refer to Section 2 to review qualification discipline pathways.

1.8 Equal opportunities, reasonable adjustments and special considerations

For information about fair assessment, equal opportunities, reasonable adjustments and special considerations please refer to the ECITB AO Policies and Procedures published on the ECITB website.

1.9 Career development within the Engineering Construction Industry

Completing this qualification can lead to a range of further career options. Those who wish to stay in engineering construction can develop their skills further, or progress through supervision to senior positions such as Construction Manager. Individuals can progress through additional qualifications and apprenticeships or into supporting engineering functions such as technical leadership, procurement, quality assurance, project management or project controls.

For more information about career progression you can go to the ECITB website www.ecitb.org.uk

2. Qualification units and scope of assessment

Overview of this L3 Installation qualification

Overview table depicting mandatory units specified for each IPS pathway:

Unit	Title	PF	PL	MF	EF
IPS01	Work safely, effectively, ethically and sustainably, managing risks and hazards.	✓	✓	✓	✓
IPS02	Interpret and follow fabrication and installation documentation and procedures including prepare and reinstate the work area.	✓	✓	✓	✓
IPS03	Mark out to the required specification.	✓	✓	✓	✓
IPS04	Shape components by material removal using hand tools.	✓	✓	✓	✓
IPS05	Forming materials by applied pressure.	✓	✓		
IPS06	Shape components by material removal using machine tools.			✓	
IPS07	Assemble components.	✓	✓	✓	
IPS08	Position and Install plant, equipment and systems.	✓	✓	✓	✓
IPS09	Connect wiring systems.				✓
IPS10	Test the performance and condition of installed components and assemblies.	✓		✓	✓
IPS11	Dismantle assemblies, plant, equipment and systems.	✓	✓	✓	✓
IPS12	Join materials by manually controlled welding processes.		✓		
IPS13	Diagnose and correct electrical faults.				✓

Please note that in the table pathways have been abbreviated as follows:

- Pipefitting – PF.
- Plating - PL.
- Mechanical Fitting - MF.
- Electrical Fitting - EF.

This qualification consists of 9 mandatory units per pathway.

The underpinning knowledge, skills and behaviours (KSBs) within units IPS01 (Work safely, effectively, ethically and sustainably, managing risk and hazards (plus employer desirable behaviours) and IPS02 (Interpret and follow fabrication and installation documentation and procedures including prepare and reinstate the work area) are not assessed separately. They are demonstrated by candidates when they undertake the observed skills assessments on plant, equipment and systems in their selected discipline to demonstrate the application of the KSBs detailed in the mandated units for each IPS pathway as above and should be assessed during the observation of those units.

This vocational qualification contains the following elements:

2.1 Underpinning knowledge, skills and behaviours

Units IPS01 and IPS02 detail the factual, procedural and theoretical knowledge that the candidate must acquire and also demonstrate on plant, equipment and systems of their selected discipline:

- Relevant national and industry health, safety and environmental standards and legislation and those relevant to the specific disciplines, as appropriate.
- Site safety responsibilities, own and others including: first aid procedures, evacuation procedures and contingency reporting.
- Types and effects of hazards, safety assessment methods and techniques and how to minimise associated risks.
- Relationships: importance of and understanding of work relationship problems.
- Lines of communication, reporting lines and levels of responsibility in the workplace.
- The importance of ethical working and the sustainable use of resources including: codes of conduct, minimising the impact of work on the environment.

- The importance of questioning and demonstrating initiative in day to day problem-solving.
- Procedures and related documentation and responsibility for reporting and following procedures.
- Preparation and reinstatement of the work area including: preparing, checking and handling material; types of equipment and the related care and control procedures; storing and disposing of material; handing over plant and equipment.

2.2 Employer-desirable behaviours and attitudes

The candidate must demonstrate the application of the following employer desirable behaviours during the observed skills assessments:

- Safety conscious - works safely at all times.
- Risk aware - manages hazards and minimises risk.
- Effective communicator - works effectively with others including keeping others informed.
- Quality focus - ensures work is completed to an appropriate level of quality.
- Conscientious - follows procedures and completes reporting documentation accurately and correctly.
- Initiative - deals with problems effectively and highlights those that cannot be solved.
- Critical thinker - displays the ability to use vocational knowledge to deal with issues that arise during practical tasks.
- Ethical and sustainability behaviours such as:
    - Manages risk to minimise adverse impact to people or the environment.
    - Uses resources efficiently and effectively.
    - Treats all people fairly and with respect.

2.3 Plant, equipment and systems specific fabrication and installation knowledge and skills (Units IPS02 to IPS13)

Units IPS02 to IPS13 are discipline specific and the candidate must demonstrate their knowledge application of KSB's on plant, equipment and systems of their selected discipline pathway:

- Pipefitting.
- Plating.
- Mechanical Fitting.
- Electrical Fitting.

The candidate is required to effectively demonstrate theoretical, factual and procedural knowledge and practical skills of the following units that comprise the qualification in relation to their chosen pathway in accordance with the stated assessment criteria and scope of assessment provided in this document:

IPS01	Work safely, effectively, ethically and sustainably, managing risks and hazards.
IPS02	Interpret and follow fabrication and installation documentation and procedures including prepare and reinstate the work area.
IPS03	Mark out to the required specification.
IPS04	Shape components by material removal using hand tools.
IPS05	Forming materials by applied pressure. (Pipefitting & Plating only)
IPS06	Shape components by material removal using machine tools. (Mechanical Fitting only)
IPS07	Assemble components. (Plating, Pipefitting and Mechanical Fitting only)

IPS08 Position and Install plant, equipment and systems.

IPS09 Connect wiring systems. (Electrical Fitting only)

IPS10 Test the performance and condition of installed components and assemblies. (Pipefitting, Mechanical Fitting and Electrical Fitting only)

IPS11 Dismantle assemblies, plant, equipment and systems.

IPS12 Join materials by manually controlled welding processes. (Plating only)

IPS13 Diagnose and correct electrical faults. (Electrical Fitting only)

All the units specific to a pathway are listed on Page 6 in the Overview table.

2.4 Further information

For further information either visit the ECITB website or contact the ECITB Awarding Organisation:

Tel: 01923 260000
Email: Qualifications@ecitb.org.uk
Website: www.ecitb.org.uk

2.5 Units

Unit IPS01 Work safely, effectively, ethically and sustainably, managing risk and hazards.

This unit applies to all pathways.

Learning outcomes for this unit:

1. The candidate can explain health and safety legislation, regulations, safe working practices, personal site safety responsibilities and demonstrate what 'work safely' at all times means as an installation crafts person.
2. The candidate can explain risk and hazard management and demonstrate the ability to identify and take action to deal with potential hazards.
3. The candidate can establish and maintain productive working relationships.
4. The candidate understands lines of communication, responsibilities and can demonstrate effective communication in the context of working as an Installation crafts person.
5. The candidate can explain and comply with the quality management systems and specifications.
6. The candidate understands codes of conduct and the importance of ethical working and the need to undertake activities in a way that contributes to environmental sustainability.
7. The candidate is able to work effectively as an installation crafts person by demonstrating all employer desirable behaviours.

Knowledge assessment criteria:
The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria:

HEALTH AND SAFETY LEGISLATION AND REGULATIONS

K1.1 The statutory requirements of the main health and safety legislation relevant to the role of installation crafts person.
K1.2 The purpose and nature of risk assessments, method statements, and permit to work systems, and the relevance of local procedures and guidance notes.
K1.3 The consequences for employers and employees of not fulfilling their legal health and safety responsibilities.
K1.4 The importance of personal behaviour in maintaining workplace standards.

PERSONAL SITE SAFETY RESPONSIBILITIES

K1.5 The need for health and safety training for themselves and others in a workplace, the procedures for requesting training and who to ask for help in understanding the work.
K1.6 Where to get information relating to the safe use of equipment and how to ensure equipment is used safely.
K1.7 When personal protective equipment should be used and how to select and use the correct equipment for the work to be undertaken.
K1.8 The potential for different types of injury including vibration injuries and how they can be prevented.
K1.9 The checks which are needed to make sure that portable appliances are safe to use.

K1.10 What a safe system for plant process isolation should including electrical isolation and why low voltage is generally safer in relation to health and safety.
K1.11 The risks from overhead, underground and enclosed utilities/services and how to control them.

FIRST AID

K1.12 First aid procedures as used in a typical company and where information about them can be obtained.
K1.13 Which first aid procedures typically apply in a workplace including:
a) The sources of competent assistance.
b) How to find local first aid facilities.
c) How to alert or summon professional authorities.

EMERGENCY AND EVACUATION PROCEDURES

K1.14 Emergency procedures and evacuation procedures as used in a typical company and where information about them can be obtained from including the different alarms.
K1.15 Contingency reporting documentation and systems including: emergencies, accidents and potential incidents.
K1.16 How to call for expert help in the event of contingencies occurring, following relevant procedures.
K1.17 How to follow shutdown and evacuation procedures promptly and correctly.

HAZARDS AND HAZARD SPOTTING

K1.18 What a hazard is and common types of hazard associated with processes, tools, equipment and materials.
K1.19 Where information on hazard spotting and safety assessment techniques can be found.
K1.20 Hazard spotting and safety assessment techniques, which apply in a typical work location.
K1.21 The effects of hazards on persons, property and the environment.
K1.22 Who to call for appropriate help using warning systems as appropriate in relation to hazards.
K1.23 What must be done when transporting hazardous substances around a site.

MANAGING HAZARDS AND THE ASSOCIATED RISK

K1.24 What the individual's responsibilities are in terms of dealing with and notifying others of hazards including what should be reported, how and the related documentation.
K1.25 The types of actions that are required to deal with and minimise the risks from different hazards.
K1.26 What risk is in relation to health and safety, its importance and the consequences of poor risk management.

MAINTAINING WORKING RELATIONSHIPS

K1.27 Why it is important to create and maintain working relationships.
K1.28 The different problems that can affect working relationships and the actions that can be taken to deal with specific difficulties.

REPORTING LINES, COMMUNICATION AND QUALITY MANAGEMENT

K1.29 The responsibilities of an installation crafts person in a typical workplace and the responsibilities of others within a typical work location.
K1.30 The importance of reporting lines, procedures, systems and documentation and the consequences of failing to follow them.

K1.31 The limits of own responsibility and who to refer to for clarification on issues.
K1.32 Quality management procedures and the importance of following them.
K1.33 The importance of dealing promptly and effectively with problems and reporting those which cannot be solved.

ETHICS AND ENVIRONMENTAL SUSTAINABILITY

K1.34 The purpose of ethics and environmental sustainability in a typical workplace.
K1.35 Codes of conduct, including professional codes of conduct relevant to an installation crafts person.
K1.36 The importance of using resources efficiently and effectively.
K1.37 What working ethically means in terms of treating all people fairly and with respect and displaying honesty, integrity, accuracy and rigour.
K1.38 How the role of an installation crafts person impacts on the environment and how this impact can be reduced.

Skills assessment criteria:

The candidate must demonstrate the following on plant, equipment and system of their selected discipline during the practical assessment of the units mandated for each IPS pathway, specifically the ability to:

SKILLS FOR WORKING SAFELY

S1.1 Work safely at all times complying with statutory health and safety and other relevant guidelines and procedures.
S1.2 Select the correct personal protective equipment for the work to be undertaken.
S1.3 Deal safely with dangers that can be contained using appropriate equipment and materials, in accordance with procedures.

SKILLS FOR MANAGING HAZARDS AND MINIMISING RISK

S1.4 Identify potential hazards in the workplace including hazardous processes, tools, equipment and materials.
S1.5 Safely check for potential hazards in accordance with agreed and approved procedures.
S1.6 Take appropriate action upon identification of a hazard or emergency to minimise the risk from it.
S1.7 Report in accordance with procedures/risk control strategy.

SKILLS FOR WORKING RELATIONSHIPS

S1.8 Develop working relationships with a range of people.
S1.9 Deal with disagreements in an amicable and constructive manner so that effective relationships are maintained.

SKILLS FOR REPORTING LINES, COMMUNICATION AND QUALITY PROCEDURES

S1.10 Keep others informed about work plans and activities which affect them – either formal/informal, written or verbal.
S1.11 If needed, seek assistance in relation to work related activities from others in a polite and courteous way without causing undue disruption to normal working activities.
S1.12 Respond in a timely and positive way when others ask for help or information e.g. prioritise requests, clarify exactly what is required.
S1.13 Follow quality requirements.

S1.14 Deal with problems appropriately if and when they arise.

SKILLS FOR ETHICS AND ENVIRONMENTAL SUSTAINABILITY
S1.15 Treat everyone fairly and with respect.
S1.16 Demonstrate accuracy and rigour when undertaking practical procedures.
S1.17 Deal effectively with resources taking environmental considerations into account.

Behaviours assessment criteria:

The candidate must demonstrate the following as part of the practical assessment of Units IPS02 to IPS12 or provide additional evidence as part of their Qualification portfolio of evidence, specifically:

EMPLOYER DESIRABLE BEHAVIOURS
B1.1 Safety conscious - work safely at all times.
B1.2 Risk aware - manage hazards and minimise risk.
B1.3 Effective communicator - work effectively with others including keeping others informed.
B1.4 Quality focus - ensure work is completed to an appropriate level of quality.
B1.5 Conscientious - follow procedures and complete documentation accurately and correctly.
B1.6 Initiative - deal with problems effectively and highlight those that cannot be solved.
B1.7 Ethical and environmental sustainability behaviours such as:
a) Manage risk to minimise adverse impact to people or the environment.
b) Use resources efficiently and effectively.
c) Treat all people fairly and with respect.
B1.8 Critical thinker – display the ability to use vocational knowledge to deal with issues that arise during practical tasks.

Unit IPS02 Interpret and follow fabrication and installation documentation and procedures including prepare and reinstate the work area.

This unit applies to all pathways.

Learning outcomes:

1. The candidate must demonstrate that they can interpret and follow fabrication and installation specifications, plans and schedules so that they are able to perform the role of a fabrication and installation crafts person effectively.
2. The candidate must demonstrate that they can follow reporting procedures, documentation and completion requirements as required to perform the role of a fabrication and installation crafts person effectively.
3. The candidate can explain and demonstrate how to prepare and reinstate the work area, material and equipment safely and correctly before and after fabrication and installation activities take place.

Knowledge assessment criteria:
The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria:

FABRICATION AND INSTALLATION DOCUMENTATION

K2.1 The principles, uses and conventions of:
- a) Method statements.
- b) Product worksheets.
- c) Technical drawings.
- d) Manufacturer's specifications.
- e) Legislative requirements.
- f) BS/EN standards.
- g) Related specifications.
- h) Risk Assessments:
  - POWRA
    And/or
  - POWLA

K2.2 The information detailed in the diagrams in engineering drawings and related specifications and how it relates to the physical component(s).

K2.3 The diagrams and key information found in:
- a) Parts catalogues.
- b) Fabrication and installation instructions and specifications.
- c) Manufacturer's specifications.
- d) Reference charts and tables.

K2.4 Where to find manufacturer and installation information or additional information that may be necessary

Skills assessment criteria:
The candidate must demonstrate the ability to:

FABRICATION AND INSTALLATION DOCUMENTATION

S2.1 Check the validity of the documentation being used.

S2.2 Interpret and follow specifications, engineering drawings and work instructions including:
- a) Method statements.
- b) Product worksheets.
- c) Technical drawings.
- d) Manufacturer's specifications.
- e) Legislative requirements.
- f) BS/EN standards.
- g) Related specifications.

S2.3 Interpret and follow equipment manuals.

S2.4 Interpret installation plans and schedules.

S2.5 Signing of compliance documentation.

FABRICATION AND INSTALLATION PROCEDURES

S2.6 Follow authorisation processes and procedures with regard to safety critical systems.

S2.7 Follow fabrication, installation and commissioning procedures and report on the completion of activities for each stage.

S2.8 Complete all relevant documentation

in order to undertake installation.

K2.5 Installation plans and schedules and their use.

K2.6 Importance of signing of documentation and the legal consequences and accountabilities.

K2.7 The importance of version control and ensuring documentation is current and valid.

FABRICATION AND INSTALLATION PROCEDURES

K2.8 Typical installation authorisation procedures.

K2.9 The procedures used to report on installation activities and the related reporting documentation. In other words - who to report to, what to report and when to report.

K2.10 The importance of checking and confirming procedures have been followed and documentation correctly completed.

HANDOVER FABRICATION AND INSTALLATION ACTIVITIES

K2.11 Typical handover procedures and environments including:

a) When handover should occur.
b) Related quality control systems and documentation procedures.
c) How to confirm the precise moment of transfer.
d) Why it is important to define the precise moment of transfer.
e) Method and means of handover.
f) The level of detail and information required by different parties for handover.
g) How to confirm the information at handover is accurate and complete, to include:
    a) Quality documentation.
    b) Inspection and test results.
    c) Authorisation process.

PREPARE AND REINSTATE THE WORK AREA

K2.12 The consequences/hazards of incorrectly preparing or reinstating the work areas, material and equipment.

correctly and accurately at all stages to include:

a) Pre-task risk assessments.
b) Authorisation process and procedures.
c) Isolation processes where relevant.
d) Record information and where appropriate test results.
e) Commissioning information.

S2.9 Report any instance where the fabrication and installation activities cannot be fully met or where there are identified defects or variations from the specification which are outside the planned schedule.

S2.10 Check required fabrication and installation reporting is completed correctly once the installation activity is completed and before any handover takes place.

HANDOVER FABRICATION AND INSTALLATION ACTIVITIES

S2.11 Follow appropriate handover procedures, confirming and recording acceptance of responsibility in line with procedures including:

a) Clearly define and obtain agreement on the moment of transfer of responsibility.
b) Communicate handover of control as specified.
c) Make sure information received at the handover is accurate, up-to-date and complete.
d) Seek additional information if there are areas of doubt or lack of clarity.
e) Provide proper support and co-ordination to those transferring control.

PREPARE AND REINSTATE THE WORK AREA

S2.12 Follow safety procedures, risk assessment and methods of work when preparing and reinstating the work area, materials, tools and equipment.

S2.13 Obtain, check against relevant specification and prepare the appropriate tools, materials and equipment and check:

K2.13 The procedures for the connection and operation of applicable services and equipment including but not limited to pneumatic, electric, gas and hydraulic. K2.14 The types of equipment used and explain the care and control procedures. K2.15 How to check materials for correct specification, quantity and quality. K2.16 Material handling techniques and preparation methods. K2.17 Storage methods and procedures. K2.18 Typical waste minimisation and disposal procedures.	a) Quantities. b) That they are in a safe and usable condition. S2.14 Ensure that all necessary service supplies are connected correctly and ready for use. S2.15 Ensure that any stored energy or substances are released correctly and safely, where appropriate. S2.16 Ensure all isolations and disconnections to the equipment are completed in line with the approved procedures (stored energy, substances, air, fluids, gas, mechanical, electrical). S2.17 Provide and maintain safe access to the work area. S2.18 Check the workplace is as expected. S2.19 Ensure that arrangements are made to protect other workers from activities likely to disrupt normal working. S2.20 Deal promptly and effectively with problems and report those that cannot be solved. **SKILLS FOR REINSTATEMENT ONLY** Reinstate the work area to a safe condition taking safety and environmental considerations into account by: S2.21 Correctly disposing of waste materials. S2.22 Storing re-usable materials and equipment in accordance with procedures. S2.23 Ensuring any necessary connections to equipment are established and complete. S2.24 Minimising waste wherever possible.

Unit IPS03 Mark out to the required specification.

Learning outcome: The candidate understands the techniques used when marking out to specification and can mark out components safely and effectively to requirements.

This unit applies to all pathways.

Knowledge assessment criteria:	**Skills assessment criteria**:
The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria: K 3.1 The identification of the correct version of drawings and specifications. K 3.2 The principles, uses and conventions of engineering drawings and related specifications. K 3.3 Surface preparation requirements and methods. K 3.4 The tools, methods and techniques used for marking out. K 3.5 Geometrical construction methods. K 3.6 Pattern development methods.	The candidate must demonstrate the ability to obtain and use the correct information for marking out: S 3.1 Obtain and use the correct information for marking out. S 3.2 Prepare suitable datum and marking out surfaces. S 3.3 Mark out using approved methods. S 3.4 Check the marking out complies with the specification.

Unit IPS04 Shape components by material removal using hand tools.

Learning outcome: The candidate understands how to shape components by material removal using hand tools and can shape components safely and effectively to requirements and procedures.

This unit applies to all pathways.

Knowledge assessment criteria: The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria:	**Skills assessment criteria**: The candidate must demonstrate the ability to:
K4.1 Methods and techniques of shaping materials using hand tools. K4.2 Types and application of hand and powered tools. K4.3 Compliance checking methods and techniques. K4.4 How to identify defects in components. K4.5 Quality control systems and documentation procedures.	S4.1 Follow relevant specifications for the component to be produced. S4.2 Shape the materials using appropriate methods and techniques. S4.3 Identify and rectify defects were appropriate. S4.4 Check that material shaping has been completed to the required specification.

Unit IPS05 Forming materials by applied pressure.

Learning outcome: The candidate understands how to form materials by applying pressure and is able to form materials safely and effectively to requirements.

This unit applies to the following pathways: Pipefitting and Plating.

Knowledge assessment criteria: The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria:	**Skills assessment criteria**: The candidate must demonstrate the ability to:
K5.1 Engineering drawings and specifications. K5.2 Calculation of material gain, bending allowance and nominal bore. K5.3 Pressure forming methods and techniques. K5.4 Materials and their characteristics with regard to methods for pressure forming. K5.5 Methods of moving long, heavy and uneven weight distributed pipes. K5.6 Quality control procedures and recognition of defects which may be caused by pressure forming process. K5.7 Compliance checking methods and techniques.	S 5.1 Follow the correct component drawing and specifications for the component to be produced. S 5.2 Determine what has to be done and how this will be achieved. S 5.3 Use the appropriate tools and equipment for the pressure forming operations. S 5.4 Bend materials to the required specification using appropriate tools, methods and techniques. S 5.5 Check that the bending operations have been completed in line with the specification and standard.

Unit IPS06 Shape components by material removal using machine tools.

Learning outcome: The candidate understands how to shape components by material removal using machine tools and is able to do so safely and effectively to specification.

This unit applies to the following pathway: Mechanical Fitting.

Knowledge assessment criteria:
The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria:

K6.1 The cutting characteristics of materials and the selection of speeds and feeds for different materials.
K6.2 How to sharpen, set and adjust machine tool operating parameters.
K6.3 The equipment, methods and techniques used to set work holding devices, work pieces and cutting tools.
K6.4 How to correctly set and adjust the work pieces in order to perform to machinery techniques.
K6.5 How to correctly set machine tool operating parameters to achieve component specification.
K6.6 How to check that all the required safety mechanisms and machine guards are in place.
K6.7 The appropriate methods and techniques used to shape engineering products by material removal using machine tools.
K6.8 The methods, techniques and procedures used to check that machined components comply with the specification.
K6.9 Quality assurance and Quality Control procedures.

Skills assessment criteria:
The candidate must demonstrate the ability to:

S 6.1 Follow the relevant specifications for the component to be produced.
S 6.2 Determine what has to be done and how the machine will be set to achieve the specification.
S 6.3 Sharpen tools to specification.
S 6.4 Mount and secure the tooling to the appropriate points on the machinery.
S 6.5 Set and adjust the machine tool operating parameters to produce components to the specification.
S 6.6 Check that all safety mechanisms are in place and that the equipment is set correctly for the required operations.
S 6.7 Operate the machine tool controls safely and correctly in line with procedures.
S 6.8 Produce components to the required quality and specification.
S 6.9 Carry out quality sampling checks in accordance with procedures.
S 6.10 Deal promptly and effectively with problems and report those that cannot be solved.

Unit IPS07 Assemble components.

Learning outcome: The candidate understands how to assemble components and is able to do so safely and effectively to meet requirements, specifications and procedures.

This unit applies to the following pathways: Pipefitting, Plating and Mechanical fitting.

Knowledge assessment criteria: The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria:	**Skills assessment criteria**: The candidate must demonstrate the ability to:
K7.1 Assembly methods and techniques. K7.2 Methods of setting up and aligning components using appropriate tools and equipment. K7.3 Fastenings, types, rating, identification, corrosion considerations, compatibility, and location. K7.4 Sequential tightening and torqueing methods and techniques (controlled bolting). K7.5 Compliance checking methods and techniques. K7.6 How to identify defects in components. K7.7 Quality control procedures and documentation procedures. K7.8 What action to take if one of the components is discovered to be unserviceable on assembly.	S7.1 Follow relevant instructions, assembly drawings and specifications. S7.2 Ensure the specified components are available and meet quality standards. S7.3 Assemble the components in the correct sequence, positions using approved methods. S7.4 Secure components using the specified connectors and securing devices. S7.5 Sequential tightening and torqueing methods and techniques. S7.6 Check the completed assembly to ensure that all operations have been completed, that it meets the specification.

Unit IPS08 Position and Install plant, equipment and systems.

Learning outcome: The candidate understands how to position and install components and assemblies and is able to do so safely and effectively to requirements.

This unit applies to all pathways.

Knowledge assessment criteria: The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria:	**Skills assessment criteria**: The candidate must demonstrate the ability to:
K8.1 Installation methods and techniques. K8.2 Compliance checking methods and techniques. K8.3 How to identify defects in components. K8.4 Quality control procedures and documentation procedures.	S8.1 Interpret relevant drawings and specifications for the installation being carried out. S8.2 Select and use the correct tools and equipment for the installation operations and check they are in a safe useable condition. S8.3 Install position and secure the components in line with specification. S8.4 Ensure all necessary connections to the equipment are complete. S8.5 Check that the installation is complete and all components are free from damage.

Unit IPS09 Connect wiring systems.

Learning outcome: The candidate understands how to connect wiring systems and is able to do so safely and effectively to requirements.

This unit applies to the following pathway: Electrical fitting.

Knowledge assessment criteria:
The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria:

- K9.1 How to ensure the correct version and most up to date relevant standards, specifications and wiring diagrams are being used.
- K9.2 The principles, uses and conventions of wiring diagrams and related specifications.
- K9.3 Methods, procedures and complexities of connecting wiring systems and equipment.
- K9.4 Safe connection methods.
- K9.5 Reporting lines, procedures, documentation and control procedures.

Skills assessment criteria:
The candidate must demonstrate the ability to:

- S9.1 Identify and confirm the correct version of the relevant standards, specifications and wiring diagrams.
- S9.2 Interpret and follow the relevant wiring diagrams, standards and specifications.
- S9.3 Accurately identify the means of electrical isolation and carry out the isolation in-line with approved procedures.
- S9.4 Make connections in accordance with specifications or IEE wiring regulations as specified in the current British Standard for electrical installations.
- S9.5 Ensure that all necessary connections to the equipment are complete.
- S9.6 Check the connections are electrically and mechanically sound and ensure they are identified correctly and clearly.

Unit IPS10 Test the performance and condition of installed components and assemblies.

Learning outcome: The candidate understands how to test the performance and condition of installed components and assemblies using testing processes safely, effectively and to requirements.

This unit applies to the following pathways: Pipefitting, Mechanical Fitting and Electrical Fitting.

Knowledge assessment criteria:
The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria:

K10.1 The principles and uses of test regulations, standards and specifications.
K10.2 How to identify the methods and procedures used when inspecting and testing installations.
K10.3 How to select and use the appropriate testing equipment.
K10.4 Calibration of equipment and authorisation procedures.
K10.5 Testing and analysis methods and procedures.
K10.6 Environmental controls relating to testing.
K10.7 How to record results in line with procedures.
K10.8 Reporting documentation and procedures.

Skills assessment criteria:
The candidate must demonstrate the ability to:

S10.1 Plan and agree the schedule for the inspecting and testing procedures to be carried out with the appropriate people.
S10.2 Interpret the required performance criteria for the plant, equipment and system in line with the regulations, standards and specifications.
S10.3 Interpret and follow the correct procedures for use of tools and equipment.
S10.4 Confirm the installation is in accordance with the appropriate regulations, standards and specifications.
S10.5 Set up and carry out tests within the agreed timescales.
S10.6 Record the test results in accordance with the regulations, standards and specifications.

Unit IPS11 Dismantle assemblies, plant, equipment and systems.

Learning outcome: The candidate understands how to dismantle assemblies, plant, equipment and systems and is able to do so safely and effectively to requirements.

This unit applies to all pathways.

Knowledge assessment criteria:
The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria:

K11.1 Component removal methods, techniques and procedures.
K11.2 How to ensure that any stored energy or substances are released safely.
K11.3 Installing support systems for dismantling.
K11.4 The tools and techniques necessary to carry out the dismantling correctly and in accordance with engineering drawings and maintenance manuals.
K11.5 Component defects and how to check for them.
K11.6 Methods and techniques for labelling and storing components for reuse.
K11.7 Methods and techniques of preventing the ingress of foreign materials to stored components.
K11.8 Disposal of waste & redundant/obsolete equipment.
K11.9 Reporting documentation and control procedures.

Skills assessment criteria:
The candidate must demonstrate the ability to:

S11.1 Interpret and follow the correct component drawing and specifications for the dismantling operations.
S11.2 Establish and where appropriate mark components for re-assembly.
S11.3 Make all isolations and disconnections in line with approved procedures.
S11.4 Ensure that any stored energy or substances are released safely and correctly.
S11.5 Installing support systems.
S11.6 Remove the required components in the correct sequence using the correct tools and techniques.
S11.7 Take appropriate precautions to prevent damage during removal including the ingress of foreign materials.
S11.8 Determine the condition of the removed components against specification.
S11.9 Identify and record components that require replacing.
S11.10 Disposal of waste, redundant/obsolete equipment in line with processes, procedures and regulations.
S11.11 Correctly record and store components for reuse.

Unit IPS12 Join materials by manually controlled welding processes.

Learning outcome: The candidate understands how join materials by manually controlled welding processes and is able to join materials by manually controlled welding.

This unit applies to the following pathway: Plating.

Knowledge assessment criteria: The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria:	**Skills assessment criteria**: The candidate must demonstrate the ability to:
K12.1 Assembly of welding equipment and operation checks. K12.2 Describe how to interpret specifications and joining procedures. K12.3 Thermal joining processes and equipment. K12.4 Material handling, preparation and finishing methods and techniques. K12.5 Materials and their joining characteristics. K12.6 Equipment setting operating and care procedures. K12.7 Quality control and test procedures for detection of defects in joints.	S12.1 Interpret and follow the relevant joining procedure and job instructions. S12.2 Ensure that the joint preparation complies with the specification. S12.3 Ensure that joining and related equipment and consumables are as specified and fit for purpose. S12.4 Make joints as specified using the appropriate welding technique. S12.5 Produce joints of the required quality and of specified dimensional accuracy. S12.6 Check that the joint meets specification. S12.7 Shut down equipment to a safe condition on completion of joining activities. S12.8 Complete records in line with procedures.

Unit IPS13 Diagnose and correct electrical faults.

Learning outcome: The candidate understands how to diagnose faults and is able to correct the electrical faults in plant.

This unit applies to the following pathways: Electrical Fitting.

Knowledge assessment criteria: The candidate must demonstrate an understanding of the following in order to satisfy the skills assessment criteria:	**Skills assessment criteria**: The candidate must demonstrate the ability to:
K13.1 Wiring diagrams and specifications detailing expected values and norms. K13.2 The methods and procedures to safely diagnose and correct faults. K13.3 Typical faults and how to rectify these. K13.4 How to select the appropriate test equipment and tools and how to use them. K13.5 Reporting lines and procedures. K13.6 Reporting documentation and control procedures.	S13.1 Obtain clear and detailed information relating to the faults including the specification and condition of the faulty electrical equipment. S13.2 Advise appropriate people clearly of the potential disruption and consequences of carrying out the diagnosis and correction of faults. S13.3 Isolate electrical supply in line with procedure. S13.4 Carry out tests on the installed equipment, safely, to identify the fault. S13.5 Agree the repairs, costs and feasibility with the appropriate people in line with procedures. S13.6 Correct the fault, in line with specifications and policy agreed with appropriate people. S13.7 Ensure that all necessary connections to the equipment are complete. S13.8 Leave the installation safe in accordance with industry regulations. S13.9 Comply with reporting documentation and control procedures.