



## **The NI Apprenticeship in Fabrication and Welding Engineering**

DRAFT



## Framework for Northern Ireland

### 1. Occupational Framework Title

NI Apprenticeship in Fabrication and Welding Engineering

### 2. Occupational Profile

Fabrication and Welding apprentices work across a broad range of job roles in the sector, such as a Sheet Metal Worker, Plater/Fabricator or Welder.

#### CORE OCCUPATIONAL STANDARD

Across the job roles in Fabrication and Welding, apprentices will be able to understand and demonstrate the following core knowledge, skills, behaviours and transversal skills relevant to their chosen specialism.

#### Core Knowledge

- Understand the typical hazards that can occur
- What health, safety and environmental procedures and precautions to follow
- How to use engineering data, drawings and reports
- How to set up, operate and close down equipment correctly
- What tools/equipment/accessories are required, how to check the condition and use them
- The basic principles of how the equipment functions and any tools/accessories, and typical operations that they can perform
- The procedure for obtaining materials and other consumables required
- The correct methods of moving or lifting bulky fabrications
- Appropriate checking/ test methods and equipment
- How to handle and dispose of unwanted components, waste materials and substances safely
- How to deal with faults and problems
- How to analyse test results
- How to evaluate and record results

#### Core Skills

- Follow the relevant instructions, assembly drawings, specifications
- Use the appropriate tools, equipment, materials, components and consumables and check they are in a safe and usable condition
- Check that all safety procedures and mechanisms are in place
- Operate the equipment safely and correctly and produce components to the required quality
- Carry out quality sampling checks at suitable intervals
- Complete the relevant documentation

## Core Behaviours and Transversal Skills

The following transversal skills and behaviours should be developed through naturally occurring activities in the job role within the apprenticeship. They should be included and recorded in the competence and knowledge qualifications.

### Behaviours

- A strong work ethic
- Dependability
- Integrity
- Positive attitude
- Responsibility
- Motivation
- Team player
- Honesty and commitment

### Skills

- Literacy
- Numeracy
- Communication
- Digital Skills
- Self-management
- Working with others
- Work professionalism
- Problem solving and decision making

## Specialist Pathways

Specialist Pathway	Knowledge	Skills
<i>Sheet Metal Worker</i>	<p>Principles of marking out, developing basic shapes from flat sheet, plate or rolled section materials</p> <p>The material characteristics and process considerations that need to be taken into account when marking out, cutting and shaping and bonding sheetmetal</p> <p>The various methods of securing/bonding the assembled components</p>	<p>Mark out using appropriate methods</p> <p>Cut, shape, bend and form the materials using appropriate tools, methods and techniques</p> <p>Use the appropriate methods and techniques to assemble the components in their correct positions</p> <p>Secure the components using the specified connectors and securing devices</p> <p>Carry out any bonding operations using the specified processes and techniques to position and bond the materials in their correct locations</p>
<i>Plater/Fabricator</i>	<p>Principles of marking out, developing basic shapes from flat sheet, plate or rolled section materials</p> <p>The material characteristics and process considerations that need to be taken into account when marking out, cutting and shaping and bonding platework/pipework</p> <p>The various methods of securing/joining the assembled</p>	<p>Use the correct methods to move or lift bulky fabrications</p> <p>Mark out using appropriate methods</p> <p>Cut, shape, bend and form the materials using appropriate equipment, methods and techniques</p> <p>Use the appropriate methods and techniques to assemble the components in their correct positions</p> <p>Secure the components using the</p>

	components	specified connectors and securing devices Make fillet welded joints using the specified techniques for a manual welding process
<i>Welder</i>	The basic principles of the relevant mechanised and automated welding processes The types, sizes, profiles, selection and maintenance of electrodes Types and features of welded joints in plate, tube and sections The techniques of operating the welding equipment to produce a range of joints in the various joint positions Weld inspection and test procedures	Set up the handling, work-holding and associated equipment to achieve correct joint positioning Set and adjust the machine operating conditions to achieve joints of the required quality and within specified dimensional accuracy Use the appropriate thermal joining technique to make the joints to the required quality and specified dimensional accuracy

### 3. Entry requirements

As a guide, the NI Apprenticeship in Fabrication and Welding Engineering is suitable for applicants who have five GCSEs grade C (or equivalent new grade 4) or above including Maths, English, and a Science. Candidates may be considered on an exceptional basis for entry if they do not meet the stated requirements. If applicants have shown an interest in engineering, or have previous work experience or employment in the sector, then this would be relevant to include in their application.

Typically applicants may have:

- completed a NI Traineeship in Fabrication and Welding Engineering **or**
- completed a NI Traineeship in another related area **or**
- Essential Skills qualifications **or**
- applied as a direct entry from school

and be

- willing to undertake a course of training both on-the-job and off-the-job and apply this learning in the workplace
  - able to follow instructions and diagrams, with literacy and numeracy to work with data
  - a good team worker, who can also work under own initiative
  - keen and motivated to work in an engineering or manufacturing environment
- Apprentices must complete the NVQ Extended Diploma at Level 3 as it contains the Performing Engineering Operations (PEO) foundation basic training required by all engineering apprentices. However if the relevant PEO units have already been achieved and certificated in a previous programme, then they will be able to credit these against the requirements of the Extended Diploma.
  - The Level 3 NVQ Diploma may only be used by adult apprentices 25 years old and over, or apprentices 16-24 years who have achieved a NI Level 2 Traineeship in a relevant occupation, who



must:

- a) have received appropriate health and safety training relevant to work area/environment that they will be working and
- b) have worked in an engineering or manufacturing environment and have skills knowledge and understanding broadly comparable to relevant practical NVQ/SVQ Level 2 units detailed in Performing Engineering Operations, Performing Manufacturing Operations or other skill specific NVQ/SVQ Level 2 in engineering or manufacturing.

#### 4. Duration

This Apprenticeship in Fabrication and Welding Engineering typically takes 42 months for apprentices starting this apprenticeship with no or little engineering experience.

Adult apprentices or those with relevant experience or who have already achieved some of the required qualifications may require less time to complete the programme.

#### 5. National Occupational Standards (NOS)

This Apprenticeship in Fabrication and Welding Engineering is underpinned by National Occupational Standards (NOS) which indicate the standards of competency performance that individuals must achieve when carrying out functions in the workplace, together with specifications of the underpinning knowledge and understanding.

The relevant NOS for this framework are in Fabrication and Welding Suite 3, where:

- the competency qualifications standards are linked directly to the NOS
- the underpinning knowledge qualification specifications are linked where possible to the NOS

Specific details of these can be found in [Appendix 1](#).

#### 6. Qualifications

Qualifications are based on competency and knowledge. Competence and technical knowledge are separately identified and separately assessed to ensure apprentices not only demonstrate the competence to do the job, but also develop the underpinning technical skills, knowledge and understanding of the wider industry and market.

If apprentices have already achieved any of the qualifications, or have relevant experience of working in the sector, this prior achievement can be recognised.

The relevant competency qualifications derived from these NOS are:

- Level 3 NVQ Extended Diploma in Fabrication and Welding Engineering
- Level 3 NVQ Diploma in Fabrication and Welding Engineering
- SVQ 3 Fabrication and Welding Engineering at SCQF Level 6.

They contain pathways relevant to the job roles listed in Section 2.

This table summarises what qualifications must be taken – qualification details are given in [Appendix 2](#).

Competency	Knowledge (Technical Certificate)
<p>Apprentices must complete a work based NVQ L3/SVQ 3 as selected by their employer and offered by one of these Awarding Organisations:</p> <ul style="list-style-type: none"> <li>• EAL</li> <li>• City &amp; Guilds</li> <li>• Pearson</li> <li>• SQA Awards</li> </ul>	<p>Apprentices must complete one of the Technical Certificates listed in <a href="#">Appendix 2</a>.</p> <p>Each Technical Certificate is relevant to both NVQ and SVQ qualifications, so there is no restriction by qualification choice.</p>

## 7. Assessment

Qualifications must be assessed and this can be through a variety of different methods. Some may be assessed internally (such as by tests or project work) or externally (such as by exams) or require a portfolio of evidence.

The competence qualifications must be assessed in a work environment. The knowledge qualifications may have some type of external assessment.

Assessors must hold the Level 3 Award in Assessing Competence in the Work Environment and have current, verifiable, relevant and sufficient technical competence to evaluate and judge performance and knowledge evidence requirements.

## 8. Enhancements

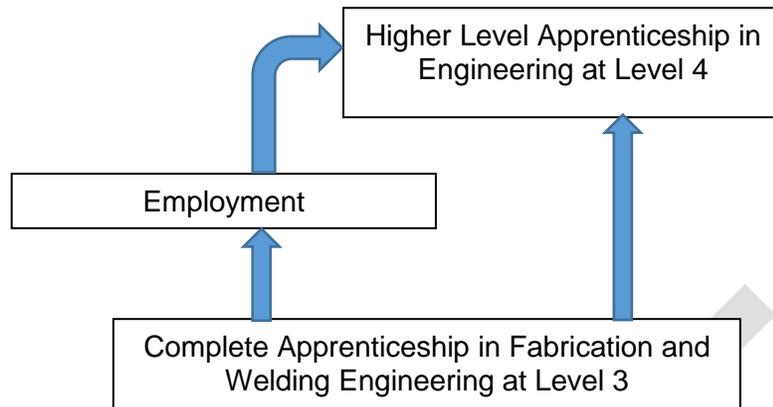
No additional enhancements have been identified by employers to date

## 9. Progression

When apprentices have completed this framework, they have two options open to them.

They can gain employment within an engineering company, perhaps in one of the skilled job roles described earlier, leading to internal promotion to team leader or supervisory roles. In time, they may also choose to complete a Higher Level Apprenticeship in Engineering.

Alternatively it gives an opportunity to progress directly to a Higher Level Apprenticeship in Engineering.



The following websites are useful to help apprentices plan career progression:

[www.apprenticeships.org.uk/types-of-apprenticeships/engineering-and-manufacturing-technologies.aspx](http://www.apprenticeships.org.uk/types-of-apprenticeships/engineering-and-manufacturing-technologies.aspx)

[nationalcareersservice.direct.gov.uk/advice/planning/jobfamily/Pages/manufactureandengineering.aspx](http://nationalcareersservice.direct.gov.uk/advice/planning/jobfamily/Pages/manufactureandengineering.aspx)

## Appendix 1

The Level 3 NVQ Diploma in Fabrication and Welding Engineering qualification is derived from the following standards:

	URN	Title of the Occupational Standard
Core NOS for all pathways	SEMMAN12301	Complying with statutory regulations and organisational safety requirements
	SEMMAN2302	Using and interpreting engineering data and documentation
	SEMMAN303	Working efficiently and effectively in engineering
<b>Manual Welding Pathway</b>  Available NOS	SEMFWE304	Welding materials by the Manual Metal Arc process
	SEMFWE305	Welding materials by the semi-automatic MIG/MAG and flux cored arc processes
	SEMFWE306	Welding materials by the manual TIG and plasma arc welding process
	SEMFWE307	Welding materials by the manual oxy/fuel gas welding process
	SEMFWE308	Welding pipe/tube using multiple manual arc welding processes
	SEMFWE309	Welding plate using multiple manual arc welding processes
<b>Welding Machine Setting and Operating Pathway</b>  Available NOS	SEMFWE310	Preparing mechanised arc welding equipment for production
	SEMFWE311	Preparing resistance spot, seam and projection welding machines for production
	SEMFWE312	Preparing laser welding machines for production
	SEMFWE313	Preparing electron beam welding machines for production
	SEMFWE314	Preparing friction welding machines for production
	SEMFWE315	Preparing brazing machines for production
	SEMFWE316	Welding materials with mechanised arc welding equipment
	SEMFWE317	Welding materials using resistance spot, seam and projection welding machines
	SEMFWE318	Welding materials using laser welding machines
	SEMFWE319	Welding materials using electron beam welding machines
	SEMFWE320	Welding materials using friction welding machines
	SEMFWE321	Joining materials using brazing machines
	SEMETS343	Resolving Engineering Problems
	SEMETS345	Implementing Engineering Activities
SEMETS346	Monitoring Engineering Activities	
<b>Sheet Metalworking (3 mm or less) Pathway</b>  Available NOS	SEMFWE322	Marking out components for metalwork
	SEMFWE323	Cutting sheetmetal to shape using hand and machine tools
	SEMFWE324	Forming sheetmetal using hand and machine tools
	SEMFWE325	Producing sheetmetal assemblies
	SEMFWE326	Heat treating materials for fabrication activities
	SEMFWE327	Developing and marking out templates for metalwork
	SEMFWE328	Joining fabricated components using mechanical fasteners
	SEMFWE329	Bonding engineering materials using adhesives
	SEMFWE330	Joining materials by resistance spot welding
	SEMFWE331	Producing fillet welded joints using a manual welding process
	SEMFWE366	Operating CNC fabrication equipment

<b>Plateworking (3 mm upwards) Pathway</b>  Available NOS	SEMFWE322	Marking out components for metalwork
	SEMFWE327	Developing and marking out templates for metalwork
	SEMFWE328	Joining fabricated components using mechanical fasteners
	SEMFWE331	Producing fillet welded joints using a manual welding process
	SEMFWE332	Cutting plate and sections using shearing machines
	SEMFWE333	Cutting and shaping materials using portable thermal cutting equipment
	SEMFWE334	Cutting materials using saws and abrasive discs
	SEMFWE335	Bending and forming plate using press brakes or bending machines
	SEMFWE336	Forming platework using power rolling machines
	SEMFWE337	Producing and finishing holes using drilling machines
	SEMFWE338	Producing platework assemblies
	SEMFWE339	Slings, lifting and moving materials and components
	SEMFWE366	Operating CNC fabrication equipment

<b>Pipe and Tube Fabrication Pathway</b>  Available NOS	SEMFWE322	Marking out components for metalwork
	SEMFWE327	Developing and marking out templates for metalwork
	SEMFWE328	Joining fabricated components using mechanical fasteners
	SEMFWE329	Bonding engineering materials using adhesives
	SEMFWE333	Cutting and shaping materials using portable thermal cutting equipment
	SEMFWE334	Cutting materials using saws and abrasive discs
	SEMFWE337	Producing and finishing holes using drilling machines
	SEMFWE344	Forming pipework by machine bending
	SEMFWE345	Producing pipe fabrications
	SEMFWE346	Producing socket and flange fillet welded joints in pipe using a manual welding process

<b>Welding Engineering Support Pathway</b>  Available NOS	SEMEM360	Determining welding and related technical requirements to achieve objectives
	SEMEM361	Planning welding production resources and activities
	SEMEM362	Implementing welding production methods and procedures
	SEMEM363	Solving welding problems in production
	SEMEM364	Monitoring welding activities in production
	SEMEM365	Inspecting welded components or structures for visual quality and dimensional accuracy

## Appendix 2

**Qualifications – Apprentices need to complete:**

**One Competency qualification    and    One Knowledge Certificate**

Competency		Knowledge (Technical Certificate)	
Title	QAN	Title	QAN
<p><b>This qualification allows candidates to achieve PEO Level 2 foundation training (if required or not already achieved by a Traineeship)</b></p>			
EAL Extended Diploma in Fabrication and Welding Engineering	600/9932/X	EAL Level 3 Certificate in Engineering Technologies	601/5800/1
		<b>or</b>	
City & Guilds Level 3 NVQ Extended Diploma in Fabrication and Welding Engineering	601/0083/7	EAL Level 3 Diploma in Engineering Technologies	601/5801/3
		<b>or</b>	
		EAL Level 3 Extended Diploma in Engineering Technologies	601/5802/5
		<b>or</b>	
<p><b>OR</b> this qualification for use in the framework by older apprentices aged 25 years and above</p>			
EAL Level 3 NVQ Diploma in Fabrication and Welding	501/1687/3	EAL Level 3 Technical Extended Diploma in Engineering Technologies	603/0564/2
		<b>or</b>	
City & Guilds Level 3 NVQ Diploma in Fabrication and Welding	601/0078/3	EAL Level 3 Diploma in Fabrication and Welding Engineering Technology	501/1131/0
		<b>or</b>	
<p><b>OR</b> these qualifications for use in the framework by apprentices aged 16 years and above</p>		Pearson BTEC Level 3 Diploma in Advanced Manufacturing Engineering (Development Technical Knowledge)	601/9054/1
		<b>or</b>	



EAL SVQ 3 Fabrication and Welding Engineering at SCQF Level 6      GL3N 23

Pearson BTEC Level 3 Extended Diploma in Advanced Manufacturing Engineering (Development Technical Knowledge)      601/9060/7

SQA SVQ 3 Fabrication and Welding Engineering at SCQF Level 6      GL6F 23

**or**  
City & Guilds Level 3 Diploma in Engineering      600/0882/9

**or**  
NEW - ABC Level 3 Certificate in Fabrication and Welding Practice      603/2258/5

**or**  
NEW - ABC Level 3 Diploma in Fabrication and Welding Practice      603/2259/7

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