

The NI Traineeship in Fabrication and Welding Engineering

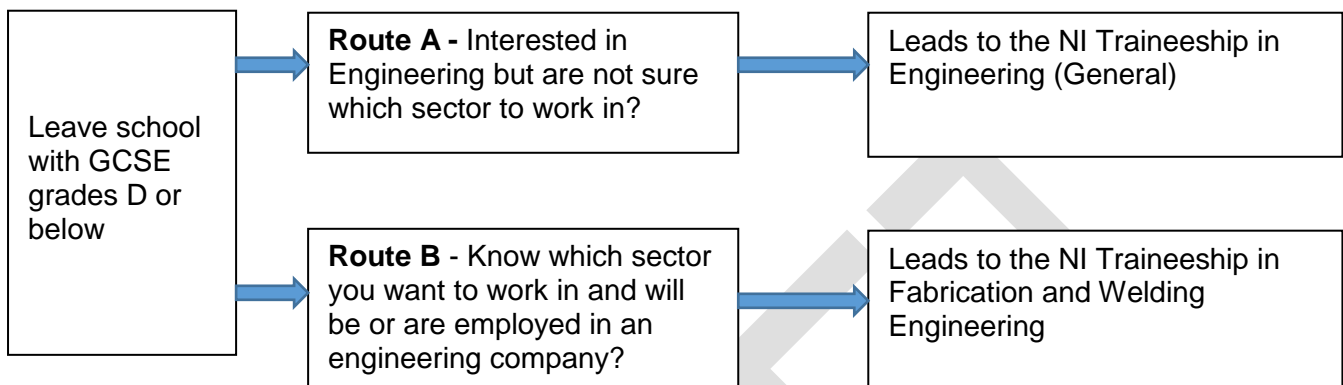
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Framework for Northern Ireland

1. Occupational Framework Title

NI Traineeship in Fabrication and Welding Engineering

There are two different routes through this framework. Learners will complete one of the following routes – A or B, depending on their GCSE grades, experience and interests.



• Route A - NI Traineeship in Engineering (General)

This Traineeship is for learners who have left school with GCSE grades D (or equivalent new grade 3) or below in some subjects, with an interest in Engineering but are not sure which sub-sector to work in. They will:

- be unemployed status
- attempt to improve their GCSE grades to a minimum of a Grade C (or equivalent new grade 4) if required
- undertake work experience - ideally in engineering companies
- develop basic engineering competency skills by completing a L2 qualification
- develop a knowledge of engineering by completing an engineering technical certificate
- develop employability skills such as CV writing, interview techniques, working with others and problem solving, some Transversal/Transferable Skills

• Route B - The NI Traineeship in Fabrication and Welding Engineering

This Traineeship is for learners who have left school with GCSE grades D (or equivalent new grade 4) or below in key subjects and are employed in an engineering company. They will:

- be employed by an engineering company
- develop basic engineering competency skills by completing a Level 2, or a work based NVQ/SVQ L2 as selected by their employer (employer to select relevant units in either Performing Engineering Operations (PEO) or a Level 2 Fabrication and Welding NVQ/SVQ)
- develop a knowledge of engineering by completing an engineering technical certificate
- developed a range of Transversal/Transferable Skills

Whichever route you choose will give you the opportunity to do a variety of job roles, such as the ones described in the following Section 2.

2. Occupational Profile

Fabrication and Welding trainees work across a broad range of job roles in the sector, such as a Fitter Welder, Pipe Fitter, Maintenance Welding Operative or in semi-skilled roles of Sheet Metal Worker or Welder/Fabricator (thick plate).

CORE OCCUPATIONAL STANDARD

Across the job roles in Fabrication and Welding, trainees 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 procedure for obtaining materials and other consumables required
- Appropriate inspection/ test methods and equipment required
- How to handle and dispose of unwanted components, waste materials and substances safely
- How to deal with faults and problems
- How to detect defects
- How to 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>Fitter Welder/ Maintenance Welding Operative</i>	<p>The basic principles of the manual/ automated/mechanised welding processes and equipment used</p> <p>The types and maintenance of electrodes and consumables</p> <p>The types of welded joints to be produced</p> <p>Methods of setting up the joint to achieve correct location of components and control of distortion</p>	<p>Use the thermal joining equipment correctly and safely</p>
<i>Sheet Metal Worker (semi- skilled)</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/joining the assembled components</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 specified connectors and securing devices</p> <p>Make fillet welded joints using the specified techniques for a manual welding process</p>
<i>Welder/ Fabricator (thick plate - semi skilled)</i>	<p>The basic principles of the manual/ automated/mechanised welding processes and equipment used</p> <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</p> <p>The various methods of securing/joining the assembled components</p>	<p>Mark out using appropriate methods</p> <p>Use the correct methods of moving or lifting bulky fabrications</p>
<i>Pipe Fitter</i>	<p>Principles and methods of marking out pipework</p> <p>The assembly, fitting and joining methods, techniques and procedures</p>	<p>Use the correct methods to move or lift bulky pipes</p> <p>Use the appropriate methods and techniques to assemble the</p>

	<p>to be used, and the importance of keeping to them</p> <p>Types of machines used to bend and form the pipe and how to produce the various bends required</p> <p>Characteristics of the various materials that are to be used for the bending operations</p> <p>The range of pipe fittings that can be used, and how to identify them</p> <p>The methods used to connect and assemble pipework</p>	<p>components in their correct positions</p> <p>Secure the components using the specified connectors and securing devices</p>
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3. Entry requirements

As a guide, the NI Traineeship in Fabrication and Welding Engineering is suitable for applicants who have left school with GCSE grades D (or equivalent new grade 3) or below in key subjects 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 must 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
- able to develop transversal/transferable skills

4. Duration

Both routes in this Fabrication and Welding Engineering traineeship typically take 24 months for trainees starting this traineeship with no or little engineering experience.

Adult trainees 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 Traineeship in Fabrication and Welding Engineering is underpinned by National Occupational Standards (NOS) which indicate the standards of competency performance that trainees 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 the Performing Engineering Operations Suite 2 and Fabrication and Welding Engineering and Installation Suite 2, 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 - Each qualification must be identified by Title, Level and the Qualification Accreditation Number (QAN)

Qualifications are based on competency and knowledge. Competence and technical knowledge are separately identified and separately assessed to ensure trainees 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 trainees 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 2 NVQ/SVQ Diploma in Performing Engineering Operations
- Level 2 NVQ Diploma in Fabrication and Welding Engineering (only suitable for employed trainees)
- SVQ 2 Fabrication and Welding Engineering at SCQF Level 5

They contain pathways relevant to the job titles listed above.

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

Competency	Knowledge (Technical Certificate)
<p>Route A Trainees must complete a PEO L2 qualification offered by one of these Awarding Organisations:</p> <ul style="list-style-type: none"> ▪ EAL ▪ City & Guilds ▪ Pearson ▪ SQA Awards <p>Route B Trainees must complete either:</p> <ul style="list-style-type: none"> • a PEO L2 qualification (as in Route A) with units relevant to their job role <p>or</p> <ul style="list-style-type: none"> • a work based NVQ/SVQ L2 in Fabrication and Welding Engineering as selected by their employer and offered by one of these Awarding Organisations: ▪ EAL ▪ City & Guilds 	<p>Route A or Route B Trainees must complete one of the Technical Certificate listed in Appendix 2</p> <p>Each Technical Certificate is relevant to both Route A and Route B, so there is no restriction by route 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 competency qualifications must be assessed in a work environment. The knowledge qualification 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

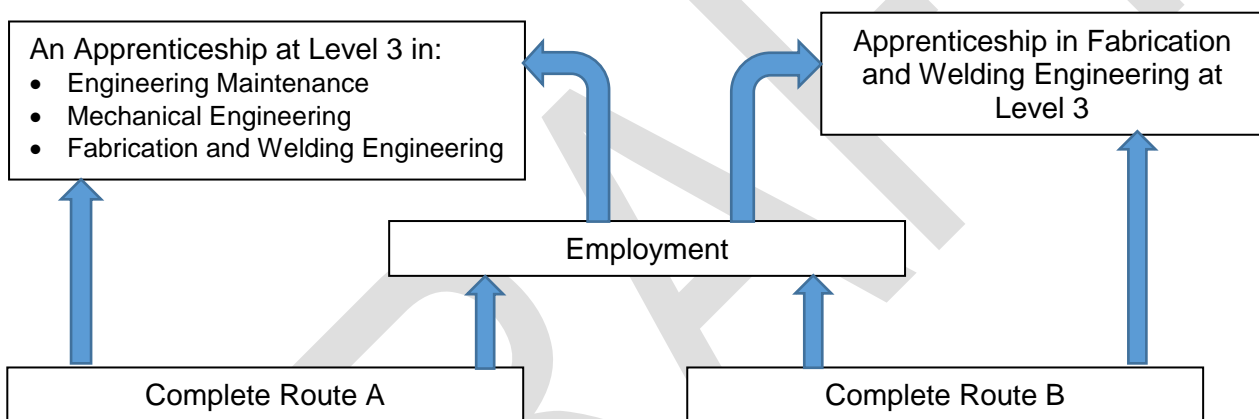
9. Progression

When trainees have completed this framework, either through Route A or Route B, they have two options open to them.

They can gain employment within an engineering company, perhaps in one of the semi-skilled job roles described earlier, leading to internal promotion to team leader or supervisory roles. In time, they may also choose to complete an Apprenticeship at Level 3.

Alternatively it gives an opportunity to progress directly to a Level 3 Apprenticeship. The general nature of the PEO Level 2, combined with relevant work experience, allows trainees to move between and across sectors.

Employed trainees completing Route B of the Level 2 Traineeship can progress to the Level 3 Apprenticeship in Welding and Fabrication Engineering.



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

www.apprenticeships.org.uk/types-of-apprenticeships/engineering-and-manufacturing-technologies.aspx

nationalcareersservice.direct.gov.uk/advice/planning/jobfamily/Pages/manufactureandengineering.aspx

Appendix 1

The Level 2 NVQ Diploma in Performing Engineering Operations 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
	SEMPEO202	Working efficiently and effectively in engineering
	SEMPEO203	Using and communicating technical information
Available NOS	SEMPEO204	Producing mechanical engineering drawings using a CAD system
	SEMPEO205	Producing components using hand fitting techniques
	SEMPEO206	Producing mechanical assemblies
	SEMPEO207	Forming and assembling pipework systems
	SEMPEO208	Carrying out aircraft detail fitting activities
	SEMPEO209	Installing aircraft mechanical fasteners
	SEMPEO210	Producing aircraft detail assemblies
	SEMPEO211	Preparing and using lathes for turning operations
	SEMPEO212	Preparing and using milling machines
	SEMPEO213	Preparing and using grinding machines
	SEMPEO214	Preparing and proving CNC machine tool programs
	SEMPEO215	Preparing and using CNC turning machines
	SEMPEO216	Preparing and using CNC milling machines
	SEMPEO217	Preparing and using CNC machining centres
	SEMPEO218	Preparing and using industrial robots
	SEMPEO219	Maintaining mechanical devices and equipment
	SEMPEO220	Assembling and testing fluid power systems
	SEMPEO221	Maintaining fluid power equipment
	SEMPEO222	Producing sheet metal components and assemblies
	SEMPEO223	Producing platework components and assemblies
	SEMPEO224	Cutting and shaping materials using thermal cutting equipment
	SEMPEO225	Preparing and proving CNC fabrication machine tool programs
	SEMPEO226	Preparing and using CNC fabrication machinery
	SEMPEO227	Preparing and using manual metal arc welding equipment
	SEMPEO228	Preparing and using manual TIG or plasma-arc welding equipment
	SEMPEO229	Preparing and using semi-automatic MIG, MAG and flux cored arc welding equipment
	SEMPEO230	Preparing and using manual oxy/fuel gas welding equipment
	SEMPEO231	Preparing and using manual flame brazing and braze welding equipment
	SEMPEO232	Producing electrical or electronic engineering drawings using a CAD System
	SEMPEO233	Wiring and testing electrical equipment and circuits
	SEMPEO234	Forming and assembling electrical cable enclosure and support systems
	SEMPEO235	Assembling, wiring and testing electrical panels/components mounted in enclosures
SEMPEO236	Assembling and testing electronic circuits	
SEMPEO237	Maintaining electrical equipment/systems	
SEMPEO238	Maintaining electronic equipment/systems	
SEMPEO239	Maintaining and testing process instrumentation and control devices	
SEMPEO240	Wiring and testing programmable controller based systems	
SEMPEO241	Using wood for pattern, modelmaking and other engineering applications	
SEMPEO242	Assembling pattern, model and engineering woodwork components	
SEMPEO243	Producing composite mouldings using wet lay-up techniques	

	SEMPEO244	Producing composite mouldings using pre-preg techniques
	SEMPEO245	Producing composite mouldings using resin flow infusion techniques
	SEMPEO246	Producing composite assemblies
	SEMPEO247	Producing components by rapid prototyping techniques
	SEMPEO248	Producing and preparing sand moulds and cores for casting
	SEMPEO249	Producing and preparing molten materials for casting
	SEMPEO250	Producing cast components by manual means
	SEMPEO251	Fettling, finishing and checking cast components
	SEMPEO252	Finishing surfaces by applying coatings or coverings
	SEMPEO253	Finishing surfaces by applying treatments
	SEMPEO254	Carrying out heat treatment of engineering materials
	SEMPEO255	Carrying out hand forging of engineering materials
	SEMPEO256	Stripping and rebuilding motorsport vehicles (pre-competition)
	SEMPEO257	Inspecting a motorsport vehicle during a competition
	SEMPEO258	Diagnosing and rectifying faults on motorsport vehicle systems (during competition)
	SEMPEO259	Carrying out maintenance activities on motorsport vehicle electrical equipment
	SEMPEO260	Stripping and rebuilding motorsport engines (pre-competition)
	SEMPEO261	Producing CAD models (drawings) using a CAD system
	SEMPEO262	Producing engineering project plans
	SEMPEO263	Using computer software packages to assist with engineering activities
	SEMPEO264	Conducting business improvement activities
	SEMPEO265	General machining, fitting and assembly applications
	SEMPEO266	General fabrication and welding applications
	SEMPEO267	General electrical and electronic engineering applications
	SEMPEO268	General maintenance engineering applications
	SEMPEO269	Joining public service vehicle components by mechanical processes
	SEMPEO270	Assembling structural sub-assemblies to produce a public service vehicle
	SEMPEO271	Fitting sub-assemblies and components to public service vehicles
	SEMPEO272	Preparing and manoeuvring armoured fighting vehicles (AFVs) for maintenance and transportation
	SEMPEO273	Producing composite mouldings using resin film infusion techniques

The Level 2 NVQ Diploma in Fabrication and Welding Engineering qualification is derived from the following standards:

	URN	Title of the Standard
Core NOS for all pathways	SEMMAN12301	Complying with statutory regulations and organisational safety requirements
	SEMMAN2302	Using and interpreting engineering data and documentation
	SEMMAN203	Working efficiently and effectively in engineering

Manual Welding Pathway Available NOS	SEMFWE 204	Joining materials by the manual metal arc welding process
	SEMFWE 205	Joining Materials by the semi-automatic MIG/MAG and flux cored arc processes
	SEMFWE 206	Joining materials by manual TIG and plasma-arc welding processes
	SEMFWE 207	Joining materials by the manual oxy/fuel gas welding process
	SEMFWE 208	Producing fillet welded joints using a manual/semi-automatic welding process

Welding Machine Operating Pathway Available NOS	SEMFWE209	Welding materials with mechanised arc welding equipment
	SEMFWE210	Welding materials using resistance spot, seam and projection welding machines
	SEMFWE211	Welding materials using laser welding machines
	SEMFWE212	Welding materials using electron beam welding machines
	SEMFWE213	Welding materials using friction welding machines

Brazing and/or Soldering Pathway	SEMFWE217	Joining materials by manual torch brazing and soldering
	SEMFWE218	Joining materials using brazing machines
Available NOS		

Sheet Metalwork Pathway	SEMFWE221	Marking out components for fabrication
	SEMFWE222	Cutting sheet metal to shape using hand and machine tools
	SEMFWE223	Forming sheet metal using hand and machine tools
	SEMFWE224	Producing sheet metal assemblies
	SEMFWE225	Heat treating materials for fabrication activities
	SEMFWE226	Cutting and shaping materials using CNC laser profiling machines
	SEMFWE227	Cutting and shaping using CNC plasma or gas cutting machines
	SEMFWE233	Cutting materials using hand operated thermal cutting equipment
	SEMFWE245	Cutting and shaping materials using CNC water jet cutting machines
	SEMFWE228	Assembling components using mechanical fasteners
	SEMFWE229	Bonding engineering materials using adhesives
	SEMFWE230	Joining materials by resistance spot welding
	SEMFWE205	Joining materials by the semi-automatic MIG/MAG and flux cored arc processes
	SEMFWE206	Joining materials by manual TIG and plasma-arc welding processes
	SEMFWE207	Joining materials by the manual oxy/fuel gas welding process
SEMFWE231	Slings, lifting and moving materials and components	
Available NOS		

Plateworker Pathway	SEMFWE221	Marking out components for fabrication
	SEMFWE232	Cutting plate and sections using shearing machines
	SEMFWE233	Cutting materials using hand operated thermal cutting equipment
	SEMFWE234	Cutting and shaping materials using gas cutting machines
	SEMFWE235	Cutting materials using saws and abrasive discs
	SEMFWE226	Cutting and shaping materials using CNC laser profiling machines
	SEMFWE227	Cutting and shaping using CNC plasma or gas cutting machines
	SEMFWE245	Cutting and shaping materials using CNC water jet cutting machines
	SEMFWE236	Bending and forming plate using power operated machines
	SEMFWE237	Forming platework using power rolling machines
	SEMFWE238	Producing platework assemblies
	SEMFWE239	Producing holes using drilling machines
	Available NOS	

Pipework Fabrication Pathway	SEMFWE221	Marking out components for fabrication
	SEMFWE233	Cutting materials using hand operated thermal cutting equipment
	SEMFWE234	Cutting and shaping materials using gas cutting machines
	SEMFWE235	Cutting materials using saws and abrasive discs
	SEMFWE239	Producing holes using drilling machines
	SEMFWE243	Forming pipework by machine bending
	SEMFWE228	Assembling components using mechanical fasteners
	SEMFWE229	Bonding engineering materials using adhesives
	SEMFWE244	Producing socket and flange fillet welded joints in pipe using a manual welding process
Available NOS		

Thermal Cutting Pathway	SEMFWE233	Cutting materials using hand operated thermal cutting equipment
	SEMFWE234	Cutting and shaping materials using gas cutting machines
	SEMFWE226	Cutting and shaping materials using CNC laser profiling machines
	SEMFWE227	Cutting and shaping using CNC plasma or gas cutting machines
Available NOS		

Appendix 2

Qualifications – Trainees need to complete:

One Competency qualification
(relevant to their choice of Route A or Route B)

and

One Knowledge Certificate
(applicable to both routes)

Competency		Knowledge (Technical Certificate)	
Title	QAN	Title	QAN
Route A – Level 2 NVQ/SVQ Diploma in Performing Engineering Operations			
EAL Level 2 NVQ Diploma in Performing Engineering Operations	600/8264/1	EAL Level 2 Certificate in Engineering Technologies	601/5670/3
		or	
City & Guilds Level 2 NVQ Diploma in Performing Engineering Operations	600/9471/0	EAL Level 2 Diploma in Engineering Technologies	601/5669/7
		or	
Pearson Level 2 NVQ Diploma in Performing Engineering Operations	601/2547/0	Pearson BTEC Level 2 Extended Certificate in Engineering (Specialist: Manufacturing Engineering)	500/8270/X
		or	
EAL SVQ Level 2 NVQ Diploma in Performing Engineering Operations	GL2P 22	City & Guilds Level 2 Technical Certificate in Engineering	603/0294/X
		or	
SQA SVQ Level 2 NVQ Diploma in Performing Engineering Operations	GL63 22	City & Guilds Level 2 Diploma in Engineering	600/0881/7
		or	
Route B (employed Trainees only) – one from:			
<ul style="list-style-type: none"> Level 2 NVQ/SVQ Diploma in Performing Engineering Operations (as above) Level 2 NVQ Diploma in Fabrication and Welding Engineering 		NEW - ABC Level 2 Certificate in Fabrication and Welding Practice	603/2243/3
EAL Level 2 NVQ Diploma in Fabrication and Welding Engineering	600/9174/5		
City & Guilds Level 2 NVQ Diploma in Fabrication and Welding Engineering	601/0077/1		

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