apprenticeship
FRAMEWORK

Composite Engineering (Operator and Semi-skilled) (Wales)

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Apprenticeships

Composite Engineering (Operator and Semi-skilled) (Wales)

Contents

Framework summary

Composite Engineering (Operator and Semi-skilled)

Foundation Apprenticeship in Composite Engineering

Pathways for this framework at level 2 include:

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Competence qualifications available to this pathway:

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Knowledge qualifications available to this pathway:

K1 - EAL Level 2 Diploma in Engineering and Technology (QCF)

K2 - City & Guilds Level 2 Certificate in Engineering (QCF)

K3 - Edexcel BTEC Level 2 Diploma in Engineering (QCF)

Combined qualifications available to this pathway:

N/A

This pathway also contains information on:

- Employee rights and responsibilities
- Essential skills

Framework information

Information on the Publishing Authority for this framework:

SEMTA

The Apprenticeship sector for occupations in science, engineering and manufacturing technologies.

Issue number: 1	**This framework includes:**
Framework ID: FR01895	Level 2
Date this framework is to be reviewed by: 28/02/2014	This framework is for use in: **Wales**

Short description

This framework for Composite Engineering at Level 2 has been designed to provide the skills, knowledge and competence requirements for operators and semi-skilled persons to carry out composite manufacturing processes to produce sub-assemblies and whole finished composite products in Wales.

Contact information

Proposer of this framework

Semta has worked closely with its Composites Sector Skills Group (SSG), the National Composites Centre, Composite Skills Alliance and leading companies such as Airbus, Aircelle, AugustaWestland, Bombardier, Cobham, Composites UK, Hexcel, Rolls Royce and Sunseeker to define National Occupational Standards (NOS). From the NOS, qualifications such as NVQs and Technical Certificates have been developed that are suitable for use within apprenticeship frameworks.

There is widespread realisation that the use of composites within engineered products is becoming prolific as these materials offer the engineering characteristics that designers are looking for such as strength, lightness, and durability. There is a need to provide a whole range of training packages to ensure that companies have the necessary skills to use these materials in a wide variety of contexts such as Aerospace, Formula 1, Marine, Medical, in fact everywhere where strength and lightness are required in combination.

Central to providing appropriate skills training is to ensure that new entrants to these industries receive state of the art competence and knowledge training that meets current and future needs. Composite Apprenticeships at levels 2, 3 & 4 will ensure that 16 to 25 yr olds are given the skills necessary to contribute to this rapidly expanding area.

Developer of this framework

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Purpose of this framework

Summary of the purpose of the framework

The composites industry is coping with manufacturing skills shortages in much the same way as other sub-sectors, however the diversity of materials and processes and the specialist nature of the skills involved means that skills are less transferable from other related sectors compounding shortages.

A UKTI (UK Trade & Investment) and BIS market report completed in April 2010 and published in 2011 entitled 'UK Composites Supply Chain Scoping Study – Key Findings' estimates that there are currently around 1,500 companies involved in the UK composites industry, of which almost 85% of all activity is undertaken by the 38 largest companies. Outside this top 38, the UK supply chain is made up of smaller firms supplying into a variety of industry sectors and export. SME companies are often innovative and forward thinking but lack the financial resource to fully develop new ideas – and improved collaboration within the sector is seen as critical to their future success. Such collaboration needs to occur across the supply chain as well as between large and small companies alike.

The global composites industry is becoming increasingly competitive and the global industry for composite materials is estimated to grow by 4-6% in the next five years. The two sectors that will drive this growth are anticipated to be aerospace and wind energy.

Today, carbon fibre and glass fibre based materials constitute the greatest value in UK demand and supply of composite components and structures. New metal matrix and ceramic matrix composite materials are being researched in the UK aerospace industry in particular and, in the longer term, may be future growth areas where the UK can play a lead.

• The size of the UK composites industry is between £1bn and £1.6bn
• UK domestic demand for composite components is £0.9bn, comprising UK production of £1.1billion less exports of £0.4billion (mostly aerospace) plus imports of £0.2billion (mostly wind turbine blades)
• The UK composites industry is a large exporter in key areas of the supply chain. These include carbon fibre composite components and structures
• 85% + of industry activity is captured by the top 38 companies which include many global leaders. Additionally there are over 1,000 companies involved in composites-those with composites revenue less than £5m or the in-house production of integrated manufacturers.

The UK Composites Strategy

The UK Composites Strategy published by BIS (the UK Department for Business, Innovation and Skills) in 2009, established a desire to focus on advanced composites, an area it believes the UK can build a competitive advantage, increase its market share in existing sectors and ensure the use of composites in new industries.

In order to do this, the UK Composites Strategy established four key requirements to be delivered through a collaborative approach:

- leadership and coordination
- value/supply chain development
- technology development
- skills development.

The National Composites Hub has been formed around these principles and hopes to achieve this by bringing together the three key national delivery partners. Based at the National Composites Centre in Bristol, the three partners will operate using shared industry information to ensure that all sizes and types of companies, as well as other organisations working in composites, are offered strong representation and the most effective support solutions for their businesses.

Historically, the UK had a leading position in composites driven by early adoption of carbon-fibre composites in the defence and aerospace industries. However, several other nations have been targeting the composites sector and supporting development of capacity and new capabilities, particularly the USA, Germany, Spain, Japan and Malaysia.

In composite component manufacture, traditionally strength of UK industry, the competitive position continues to weaken as European competitors take a lead in manufacturing improvements, and lower labour cost countries invest, often with Government support, e.g. in Malaysia, to develop capability.

In both resins and fibres the global industry is already consolidated and led by Japanese and US companies. Many of these players maintain a UK presence to support their overall presence across Europe, and to participate in the UK composites industry itself.

Notable companies who use and develop composites in the UK

The largest composite companies in the UK are:
- Airbus UK
- Aircelle

- AugustaWestland
- Atkins
- Cobham
- Composites UK
- EPM Technology Group
- GE Aviation
- GKN Aerospace
- Marshall Aerospace
- Scott Bader
- Umeco
- Rolls Royce
- Sunseeker

Composites supply chain

There are a variety of companies in the supply chain specialising in different forms of composites manufacture:

- **Composite Structures**
  Design of structures including composite parts; mix of in-house and outsourced manufacture
- **Composite Components**
  Design and manufacture of composite components; focus on outsourced aerospace demand, also automotive niche markets
- **Semi-finished material**
  Production of pre-preg and woven fibres as input to composite component manufacture
- **Resins & Fibres**
  Production of these fibres and resins for semi-finished products

International competitors are investing to develop their composites industries
Many competitor countries have recognised the strategic importance of composite materials and support their companies to develop capability by providing them with a global comparative advantage. Thus the UK is only likely to remain competitive by grasping commercial opportunities and building on the expertise and capability we already have to become world class.

USA
Aerospace, Defence, Wind and Raw materials. The key sectors in which UK companies face competition from the US are the military and civil aerospace sector, from a strong base of government driven purchasing patterns and in particular restrictions on technology derived from the defence industry limits some of the cross-border competition.

France
Aerospace, Fabrics. The growth in aerospace composites use, and France's share of Airbus programmes, has fostered a similar industry structure to that in the UK, with a number of composite structure and composite component manufacturers such as Composites Aquitaine, Duqueine, and several others having revenue exceeding £20million. France also houses a number of subsidiaries of internationally leading players, for both raw materials and semi-finished materials which export to the UK.

Germany
Aerospace, Wind, Automotive. In aerospace, the German industry is encroaching on the UK's core competency of wing manufacture, evidenced by parts of the A350 wing skins made in Germany. With established scale and significant experience, German wind turbine blade manufacturing poses a competitive threat to the establishment of a UK manufacturing base in the sector. Exports from composites companies serving the German automotive industry into the UK is limited.

Spain
Aerospace, Wind. Spain is believed to have a competitive advantage over the UK in the component manufacture segment and poses a significant competitive threat in aerospace in particular. This supposedly by Spain winning the manufacture of composite wing panels for the A350.

Spain has positioned itself as a manufacturing base specialising in composites, compared to UK manufacturers who are built around particular applications (e.g. wings).

Italy
The Italian boat building sector is recognized as being more progressive than the UK and is beginning to leverage its composites expertise as a source of competitive advantage over the UK.

Aerospace competes with the UK in manufacturing of large aerospace structures, and is a threat due to its access to US manufacturers such as Boeing.

Japan
Materials, Automotive, Aerospace. Japan has a competitive advantage over the UK carbon fibre manufacturers, with the leading firms manufacturing their products across the globe, reaching virtually all export markets.

Japan is unlikely to be an imminent threat to the UK aerospace composites industry due to limitations imposed on Japanese partners by Boeing on the export of the technology.

China
Multi sector, Low cost production. In the half term China will be a threat to low end volume component manufacturers in the UK, leveraging the country's lower cost of labour.

As China industry develops, higher and component manufacturers and composite structure manufacturers are expected to face increasing competition from Chinese companies.

Malaysia
Aerospace, Low cost production. Malaysia is already a direct competitor or outsourcing partner to the larger UK composite component manufacturers. This trend is expected to continue. Malaysian composites expertise combined with low cost manufacturing capability pose an on-going threat to the UK industry.

Turkey
The marine sector in Turkey is becoming very competitive in the cost effective manufacture of yachts, a sector that is the mainstay of the UK marine composites industry and therefore poses a threat to UK demand for composites in this sector.

Canada
Aerospace. Canada does not compete directly with the UK to any significant extent but is an important trading partner (notably Bombardier) for the UK composites industry.

Key Markets by Sectors

UK demand for composites is expected to grow rapidly over the next five years due to increasing demand from aerospace and wind applications, from £1.2billion in 2010 to £2billion in 2015. The growth rates for both glass fibre (9% pa) and Carbon fibre (17%pa) composites are faster than those forecast for the USA and rest of Europe, and match or exceed those of emerging markets. Exploiting this growth is a huge opportunity for the UK composite industry.

The key manufacturing markets for composites are currently:

- **Aerospace** - the UK aerospace composite demand will grow at 9% pa over the next five years to £1.1bn as the Airbus A350, Joint Strike Fighter and Bombardier programmes achieve full production
- **Wind turbines** - the sector experiencing the largest growth in demand is composite wind turbine blades, where demand is forecast to grow from around £0.1bn to £0.4bn by 2015 and to continue to grow thereafter to £0.6bn by 2020. Underpinning the demand are the plans to grow offshore wind power generation in the UK, focused on the North Sea, with 4,00 turbines installed by 2020

- **Automotive** - carbon fibre composite demand is forecast to grow at over 10% per annum to equal glass fibre demand by 2020; however both relatively small versus other industry sectors
- **Marine** - comprises approximately one third of composite demand outside the top three sectors. The UK boating industry is focused on the manufacture of small to medium sized pleasure craft. Within the industry, there are three large boat builders of scale, with around 100 smaller firms producing a limited number of craft.

Aerospace

The UK aerospace industry faces a number of challenges in further exploiting the potential of composites, including:

• **Capacity - automation:** The UK needs to introduce automated manufacturing techniques that will allow the cost effective manufacture of large, composite structures to meet the increased production requirements of future aircraft programmes
• **Capability - material supply:** Supply of carbon fibre is a key component in the UK aerospace supply chain. While supply of carbon fibre is not currently an issue, this may change as demand for the material increases in all sectors. This should be closely monitored such that there are readily available sources of supply to deliver the strategic objectives of the nation
• **Capability - skills:** A strategy needs to be put in place that addresses current skills shortages at shop floor level (practical skills) and at a professional level (e.g. design engineering). However the skills strategy also needs to encompass future skills requirements, taking into account the future technology trends within the UK aerospace composites sector
• **Sustainability - recycling:** While the recycling of composites in the aerospace industry is not yet being driven by legislation, as in the automotive industry, the industry is aware of the need to provide recycling solutions in the long term. This could provide an opportunity for UK industry to develop existing capability ahead of other international competition thereby capitalising on our existing technology lead.

Renewable Energy

The renewable energy sector including fuel cells, storage cylinders for compressed natural gas, wind turbine blades and tidal power structures. The wind energy market, particularly offshore, offers the most immediate growth opportunities and should be one of the areas of focus for a national strategy.

Offshore wind is a rapidly growing sector across Northern Europe and will play an important part in meeting Britain's renewable energy and carbon emission reduction targets as well as improving energy security by 2020 and beyond. It has the potential to employ a further

40,000-70,000 workers by 2020, bringing annual economic benefits and investment to the UK of £6-8 billion. Turbine blades are expensive and can amount to as much as 20-25% of the total cost of manufacture and installation of a wind turbine. It is estimated that the value of the UK wind turbine blade market alone will be worth above £5 billion by 2020.The UK is the largest single market for offshore wind globally.

To produce higher power machines, the offshore wind industry is increasingly looking to design and manufacture turbines with larger blades. However, the increase in size and weight requires the use of stiffer materials to prevent the blade bending and hitting the tower. This means that manufacture of larger blades necessitates changes in both materials and manufacturing technology. Current thinking is that as offshore blade size increases, the industry will move from the use of glass fibre composites to the use of stiffer carbon fibre composites.

However the UK offshore wind industry is experiencing the following issues in adopting more composites in its manufacturing processes:

• **Capacity and capability - cost:** The industry needs to reduce the cost of production of large scale composite structures through use of lower cost material forms and automation. This will require a step change in technology in excess of that required by the aerospace industry
• **Capability - quality:** Further automation is required to increase manufacturing quality. This will improve reliability which will reduce the cost of maintenance, repair and overhaul of large turbine structures that is currently a huge expense
• **Capacity and capability – skills:** A need to train staff to help them make the transition from labour intensive production towards automated production
• **Capacity - materials:** The supply of carbon fibre is a constant issue. As the amount used by the wind industry increases, existing manufacturers are looking to expand their manufacturing capability – Composites Technology estimated that by 2017 the wind energy industry could require 60,000 tonnes of carbon fibre per year, which is currently double the global production
• **Sustainability:** Although it may not be of immediate concern, the volume of blades that will be produced for the offshore sector in the UK means that recycling of composite structures and manufacturing waste is an area that will become of interest to turbine manufacturers.

Automotive

Glass fibre composites are currently used for body panels, bumper beams, grill openings, and injection moulded compounds are used to produce front-end structures, and under bonnet components. To date carbon fibre composites are used in only a few consumer vehicles, mainly used in Formula 1 and other high performance sports cars. However, Composites have great potential to be a key contributor to weight and CO2 emission reduction in all types of vehicles, including buses and trucks.

Marine

There is already significant usage of composites in the marine industry. Composites are extensively used in recreational and utility craft (military and civil) and lifeboats. This includes the low end of composites technology, and higher end technology such as that used in the Sunseeker luxury motor yacht and the Mirabella luxury sailing yachts.

It is this higher end technology area of composites that has the potential to help sustain the UK competitive position through helping new products to be produced as quickly as possible, and through allowing the development of increasingly high-tech/high value products that can differentiate themselves in the marketplace.

There is increased competition from new entrants to the market, such as Turkey, where significant investment in technology threatens to overtake the UK. This can be addressed by:

• **Capability and capacity - sector spill-over:** The UK has significant expertise in composites in other industry sectors, which can be transferred into the marine sector. This will help the sector to be more innovative and experimental with new materials and processes, making greater use of composites to produce cost effective, higher value products
• **Capability - skills:** This needs to be developed to follow the technology requirements of the industry.

Challenges: Semta UK sector figures (UK sectors)

Gender
• 21% of Semta's workforce is female (48% for all sectors)
• 500,000 working age women living in the UK (2008) who were qualified in SET, but only 185,000 (37%) were working in SET occupational sectors

Age
• 9% is aged 16-24 (14% for all sectors)
• 14% is aged 60 (12% for all sectors)

Disability
• 12% of workforce has a disability (14% for all sectors)

Ethnicity
• 5% is from an ethnic minority (8% for all sectors)

Hard to fill vacancies
• Around 7,500 vacancies per year - 1,900 due to technical and practical skills

Skills gaps:
• Around a quarter of companies have skills gaps
• Gaps mainly in technical, practical or job specific skills plus problem solving, team working, oral communications and management skills
• Sub sector skills priorities are identical:
  o Leadership and Management
  o Process Improvement (Productivity & Competitiveness)
  o Technical Workforce Development
  o Strategic Workforce Planning

Higher level skills
• The proportion of employees in higher-skilled occupations (managers, professionals and technicians) is 52% for Semta's sectors (43% for all sectors)
• 174,000 technical managers, professionals and technicians need to be upskilled to S/NVQ L4 (or equivalent)
• Only 15% of SMEs in Advanced Manufacturing and Engineering employ graduates

Technical skills
• Need to recruit and train 82,000 engineers, scientists and technologists by 2016
• 363,000 of current technical workforce are qualified below world-class standards

Apprenticeships
• 18% of engineering employers have or offer apprentices
• In 2010/11: 48,970 starts in Engineering and Manufacturing technologies apprenticeships (up 30% on previous year)

Drivers of skills change
Semta's sectors in the UK felt that the main drivers of future skills requirements would be new legislative or regulatory requirements (48%), introduction of new technologies or equipment (46% of establishments), development of new products and services (42%), introduction of new working practices (41%) and increased competitive pressure (34%). Large and medium-sized employers were most likely to expect a change in their skills needs from the key drivers identified.

The occupations most likely to be affected by the need to acquire new skills or knowledge were craftspersons, managers, operators and technicians.

Operator/semi-skilled occupations

Employment
• 162,000 operators and semi-skilled persons are employed in technical roles in engineering sectors in the U.K.

Key occupations
• The main sub-occupations within the operator/semi-skilled category include metal working machine operatives, assemblers, inspectors and testers and plant and machine operatives

Demographic profile
• 95% of operators and semi-skilled people are full time of which 24% are female, 9% aged 16 to 24yrs, 8% are over 60yrs,15% have a disability and 9% have non-white ethnicity
Source: LFS 2009

Current skills and qualifications
• 61% of operators and semi-skilled people in the U.K. within the engineering sectors were qualified to NVQ Level 2 or higher

Vacancies
• It is estimated that in 2009 there were 2,700 operator/semi-skilled vacancies in the U. K. across the engineering sector
• 290 operator/semi-skilled vacancies were hard-to-fill

Skills needs and gaps
• 6% of engineering establishments had skills gaps for operators/semi-skilled roles
• 10% of operators/semi-skilled within engineering establishments had skills gaps

Future skills demand
• 17,900 operators/semi-skilled (2,600 per annum) are required into the engineering sectors over the period 2010-2016
• 9,000 of these operators/semi-skilled will need qualifications at NVQ Level 2 or higher

The Foundation Apprenticeship in Composite Engineering will help address both the current skills requirements and future needs for both operators and semi-skilled persons as stated above. It will also address the skills gaps and shortages identified and ensure a steady flow of new operators and semi-skilled people into this important industry.

Aims and objectives of this framework (Wales)

The aim of this framework is to attract young people into an expanding and exciting industry, and will provide apprentices with the skills, underpinning knowledge and transferable skills required to work at operator or semi-skilled level in a composites manufacturing environment carrying out a wide variety of defined manufacturing activities.

Further aims and objectives:

- Meet the operator and semi-skilled requirement for the composites manufacturing sector
- Attract new people into the Welsh engineering/manufacturing sector from a diverse range of backgrounds to replace those who naturally leave the sector and those 11% who are 60+ who will retire sometime in the next 5 years
- The framework will ensure apprentices can undertake composite manufacturing operations safely and effectively
- Incorporate the latest developments in Composite Engineering National Occupational Standards (NOS) at level 2
- Provide greater unit flexibility through the QCF
- Provide a composite pathway that meets engineering employers needs
- Improve overall operational performance through improving skills
- Help improve recruitment and retention rates within the industry by offering appropriate career progression
- Improve productivity rates and thus profitability (GVA per employee)
- Address current skills gaps and shortages and future skills demands
- Provide a career pathway into more advanced level composite engineering employment and training
- To better address equality and diversity within the sector, especially under representation of women (only 18% of the workforce is female, compared to 50% for all sectors in Wales)
- To increase participation rates in the frameworks at Foundation Apprenticeship level
- Increase the level of general literacy and numeracy through transferable skills
- Develop apprentices employability and skills making them more attractive to all employers whichever career they choose.

Entry conditions for this framework

Employers wish to attract applicants who have an interest in working in the composites industry.

The Foundation Apprenticeship in Composite Engineering is suitable for applicants who have five GCSEs grade D to E or above including Maths, English and a Science. This is not a hard and fast rule but may vary according to the pathway (operator or semi-skilled) and the suitability of individual applicants.

Employers in the composite industry welcome applicants from a diverse range of backgrounds and anticipate that they will have a wide range of experience, achievements and qualifications.

Employers would be interested in applicants who:

- have previous employment or work experience in the sector or
- have completed a 14 to 19 Diploma in Engineering or Manufacturing or
- have GCSE's in English, Maths, and Science (grade D to E or higher) or
- have completed a Pathways to Apprenticeship programme or
- are keen and motivated to work in a composites development and manufacturing environment or
- are practically minded and want to work with their hands or
- are willing to undertake a course of training both on-the-job and off-the job and apply this learning in the workplace or
- have completed a Young Apprenticeship in Engineering or other related area or
- have a Welsh Baccalaureate or
- have completed the Essential Skills Wales (ESW) or Wider Key Skills qualifications or
- have completed tests in basic numeracy, literacy and communications skills and have spatial awareness.

The selection process on behalf of employers may include initial assessment activity such tests in basic numeracy, literacy, communication skills and spatial awareness. There may also be an interview to ensure potential apprentices have selected the right occupational sector to meet their needs and expectations and those of their employer.

Learners who have completed the Welsh Baccalaureate may have completed units or short courses which will provide underpinning knowledge towards the Apprenticeship, this will be assessed during an initial assessment allowing Recognition of Prior Learning (RPL) where appropriate.

Rules to avoid the need to repeat qualifications

Processes exist to make sure that applicants with prior knowledge, qualifications and/or experience are not disadvantaged by having to repeat learning. Training providers, Colleges and Awarding Organisations will be able to advise applicants on the current rules for accrediting prior learning and recognising prior experience. There are no relaxations or proxies for any qualifications specified in a framework in SASW, however providers are encouraged to identify additional on-the-job training programmes that customise the learning to the new workplace.

It is understood that where applicants have accredited prior learning that apprentices must be offered training which helps them to deliver new skills and learning at a higher level.

Essential Skills Wales

Key skills are accepted as alternatives to Essential Skills Wales qualifications, provided the Key Skills Certificate(s) attained are at the same level(s) as those specified for Essential Skills Wales Qualifications.

Knowledge qualifications

If applicants already have one of the Foundation (Level 2) Knowledge Qualifications before starting their apprenticeship (see knowledge qualifications page), they may count this and will not have to repeat the qualification providing they have achieved this qualification within five years of starting their apprenticeship. The hours that were spent gaining the qualification may be counted towards the total hours for the apprenticeship. For example, they may have already achieved the knowledge element as part of the Welsh Baccalaureate. The hours that were spent gaining the qualification may be counted towards the total hours required for this framework.

Competence qualifications

It is unlikely that applicants will already have the Foundation (Level 2) Competence Qualification stated, as it is a new qualification.

The Welsh Baccalaureate with its Core programme of personal learning and development studies along with options such as NVQs, Vocational Qualifications and Principal Learning (Engineering World, Discovering Engineering Technology and Engineering the Future) could provide significant opportunities for accreditation of Prior Learning against the components of this framework. The same processes can be applied to GCSEs. Training providers/colleges should be able to advise entrants on the potential reduction in programme duration that could result from accrediting previous qualifications and experience.

Prior experience in the sector

Applicants that are already working in the sector or have recently worked, should be able to have their experience recognised by Awarding Organisations against the elements above.

Level 2

Title for this framework at level 2

Foundation Apprenticeship in Composite Engineering

Pathways for this framework at level 2

Pathway 1:	Composite Manufacture

Level 2, Pathway 1: Composite Manufacture

Description of this pathway

Pathway duration approximately 18 months depending on the qualification and unit options selected

Total minimum credit value (made up of the total on- and off-the-job training for all the components) = 133 credits

Competence - minimum on the job training hours = 275 training hours

Off the job training includes a minimum of 336 additional training hours for Key Skills at the same level as Essential Skills Wales, Wider Key Skills, ERR and Mentoring.

Pathway with minimum total learning hours = 911 training hours
- Competence = minimum 275 hours/ minimum 71 credits
- Knowledge = minimum 300 hours (smallest technical certificate) / minimum 35 credits
- *Essential Skills Wales (notional value 60 hours x 3) = 180 hours /18 credits or **Key skills at the same level 135 hrs /15 credits**
- Wider Key Skills = 120 hours/ 2 x 6 = 12 credits
- Mentoring 66 weeks x 1 hour/week = 66 hours
- ERR = 15 minimum hours

*Essential Skills Wales/Key Skills:Foundation Apprentices who already have Essential Skills Wales/Key Skills at level 1 should be encouraged to achieve level 2

Year 1 = 607 Hours Year 2 = 304 Hours

Minimum credit value - 133 credits

Minimum off-the-job training hours = 636 training hours

Knowledge - City & Guilds Level 2 Certificate in Engineering (QCF) (300 training hours) plus 336 additional training hours for Key Skills at the same level as Essential Skills Wales, Wider Key Skills, ERR and Mentoring

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Pathway with maximum total learning hours = 1016 training hours

- Competence = 275 hours/ 71 credits
- Knowledge = maximum 360 hours (based on the largest technical certificate training hours)
- Knowledge = maximum 60 credits (based on the largest technical certificate credit)
- ***Essential Skills Wales (notional value 60 hours x 3) = 180 hours /18 credits** or Key Skills at the same level 135 hrs /15 credits
- Wider Key Skills = 120 hours/ 2 x 6 = 12 credits
- Mentoring 66 weeks x 1 hour/week = 66 hours
- ERR = 15 minimum hours

*Essential Skills Wales/Key Skills:Foundation Apprentices who already have Essential Skills Wales/Key Skills at level 1 should be encouraged to achieve level 2

Year 1 = 677 Hours Year 2 = 339 Hours

Maximum credit value = 161 credits

Maximum off-the-job training hours = 741 training hours

Knowledge - Edexcel BTEC Level 2 Diploma in Engineering (QCF) (360 training hours) plus 381 additional training hours for Essential Skills Wales, Wider Key Skills, ERR and Mentoring.

Entry requirements for this pathway in addition to the framework entry requirements

There are no additional requirements other than the general entry conditions

Job title(s)	Job role(s)
Operator (Semi skilled) Wet Lay-up Laminating Techniques	Using Wet Lay-up techniques to produce a range of composite mouldings, incorporating laminates and sandwich structures, using a range of resin, fibre and core materials
Operator (Semi skilled) Spray Lay-up Laminating Techniques	Using Spray Wet Lay-up techniques to produce a range of composite mouldings, incorporating laminates and sandwich structures, using a range of resin, fibre and core materials
Operator (Semi skilled) Resin Flow Infusion Techniques	Produce composite mouldings using resin flow infusion techniques
Operator (Semi skilled) Resin Flow Infusion Techniques	Use resin flow infusion methods for the manufacture of different composites materials components and structures
Operator (Semi skilled) Filament Winding Techniques	Produce composite mouldings using filament winding moulding techniques
Trimmer (Composite Mouldings)	Trimming of moulds, components, splashes, jigs using hand tools in accordance with approved procedures
Composite Assembly Operator	Produce composite assemblies from basic composite components in accordance with approved procedures
Operator (Composite repair)	Repair of a range of composite mouldings with various defects due to manufacturing damage or in service damage
Quality Assurance Operator	Check for defects in composite mouldings such as moulds, panels, components, jigs in accordance with quality procedures

Qualifications

Competence qualifications available to this pathway

C1 - Level 2 NVQ Diploma in Composite Engineering (QCF)					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**UCAS points value**
C1a	600/8085/1	EAL	71	275	N/A

Knowledge qualifications available to this pathway

K1 - EAL Level 2 Diploma in Engineering and Technology (QCF)					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**UCAS points value**
K1a	500/7595/0	EAL	39	330	N/A

K2 - City & Guilds Level 2 Certificate in Engineering (QCF)					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**UCAS points value**
K2a	600/0880/5	City & Guilds	35	300	N/A

Knowledge qualifications available to this pathway (cont.)

K3 - Edexcel BTEC Level 2 Diploma in Engineering (QCF)					
No.	**Ref no.**	**Awarding organisation**	**Credit value**	**Guided learning hours**	**UCAS points value**
K3a	500/7576/7	Edexcel	60	360	N/A

Combined qualifications available to this pathway

N/A

Notes on competence and knowledge qualifications (if any)

K1a - K3a provide underpinning knowledge for C1a

The designated technical certificates underpin the knowledge elements of the competence qualification in this pathway. The knowledge qualifications deliver essential underpinning knowledge which supports the fundamental scientific and mathematical principles to equip apprentices with the understanding required to operate effectively and efficiently at operator and semi-skilled level within this sub-sector. Working closely with key stakeholders including the composites SSG, other relevant employers and Awarding Organisations, we have ensured employers have access to a range of technical certificates.

The different sizes (credit value and GLH) of the technical knowledge qualifications reflect the varying degree in the complexity, breadth and depth of the skills, knowledge, understanding of theoretical concepts required in composites Engineering.

Employers have agreed that their apprentices should have access to a number of different technical knowledge qualifications that specify varying degrees of theoretical concepts required in the composities sector, including a broad range of mathematical, scientific and engineering/manufacturing principles and processes.

Transferable skills (Wales)

Essential skills (Wales)

	Minimum level	Credit value
Communication	1	6
Application of numbers	1	6
IT	1	6

Progression routes into and from this pathway

Progression routes into this pathway:

Entrants to this pathway could be school leavers who have completed their GCSE studies and in some cases relevant vocational activity such as a Diploma in Engineering or Manufacturing, Young Apprenticeship or extended work experience.

Other entrants may have experience from working in the sector in a composite engineering or manufacturing context, and are now seeking to become qualified by undertaking an apprenticeship programme.

Progression routes from this pathway:

It is likely that a significant number of Foundation Apprentices will progress on completion of this pathway to the Apprenticeship in Composite Engineering at Level 3. More generally, most ex-apprentices aspire to a combination of internal promotion within the company to team leader or supervisor level, while at the same time taking Further Education qualifications to augment their knowledge. For more information on engineering progression routes we recommend you visit the careers page and progression map at the Semta website hot-linked below.

semta.org.uk/individuals/p rogression-routes/

the progression map

http://sem ta.org.uk/store/files/Routeimage4Jan2010_UpdatedLinks.pdf

Delivery and assessment of employee rights and responsibilities

The nine national outcomes for Employment Rights and Responsibilities (ERR) are as follows:

1. The range of employer and employee statutory rights and responsibilities under employment law and that employment rights can be affected by other legislation as well. This should cover the apprentice's rights and responsibilities under the Disability Discrimination Act, other relevant equalities legislation and health and safety, together with the duties of employers.

2. Procedures and documentation which recognises and protects their relationship with their employer, including health and safety and equality and diversity training as part of the apprenticeship.

3. The range of sources and information and advice available to them on their employment rights and responsibilities, including Access to Work and Additional Learning Support.

4. The role played by their occupation in their organisation and industry.

5. Has an informed view of the types of career pathways that are open to them.

6. The types of representative bodies and understands their relevance to their industry and organisation and the main roles and responsibilities.

7. Where and how to get information and advice on their industry, occupation, training and career.

8. Can describe and work within their organisation's principles and codes of practice.

9. Can recognise and form a view on issues of public concern that affect their organisation and industry.

There are two methods of achieving ERR as set out below:

Method 1 - Qualifications

1a. EAL have produced a stand-alone qualification that covers all 9 outcomes of ERR requirements.

Qualification details:

EAL Level 2 Award in Employment Rights and Responsibilities for new Entrants into the Science, Engineering and Manufacturing Sectors (QCF)
QCF qualification ref no: 600/0290/6
Credit value: 5 credits
Guided learning hours: 41

1b. Edexcel have produced a stand-alone qualification that can cover all 9 outcomes of ERR requirements if Unit 2 is achieved.

Qualification details:
Edexcel BTEC Level 2 Award in WorkSkills for Effective Learning and Employment (QCF)
QCF qualification ref no: 501/1793/2
Credit value: 4 credits
Guided learning hours: 40

Please note: The Edexcel BTEC Level 2 Award consists of a mandatory unit as an introduction to apprenticeships. Apprentices must then complete Unit 2 which covers the ERR requirements (included within content). This qualification is designed to be assessed in the context of the sector relevant to the apprenticeship framework being undertaken (i.e. manufacturing/engineering in this case).

1c. City & Guilds have produced a stand-alone qualification that can cover all 9 outcomes of ERR requirements.

Qualification details:
City & Guilds Level 2 Subsidiary Award in Employment and Personal Learning at Work (QCF)
QCF qualification ref no: 600/2819/1
Credit value: 2 credits
Guided learning hours: 15

Please note: Although it may be possible to complete ERR in a minimum of 15 Guided learning hours (GLH), Semta recommend a minimum of 40 GLH are taken to complete the ERR requirements.

These qualifications will enable apprentices to both know and understand the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being. Apprentices achieving the qualifications will have demonstrated that they have the underpinning knowledge relevant for the engineering/manufacturing environment which satisfies the Specification for Apprenticeship Standards for Wales.

Method 2 - Workbook

Semta has produced an Apprentice ERR workbook that is available from: customercare@eal.org.uk

The requirements for completing it must be explained to the apprentice right at the start of their training in order that they may take full advantage of their *company induction where significant amounts of information towards the national outcomes will be covered. The workbook is intended to enable apprentices to know, understand and record the principles associated with the nine national outcomes such as the world of work and how they are constrained by various legal and organisational procedures for their own well-being.

***Please note:** All apprentices must receive a company induction programme.

At present, Wales has a paper based system to claim final certification of the apprenticeship framework. However, this will soon be changed to an electronic based system. However in both cases one of the following forms of ERR evidence will be required:

A qualification certificate for EAL Level 2 Award in Employment Rights and Responsibilities for new Entrants into the Science, Engineering and Manufacturing Sectors (QCF)

or

A qualification certificate for Edexcel BTEC Level 2 Award in WorkSkills for Effective Learning and Employment (QCF) **which must include achievement of Unit 2**

or

A qualification certificate for City & Guilds Level 2 Subsidiary Award in Employment and Personal Learning at Work (QCF)

or

A completed and countersigned Semta ERR workbook

The remaining sections apply to all levels and pathways within this framework.

How equality and diversity will be met

Semta recognises the training and business benefits of having apprentices from a wide variety of diverse backgrounds. We are committed to ensuring equality and diversity drives all aspects of apprentice selection and recruitment. Equal opportunity and diversity refers to the active elimination of unlawful or unfair discrimination against any person or group on the grounds of gender, race, colour, nationality, ethnic origin, religion, age, sexual orientation, marriage and civil partnership, pregnancy and maternity, political belief, disability and where appropriate, prison/offender background where this is deemed irrelevant.

Despite the encouraging numbers of both female participants and ethnic minorities on the 14 to 19 Engineering and Manufacturing Diplomas and Young Apprenticeship programmes, the Engineering sector still has a significant way to go to encourage women into engineering and manufacturing careers. Semta wishes to make a Gender Equality Commitment. Semta has signed the United Kingdom Resource Centre (UKRC) CEO's charter in a bid to step up female recruitment in its key sectors and programmes. Due to impending skills gaps it is estimated that 187,000 people will be required to be recruited and trained between 2010-2016 within Semta's sectors of aerospace, automotive, bioscience, composites, electrical, electronics, maintenance, marine, mathematics, metals and engineered metal products, renewables and science.

The UKRC is the Government's leading body for advanced gender equality in science, engineering and technology (SET) and the CEO's charter is a formal commitment to the UKRC's agenda to challenge the under-representation of women in SET. Women make up 50% of the labour market, yet they make up less than 20% of the labour market in science, engineering and technology.

The UKRC believes that only a concerted effort by the SET industry will break down the gender barriers that exist in traditionally male-dominated environments and we want to be part of a new consensus which will create an inclusive working environment for women. The manufacturing industries in which this framework operates are traditionally dominated by a white, male workforce. However, faced with an aging workforce and the probability of skill shortages we must look to attract new entrants from a much more diverse recruitment pool. This means that all young people and adults considering engineering and manufacturing as a career are welcome.

Providers of apprenticeship training including employers must be able to demonstrate there are no overt or covert discriminatory practices in the selection and employment of apprentices this can be demonstrated by the implementing of a Single Equality Scheme (SES). The new Equality Duty (part of the Single Equality Bill) introduced to the public sector requires all public sector bodies to produce a SES combining their current race, disability and gender schemes and should be recognised by all providers of apprenticeship training. The implementation of a SES demonstrates the organisation's commitment to equality and diversity by identifying new and improved ways of working to ensure the organisation is more efficient and effective in meeting the diverse needs of both staff and customers. All those who recruit apprentices, be they colleges, training providers or employers, must comply with the Equality act of 2010 and apply the Equality and Diversity legislation taking full account of the following:

- The Sex Discrimination Act 1975 and Code of Practice
- The Race Relations Act 1976 and Code of Practice
- The Disability Discrimination Act 1995 and Code of Practice
- Employment Equality (Religion or Belief) Regulations 2003
- Employment Equality (Sexual Orientation) Regulations 2003
- Employment Equality (Age) Regulations 2006
- The Equality Act 2010

Providers of apprenticeship training and employers must also actively monitor equality of opportunity and diversity procedures and take positive action where necessary to ensure equal access and treatment for all. Apprenticeships must be seen as a vital route to encourage and facilitate long term change in the equality and diversity of the engineering industry, therefore entry conditions into this framework are extremely flexible. All effort should be made to increase the diversity of our apprentice population.

On and off the job training (Wales)

Summary of on- and off-the-job training

For the Foundation Apprenticeship, the hours outlined in the sections that follow may vary depending on previous experience and attainment of the apprentice. Where a learner enters an apprenticeship agreement having previously attained or acquired some or all of the appropriate competence or knowledge, this prior learning needs to be recognised and documented using the relevant QCF credit transfer, QCF exemption or Recognition of Prior Learning (RPL) procedures.

The amount of 'on-the-job' training required to complete the apprenticeship under the apprenticeship agreement may then be reduced accordingly, provided the total numbers of 'on-the-job' hours for this framework can be verified for apprenticeship certification. Those apprentices who commence training under a new apprenticeship agreement with a new employer may bring a range of prior experience with them. When an apprentice can claim 5% or more hours towards the 'on-the-job' framework total through prior learning acquired from previous full-time education, employment or other vocational programme, then the apprentice's learning programme should include 'customisation'.

Training providers and colleges are encouraged to identify additional 'on-the-job' training programmes that customise the learning to the new workplace. Customisation programmes may include selecting appropriate additional Unit(s) from QCF qualifications, or relevant units recognised as Quality Assured Lifelong Learning [QALL] through a CQFW recognised body, or follow Essential Skills at a level higher than that specified in the framework, including one or more Wider Key Skills or other competency-based qualifications/units relevant to the workplace.

Note
This Composite Engineering framework primarily addresses the training needs of apprentices involved in a composites engineering environment. Having discussed the requirement for Essential Skills Wales, it was felt that all three qualifications would be required. For an apprentice who has already achieved the relevant qualification, they must have been certificated within 5 years from the date of application for the Foundation Apprenticeship Certificate.

Any off-the-job training undertaken before the apprentice started may count towards the off-the-job training required for the apprenticeship if it was undertaken in relation to an accredited qualification contained in the framework for which an apprenticeship certificate is applied for. Both on and off-the-job training hours need to be planned, reviewed and jointly evaluated between the apprentice, training instructor, tutor or lecturer and workplace supervisor and where relevant the apprentices's mentor. The apprentice should have access to training support at all times whether on or off-the job training.

On and off-the job training hours should be delivered through a variety of learning methods, individual and group teaching; team-working; e-learning; distance learning; coaching; mentoring; feedback and assessment.

The minimum and maximum training hours and credit value for each pathway are summarised in the pathway descriptions.

Evidence requirements for claiming an Apprenticeship Certificate

The Welsh Government still retains a paper based certification system (at the time of Issuing this framework). In order to claim an apprenticeship certificate training providers will need to:

- Complete a Registration Request form (downloadable from the Semta website)
- Complete a Certificate Request form (downloadable from the Semta website)

In addition the certificate request must include:

- the full name of the apprentice
- apprentice start date
- the title of the apprenticeship framework completed
- the level of the apprenticeship completed which must be expressed as either Foundation, Apprenticeship, or Higher
- the apprentice sector to which the apprenticeship framework relates
- the date the apprentice completed the apprenticeship framework
- evidence of completion of the competency qualification (Awarding Organisation Completion Certificate)
- evidence of completion of the technical knowledge-based qualification (Awarding Organisation Completion Certificate)
- evidence of completion of Transferable Skills: (Essential Skills Wales or Key Skills at the same level) as specified in the Transferable Skills section within this framework
- evidence of completion of the Wider Key Skills
- evidence of completion of Employer Rights and Responsibilities (ERR) as detailed in the

ERR section of this framework

Applications should be made by post to the Semta Apprenticeship Certification department,14, Upton Road, Watford, WD18 0JT.

The Welsh Government have given their commitment to join England in moving to an on-line apprenticeship certification system currently being operated by the Alliance of Sector Skills Councils, so arrangements for certification of apprenticeship will change significantly.

Off-the-job training

Off-the-job training is defined as time for learning activities away from normal work duties or away from the immediate pressure of the workplace.

The amount of off-the-job training hours required to complete this Foundation apprenticeship varies according to the pathway and technical certificate selected, however all include a minimum of 336 training hours for Essential Skills Wales (Communication, Application of Number & ICT) or Key skills at the same level as Essential Skills Wales; Wider Key skills (WWO & IOLP); ERR and Mentoring.

The minimum and maximum off-the-job training hours for each pathway are summarised in the pathway descriptions.

How this requirement will be met

Off-the-job training needs to:

• be planned, reviewed and evaluated jointly between the apprentice and a tutor, teacher, mentor or manager
• allow the apprentice to have access to a tutor, teacher, mentor or manager as and when required
• be delivered during contracted working hours
• be delivered through one or more of the following methods: individual and group teaching, e-learning, distance learning, coaching; mentoring, feedback and assessment; collaborative/networked learning with peers, guided study and induction.

The knowledge qualification, Essential Skills Wales and Employment Rights and Responsibilities will be formally delivered by the training provider/college staff in accordance with the awarding organisation's delivery and assessment guidance.

It is recommended that a mentor is appointed for each apprentice to review their progress on a regular basis. It is estimated that a mentor will have up to two hours per week contact time with each Foundation Apprentice. This activity will take place off-the-job but is inclusive within the off-the-job hours quoted in the previous section.

The Technical Certificate may be delivered either by day or block release or a combination of the two at a local Training Provider or College of FE or delivered on the employers premises (away from the immediate pressures of the workplace). There may also be a need for self study according to the Training Providers, Colleges or Awarding Organisations arrangements.

Essential Skills Wales delivery methods may vary, however all methods should start with initial/early assessment of a learner's skills, personalised learning should be based on assessing performance to date in order to inform and shape the next step in learning for that individual or group of individuals. Essential Skills Wales are externally assessed and candidates need to be prepared in order to take the tests, again methods of preparation vary but the preferred method seems to be an intensive off-the-job coaching period where candidates are taught the techniques required to undertake previous test papers to become proficient.

Employment Rights and Responsibilities (ERR) will be delivered as per the guidance in the ERR section of this framework. It is important that all new apprentices receive a comprehensive induction programme on joining their company and that they are aware of the evidence opportunities this presents to complete significant areas of the ERR requirements.

All three key elements (along with Wider Key Skills Wales) will be delivered by a combination of group-based delivery and self-study. In addition there will be a company induction, and it is recommended that a mentor should be appointed for each apprentice to review their progress on a regular weekly basis. All of these activities will take place off-the-job.

The Technical Certificate, Essential Skills Wales and Employment Rights and Responsibilities will be formally delivered by the training provider/college staff in accordance with the awarding organisation's delivery and assessment guidance.

Inclusion of Technical Certificates in the Apprenticeship Framework pathway
Working closely with a number of stakeholders including employers and awarding organisations, we have ensured that employers and apprentices have access to a range of technical certificates across a number of awarding organisations.

Whilst Awarding Organisation partners have ensured that each of the technical knowledge qualification in the pathway delivers, via a core and options approach, the minimum knowledge and understanding requirements for all the (job roles) selected in the appropriate NVQ. Employers have also demanded that they and apprentices have access to a number of different technical knowledge qualifications that specify varying degrees of theoretical concepts required in Composite Manufacturing, Engineering and Advanced Technology Sectors including maths, scientific and engineering/manufacturing principles.

The different sizes (credit value and training hours) of the technical knowledge qualifications reflects the varying degree in the complexity, breadth and depth of the skills, knowledge, understanding and theoretical concepts required in the Composite Manufacturing, Engineering and Advanced Technology Sectors.

The benefits of this approach for both the employer and apprentices is that they can select the most appropriate qualification that meets the business requirements but also recognises the potential progression opportunities both in company including access to further and higher education and the career aspirations and abilities of the apprentice.

The providers of the technical knowledge qualification in partnership with the apprentice and employer could take the following into account and/or undertake further diagnostic assessments to ensure that the apprentice is enrolled on the most appropriate technical qualification:

- The career aspirations of the apprentice
- The skill and knowledge requirements of the employer for the selected composite occupational area (job role). The employer may have recruited the apprentice based on a workforce planning tool including succession planning
- An assessment of the academic qualifications achieved by the apprentice prior to undertaking the Foundation Apprenticeship to determine if the apprentice will have the ability to achieve one of the more academically demanding technical knowledge qualifications
- The results of any psychometric tests that would ascertain whether the apprentice will be able to achieve one of the more academically demanding technical knowledge qualifications
- The preferred learning style of the apprentice including the various assessment methodologies used by the different Awarding Organisations
- Custom and practice within the Sector, including any legislation requirements
- Local and/or National Trade Union agreements

Evidence of Off-the-job hours

Off-the-job training must be formally recorded, either in a diary, workbook, portfolio or be verified by attendance records. This evidence needs to be checked and signed by the assessor and employer. The range of evidence requirements are as follows:

- Copy of Awarding Organisation certificates for Communication, Application of Number and ICT (Essential Skills Wales) or Key skills at the same level as Essential Skills Wales
- Copy of Awarding Organisation certificates for IOLP and WWO (Wider Key Skills Wales)
- Copy of the Awarding Organisation certificate for the ERR qualification (EAL or Edexcel or City & Guilds) or completed countersigned ERR workbook
- Copy of the Awarding Organisation certificate for the knowledge qualification

Previous experience

Where an applicant enters an apprenticeship agreement with previous work-related experience, this prior learning needs to be recognised (see QCF Guidance on Claiming Credit for further details). To count towards apprenticeship certification, previous experience must be recorded using the appropriate awarding organisation's CQFW 'Recognition of Prior Learning' (RPL) procedures and the hours recorded may then count towards the off-the-job hours required to complete the apprenticeship.

For apprentices with prior uncertified learning experience, the off-the-job learning must have been acquired within 5 years of application for the Foundation Apprenticeship Certificate.

On-the-job training

The minimum and maximum on-the-job training hours for each pathway are summarised in the pathway descriptions

How this requirement will be met

The NVQ Level 2 Diploma included in this Foundation Apprenticeship must be delivered in accordance with the relevant Awarding Organisations delivery and assessment guidance, which includes the requirements set out in Semta's QCF NVQ Unit Assessment Strategies.

The QCF NVQ Unit Assessment Strategies for Engineering and Performing Engineering Operations can be downloaded from Semta's website using the following URL: http: //semta.org.uk/training-providers/training-providers-qualifications

All apprentices are required to generate evidence in the workplace to demonstrate completion of the competence qualification, this may be through:

- apprentices generating a portfolio to record evidence of unit completion in accordance with the Awarding Organisations requirements and this will be regularly reviewed by the assessor and mentor. A period of one hour per week has been set aside for mentors to review the ongoing progress of their apprentice

or

- apprentices generating portfolio evidence based on jobs undertaken will need to get this and agreed by the assessor as a contribution to demonstrating competence in the workplace.

Generation of portfolio evidence may be paper based, electronic with other mediums such as video evidence. Evidence may be gathered throughout the whole apprenticeship period.

It is also important that:

- progress towards completion of the competence qualification should be planned, reviewed and evaluated jointly between the apprentice and an appointed mentor or manager
- apprentices should receive regular reviews from the mentor and assessor in order to ensure they remain on target to complete the competence qualification in the allocated time the qualification is delivered during normal contracted working hours

Examples of on-the-job guided learning in an engineering manufacturing context might be:

- Environmental awareness
- Employability skills
- Team working and communications
- Task specific workplace instructions or team briefings
- Taught sessions by the workplace line manager/instructor
- Induction where activities are covered within normal work duties
- Coaching of learners.

Wider key skills assessment and recognition (Wales)

Improving own learning and performance

Improving own learning and performance is an essential component of the Foundation Apprenticeship in Composite Engineering at Level 2 and will remain so within the new SASW arrangements.
The requirement is at Level 1.

Working with others

Working with others is an essential component of the Foundation Apprenticeship in Composite Engineering at Level 2 and will remain so within the new SASW arrangements.
The requirement is at Level 1.

Problem solving

Although the ability to problem solve is required in many engineering processes, it is dealt with 'on-the-job' within the NVQ and technical certificate rather than in the abstract.
Therefore problem solving does not form a specific part of the Wider Key requirements for this framework.

Additional employer requirements

There are no additional employer requirements

apprenticeship
FRAMEWORKS ONLINE

For more information visit
www.afo.sscalliance.org