

apprenticeship FRAMEWORK

Composite Engineering (England)

Latest framework version?

Please use this link to see if this is the latest issued version of this framework:

afo.sscalliance.org/frameworkslibrary/index.cfm?id=FR02057

Issue date: 26 March 2013

Issued by
SEMTA

apprenticeship
FRAMEWORKS ONLINE
www.afo.sscalliance.org

Document status:
Issued

Composite Engineering (England)

Contents

Framework summary	3
Framework information	5
Contact information	6
Purpose of the framework	8
Entry conditions	20
Level 2: Composite Engineering (Level 2)	22
Pathway 1: Composite Engineering (Level 2)	23
Level 3: Composite Engineering (Level 3)	35
Pathway 1: Composite Engineering (Level 3)	36
Equality and diversity	50
On and off the job guided learning	52
Personal learning and thinking skills	62
Additional employer requirements	67

Framework summary

Composite Engineering

Composite Engineering (Level 2)

This framework includes information on Personal Learning and Thinking Skills

Pathways for this framework at level 2 include:

Pathway 1: Composite Engineering (Level 2)

Competence qualifications available to this pathway:

C1 - Level 2 NVQ Diploma in Composite Engineering (QCF)

Knowledge qualifications available to this pathway:

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

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

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

K4 - City & Guilds Level 2 Certificate in Marine Construction, Systems Engineering and Maintenance (QCF)

Combined qualifications available to this pathway:

N/A

This pathway also contains information on:

- Employee rights and responsibilities
- Functional skills

Composite Engineering

Composite Engineering (Level 3)

This framework includes information on Personal Learning and Thinking Skills

Pathways for this framework at level 3 include:

Pathway 1: Composite Engineering (Level 3)

Competence qualifications available to this pathway:

C1 - Level 3 NVQ Extended Diploma in Composite Engineering (QCF)

C2 - Level 3 NVQ Diploma in Composite Engineering (QCF)

Knowledge qualifications available to this pathway:

K1 - EAL Level 3 Diploma in Engineering Technology (QCF)

K2 - City & Guilds Level 3 Diploma in Engineering (QCF)

K3 - EAL Level 3 Diploma in Mechanical Engineering Technology (QCF)

K4 - Edexcel BTEC Level 3 Diploma in Aeronautical Engineering (QCF)

K5 - Edexcel BTEC Level 3 Extended Diploma in Aeronautical Engineering (QCF)

K6 - Edexcel BTEC Level 3 Extended Diploma in Manufacturing Engineering (QCF)

K7 - Edexcel BTEC Level 3 Diploma in Manufacturing Engineering (QCF)

K8 - City & Guilds Level 3 Diploma in Marine Construction, Systems Engineering and Maintenance (QCF)

Combined qualifications available to this pathway:

N/A

This pathway also contains information on:

- Employee rights and responsibilities
- Functional skills

Framework information

Information on the Issuing Authority for this framework:

SEMTA

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

Issue number: 1	This framework includes:
Framework ID: FR02057	Level 2 Level 3
Date this framework is to be reviewed by: 28/02/2014	This framework is for use in: England

Short description

The framework for Composite Engineering at levels 2 and 3 has been designed to provide the skills, knowledge and competence requirements to work in composites at an appropriate level within the manufacturing and engineering sectors in England.

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, GKN Aerospace, Gurit Ltd, Hexcel, Marshalls Slingsby Composites, 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. As a consequence 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.

Key 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 both current and future needs. Composite Apprenticeships at levels 2 and 3 will ensure that 16 to 25 yr olds are given the appropriate skills necessary to contribute to this rapidly expanding area.

Developer of this framework

Name: Ian Carnell
Organisation: Semta
Organisation type: Sector Skills Council
Job title: Manager - Frameworks
Phone: 01923 652350
Email: icarnell@semta.org.uk
Postal address: 14 Upton Road
Watford
Herts
WD18 0AJ
Website: www.semta.org.uk

Issuing Authority's contact details

Issued by: SEMTA
Issuer contact name: David George
Issuer phone: 0845 6439001
Issuer email: IssuingAuthority@semta.org.uk

Purpose of this framework

Summary of the purpose of the framework

National Apprenticeship Service (NAS) Quality Statement

An Apprenticeship is a job with an accompanying skills development programme designed by employers in the sector. It allows the apprentice to gain technical knowledge and real practical experience, along with functional and personal skills, required for their immediate job and future career. These are acquired through a mix of learning in the workplace, formal off the job training and the opportunity to practice and embed new skills in a real work context. This broader mix differentiates the Apprenticeship experience from training delivered to meet narrowly focused job needs.

On completion of the Apprenticeship the apprentice must be able to undertake the full range of duties, in the range of circumstances appropriate to the job, confidently and competently to the standard set by the industry.

Summary of the purpose of the framework

The composites industry is coping with manufacturing skills shortages in much the same way as other manufacturing sub-sectors, however the diversity of materials and processes and the specialist nature of the skills involved in composite manufacture means that these 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 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 and increase its market share by introducing 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 technology and skills 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 a 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
- Gurit Ltd
- 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 composite structure manufacturers and composite component manufacturers. However, 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 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 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 4,000 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 circa 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 includes 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 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 Level 4 (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 apprenticeships (NESS 2009 England only)
- In 2010/11: 48,970 starts in Engineering and Manufacturing technologies apprenticeships (up 30% on previous year)

Drivers of skills change in the UK

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 are employed in technical roles in the engineering sectors in the UK

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/semi-skilled 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/semi/skilled within the engineering sectors in the UK were qualified to NVQ Level 2 or higher

Vacancies

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

Skills needs and gaps

- 6% of engineering establishments had skills gaps for operator/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 in the UK over the period 2010-2016
- 9,000 of these operators/semi-skilled will need qualifications at NVQ Level 2 or higher

The Composite Engineering framework at level 2 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.

Craft/technician occupations

Employment

- 253,000 craftsperson and 37,000 technicians are employed in technical roles in the engineering sectors in the UK.

Key occupations

- The main sub-occupations within the craft category include metal working, production and

maintenance fitters, welding trades, electricians and electrical fitters, metal machining setters & setter-operators and electrical and electronic engineers

- The main sub-occupations within the technician category include engineering technicians, draftsman, laboratory technicians and electrical and electronics technicians

Demographic Profile

- 98% of operators are full time of which 1% are female, 10% aged 16 to 24yrs, 15% are over 60yrs, 14% have a disability and 3% have non-white ethnicity Source: LFS 2009

Current skills and qualifications

- 64% of craftspersons and 73% of technicians were qualified to NVQ Level 3 or higher

Vacancies

- It is estimated that in there were 2,700 crafts-person vacancies and 1,000 technician vacancies across the engineering sector in the UK in 2009
- 690 craft vacancies were hard-to-fill and 280 technician vacancies were hard-to-fill

Skills needs and gaps

- 13% of engineering establishments had skills gaps for craftspersons and 2% had skills gaps for technicians
- 13% of craftspersons and 16% of technicians within engineering establishments in the UK had skills gaps.

Future skills demand

- 22,200 craftspersons (3,200 per annum) and 6,800 technicians (970 per annum) are required into the engineering sectors in U.K. over the period 2010-2016
- 10,300 craftspersons and 4,700 technicians will need qualifications at NVQ Level 3 or higher

The Composite Engineering framework at levels 2 and 3 will help address both the current skills requirements and future needs for both operators/semi-skilled and craft persons/technicians as stated above. It will also address the skills gaps and shortages identified and ensure a steady flow of new entrants into this important industry.

Aims and objectives of this framework (England)

The aim of this framework is to attract, retain and develop apprentices who wish to work in composites engineering, and contribute to an expanding and exciting industry. It will provide apprentices with the skills, underpinning knowledge and transferable skills required to operate both at operator and semi skilled (level 2) and craft or technician (level 3) in a composites engineering environment.

Further aims and objectives:

- Develop more operators and semi skilled staff in composites
- Develop more craft and technicians (Skills for Growth Strategy England)
- Incorporate the latest developments in Composite Engineering National Occupational Standards (NOS) at levels 2 and 3
- Provide greater flexibility through the use of QCF qualifications
- Provide a range of composite engineering training activities
- Help improve recruitment and retention rates within the industry by offering appropriate career progression
- Improve productivity rates and profitability (increased GVA per person)
- Address current skills gaps and shortages
- Address future skills demands
- To better address equality and diversity within the sector as defined in the framework summary above.
- To tackle the age profile within the sub-sector
- To help reduce the carbon footprint by maximising efficiency and eliminating waste
- Increase the level of workforce literacy and numeracy through transferable skills
- Provide a career path from semi-skilled operators through to fully skilled craft-persons and technicians
- Develop apprentices employability and skills making them more attractive to all employers whichever career they choose
- Provide a pathway to foundation degree and to undergraduate programmes for those who choose to do so.

Entry conditions for this framework

Employers wish to attract applicants who have an interest in working in the composite industry and 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) for the Intermediate Apprenticeship or
- have five GCSE's (including English, Maths, and Science) grade C or above for the Advanced Apprenticeship or
- are keen and motivated to work in a composite development and engineering/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 (Welsh applicants) 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.

The Level 2 (intermediate level) in Composite Engineering is suitable for applicants who have 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.

The Level 3 (Advanced level) in Composite Engineering is suitable for applicants who have five GCSEs grade C or above including Maths, English, and a Science. Again, this is not a hard and fast rule but may vary according to the pathway (craft or technician) and the suitability of individual applicants.

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. 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.

Transferable skills

Please refer to the transferable skills section of this framework to identify alternative qualifications applicable to functional skills

Knowledge qualifications

If applicants already have one of the Level 2 Knowledge Qualifications (for the intermediate Apprenticeship) or Level 3 Knowledge Qualifications (for the Advanced Apprenticeship) 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.

Competence qualifications

It is unlikely that applicants will already have the Intermediate (Level 2) or Advanced (Level 3) Competence Qualification or units towards, as these are new qualifications.

However, Advanced Apprentices may have individual QCF units at Level 2, such as PEO which can be APL'd into the Extended Diploma providing they have achieved these within five years of starting their apprenticeship. It is important however that there is agreement between the employer and the apprentice that the applicant is currently competent.

As with the knowledge element above, the hours that were spent gaining the competence qualification may be counted towards the total hours for the apprenticeship.

Initial Assessment

Training providers/colleges and employers will use initial assessment to ensure that applicants have a fair opportunity to demonstrate their ability and to tailor programmes to meet individual needs, recognising prior 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

Composite Engineering (Level 2)

Pathways for this framework at level 2

Pathway 1: Composite Engineering (Level 2)

Level 2, Pathway 1: Composite Engineering (Level 2)

Description of this pathway

Composite Engineering (Operator and Semi-skilled) total minimum credit value = 118 credits

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) 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) Wet Lay-up Laminating	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) Resin Flow Infusion Techniques	Use resin flow infusion methods for the manufacture of different composite 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/machine 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 faults or in service damage
Quality Assurance Operator	Check for defects in composite mouldings, panels, components, jigs etc. 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 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

K4 - City & Guilds Level 2 Certificate in Marine Construction, Systems Engineering and Maintenance (QCF)					
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
K4a	600/2304/1	City & Guilds	32	280	N/A

Combined qualifications available to this pathway

N/A

Notes on competence and knowledge qualifications (if any)

K1a - K4a 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 composite 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 composites sector, including a broad range of mathematical, scientific and engineering/manufacturing principles and processes.

Transferable skills (England)

Functional Skills / GCSE (with enhanced functional content) and Key Skills (England)

Apprentices must complete or have completed one of the English transferable skills qualifications and one of the Mathematical transferable skills qualifications listed below in order to successfully complete their Apprenticeship and this will carry the QCF five credit values. If they do not have these qualifications as part of their evidence an Apprenticeship certificate cannot be awarded.

English	Minimum level or grade	Credit value
Functional Skills qualification in English	1	5
GCSE qualification in English (with enhanced functional content)	E	5
Key Skills qualification in Communication achieved either before September 2013 as part of the Apprenticeship, or...*	1	5
GCSE Qualification in English*	C	N/A
A' Level or AS Level qualification in English Language*	E	N/A
A' Level or AS Level qualification in English Literature*	E	N/A
A' Level or AS Level qualification in English Language and Literature*	E	N/A
GCSE or O' Level qualification in English Language**	A	N/A
A' Level or AS Level qualification in English Language**	A	N/A
A' Level or AS Level qualification in English Literature**	A	N/A
A' Level or AS Level qualification in English Language and Literature**	A	N/A

* achieved before September 2012 and within the 5 years immediately prior to starting an Apprenticeship.

** achieved before September 2012, otherwise at any time prior to starting the Apprenticeship.

Mathematics	Minimum level or grade	Credit value
Functional Skills qualification in Mathematics	1	5
GCSE qualification (with enhanced functional content) in Mathematics	E	5
Key Skills qualification in Application of Number achieved either before September 2013 as part of the Apprenticeship, or...*	1	5
GCSE qualification in Mathematics*	C	N/A
A' level or AS Level qualification in Mathematics*	E	N/A
A' Level or AS Level qualification in Pure Mathematics*	E	N/A
A'Level or AS Level qualification in Further Mathematics*	E	N/A
GCSE or O'Level qualification in Mathematics**	A	N/A
A' Level or AS Level qualification in Mathematics**	A	N/A
A' Level or AS Level qualification in Pure Mathematics**	A	N/A
A' Level or AS Level qualification in Further Mathematics**	A	N/A

* achieved before September 2012 and within the 5 years immediately prior to starting an Apprenticeship.

** achieved before September 2012, otherwise at any time prior to starting the Apprenticeship.

ICT

Apprentices must complete or have completed one of the ICT transferable skills qualifications listed below in order to successfully complete their Apprenticeship and this will carry the QCF five credit values. If they do not have one of these qualifications as part of their evidence an Apprenticeship certificate cannot be awarded.

ICT	Minimum level or grade	Credit value
Functional Skills qualification in Information and Communications Technology (ICT)	1	5
GCSE qualification in ICT (with enhanced functional content)	E	5
Key Skills qualification in ICT achieved either before September 2013 as part of the Apprenticeship, or...*	1	5
GCSE qualification in ICT*	C	N/A
A' Level or AS Level qualification in ICT*	E	N/A
GCSE or O'Level qualification in ICT**	A	N/A
A' Level or AS Level qualification in ICT**	A	N/A

* achieved before September 2012 and within the 5 years immediately prior to starting an Apprenticeship.

** achieved before September 2012, otherwise at any time prior to starting the Apprenticeship.

Inclusion of Information and Communications Technology (ICT)

ICT is included as a mandatory requirement in this framework

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 have some relevant vocational qualification or experience from working in a composite

engineering or manufacturing context and are now seeking to become qualified by undertaking an apprenticeship programme. More specifically they may:

- 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
- are keen and motivated to work in a composite engineering/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 (Welsh applicants) or
- have completed tests in basic numeracy, literacy and communications skills and have spatial awareness.

Progression routes from this pathway for those who successfully complete the Level 2 apprenticeship programme

It is likely that a significant number of Intermediate apprentices will progress on completion to the Advanced 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/progression-routes/

and the progression map:

semta.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 (ie 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 England.

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.

To claim final certification of the apprenticeship, one of the following forms of ERR evidence will be required, together with the Apprentice Declaration and Authorisation form V2 which is available from the Alliance of SSCs site acecerts.co.uk/

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

Level 3

Title for this framework at level 3

Composite Engineering (Level 3)

Pathways for this framework at level 3

Pathway 1: Composite Engineering (Level 3)

Level 3, Pathway 1: Composite Engineering (Level 3)

Description of this pathway

Composite Engineering (Craft and Technician 16 yrs - 24yrs) - Total minimum credit value = 166 credits

(For Adult apprentices 25 years plus only completing the Level 3 NVQ Diploma in Composite Engineering - Total minimum credit value = 139 credits)

Please note: As an option, adult apprentices 25 years plus can complete the level 3 NVQ Extended Diploma in Composite Engineering (QCF)

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)
GRP Finisher/Laminator (Large Structures)	Open wet lay up lamination, large deck structures (decks, hulls, superstructures 40 to 155ft)
GRP Finisher/Laminator (Small Structures)	Open wet lay up of small structures (wet bars, showers, seating areas)
Carbon Fibre Pre Preg Technicians	Mould preparation and application of vacuum infusion techniques
Composite Technician	Perform a variety of non-routine and non-repetitive procedures mixing resins and laying up composite material onto tooling moulds using various hand tools. Working with a variety of epoxy agents, fibreglass, Kevlar fabrics, structural adhesives, rivets, threaded and blind fasteners.
Manufacturing Process Engineer	Define, develop and introduce manufacturing processes that deliver safe, high quality, repeatable, cost effective solutions with short lead time outputs. To support the manufacturing function with problem solving and corrective action
Composite Assembly/Repair Technician	Manufacture aircraft components from composite core materials including operation of CNC Automatic Tape Layup, Fibre Placement and Double Diaphragm machines
Tooling Engineer	Design and maintain composite tooling for manufacture, through internal and external resources
Composite Pattern Maker	Preparing material for CNC machining, modifying patterns to suit drawing issue changes. Liaising with CAM engineers on pattern construction. Shuttering patterns to suit moulding requirements. Hand finishing patterns following machining and painting.
Composite Assemblies Fitter	Use composite hand lay up techniques using prepreg (Carbon Fibre, Glass Fibre). Assembly of metal to composite structures including sub-assemblies using mechanical fasteners.

Qualifications

Competence qualifications available to this pathway

C1 - Level 3 NVQ Extended Diploma in Composite Engineering (QCF)					
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
C1a	600/8284/7	EAL	102	390	

C2 - Level 3 NVQ Diploma in Composite Engineering (QCF)					
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
C2a	600/8086/3	EAL	75	267	

Knowledge qualifications available to this pathway

K1 - EAL Level 3 Diploma in Engineering Technology (QCF)					
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
K1a	501/1130/9	EAL	78	600	

Knowledge qualifications available to this pathway (cont.)

K2 - City & Guilds Level 3 Diploma in Engineering (QCF)					
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
K2a	600/0882/9	City & Guilds	54	480	

K3 - EAL Level 3 Diploma in Mechanical Engineering Technology (QCF)					
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
K3a	501/1155/3	EAL	78	600	

K4 - Edexcel BTEC Level 3 Diploma in Aeronautical Engineering (QCF)					
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
K4a	500/7799/5	Edexcel	120	720	

K5 - Edexcel BTEC Level 3 Extended Diploma in Aeronautical Engineering (QCF)					
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
K5a	500/7800/8	Edexcel	180	1080	

Knowledge qualifications available to this pathway (cont.)

K6 - Edexcel BTEC Level 3 Extended Diploma in Manufacturing Engineering (QCF)					
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
K6a	500/7314/X	Edexcel	180	1080	

K7 - Edexcel BTEC Level 3 Diploma in Manufacturing Engineering (QCF)					
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
K7a	500/7319/9	Edexcel	120	720	

K8 - City & Guilds Level 3 Diploma in Marine Construction, Systems Engineering and Maintenance (QCF)					
No.	Ref no.	Awarding organisation	Credit value	Guided learning hours	UCAS points value
K8a	600/2306/5	City & Guilds	49	450	

Combined qualifications available to this pathway

N/A

Notes on competence and knowledge qualifications (if any)

*Level 3 NVQ Diploma in Composite Engineering (QCF) - is for use by 25yrs+ only (see below)

K1a - K8a provide underpinning knowledge for C1a and C2a.

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 craft and technician 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 reflects the varying degree in the complexity, breadth and depth of the skills, knowledge, understanding of theoretical concepts required in composites. Employers have agreed that their apprentices should have access to number of different under-pinning knowledge qualifications that specify theoretical knowledge at varying levels required, which includes a broad range of mathematical, scientific and engineering/manufacturing principles and processes.

***Note:** The Level 3 NVQ Diploma in Composite Engineering (QCF) may be used by adult apprentices 25 yrs old and over only, 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 Level 2 units detailed in Performing Engineering Operations, Performing Manufacturing Operations or other skill specific NVQ Level 2 in engineering or manufacturing.

The above must be evidenced by a signed letter from the Apprentices Company and sent prior to the commencement of training to: Ian Carnell, Frameworks Manager, 14 Upton Road, Watford, Herts, WD18 0JT or icarnell@semta.org.uk

Transferable skills (England)

Functional Skills / GCSE (with enhanced functional content) and Key Skills (England)

Apprentices must complete or have completed one of the English transferable skills qualifications and one of the Mathematical transferable skills qualifications listed below in order to successfully complete their Apprenticeship and this will carry the QCF five credit values. If they do not have these qualifications as part of their evidence an Apprenticeship certificate cannot be awarded.

English	Minimum level or grade	Credit value
Functional Skills qualification in English	2	5
GCSE qualification in English (with enhanced functional content)	C	5
Key Skills qualification in Communication achieved either before September 2013 as part of the Apprenticeship, or...*	2	5
GCSE Qualification in English*	C	N/A
A' Level or AS Level qualification in English Language*	E	N/A
A' Level or AS Level qualification in English Literature*	E	N/A
A' Level or AS Level qualification in English Language and Literature*	E	N/A
GCSE or O' Level qualification in English Language**	A	N/A
A' Level or AS Level qualification in English Language**	A	N/A
A' Level or AS Level qualification in English Literature**	A	N/A
A' Level or AS Level qualification in English Language and Literature**	A	N/A

* achieved before September 2012 and within the 5 years immediately prior to starting an Apprenticeship.

** achieved before September 2012, otherwise at any time prior to starting the Apprenticeship.

Mathematics	Minimum level or grade	Credit value
Functional Skills qualification in Mathematics	2	5
GCSE qualification (with enhanced functional content) in Mathematics	C	5
Key Skills qualification in Application of Number achieved either before September 2013 as part of the Apprenticeship, or...*	2	5
GCSE qualification in Mathematics*	C	N/A
A' level or AS Level qualification in Mathematics*	E	N/A
A' Level or AS Level qualification in Pure Mathematics*	E	N/A
A'Level or AS Level qualification in Further Mathematics*	E	N/A
GCSE or O'Level qualification in Mathematics**	A	N/A
A' Level or AS Level qualification in Mathematics**	A	N/A
A' Level or AS Level qualification in Pure Mathematics**	A	N/A
A' Level or AS Level qualification in Further Mathematics**	A	N/A

* achieved before September 2012 and within the 5 years immediately prior to starting an Apprenticeship.

** achieved before September 2012, otherwise at any time prior to starting the Apprenticeship.

ICT

Apprentices must complete or have completed one of the ICT transferable skills qualifications listed below in order to successfully complete their Apprenticeship and this will carry the QCF five credit values. If they do not have one of these qualifications as part of their evidence an Apprenticeship certificate cannot be awarded.

ICT	Minimum level or grade	Credit value
Functional Skills qualification in Information and Communications Technology (ICT)	2	5
GCSE qualification in ICT (with enhanced functional content)	C	5
Key Skills qualification in ICT achieved either before September 2013 as part of the Apprenticeship, or...*	2	5
GCSE qualification in ICT*	C	N/A
A' Level or AS Level qualification in ICT*	E	N/A
GCSE or O'Level qualification in ICT**	A	N/A
A' Level or AS Level qualification in ICT**	A	N/A

* achieved before September 2012 and within the 5 years immediately prior to starting an Apprenticeship.

** achieved before September 2012, otherwise at any time prior to starting the Apprenticeship.

Inclusion of Information and Communications Technology (ICT)

ICT is included in the required Functional Skills

Progression routes into and from this pathway

Progression routes into the pathway

Entrants to this pathway could be school leavers who have completed their GCSE studies and have some relevant vocational qualification or experience from working in a composite

engineering or manufacturing context and are now seeking to become qualified by undertaking an apprenticeship programme. More specifically they may:

- have GCSEs in English, Maths and Science - grade C or above
- have A or AS levels in Science, Technology, Engineering or Mathematics subjects
- have completed an engineering manufacturing or composites framework at Level 2
- have previous work experience or employment in the engineering or manufacturing sector
- have completed a 14 to 19 Diploma in Engineering or Manufacturing
- have completed a Young Apprenticeship in Engineering or other related area
- have a Welsh Baccalaureate (Welsh applicants)
- are keen and motivated to work in a composites development and manufacturing environment
- are willing to undertake a course of training both on-the-job and off-the-job and apply this learning in the workplace.

Progression from this pathway for those who complete the Level 3 apprenticeship programme

While significant numbers of Advanced Apprentices will seek internal progression to team leader or supervisory roles within their companies, some will want to progress to a Higher Apprenticeship in Engineering at Level 4; others may decide to opt for a Foundation degree or HNC/HND.

More generally, most ex-apprentices aspire to a combination of internal promotion while at the same time undertaking company sponsored qualifications as specified above.

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/

and the progression map

semta.org.uk/store/files/Routeimage4Jan2010_UpdatedLinks.pdf

UCAS points for this pathway:

(no information)

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 (ie manufacturing/ engineering in this case).

1c. Edexcel have produced a Level 3 stand-alone qualification that can cover all 9 outcomes of ERR requirements if Units 2 and 4 are achieved.

Qualification details:

Edexcel BTEC Level 3 Award in Work-Skills for Effective Learning and Employment (QCF)

QCF qualification ref no: 501/1791/9

Credit value: 4 credits

Guided learning hours: 40

The Edexcel BTEC Level 3 Award consists of a mandatory unit as an introduction to apprenticeships. Apprentices must then complete Units 2 and 4 which cover 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).

Please note: Only Level 2 is required to meet the framework requirements.

1d. 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 England.

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.

To claim final certification of the apprenticeship, one of the following forms of ERR evidence will be required, together with the Apprentice Declaration and Authorisation form V2 which is available from the Alliance of SSCs site: acecerts.co.uk/

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

Edexcel BTEC Level 3 Award in Work-Skills for Effective Learning and Employment (QCF) **which must include achievement of units 2 and 4**

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 guided learning (England)

Total GLH for each pathway

Semta recognises that all apprentices have different learning needs and some apprentices will require more Guided Learning Hours (GLH) while others will require less. We have outlined the GLH delivered to apprentices as set out in the GLH in the individual qualifications. This represents a typical apprentice with minimum experience in the sector, as specified by the Specification for Apprenticeship Standards for England (SASE).

Both on and off-the-job GLH must be clearly evidenced. This SASE requirement for on-the-job and off-the-job guided learning is intended to meet the requirement in section 27(2) (b) of the Apprenticeships, Skills, Children & Learning (ASCL) Act for on-the-job and off-the-job training.

Total GLH for each pathway is summarised below:

Intermediate Apprenticeship (Level 2) - Composite Engineering (Operator and Semi-skilled)

Pathway 1: Composite Engineering (Level 2)

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

Total minimum credit value = 118 credits

Total GLH = 811 hours

- Competence = 275 minimum hours / 71 minimum credits
- Knowledge = 280 minimum hours (smallest Technical Certificate) / 32 minimum credits)
- *Functional Skills (notional value 45 hours x 3 = 135 hours/ 15 credits)
- Mentoring 66 weeks x 1 hour/week = 66 hours
- PLTS = 40 minimum hours
- ERR = 15 minimum hours

*Functional skills: Intermediate apprentices who already have functional skills at level 1 should be encouraged to achieve level 2

Year 1 = 541 hours Year 2 = 270 hours

Advanced Apprenticeship (Level 3) - Composite Engineering (Craft & Technician)

Pathway 1: Composite Engineering (Level 3)

Pathway duration approximately 42 months depending on the qualification and unit options selected

1. Level 3 NVQ Extended Diploma in Composite Engineering (QCF) - for use with 16-24 year olds only or as an option for 25+

Total minimum credit value: 166 credits

Total GLH = 1,184 hours

- Competence = 390 minimum hours /102 minimum credits
- Knowledge = 450 minimum hours (based on the smallest technical certificate GLH)
- Knowledge = 49 minimum credits (based on the smallest technical certificate credit)
- Functional Skills (notional value 45 hours x 3) =135 hours /15 credits
- Mentoring 154 weeks x 1 hour/week =154 hours
- PLTS = 40 minimum hours
- ERR = 15 minimum hours

Year 1 = 338 hours Year 2 = 338 hours Year 3 = 338 hours Year 4 = 170 hours

2. Level 3 NVQ Diploma in Composite Engineering (QCF) - for use with 25 years and over only

Note: This NVQ Diploma qualification is for adult apprentices 25 years and over only who must be able to demonstrate a practical ability comparable to 3 relevant practical PEO units at Level 2, along with relevant health and safety training.

Total minimum credit value: 139 credits

Total GLH = 1,061 hours

- Competence = 267 minimum hours / 75 minimum credits
- Knowledge = 450 minimum hours (based on the smallest technical certificate GLH)
- Knowledge = 49 minimum credits (based on the smallest technical certificate credit)
- Functional Skills (notional value 45 hours x 3) =135 hours /15 credits
- Mentoring 154 weeks x 1 hour/week =154 hours
- PLTS = 40 minimum hours
- ERR = 15 minimum hours

Year 1 = 303 hours Year 2 = 303 hours Year 3 = 303 hours Year 4 = 152 hours

Evidence requirements for claiming an Apprenticeship Certificate

The Apprenticeships, Skills, Children and Learning Act (ASCL) was enacted in November 2010 and the new certification requirements came into force on the 13th April 2011. One of the key requirements of the Act is that only the Certifying Authority for England can issue

apprenticeship certificates to successful apprentices in England. In order to make this happen the Alliance of Sector Skills Councils (Alliance) has been designated the Certifying Authority in England. In turn the Alliance has delegated this role to individual Sector Skills Councils and Sector Bodies who certify on behalf of the Alliance.

Certification applications are made through the Apprenticeship Certificates England (ACE) on-line system.

The Apprenticeships, Skills, Children and Learning Act 2009 requires that apprentices must apply for their Apprenticeship completion certificate. Where the application is facilitated by a third party, there must be evidence that this was done at the specific request of the apprentice. Apprentices must also provide all of the appropriate evidence to support their claim for an Apprenticeship Completion Certificate.

In order to provide the Certifying Authority (Alliance of Sector Skills Councils) with the required evidence, the declaration must be completed and signed by both the apprentice and, where appropriate, the third party facilitating the application, before the form is uploaded to the Apprenticeship Certificates England (ACE) system.

In order to claim an apprenticeship certificate on completion of training the apprentice must complete the revised Universal Apprentice Declaration form V2 (8th November 2012) which will be down-loadable from the ACE website from March 2013.

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 Intermediate, Advanced 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 (either Functional Skills or alternative Transferable Skills) such as GCSEs, A levels or AS levels with enhanced functional skills as specified in the Transferable Skills section within this framework.
- evidence of completion of Employer Rights and Responsibilities (ERR) as detailed in the ERR section of this framework
- evidence of completion of Personal Learning and Thinking Skills (PLTS) as detailed in the PLTS section of this framework

Applications are made on-line through the ACE website to the appropriate SSC. These

requirements may well change as time goes by, so please refer to the ACE website for any updated requirements.

Minimum off-the-job guided learning hours

Below are the minimum off-the-job guided learning hours specified for:

Intermediate Apprenticeship (Level 2) - Composite Engineering (Operator and Semi-skilled)

Pathway 1: Composite Engineering (Level 2)

Minimum off-the-job hours through pathway 1 is 536 GLH, and is evidenced by completion of the knowledge element, Functional skills, Employment Rights and Responsibilities (ERR), PLTS and Mentoring.

This amounts to 66% of the total pathway GLH

Advanced Apprenticeship (Level 3) - Composite Engineering (Craft and Technician)

Pathway 1: Composite Engineering (Level 3)

Minimum off-the-job hours through pathway 1 is 794 GLH, and is evidenced by completion of the knowledge element, Functional skills, Employment Rights and Responsibilities (ERR), PLTS and Mentoring.

This amounts to 67% of the total pathway GLH for the Level 3 NVQ Extended Diploma or 75% for the NVQ Diploma option.

How this requirement will be met

Level 2 and 3 programmes

Apprentices following the pathways described within this framework will receive off-the-job learning via a combination of activities such as the Underpinning Knowledge (Technical certificate), Functional skills; Employment Rights and Responsibilities (ERR) and Personal Learning and Thinking Skills (PLTS).

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.

Functional skills delivery methods may vary, however all methods should start with initial/early assessment of a learner's functional 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. Functional skills 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 will be delivered by a combination of group-based delivery and self-study. These in combination exceed the 100 GLH / 30% rule as defined in the SASE (19. Section 27-1 SASE). In addition there will be a company induction, group delivery of PLTS requirements (prior to each apprentice starting to record their PLTS) 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, Functional skills, 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. This process is regulated and quality assured by Ofqual and Ofsted. PLTS will be delivered as described within its section.

Level 3 Programme

Advanced Apprentices aged 16 to 24yrs must complete one of the Level 3 NVQ Extended Diplomas which include a number of Performing Engineering Operations (PEO) Level 2 NVQ units. These units should be delivered and assessed in a sheltered and realistic environment and must be achieved before apprentices complete the Level 3 units in the Extended Diploma on the job in the workplace.

It is recognised that in some instances in the past, the PEO NVQ Level 2 has been delivered on a part-time day-release basis in a sheltered environment with the employer delivering the NVQ Level 3 in parallel for the balance of time each week. There are clear disadvantages to this approach:

1. The potential for trainees to work in hazardous environments commensurate with Level 3 activities without having received the Health and Safety tuition at Level 2 that would support this situation
2. The potential for the learner not to be trained in a progressive way developing competences and knowledge at Level 2 that progresses seamlessly to Level 3.

If providers and employers wish to continue delivery on this basis, they must ensure that:

- a) All appropriate Health and Safety units are successfully completed at Level 2 prior to any delivery at Level 3 in the workplace
- b) Any units at Level 3 delivered in the workplace must have been preceded by delivery at Level 2 in a sheltered environment.

Inclusion of Technical Certificates in the Apprenticeship Framework pathways

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 GLH) 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 Apprenticeship to determine if the apprentice will have the ability to achieve one of the more academically demanding technical knowledge qualification
- 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

Minimum on-the-job guided learning hours

Below are the minimum on-the-job guided learning hours specified for:

Composite Engineering (Operator and Semi-skilled)

Pathway 1: Composite Engineering (Level 2)

Minimum on-the-job through pathway 1 is 275 GLH and is evidenced by completion of the Level 2 NVQ Diploma in Composite Engineering (QCF)

Advanced Apprenticeship in Composite Engineering (Craft and Technician)

Pathway 1: Composite Engineering (Level 3)

Minimum on-the-job through pathway 1 is 390 GLH and is evidenced by completion of the Level 3 NVQ Extended Diploma in Composite Engineering (QCF)

Note: Minimum on-the-job through pathway 1 is 267 GLH if evidenced by completion of the Level 3 NVQ Diploma in Composite Engineering (QCF) (only by an adult apprentice 25 years and over with a practical skill comparable with 3 relevant practical PEO units, along with relevant health and safety training)

How this requirement will be met

Intermediate Apprenticeship in Composite Engineering (Operator and Semi-skilled)

Pathway 1: Composite Engineering (Level 2)

The Level 2 NVQ Diploma should be delivered in accordance with the Awarding Organisations delivery and assessment guidance, which includes the additional requirements as set down in Semta's QCF NVQ Unit Assessment Strategies. This 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 signed as having been completed by a responsible work colleague. This is then examined 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 should be 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.

Advanced Apprenticeship in Composite Engineering (Craft and Technician)

Pathway 1: Composite Engineering (Level 3)

The Level 3 NVQ Extended Diplomas and Level 3 NVQ Diplomas included in this Advanced 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>

Advanced Apprentices must complete the Level 3 NVQ Extended Diploma in Composite Engineering. However if the relevant QCF PEO units have already been achieved and certificated in a previous programme, such as applicants who have completed the improving Operational Performance Level 2 framework (Performing Engineering Operations Level 2 pathway), then they will be able to accredit these against the requirements of the Level 3 Extended Diploma. In such circumstances this would result in the minimum GLH requirements for the relevant pathway being reduced by a minimum of 123 hours and a minimum value of 27 credits (depending on the PEO units completed).

The Level 3 NVQ Extended Diploma includes a number of Performing Engineering Operations (PEO) Level 2 NVQ units. It is strongly recommended that the PEO units are delivered and assessed off the job in a sheltered and realistic work environment. This will ensure that Advanced Apprentices have attained a minimum and safe level of skills, knowledge and understanding in the occupational area prior to entering the workplace, thus minimising the risk of injury to themselves and other employees and the potential of increased costs incurred by the employer such as damaged tools/equipment, scrapped materials and components.

In order to ensure the safe transition to the workplace prior to being exposed to the hazards of the industrial environment, Advanced Apprentices must receive sufficient Health and Safety training covering both general and occupational specific requirements whilst undertaking the selected Level 2 NVQ PEO units off the job and in a sheltered and realistic work environment.

As a minimum the training programme should include the skills, knowledge and understanding requirements set out in the Performing Engineering Operations Level 2 QCF Qualification.

Whilst undertaking the skill specific Level 2 QCF NVQ units as part of the Level 3 NVQ Extended Diploma, Training Providers may wish to consider registering Advanced Apprentices on the three Mandatory Units from the Level 2 NVQ Diploma in Performing Engineering Operations(QCF) qualification

Unit 1: Working Safely in an Engineering Environment. QCF Unit Ref; L/600/5781

Unit 2: Carrying out Engineering Activities Efficiently and Effectively. QCF Unit Ref; D/600/5784

Unit 3: Using and Communicating Technical Information. QCF Unit Ref; M/600/5790

This has the advantage that if for any reason the apprentice is not able to complete the Level 3 NVQ Extended Diploma they would have achieved sufficient units to claim the Level 2 NVQ Diploma in Performing Engineering Operations (QCF)

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 signed as having been completed by a responsible work colleague. This is then examined 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.

Personal learning and thinking skills assessment and recognition (England)

Summary of Personal Learning and Thinking Skills

Personal Learning and Thinking Skills (PLTS) comprise of six skill areas that are essential to being successful in an apprenticeship.

There are two methods of evidencing the completion of PLTS within this framework.

Method 1 - Qualifications

1a. EAL have produced a stand-alone qualification that covers all 6 skill areas of PLTS.

Qualification details:

EAL Level 2 Award in Personal Learning and Thinking Skills for New Entrants into the Science, Engineering and Manufacturing Sectors (QCF)

QCF qualification ref no: 600/2019/2

Credit value: 6 credits

Guided learning hours: 60

1b. Edexcel have produced a stand-alone qualification that can cover all 6 skill areas of PLTS if Units 7, 8 and 9 are 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 qualification consists of a mandatory unit as an introduction to apprenticeships. Apprentices must then complete Units 7, 8 and 9 to cover all the PLTS which are mapped in grids at the end of each unit. This qualification is designed to be assessed in the context of the sector relevant to the apprenticeship framework being undertaken (ie manufacturing/engineering in this case).

1c. Edexcel have produced a Level 3 stand-alone qualification that can cover all 6 skill areas if Units 5, 6 and 7 are achieved.

Qualification details:

Edexcel BTEC Level 3 Award in Work-Skills for Effective Learning and Employment (QCF)

QCF qualification ref no: 501/1791/9

Credit value: 4 credits

Guided learning hours: 40

The Edexcel BTEC Level 3 Award consists of a mandatory unit as an introduction to apprenticeships. Apprentices must then complete Units 5, 6 and 7 to cover all the PLTS which are mapped in grids at the end of each unit. 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).

Please note: Only Level 2 is required to meet the framework requirements

Method 2 - Workbook

Apprentices or training providers may download the Semta PLTS Evidence Recording Document available from the Semta website:

<http://semta.org.uk/training-providers/training-providers-work-based-learning/training-providers-apprenticeships/apprenticeship-forms/>

This document will be used to record the apprentices PLTS evidence from the most naturally occurring location, such as the knowledge or competency qualifications, or Functional skills and ERR components of the framework.

To claim final certification of the apprenticeship, one of the following forms of PLTS completion evidence will be required, together with the Apprentice Declaration and Authorisation form V2 which is available from the Alliance of SSCs site acecerts.co.uk/

A qualification certificate for the EAL Level 2 Award in Personal Learning and Thinking Skills 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 Units 7, 8 and 9**

or

A qualification certificate for Edexcel BTEC Level 3 Award in Work-Skills for Effective Learning and Employment (QCF) **which must include achievement of Units 5, 6 and 7**

or

A completed and countersigned Semta PLTS evidence recording document

All apprentices will need to receive guidance on what PLTS are and how they will need to provide evidence for all 6 PLTS areas as detailed below. They will need to understand those aspects of each skill area as defined in the bullet points below and be able to identify opportunities to practice and evidence these skills within their apprenticeship.

The PLTS areas are interconnected so it is likely that apprentices will encounter skills from several areas in any one learning experience. For example, when an apprentice works to improve their own and team practice in the workplace they will have demonstrated team worker (collaborate with others to work towards common goals), effective participator (identify improvements that would benefit others as well as themselves) and self manager skills (work towards goals, showing initiative, commitment and perseverance).

Lecturers and/or assessors will be expected to check individual apprentices' progress in using and recording PLTS.

Creative thinking

For Creative Thinking there is a focus statement summing up the range of skills to be mastered and this is accompanied by a set of outcome statements that are indicative of the skills, behaviours and personal qualities associated with creative thinking.

Creative Thinking involves:

- generating ideas and exploring possibilities
- asking questions to extend thinking
- connecting own and others' ideas and experiences in inventive ways
- questioning own and others' assumptions
- trying out alternatives or new solutions and following ideas through
- adapting ideas as circumstances change

Independent enquiry

For Independent Enquiry there is a focus statement summing up the range of skills to be mastered and this is accompanied by a set of outcome statements that are indicative of the skills, behaviours and personal qualities associated with independent enquiry.

Independent Enquiry involves:

- identifying questions to answer and problems to resolve
- planning and carrying out research, appreciating the consequences of decisions
- exploring issues, events or problems from different perspectives
- analysing and evaluating information, judging its relevance and value
- considering the influence of circumstances, beliefs and feelings on decisions and events

Reflective learning

For Reflective Learning there is a focus statement summing up the range of skills to be mastered and this is accompanied by a set of outcome statements that are indicative of the skills, behaviours and personal qualities associated with independent enquiry.

Reflective Learning involves:

- assessing yourself and others, identifying opportunities and achievements
- setting goals with success criteria for your personal development and work
- reviewing progress, acting on the outcomes
- inviting feedback and dealing positively with praise, setbacks and criticism
- evaluating experiences and learning to inform your future progress
- communicating your learning in relevant ways for different audiences

Team working

For Team Working there is a focus statement summing up the range of skills to be mastered and this is accompanied by a set of outcome statements that are indicative of the skills, behaviours and personal qualities associated with team working.

Team Working involves:

- collaborating with others to work towards common goals
- reaching agreements, managing discussions to achieve results
- adapting behaviour to suit different roles and situations, including leadership roles
- showing fairness and consideration to others
- taking responsibility, showing confidence in yourself and your contribution
- providing constructive support and feedback to others

Self management

For Self Managers there is a focus statement summing up the range of skills to be mastered and this is accompanied by a set of outcome statements that are indicative of the skills, behaviours and personal qualities associated with self management.

Self Manager involves:

- seeking out challenges or new responsibilities and showing flexibility when priorities change
- working towards goals, showing initiative, commitment and perseverance
- organising time and resources, prioritising actions
- anticipating, taking and managing risks
- dealing with competing pressures, including personal and work-related demands
- responding positively to change, seeking advice and support when needed
- managing your emotions and building and maintaining relationships

Effective participation

For Effective Participation there is a focus statement summing up the range of skills to be mastered and this is accompanied by a set of outcome statements that are indicative of the skills, behaviours and personal qualities associated with effective participation, skills, behaviours and personal qualities associated with

Effective Participation involves:

- discussing issues of concern, seeking resolution where needed
- presenting a persuasive case for action
- proposing practical ways forward, breaking these down into manageable steps
- identifying improvements that would benefit others as well yourself
- trying to influence others, negotiating and balancing diverse views to reach workable solutions
- acting as an advocate for views and beliefs that may differ from your own

Additional employer requirements

There are no additional employer requirements

apprenticeship
FRAMEWORKS ONLINE

For more information visit
www.afo.sscalliance.org