

Composite Engineering (England)

IMPORTANT NOTIFICATION FOR ALL APPRENTICESHIP STARTS FROM 21 SEPTEMBER 2018

Modifications to SASE came into effect on 21 September 2018. Accordingly, SASE publication DFE-00236-2018 applies **both** to new Apprenticeship starts from 21 September 2018 **and** all Apprenticeships commenced before and not completed by 21 September 2018.

Latest framework version?

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Issue date: 16 October 2014

Issued By:
SEMTA

Apprenticeship Certificates
England

https://acecerts.co.uk/framework_library

Document Status:
Issued

Composite Engineering

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Framework information

Information on the Issuing Authority for this framework:

SEMTA

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

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| Issue number: 2 | This framework includes: |
| Framework ID: FR03098 | Level 2 <input checked="" type="checkbox"/> Level 3 <input checked="" type="checkbox"/> Level 4-7 <input type="checkbox"/> |
| Date this framework is to be reviewed by: 31/10/2015 | 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 year olds are given the appropriate skills necessary to contribute to this rapidly expanding area.

Developer of this framework

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Revising a framework

Why this framework is being revised

Changes to competency and knowledge qualifications at Level 2 and Level 3 as requested by Awarding Organisations and employers.

Summary of changes made to this framework

COMPOSITE ENGINEERING - Level 2

Pathway 1: Composite Engineering

- One new competence qualification has been added
- One knowledge qualification has been removed
- One knowledge qualification has been added

COMPOSITE ENGINEERING - Level 3

Pathway 1: Composite Engineering

- Two new competence qualifications have been added

Qualifications removed

COMPOSITE ENGINEERING - Level 2

Pathway 1: Composite Engineering

- Pearson BTEC Level 2 Diploma in Engineering (QCF) 500/7576/7

Qualifications added

COMPOSITE ENGINEERING - Level 2

Pathway 1: Composite Engineering

- C1b - ETCAL Level 2 NVQ Diploma in Composite Engineering (QCF) 601/4454/3 (new)
- K4 - Pearson BTEC Level 2 Extended Certificate in Engineering (Specialist: Manufacturing Engineering) (QCF) 500/8270/X

COMPOSITE ENGINEERING - Level 3

Pathway 1: Composite Engineering

- C1b - ETCAL Level 3 NVQ Extended Diploma in Composite Engineering (QCF) 601/4502/X

(new)

- C2b - ETCAL Level 3 NVQ Diploma in Composite Engineering (QCF) 601/4485/3 (new)

Qualifications that have been extended

None

Purpose of this framework

Summary of the purpose of the framework

Intermediate Apprenticeships and Advanced Apprenticeships are jobs 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.

All apprentices commencing their Intermediate Apprenticeship or Advanced Apprenticeship must have an Apprenticeship Agreement between the employer and apprentice. This can be used to reinforce the understanding of the requirements of the apprenticeship. 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 CompositesAquitaine, 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 Airbus 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 Airbus.

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 end 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,

draftsperson, 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 objectives are to:

- provide a structured training programme to develop and upskill the workforce
- develop more craft and technicians (Skills for Growth Strategy England)
- provide apprentices with the relevant semi-skilled, craft or technician skills required by composite manufacturing employers
- 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
- better address equality and diversity within the sector as defined in the framework summary above.
- tackle the age profile within the sub-sector
- 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

The Level 2 Intermediate framework offers one pathway. 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.

As a guide, the Intermediate Apprenticeship in Composite Engineering framework (Level 2) is suitable for applicants who have five GCSEs grades D to E in English, Maths and Science. The selection process on behalf of employers may include initial assessment where applicants will be asked if they have any qualifications or experience that can be accredited against the requirements of the apprenticeship. They may also be required to take tests in basic numeracy and literacy, communication skills and spatial awareness. There may also be an interview to ensure applicants have selected the right occupational sector and are motivated to become an apprentice, as undertaking an apprenticeship is a major commitment for both the individual and the employer.

Employers would be interested in applicants who:

- are keen and motivated to work in a composite development and engineering/manufacturing environment 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 previous employment or work experience in the sector or
- have GCSE's in English, Maths, and Science (grade D to E or higher) for the Intermediate Apprenticeship or
- have completed a 14 to 19 Diploma in Engineering or Manufacturing or
- are practically minded and want to work with their hands 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.

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.

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. Colleges, Training Providers

and Awarding Organisations will be able to advise applicants on the current rules for accrediting prior learning (APL) and experience. It is understood that where applicants have accredited prior learning that Apprentices must be offered training which helps them to develop new skills and learning at a higher level.

Transferable skills

An Intermediate Apprenticeship framework must specify that an apprentice needs to achieve (or have achieved) Functional skills or GCSEs (with enhanced functional content). These are listed together with the required levels under the Transferable skills section of this framework.

Knowledge qualifications

If applicants already have one of the knowledge qualifications or individual QCF units at Level 2 before starting their apprenticeship (see knowledge qualifications page) they may count this and will not have to repeat the qualification providing they achieved this qualification within 5 years of starting the apprenticeship. The hours that were spent gaining the qualification may be counted towards the total hours for the apprenticeship.

Competence qualifications

If applicants already have one of the competence qualifications at Level 2 (see competence qualifications page) before starting their apprenticeship, 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 competence qualification may be counted towards the total hours for the apprenticeship.

It is important however that there is agreement between the employer and the apprentice that the applicant is currently competent.

Prior experience in the sector

Applicants that are already working in the sector or who have recently worked in the sector at the appropriate level can apply to have their experience formally recognised by an Awarding Organisation and this could count towards the qualification(s) in this framework.

The Level 3 Advanced framework offers one pathway. Employers would welcome applicants from a wide and diverse background and wish to attract applicants who have an interest to work in a composite manufacturing or engineering environment.

As a guide, the Advanced Apprenticeship in Composite Engineering framework is suitable for applicants who have five GCSEs grade C or above including Maths, English, and a Science. This is not a hard and fast rule but may vary according to the pathway chosen and the suitability of individual candidates.

Employers would be interested in applicants who:

- have completed an Intermediate Apprenticeship in Composite Engineering or
- have completed an intermediate Apprenticeship at Level 2 in the relevant engineering/manufacturing occupational discipline or
- have GCSEs in English, Maths and Science - grade C or above or
- have completed a 14 to 19 Diploma in Engineering or Manufacturing or
- have completed a Young Apprenticeship in Engineering or other related area or
- have a Welsh Baccalaureate (Welsh applicants) 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 previous work experience or employment in the sector or
- have the ability to follow instructions and diagrams have literacy and numeracy to work with data
- are good team worker, who can also work under own initiative
- are keen and motivated to work in an engineering or manufacturing environment

Selection process

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, as undertaking an apprenticeship is a major commitment for both the individual and the employer.

Rules to avoid the need to repeat qualifications

To avoid the need to repeat qualifications, processes exist to ensure applicants with prior knowledge, qualifications and/or experience are not disadvantaged. Colleges, Training Providers and Awarding Organisations will be able to advise applicants on the current rules for accrediting prior learning and experience.

Transferable skills

An Advanced Apprenticeship framework must specify that an apprentice needs to achieve (or have achieved) Functional skills or GCSEs (with enhanced functional content). These are listed together with the required levels under the Transferable skills section of this framework.

Knowledge qualifications

If applicants already have one of the knowledge qualifications or individual QCF units at Level 3 (see knowledge qualifications page) before starting their apprenticeship, 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. Furthermore the hours that were spent gaining the qualification may be counted towards the total hours for the apprenticeship.

Competence qualifications

If applicants already have one of the competence qualifications at Level 3 (see competence qualifications page) before starting their apprenticeship, 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.

It is important however that there is agreement between the employer and the apprentice that the applicant is currently competent.

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

Prior experience in the sector

Applicants that are already working in the sector or have recently worked, should be able to have their experience formally recognised by an Awarding Organisation and this could count towards the qualification(s) in this framework.

Applicants who have completed the Improving Operational Performance Level 2 framework (Performing Engineering Operations Level 2 pathway) will be able to accredit this qualification against the requirements of the Extended Level 3 Diploma.

Level 2

Title for this framework at level 2

Intermediate Level in Composite Engineering

Pathways for the 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 = 116 credits

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

Competence = 71 minimum credits

Knowledge = 30 minimum credits

Transferable Skills = 15 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 |
| C1b | 601/4454/3 | ETC Awards Ltd | 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 |

K3 - 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 |
|-----|------------|-----------------------|--------------|-----------------------|-------------------|
| K3a | 600/2304/1 | City & Guilds | 32 | 280 | N/A |

K4 - Pearson BTEC Level 2 Extended Certificate in Engineering (Specialist: Manufacturing Engineering) (QCF)

| No. | Ref no. | Awarding organisation | Credit value | Guided learning hours | UCAS points value |
|-----|------------|-----------------------|--------------|-----------------------|-------------------|
| K4a | 500/8270/X | Pearson | 30 | 180 | N/A |

Combined qualifications available to this pathway

N/A

Relationship between competence and knowledge qualifications

K1 - K4 provide underpinning knowledge for C1a - C1b

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)

Apprentices must complete, or have completed, one of the English transferable skills qualifications and one of the Mathematical transferable skills qualifications in order to successfully complete their Apprenticeship.

The list of acceptable qualifications may vary depending on the Apprentice's completion date of their Apprenticeship. Please check the qualifications that are acceptable for each Apprentice.

If Apprentices do not have acceptable evidence of the achievement of these mandatory qualifications, at the required grade/level, an Apprenticeship certificate cannot be awarded.

ENGLISH

For the current list of acceptable English qualifications and appropriate **minimum** grade/level requirements, please refer to the most recent version of [SASE](#) on the www.gov.uk website. Additional guidance materials can be found on the [Knowledge Base](#) section of the [ACE](#) website.

Does this framework require English achievement above the minimum SASE requirement?

YES

NO

If YES, please state the grade/level required for English:

Click here to enter text.

MATHS

For the current list of acceptable Maths qualifications and appropriate **minimum** grade/level requirements, please refer to the most recent version of [SASE](#) on the www.gov.uk website. Additional guidance materials can be found on the [Knowledge Base](#) section of the [ACE](#) website.

Does this framework require Maths achievement above the minimum SASE requirement?

YES

NO

If YES, please state the grade/level required for Maths:

Click here to enter text.

Inclusion of Information and Communications Technology (ICT)

Is ICT a framework requirement? **YES** **NO**

ICT

For the current list of acceptable ICT qualifications and appropriate **minimum** grade/level requirements, please refer to the most recent version of [SASE](#) on the www.gov.uk website. Additional guidance materials can be found on the [Knowledge Base](#) section of the [ACE](#) website.

Does this framework require ICT achievement above the minimum SASE requirement

YES

If YES, please state the grade/level required for ICT:

Click here to enter text.

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
- be keen and motivated to work in a composite engineering/manufacturing environment or
- be practically minded and want to work with their hands or
- be 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.

Other entrants may have experience from working in the sector in a manufacturing context, and are now seeking to become qualified by undertaking an apprenticeship programme. Particular interest would be shown to those applicants who have had previous work experience or employment in the sector.

Progression routes from this pathway

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.

To further assist apprentices plan their careers we recommend they visit the following websites:

<http://www.apprenticeships.org.uk/types-of-apprenticeships/engineering-and-manufacturing-technologies.aspx>

<https://nationalcareersservice.direct.gov.uk/advice/planning/jobfamily/Pages/manufactureandengineering.aspx>

Employee rights and responsibilities

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

Qualification details:

Pearson 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 Pearson 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 preceding forms of ERR evidence will be required, together with the Apprentice Declaration and Authorisation form V3 which is available from the Federation for Industry Sector Skills and Standards (Fisss) website: acecerts.co.uk/

Certification Requirements for ERR

All providers and apprentices must complete the Apprenticeship Consent Form when claiming for the Apprentice's apprenticeship certificate. The universal form covers declarations for the apprentice to:

- confirm the existence of an Apprenticeship Agreement between themselves and their employer;
- confirm their achievement of all ERR requirements;
- confirm their achievement of all 6 PLTS;
- confirm that they have received at least the minimum levels of GLH set out in their framework and have undertaken training both on and off the job.

All apprentices must sign this form at the end of programme to give their authority for the claimant, named on the form, to make a claim, on their behalf, for their Apprenticeship completion certificate.

Level 3

Title for this framework at level 3

Advanced Level in Composite Engineering

Pathways for the framework at level 3:

Pathway 1: Composite Engineering (Level 3)

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

Description of this pathway

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

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)

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

- Competence = 102 credits
- Knowledge = 49 credits
- Transferable Skills = 15 credits

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

- Competence = 75 credits
- Knowledge = 49 credits
- Transferable Skills = 15 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) |
|---|---|
| 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 | N/A |
| C1b | 601/4502/X | ETC Awards Ltd | 102 | 390 | N/A |

| 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 | N/A |
| C2b | 601/4485/3 | ETC Awards Ltd | 75 | 267 | N/A |

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 | N/A |

| 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 | N/A |

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 | N/A |

K4 - Pearson 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 | Pearson | 120 | 720 | N/A |

K5 - Pearson 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 | Pearson | 180 | 1080 | N/A |

K6 - Pearson 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 | Pearson | 180 | 1080 | N/A |

K7 - Pearson 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 | Pearson | 120 | 720 | N/A |

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 | N/A |

Combined qualifications available to this pathway

N/A

Relationship between competence and knowledge qualifications

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

K1 - K8 provide underpinning knowledge for C1a - C2b and C2a - C2b

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 years 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:

Standards and Frameworks Manager, Semta, Unit 2 The Orient Centre, Greycaine Road, Watford WD24 7GP or frameworks@semta.org.uk

Transferable skills (England)

Apprentices must complete, or have completed, one of the English transferable skills qualifications and one of the Mathematical transferable skills qualifications in order to successfully complete their Apprenticeship.

The list of acceptable qualifications may vary depending on the Apprentice's completion date of their Apprenticeship. Please check the qualifications that are acceptable for each Apprentice.

If Apprentices do not have acceptable evidence of the achievement of these mandatory qualifications, at the required grade/level, an Apprenticeship certificate cannot be awarded.

ENGLISH

For the current list of acceptable English qualifications and appropriate **minimum** grade/level requirements, please refer to the most recent version of [SASE](#) on the www.gov.uk website. Additional guidance materials can be found on the [Knowledge Base](#) section of the [ACE](#) website.

Does this framework require English achievement above the minimum SASE requirement?

YES

If YES, please state the grade/level required for English:

Click here to enter text.

MATHS

For the current list of acceptable Maths qualifications and appropriate **minimum** grade/level requirements, please refer to the most recent version of [SASE](#) on the www.gov.uk website. Additional guidance materials can be found on the [Knowledge Base](#) section of the [ACE](#) website.

Does this framework require Maths achievement above the minimum SASE requirement?

YES

NO

If YES, please state the grade/level required for Maths:

Click here to enter text.

Inclusion of Information and Communications Technology (ICT)

Is ICT a framework requirement? **YES** **NO**

ICT

For the current list of acceptable ICT qualifications and appropriate **minimum** grade/level requirements, please refer to the most recent version of [SASE](#) on the www.gov.uk website. Additional guidance materials can be found on the [Knowledge Base](#) section of the [ACE](#) website.

Does this framework require ICT achievement above the minimum SASE requirement

YES

NO

If YES, please state the grade/level required for ICT:

Click here to enter text.

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 or
- have A or AS levels in Science, Technology, Engineering or Mathematics subjects or
- have completed an engineering manufacturing or composites framework at Level 2 or
- have previous work experience or employment in the engineering or manufacturing sector or
- have completed a 14 to 19 Diploma in Engineering or Manufacturing or
- have completed a Young Apprenticeship in Engineering or other related area or
- have a Welsh Baccalaureate (Welsh applicants) or
- be keen and motivated to work in a composites development and manufacturing environment or
- be 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.

To further assist apprentices plan their careers we recommend they visit the following websites:

<http://www.apprenticeships.org.uk/types-of-apprenticeships/engineering-and-manufacturing-technologies.aspx>

<https://nationalcareersservice.direct.gov.uk/advice/planning/jobfamily/Pages/manufactureandengineering.aspx>

Employee rights and responsibilities

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

Qualification details:

Pearson 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 Pearson 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. Pearson 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 Pearson 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 preceding forms of ERR evidence will be required, together with the Apprentice Declaration and Authorisation form V3 which is available from the Federation for Industry Sector Skills and Standards (Fisss) website: acecerts.co.uk/

Certification Requirements for ERR

All providers and apprentices must complete the Apprenticeship Consent Form when claiming for the Apprentice's apprenticeship certificate. The universal form covers declarations for the apprentice to:

- confirm the existence of an Apprenticeship Agreement between themselves and their employer;
- confirm their achievement of all ERR requirements;
- confirm their achievement of all 6 PLTS;
- confirm that they have received at least the minimum levels of GLH set out in their framework and have undertaken training both on and off the job.

All apprentices must sign this form at the end of programme to give their authority for the claimant, named on the form, to make a claim, on their behalf, for their Apprenticeship completion certificate.

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.

Download the guidance on the Equality Act here:

www.equalityhumanrights.com/advice-and-guidance/new-equality-act-guidance/

On and off the job guided learning (England)

Total GLH for each pathway

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 Federation for Industry Sector Skills & Standards (Fiss) has

been designated the Certifying Authority in England. Certification applications are made through the Apprenticeship Certificates England (ACE) on-line system.

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).

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 = 116 credits

Total GLH = 711 hours

- Competence = 275 minimum hours / 71 minimum credits
- Knowledge = 180 minimum hours (smallest Technical Certificate) / 30 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 = 474 hours Year 2 = 237 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

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 436 GLH, and is evidenced by completion of the knowledge element, Functional skills, Employment Rights and Responsibilities (ERR), PLTS and Mentoring.

This amounts to 61% 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

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 candidates 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.

Employee 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.

Off-the-job training needs to:

- achieve clear and specific outcomes which contribute directly to the successful achievement of the framework and this may include accredited and non-accredited elements of the framework
- be planned, reviewed and evaluated jointly between the apprentice and a tutor, teacher, mentor or manager
- allow the apprentice access as, and when required to tutors, teachers, mentor(s) or manager
- be delivered through one or more of the following methods: individual and group teaching, e-learning, distance learning, coaching; mentoring, feedback and assessment; collaborative/networked learning with peers, guided study and induction.

Providers will not be required to record individual on and off-the-job Guided Learning Hours (GLH). However for certification purposes, the provider will be required to declare that the apprentice has completed the on and off-the-job GLH requirement as set out in this Apprenticeship framework.

Guided learning hours delivered under an apprenticeship agreement may vary depending on the previous experience and attainment of the apprentice. The amount of off-the-job training required to complete the apprenticeship under the apprenticeship agreement may then be reduced accordingly, provided the total number of off-the-job hours for this framework can be verified for apprenticeship certification.

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

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 wide range of technical certificates across a number of awarding organisations.

Whilst Awarding Organisation partners have ensured that each of the technical knowledge qualifications in each pathway delivers, via a core and options approach the minimum knowledge and understanding requirements for all the occupational areas (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 Engineering, Manufacturing 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 Engineering, Manufacturing 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 progressions 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 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 qualifications
- the results of any psychometric tests that would ascertain whether the apprentice will be able to achieve one of the more academically demanding technical knowledge qualifications
- the preferred learning style of the apprentice including the various assessment methodologies used by the different Awarding Organisations
- custom and practice within the Sector, including any legislation requirements
- local and/or national Trade Union agreements

Advanced Apprenticeship in Composite Engineering

Advanced Apprentices aged 16 to 24 years 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:

a) 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

b) the potential for the trainees 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.

Minimum on-the-job guided learning hours

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

On-the-job delivery

The units must be assessed in a work environment and must be assessed in accordance with the 'Common Requirements for National Vocational Qualifications (NVQ) in the QCF' which can

be downloaded from Semta's website.

Additional assessment requirements have been published by Semta. These additional assessment requirements are set down in Semta's Engineering NVQ QCF unit assessment strategy which can also be downloaded from Semta's website.

On-the-job training hours should:

- achieve clear and specific outcomes which contribute directly to the successful achievement of the framework and this may include accredited and non-accredited elements of the framework
- be planned, reviewed and evaluated jointly between the apprentice and a tutor, teacher, mentor or manager
- allow access as and when required by the apprentice either to a tutor, teacher, mentor or manager
- be delivered during contracted working hours.

Examples of on-the-job training hours in a composite engineering or manufacturing context might be:

- technical or business 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 apprentices.

These hours may vary depending on previous experience and attainment of the apprentice. Where a candidate enters an apprenticeship agreement having previously attained or acquired the appropriate competencies or knowledge, this prior learning needs to be recognised and documented using the relevant QCF credit transfer, QCF exemption or RPL procedures (as off-the-job above).

The amount of on-the-job training required to complete the apprenticeship under the apprenticeship agreement may then be reduced accordingly, provided the total number of on-the-job hours for this framework can be verified for apprenticeship certification.

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.

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).

Certification Requirements for GLH

All providers and apprentices must complete the Apprenticeship Consent Form when claiming for the apprentice's Apprenticeship certificate. The universal form covers declarations for the apprentice to:

- confirm the existence of an Apprenticeship Agreement between themselves and their employer;
- confirm their achievement of all ERR requirements;
- confirm their achievement of all 6 PLTS;
- confirm that they have received at least the minimum levels of GLH set out in their framework and have undertaken training both on and off the job.

All apprentices must sign this form at the end of programme to give their authority for the claimant, named on the form, to make a claim, on their behalf, for their Apprenticeship completion certificate.

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. Pearson 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:

Pearson 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 Pearson 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. Pearson 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 Pearson 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/>

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:

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 Pearson 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 Pearson 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.

Certification Requirements for PLTS

All providers and apprentices must complete the Apprenticeship Consent Form when claiming for the apprentice's Apprenticeship certificate. The universal form covers declarations for the apprentice to:

- confirm the existence of an Apprenticeship Agreement between themselves and their employer;
- confirm their achievement of all ERR requirements;
- confirm their achievement of all 6 PLTS;
- confirm that they have received at least the minimum levels of GLH set out in their framework and have undertaken training both on and off the job.

All apprentices must sign this form at the end of programme to give their authority for the claimant, named on the form, to make a claim, on their behalf, for their Apprenticeship completion certificate.

Creative thinking

People think creatively by generating and exploring ideas, making original connections. They try different ways to tackle a problem, working with others to find imaginative solutions and outcomes that are of value.

To demonstrate these skills, behaviours and personal qualities, apprentices should:

- Generate ideas and explore possibilities;
- Ask questions to extend their thinking;
- Connect their own and others' ideas and experiences in inventive ways; Question their own and others' assumptions;
- Try out alternatives or new solutions and follow ideas through; Adapt ideas as circumstances change.

Independent enquiry

People process and evaluate information in their investigations, planning what to do and how to go about it. They take informed and well-reasoned decisions, recognising that others have different beliefs and attitudes.

Skills, behaviours and personal qualities for apprentices:

- Identify questions to answer and problems to resolve;
- Plan and carry out research, appreciating the consequences of decisions; Explore issues, events or problems from different perspectives;
- Analyse and evaluate information, judging its relevance and value;
- Consider the influence of circumstances, beliefs and feelings on decisions and events; Support conclusions, using reasoned arguments and evidence.

Reflective learning

People evaluate their strengths and limitations, setting themselves realistic goals with criteria for success. They monitor their own performance and progress, inviting feedback from others and making changes to further their learning.

To demonstrate these skills, behaviours and personal qualities, apprentices should:

- Assess themselves and others, identifying opportunities and achievements;
- Set goals with success criteria for their development and work;
- Review progress, acting on the outcomes;
- Invite feedback and deal positively with praise, setbacks and criticism; Evaluate experiences and learning to inform future progress;
- Communicate their learning in relevant ways for different audiences.

Team working

People work confidently with others, adapting to different contexts and taking responsibility for their own part. They listen to and take account of different views. They form collaborative relationships, resolving issues to reach agreed outcomes.

To demonstrate these skills, behaviours and personal qualities, apprentices should:

- Collaborate with others to work towards common goals;
- Reach agreements, managing discussions to achieve results;
- Adapt behaviour to suit different roles and situations, including leadership roles; Show fairness and consideration to others;
- Take responsibility, showing confidence in themselves and their contribution;
- Provide constructive support and feedback to others.

Self management

People organise themselves, showing personal responsibility, initiative, creativity and enterprise with a commitment to learning and self-improvement. They actively embrace change, responding positively to new priorities, coping with challenges and looking for opportunities.

To demonstrate these skills, behaviours and personal qualities, apprentices should:

- Seek out challenges or new responsibilities and show flexibility when priorities change;
- Work towards goals, showing initiative, commitment and perseverance;
- Organise time and resources, prioritising actions;
- Anticipate, take and manage risks;
- Deal with competing pressures, including personal and work-related demands;
- Respond positively to change, seeking advice and support when needed;
- Manage their emotions, and build and maintain relationships.

Effective participation

People actively engage with issues that affect them and those around them. They play a full part in the life of their school, college, workplace or wider community by taking responsible action to bring improvements for others as well as themselves.

To demonstrate these skills, behaviours and personal qualities, apprentices should:

- Discuss issues of concern, seeking resolution where needed;
- Present a persuasive case for action;
- Propose practical ways forward, breaking these down into manageable steps;
- Identify improvements that would benefit others as well as themselves;
- Try to influence others, negotiating and balancing diverse views to reach workable solutions;
- Act as an advocate for views and beliefs that may differ from their own.

apprenticeship **FRAMEWORK**

For more information visit-
www.acecerts.co.uk/framework_library