



Part of the
Enginuity Group

Qualification Manual

SVQ Performing Engineering Operations at SCQF Level 5

Qualification code: GR6W 45

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1.0 About EAL

Since 1964 EAL (Excellence, Achievement and Learning) has been awarding vocational qualifications and apprenticeship components for engineering, building services and related sectors. Developed to the highest technical standard, our qualifications are regularly updated to reflect regulatory, employer and technical changes. We support the providers of our qualifications with an unparalleled level of service to ensure that learners are well prepared for the roles they plan to take on.

EAL recognise the value of skills in the work environment as one of the five key drivers of productivity, essential for economic growth and bringing a number of wider social benefits. Through its programme of continuous improvement EAL strives to meet the demand from employers for high performing, high quality products.

In 2012, EAL changed its name from EMTA Awards Limited to Excellence, Achievement and Learning, to better reflect its wide reaching position across industry – providing qualifications, not only in Engineering and Manufacturing, but also specialising in Building Services Engineering, Gas Utilisation, Environmental Technologies, Business Services and closely related sectors.

1.1 Equal opportunities and diversity

EAL expects its Centres to enable learners to have equal access to training and assessment for qualifications in line with equalities legislation. Further details can be located in the EAL Equal Opportunities and Diversity Policy:

<http://www.eal.org.uk/centre-support/centre-support/policies-and-important-documents>

1.2 Customer Experience and feedback

Customer Experience is a fundamental part of EAL's commitment to you. EAL aims to ensure that all customers receive a high-quality, efficient service. We are always interested in feedback and if you have any comments or feedback on our qualifications, products, or services, please contact the Customer Experience team:

EAL Customer Experience

Tel: +44 (0)1923 652 400

Email: Customer.Experience@eal.org.uk

2.0 About the qualification

The SVQ Performing Engineering Operations at SCQF Level 5 is gained when all the necessary assessment routes have been achieved. The Centre will then be able to apply for the learner's certificate of achievement. The learner will also receive a certificate of unit credit, listing all the assessment routes they have achieved.

If the learner does not complete the full qualification, they can still claim a certificate of unit credit for the assessment routes achieved. This will mean they will have proof of their ability and could complete the qualification at a later date.

Assessment routes can also be taken individually (stand-alone units). This manual must be used in conjunction with the delivery and assessment of any individual assessment routes to ensure that assessment requirements and methodologies are consistently applied.

SVQ qualifications are subject to the 10 week rule. This means that there must be a minimum 10 week period between registration and certification.

2.1 Learner registration and certification

Learners must be registered with EAL on a code which relates to the qualification - this must be completed prior to assessment. Both learner registration and certification can be completed online at the EAL website: www.eal.org.uk

Qualification Title:	Code:
SVQ Performing Engineering Operations at SCQF Level 5	GR6W 45

2.2 Funding for this qualification

Most funding in Scotland is through the Skills Development Scotland (SDS) process for apprenticeships and other approved programmes. They can be contacted at:

Skills Development Scotland
Monteith House
11 George Square
Glasgow
G2 1DY

<https://www.skillsdevelopmentScotland.co.uk>

2.3 Qualification support materials

The following assessment support materials are available:

Assessment routes:

These contain the details of the nationally recognised assessment routes. The documents allow both the learner and assessor to record the learners progress through the qualification selected. The assessment routes contain the performance to be assessed, the knowledge to be assessed and the evidence required from the learner to demonstrate their competence

Learner guide (including performance assessment plan and evidence record):

This guide explains to the learner how they will be assessed, and also gives ideas for evidence. It can be given to the learner during induction to help them understand the qualification and assessment requirements

2.4 Training sign off

Sufficient training must be carried out prior to the commencement of the formal competency assessment process: evidence must be available to show that the relevant training has been carried out prior to the assessment of the performance and skills criteria. The evidence that training has been completed to a sufficient level must be signed and dated by both the trainer and learner. Failure to provide evidence that sufficient training has taken place will result in the delay or failure in the certification of this qualification or individual units.

3.0 Centre and qualification approval

Centres wishing to deliver the SVQ Performing Engineering Operations at SCQF Level 5 will need to comply with the Qualification Manual and EAL's Centre recognition criteria. Centres must also put in place the appropriate physical and human resources and administration systems to effectively run the qualification.

For existing EAL Centres to put the qualification on your Centre remit:

To add the SVQ Performing Engineering Operations at SCQF Level 5 qualification to your Centre qualification remit, create and complete a qualification approval application form in Smarter Touch and submit to EAL.

For non EAL Centres to gain Centre approval to run the qualification:

Please contact the EAL Customer Experience Team who will be delighted to hear from you:

EAL Customer Experience

Tel: +44 (0)1923 652 400

Email: Customer.Experience@eal.org.uk

EAL provides a wide range of other qualifications some of which can be used as a progression route from this qualification, details on these can be obtained from the [EAL website](#) or alternatively, contact:

EAL Customer Experience

Tel: +44 (0)1923 652 400

Email: Customer.Experience@eal.org.uk

4.0 Qualification structure

Rule of combination

To achieve the SVQ Performing Engineering Operations at SCQF Level 5 qualification learners are required to obtain the **three** mandatory units plus **five** optional units from either **Group A** and/or **Group B**

Units selected from Group B must be delivered and assessed in the Learner's place of work

Mandatory assessment routes: All three assessment routes must be completed:

EAL code	Assessment route title	Level	Credit value
SCPEO2/001	Complying with statutory regulations and organisational safety requirements	5	5
SCPEO2/002	Using and interpreting engineering data and documentation	5	5
SCPEO2/003	Working Efficiently and Effectively in Engineering	5	5

Group A Optional assessment routes:

SCPEO2/004	Producing Mechanical Engineering Drawings using a CAD System	5	29
SCPEO2/005	Producing Components using Hand Fitting Techniques	5	22
SCPEO2/006	Producing Mechanical Assemblies	5	23
SCPEO2/007	Forming and Assembling Pipework Systems	5	27
SCPEO2/008	Carrying Out Aircraft Detail Fitting Activities	5	30
SCPEO2/009	Installing Aircraft Mechanical Fasteners	5	22
SCPEO2/010	Producing Aircraft Detail Assemblies	5	28
SCPEO2/011	Preparing and Using Lathes for Turning Operations	5	29
SCPEO2/012	Preparing and Using Milling Machines	5	28
SCPEO2/013	Preparing and Using Grinding Machines	5	31
SCPEO2/014	Preparing and Proving CNC Machine Tool Programs	5	30
SCPEO2/015	Preparing and Using CNC Turning Machines	5	34

Group A Optional assessment routes (cont)

SCPEO2/016	Preparing and Using CNC Milling Machines	5	34
SCPEO2/017	Preparing and Using CNC Machining Centres	5	34
SCPEO2/018	Preparing and Using Industrial Robots	5	34
SCPEO2/019	Maintaining Mechanical Devices and Equipment	5	31
SCPEO2/020	Assembling and Testing Fluid Power Systems	5	36
SCPEO2/021	Maintaining Fluid Power Equipment	5	36
SCPEO2/022	Producing Sheet Metal Components and Assemblies	5	25
SCPEO2/023	Producing Platework Components and Assemblies	5	36
SCPEO2/024	Cutting and Shaping Materials using Thermal Cutting Equipment	5	36
SCPEO2/025	Preparing and Proving CNC Fabrication Machine Tool Programs	5	31
SCPEO2/026	Preparing and Using CNC Fabrication Machinery	5	34
SCPEO2/027	Preparing and Using Manual Metal Arc Welding Equipment	5	29
SCPEO2/028	Preparing and Using Manual TIG or Plasma-arc Welding Equipment	5	33
SCPEO2/029	Preparing and Using Semi-automatic MIG, MAG and Flux Cored Arc Welding Equipment	5	34
SCPEO2/030	Preparing and Using Manual Oxy/fuel Gas Welding Equipment	5	29
SCPEO2/031	Preparing and Using Manual Flame Brazing and Braze Welding Equipment	5	30
SCPEO2/032	Producing Electrical or Electronic Engineering Drawings using a CAD System	5	32
SCPEO2/033	Wiring and Testing Electrical Equipment and Circuits	5	32
SCPEO2/034	Forming and Assembling Electrical Cable Enclosure and Support Systems	5	27
SCPEO2/035	Assembling, Wiring and Testing Electrical Panels/Components Mounted in enclosures	5	31
SCPEO2/036	Assembling and Testing Electronic Circuits	5	32
SCPEO2/037	Maintaining Electrical Equipment/Systems	5	34
SCPEO2/038	Maintaining Electronic Equipment/Systems	5	34

Group A Optional assessment routes (cont)

SCPEO2/039	Maintaining and Testing Process Instrumentation and Control Devices	5	32
SCPEO2/040	Wiring and Testing Programmable Controller Based Systems	5	33
SCPEO2/041	Using Wood for Pattern, Modelmaking and Other Engineering Applications	5	29
SCPEO2/042	Assembling Pattern, Model and Engineering Woodwork Components	5	27
SCPEO2/044	Producing composite mouldings using pre-preg techniques	5	32
SCPEO2/045	Producing composite mouldings using resin flow infusion techniques	5	32
SCPEO2/046	Producing Composite Assemblies	5	25
SCPEO2/052	Finishing Surfaces by Applying Coatings or Coverings	5	29
SCPEO2/054	Carrying Out Heat Treatment of Engineering Materials	5	27
SCPEO2/061	Producing CAD Models (Drawings) using a CAD System	5	33
SCPEO2/062	Producing Engineering Project Plans	5	29
SCPEO2/063	Using Computer Software Packages to Assist with Engineering Activities	5	27
SCPEO2/064	Conducting Business Improvement Activities	5	32
SCPEO2/065	General Machining, Fitting and Assembly Applications	5	32
SCPEO2/066	General Fabrication and Welding Applications	5	32
SCPEO2/067	General Electrical and Electronic Engineering Applications	5	32
SCPEO2/068	General Maintenance Engineering Applications	5	32
SCPEO2/070	Assembling Structural Sub-Assemblies to Produce a Public Service Vehicle	5	28
SCPEO2/071	Fitting Sub-Assemblies and Components to Public Service Vehicles	5	28
SCPEO2/073	Producing Composite Mouldings using Resin Film Infusion Techniques	5	32

Group B Optional assessment routes

SCPEO2/074	Operating Centre Lathes	5	30
SCPEO2/075	Operating Milling Machines	5	30
SCPEO2/076	Operating CNC Turning Machines	5	33
SCPEO2/077	Operating CNC Milling Machines	5	33
SCPEO2/078	Operating CNC Electro-Discharge Machines	5	33
SCPEO2/079	Operating CNC Machining Centres	5	33
SCPEO2/080	Producing Mechanical Sub-Assemblies/ Assemblies	5	28
SCPEO2/081	Assembling Fluid Power Components to Mechanical Equipment	5	28
SCPEO2/082	Assembling Electrical or Electronic Components to Mechanical Equipment	5	30
SCPEO2/083	Assembling Pipework Components to Mechanical Equipment	5	31
SCPEO2/084	Handing Over and Confirming Completion of Maintenance or Installation	5	29
SCPEO2/085	Carrying Out Fault Location on Mechanical Equipment	5	31
SCPEO2/086	Carrying Out Maintenance Activities on Mechanical Equipment	5	29
SCPEO2/087	Restoring Mechanical Components to Usable Condition by Repair	5	29
SCPEO2/088	Carrying Out Scheduled Maintenance Activities on Mechanical Equipment	5	29
SCPEO2/089	Carrying Out Fault Location on Electrical Equipment and Circuits	5	31
SCPEO2/090	Carrying Out Maintenance Activities on Electrical Equipment	5	32
SCPEO2/091	Carrying Out Modifications or Rewiring Electrical Circuits	5	31
SCPEO2/092	Carrying Out Scheduled Maintenance Tasks on Electrical Equipment	5	30
SCPEO2/093	Carrying Out Fault Location on Fluid Power Equipment and Circuits	5	32
SCPEO2/094	Carrying Out Maintenance Activities on Fluid Power Equipment	5	31
SCPEO2/095	Carrying Out Scheduled Maintenance Tasks on Fluid Power Equipment	5	31
SCPEO2/096	Carrying Out Fault Location on Service Systems and Equipment	5	32

Group B Optional assessment routes (cont)

SCPEO2/097	Carrying Out Scheduled Maintenance Tasks on Service Systems and Equipment	5	29
SCPEO2/099	Carrying Out Maintenance on Compressed Air Equipment	5	29
SCPEO2/100	Assisting in the Installation of Mechanical Equipment	5	32
SCPEO2/108	Joining Materials by Semi-automatic MIG/MAG and Flux cored arc Processes	5	32
SCPEO2/109	Producing Fillet Welded Joints Using a Manual/Semi-automatic Welding Process	5	32
SCPEO2/110	Welding Materials with Mechanised Arc Welding Equipment	5	32
SCPEO2/111	Marking Out Components for Fabrication	5	26
SCPEO2/112	Cutting Sheet Metal to Shape Using Hand and Machine Tools	5	24
SCPEO2/113	Forming Sheet Metal Using Hand and Machine Tools	5	26
SCPEO2/114	Producing Sheet Metal Assemblies	5	27
SCPEO2/115	Cutting and Shaping Materials using CNC Laser Profiling Machines	5	31
SCPEO2/116	Cutting and Shaping Using CNC Plasma or Gas Cutting Machines	5	30
SCPEO2/117	Assembling Components Using Mechanical Fasteners	5	27
SCPEO2/118	Slinging, Lifting and Moving Materials and Components	5	23
SCPEO2/119	Cutting Plate and Sections Using Shearing Machines	5	26
SCPEO2/120	Cutting Materials Using Saws and Abrasive Discs	5	32
SCPEO2/121	Bending and Forming Plate Using Power Operated Machines	5	30
SCPEO2/122	Producing Platework Assemblies	5	31
SCPEO2/123	Producing Holes Using Drilling Machines	5	30
SCPEO2/124	Producing Structural Steel Ancillary Components	5	30
SCPEO2/125	Assembling Structural Steelwork	5	32
SCPEO2/127	Assisting in the installation of wooden furniture/outfitting units for yachts and boats	5	39
SCPEO2/129	Fitting seating, interior panels, soft furnishing and trim in yachts and boats	5	30
SCPEO2/130	Carrying out repairs to yacht and boat wooden components and assemblies	5	37
SCPEO2/131	Carrying out repairs to yacht and boat composite components	5	33

5.0 Assessment strategy

5.1 Introduction

This Assessment Strategy has been developed by Enginuity, the employer-led skills body for the science engineering manufacturing technologies sector. The Strategy complies with SQA Accreditation's regulatory requirements.

Enginuity has produced this Assessment Strategy to:

- assist assessors, internal verifiers and external quality assurance personnel
- encourage and promote consistent assessment of the qualifications and/or units.
- promote cost effective assessment plans

The Assessment Strategy provides definitions for:

- the qualifications and experience required for assessors, internal verifiers and external quality assurers
- the assessment environment and notes on simulation / replication
- access to the qualifications/units

and suggestions for:

- carrying out assessments
- performance evidence requirements
- assessing knowledge and understanding
- the arrangements for 'external quality control of assessment'

Enginuity has two key measures of success for this assessment strategy:

- the importance employers and learners place on the qualifications
- Enginuity's partnership with the relevant awarding bodies.

Enginuity will use these measures, and review the following guidance, to continually improve its assessment strategies for part or whole qualifications.

5.2 Scope of the qualification

Evidence of competence must be assessed against the requirements of the relevant National Occupational Standards.

The SVQ in Performing Engineering Operations (PEO) at SCQF Level 5 has been designed for learners who are either:

- acquiring engineering competencies in a realistic, sheltered and controlled environment, these institutions could be schools, colleges, training providers, company training Centres, HM Prison Services and the MOD training workshops, to enable a safe progression into the workplace/employment
- employed but require additional engineering competencies as part of an existing job role or to enable career progression

5.3 Qualification structure

Learners are required to complete all mandatory assessment routes (Units) plus five optional assessment routes. The range of optional assessment routes allows for many variations in the learners occupation to meet the needs of different organisations across the sector.

The number of mandatory and optional assessment routes required to achieve the qualification are defined in the rule of combination.

5.4 Assessor requirements

Assessment must be carried out by competent assessors who must hold or be working towards an appropriate assessor qualification accepted by SQA Accreditation, the qualification regulator.

Assessors holding older assessor qualifications must be able to demonstrate that they are assessing to the current standards appropriate to the assessment being carried out.

Specific technical requirements for assessors

Assessors must be able to demonstrate that they have verifiable, relevant and sufficient technical competence to evaluate and judge evidence for the qualification(s). This will be demonstrated either by holding a relevant technical qualification or by proven industrial experience of the technical areas to be assessed. The assessor's competence must, as a minimum, be at the same level as that required of the learner(s) in the units being assessed.

Assessors must also know:

- the content and meaning of the National Occupational Standards against which assessments are to be carried out
- SQA Accreditation's regulatory requirements
- the relevant awarding body's documentation and system of vocational qualifications within which the assessment is taking place.

5.5 Expert witness

The use of expert witnesses is encouraged as a contribution to the provision of performance evidence presented for assessment. The role of the expert witness is to submit evidence to the assessor as to the competence of the learner in any given unit. This evidence must directly relate to learner's performance in the workplace which has been seen by the expert witness.

All Expert Witnesses must:

- be occupationally competent in the area being assessed. This means that each expert witness must, according to current sector practice, be competent in the functions covered by the units to which they are contributing.
- maintain their occupational competence by actively engaging in continuous professional development activities in order to keep up to date with developments
- provide current records of their skills and the current supporting knowledge and understanding in the context of a recent role directly related to the qualification unit that they are witnessing.
- be familiar with the qualification unit; and must be able to interpret current working practices and technologies within the area of work.
- be inducted by the Centre so that they are familiar with the standards for those units for which they are to provide expert witness evidence. They must also understand the Centre's recording requirements and will need guidance on the skills required to provide evidence for the NOS.

5.6 Internal verifier requirements

Internal Verifiers must hold, or be working towards, an appropriate internal verifier qualification as accepted by SQA Accreditation, the qualification regulator.

Internal Verifiers holding older qualifications must be able to demonstrate that they are verifying to the current standards.

The tables below show the recommended levels of technical competence for assessors, internal verifiers, and external verifiers/external quality assurers

Position	Prime activity requirements	Support activity requirements	Technical requirements (see notes below)
Assessor	Assessment Skills	IV Systems	Technical <i>competence</i> in the areas covered by the qualifications being assessed
Internal Verifier	Verification Skills	Assessment Knowledge	Technical <i>understanding</i> of the areas covered by the qualifications
External Verifier / External Quality Assurer	Verification skills	Assessment Understanding	Technical <i>awareness</i> of the areas covered by the qualifications

Notes

1. Technical *competence* is defined here as a combination of practical skills, knowledge, and the ability to apply both of these, in familiar and new situations, within a real working environment.
2. Technical *understanding* is defined here as having a good understanding of the technical activities being assessed, together with knowledge of relevant Health & Safety implications and requirements of the assessments.
3. Technical *awareness* is defined here as a general overview of the subject area, sufficient to ensure that assessment and portfolio evidence are reliable, and that relevant Health and Safety requirements have been complied with.
4. The competences required by the assessor, internal verifier and external verifier/external quality assurer, in the occupational area being assessed, is likely to exist at three levels as indicated by the shaded zones in the following table.

Technical Competence required by:	An ability to <i>discuss</i> the general principles of the competences being assessed	An ability to <i>describe</i> the practical aspects of the competence being assessed	An ability to <i>demonstrate</i> the practical competences being assessed
Assessor			
Internal Verifier			
External Verifier / External Quality Assurer			

5.7 Assessment environment

The SVQ in PEO at SCQF Level 5 is intended to have a wide application throughout the engineering sector. It is necessary therefore, to have a flexible approach to the environment in which the units are delivered and assessed.

There will be learners who have been working in an industry for some time and wish to acquire a broad range of basic competencies as part of an existing job role or to enable career progression. The PEO SVQ units will satisfy that need. Where this is the case assessment should take place within the learner’s normal workplace/environment.

However, there is much to be gained by acquiring the basic engineering competencies whilst working in a sheltered environment. This is due to an ongoing emphasis on safety critical work activities and the need to ensure flexibility of assessment opportunities to both maintain and enhance the provision of competent personnel within the industry. This assessment method will allow a minimum safe level of skills, knowledge and understanding to be achieved and demonstrated by the learner prior to being exposed to the hazards of the industrial environment, thus minimizing the risk of injury to themselves and other employees.

Not all learners who wish to achieve PEO SVQ units would require this form of sheltered assessment environment. Only those who are judged to be potentially at risk, would need to provide evidence of a minimum level of skills, knowledge and understanding before they enter the industrial environment.

Examples of this are:

- Where the hazardous nature of the engineering occupations mean that the learner requires close supervision whilst they provide evidence of competence involving safety critical activities.
- For reasons of age, people entering an industrial training environment are gradually introduced to the “world of work”. This helps them mature and grow in confidence as well as providing evidence of their engineering competence.
- Learners with special assessment requirements, benefit from the close supervision offered by this type of environment, whilst providing evidence of competence.
- Adult learners, new to the industry or to a specific skill area, can provide evidence without fear of making mistakes which could prove to be dangerous and/or expensive.
- Where equipment must only be used or worked on by approved, licensed or competent people (such as the aircraft industry) learners can provide the necessary evidence that they have achieved a level of skills, knowledge and understanding, in order to prepare themselves for future employment.

- Penal institutions where learners wish to provide evidence of a vocational achievement in order to prepare themselves for future employment.

For the above reasons the assessment of a learner's competence in a sheltered environment is acceptable for the PEO qualifications, where the environment replicates that expected in industry.

Where applicable, the machinery, tools, materials, equipment and resources used must be representative of industry standards and there must be sufficient equipment/resources available for each learner to demonstrate their competence individually, (**see note below**). Workpieces or work outcomes assessed must be the learner's own work and should be actual work examples that combine the skills and techniques required by the SVQ unit(s) so that achievement will properly reflect the learner's competence as specified in the unit.

Assessors must therefore ensure that the competency is fully transferable to the workplace. Other aspects that should be considered could include:

- environmental conditions such as lighting conditions, noise levels and the presence of hazards
- pressure of work such as time constraints and repetitive activities
- producing actual workpieces or work outcomes and the consequence of making mistakes and the effect this has on customer, supplier and departmental relationships

Note:

Group B assessment routes in the SVQ in Performing Engineering Operations at SCQF level 5 are skill specific work-based learning units. Assessment of these units in a sheltered environment is NOT acceptable for the qualification, and, assessment must take place in the learner's place of work

5.8 Simulation/replication of the workplace environment

Direct evidence produced through normal performance in the workplace is the primary source for meeting the evidence requirements of this qualification.

If the learner cannot meet all assessment criteria under naturally occurring activities in their workplace and need to simulate a specific task, please refer to the guidance notes "Centre Guidance for Developing Assessments for Simulation/Replication" in smarter touch.

5.9 Access to assessment

There are no entry qualifications or age limits required for the qualification and/or units unless this is a legal requirement of the process or the environment. Assessment is open to any learner who has the potential to reach the standards laid down for the qualification and/or units.

Learners may use, aids or appliances during assessment, providing they do not compromise the standard required.

5.10 Carrying out assessments

EAL strongly recommends that the majority of assessment evidence for the mandatory units is gathered during the performance of the optional units. Evidence should be obtained holistically, wherever practically possible, since competent performance in the optional units is often dependent on competence in the mandatory units.

Although it is possible to achieve these qualifications with the minimum number of optional units, organisations may wish to assess their learners for additional units.

The National Occupational Standards were developed to cover a range of activities. The evidence produced for the qualification and/or units will, therefore, depend on the learner's choice of 'scope/range' items in the standard, which are intended to help the learner to seek the appropriate information and to acquire the necessary skills, techniques and knowledge before being able to demonstrate competent performance.

Where the scope/range section gives a choice (for example 'any **three** from five'), assessors should note that learners do not need to cover the other (in this example, two) items, particularly where these additional items may relate to other activities or methods that are not part of the learner's normal workplace activity or area of expertise.

5.11 Assessing knowledge and understanding

Knowledge and understanding are key components of competent performance, but it is unlikely that performance evidence alone will provide enough evidence in this area. Where the learner's knowledge and understanding (and the handling of contingency situations) is not apparent from performance evidence, it must be assessed by other methods and be supported by suitable evidence.

Knowledge and understanding can be demonstrated in a number of different ways, but it is suggested that the most appropriate methods for this qualification are oral questioning and practical demonstrations. Assessors should ask enough questions to be able to determine that the learner has an appropriate level of knowledge and understanding as required by the unit(s).

Evidence of knowledge and understanding will **not** be required for those scope/range items that have not been selected by the learner.

5.12 Evidence of prior achievement

The achievement of the specific knowledge and understanding requirements of the standards cannot simply be inferred by the results of tests or assignments from other qualifications or training programmes. Where evidence is submitted from these sources, the assessor must, as with any assessment, make sure the evidence is valid, reliable, authentic, directly attributable to the learner, and meets the full knowledge and understanding requirements of the standard.

Where oral questioning is used the assessor must retain a record of the questions asked, together with the learner's answers.

Awarding Bodies may choose other methods, which must be supported by a suitable rationale.

5.13 Expert witness testimony

Where 'observation of process' is used to obtain the performance evidence, this must be carried out against the National Occupational Standards. Best practice requires that such observation is carried out by a qualified assessor. However, if this is not practicable, then alternative sources of evidence may be used. For example, the observation may be carried out against the standards by someone in close contact with the learner.

Evidence from any Expert Witnesses must meet the requirements of validity, reliability and authenticity. Expert Witnesses must be inducted by the Centre, so they are familiar with those units for which they are to provide expert witness evidence.

5.14 EAL external quality control of assessment; working with awarding bodies

General

There are two major points where an awarding body interacts with the Centre in relation to the external quality control of assessment for a qualification and these are:

- Approval - when a Centre takes on new qualification(s), the awarding body, normally through an external verifier/external quality assurer, ensures that the Centre is suitably equipped and prepared to deliver the new qualification(s)
- Monitoring - throughout the ongoing delivery of the qualification(s) the awarding body, through external monitoring and other mechanisms must maintain the quality and consistency of assessment of the qualification/s.

Approval

In granting approval, the awarding body, normally through its external verifiers/external quality assurers must ensure that the prospective Centre:

- meets the requirements of SQA Accreditation
- has sufficient and appropriate physical and staff resources
- meets relevant health and safety and equality and access requirements
- has a robust plan for the delivery of the qualification(s).

Depending on an assessment of the condition of the Centre by the awarding body this may require a visit to the Centre to view evidence or may be undertaken through other means. The awarding body must have a clear rationale for the method(s) deployed.

Monitoring

The awarding body, through external monitoring and other mechanisms must ensure:

- that a strategy is developed and deployed for the ongoing awarding body monitoring of the Centre. This strategy must be based on an active risk assessment of the Centre. In particular the strategy must identify the learner, assessor and internal verifier sampling strategy to be deployed and the rationale behind this
- that the Centre's internal quality assurance processes are effective in learner assessment
- that sanctions are applied to a Centre where necessary and that corrective actions are taken by the Centre and monitored by the awarding body external verifier/ external quality assurers
- that reviews of awarding body external auditing arrangements are undertaken

5.15 Assessment guidance

Performance evidence requirements

Performance evidence must be the main form of evidence gathered.

In order to demonstrate competent performance for a unit, learners will need to show consistent performance across multiple examples and must be sufficient to show that the performance requirements of the unit have been carried out to the prescribed standards. The minimum number of items specified in each of the scope/range statements for a unit (e.g. **four** from a choice of six) must **all** be covered, and appropriate evidence provided. It is possible that some of the scope/range items may be covered more than once. If, however, the examples chosen of performance evidence are not sufficient to cover all the specified scope/range items, then further examples of performance evidence will be required to ensure this coverage is achieved.

The most effective way of assessing competence, especially for the performance statements in relation to scope/range items, is through direct observation of the learner. Assessors must make sure that the evidence provided reflects the learner's competence and not just the achievement of a training programme.

Evidence that has been produced from team activities (e.g. maintenance and installation) is only valid when it clearly relates to a learner's specific and **individual** contribution to the activity, and not to the general outcome(s).

Items of performance evidence often contain features that apply to more than one unit and can be used as evidence in any unit where appropriate.

Performance evidence must be a combination of:

- products of the learner's work, such as items that have been produced or worked on, and documents produced as part of a work activity

and

- evidence of the way the learner carried out the activities such as expert witness testimonies, assessor observations or authenticated learner reports, records or photographs of the work/activity carried out.

Competent performance is more than just carrying out a series of individual set tasks. Many of the units contain statements that require the learner to provide evidence that proves they are capable of combining the various features and techniques. Where this is the case, separate fragments of evidence would not provide this combination of features and techniques and will not, therefore, be acceptable as demonstrating competent performance.

If there is any doubt as to what constitutes suitable evidence, the external verifier/external quality assurer should be consulted.

6.0 About the SVQ qualification units

These qualifications are made up of a number of nationally recognised units which EAL has converted into assessment material called assessment routes. These documents allow both the learner and the assessor to record the learners progress through their SVQ qualification. The units contain the performance to be assessed, the knowledge to be assessed and the evidence required from the learner to demonstrate their competence.

All units in this qualification contain the following information:

- Qualification & assessment route title
- Assessment route level
- Credit value
- SCQF level
- Assessment route summary
- Performance to be assessed and evidenced (assessment criteria)
- Knowledge to be assessed and evidenced (knowledge requirements).

6.1 Learner's portfolio building and referencing

For guidance to assessment and exemplars on completing documentation including completed assessment units and assessment planning documentation please refer to EAL Centre guidance.

For further information please contact EAL Customer Experience:

EAL Customer Experience

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Appendix

Core Skills Signposting

Introduction

Core Skills signposting indicates if there are opportunities within units to develop Core Skills in the workplace to a specified SCQF level. The signposting document should also acknowledge where there are no opportunities to develop Core Skills. This signposting can be used by providers and assessors to plan the development and assessment of Core Skills.

The five Core Skills are:

- Communication
- Information and Communication Technology
- Numeracy
- Problem Solving
- Working with Others

This document signposts opportunities for learners completing the SVQ in Performing Engineering Operations at SCQF Level 5, to use their SVQ evidence towards achieving Core Skills units. The SVQ units are most likely to provide evidence towards Core Skills units at SCQF Levels 5 and 6. This document contains signposting to both SCQF level 5 and SCQF Level 6 Core Skills. The signposting to Core Skills at SCQF level 5 and SCQF Level 6 is summarised in the following tables.

Engineering operations provide many opportunities for learners to generate evidence of communicating and working with others, solving problems, and using number to measure, calculate and check tolerances and accuracy of work. Some SVQ units provide explicit opportunities to use ICT, particularly CNC and CAD software. Learners may need other opportunities to generate further ICT evidence.

The signposting shows which SVQ units may generate evidence towards a signposted Core Skill. It does not imply the SVQ units provide full coverage of Core Skills. Learners are expected to produce additional evidence, when needed, to achieve their Core Skills.

Important Notes:

1. A tick (✓) against a PEO Unit is only an indication that evidence could be available for certain tasks required in the core skills.
2. Specific evidence will be dependent on the context of delivery of the PEO and the assessment method selected.

SVQ Performing Engineering Operations (SCQF Level 5)**Mandatory assessment routes**

URN	Unit title	Communication	ICT	Numeracy	Problem Solving	Working with Others
SCPEO2/001	Complying with statutory regulations and organisational safety requirements	✓			✓	✓
SCPEO2/002	Using and interpreting engineering data and documentation	✓	✓	✓	✓	✓
SCPEO2/003	Working efficiently and effectively in engineering	✓			✓	✓

Group A Optional assessment routes

URN	Unit title	Communication	ICT	Numeracy	Problem Solving	Working with Others
SCPEO2/004	Producing mechanical engineering drawings using a CAD system	✓	✓	✓	✓	✓
SCPEO2/005	Producing components using hand fitting techniques	✓		✓	✓	✓
SCPEO2/006	Producing mechanical assemblies	✓		✓	✓	✓
SCPEO2/007	Forming and assembling pipework systems	✓		✓	✓	✓
SCPEO2/008	Carrying out aircraft detail fitting activities	✓		✓	✓	✓
SCPEO2/009	Installing aircraft mechanical fasteners	✓		✓	✓	✓
SCPEO2/010	Producing aircraft detail assemblies	✓		✓	✓	✓
SCPEO2/011	Preparing and using lathes for turning operations	✓		✓	✓	✓
SCPEO2/012	Preparing and using milling machines	✓		✓	✓	✓
SCPEO2/013	Preparing and using grinding machines	✓		✓	✓	✓
SCPEO2/014	Preparing and proving CNC machine tool programs	✓	✓	✓	✓	✓
SCPEO2/015	Preparing and using CNC turning machines	✓	✓	✓	✓	✓

URN	Unit Title	Communication	ICT	Numeracy	Problem Solving	Working with others
SCPEO2/016	Preparing and using CNC milling machines	✓	✓	✓	✓	✓
SCPEO2/017	Preparing and using CNC machining centres	✓	✓	✓	✓	✓
SCPEO2/018	Preparing and using industrial robots	✓	✓	✓	✓	✓
SCPEO2/019	Maintaining mechanical devices and equipment	✓		✓	✓	✓
SCPEO2/020	Assembling and testing fluid power systems	✓		✓	✓	✓
SCPEO2/021	Maintaining fluid power equipment	✓		✓	✓	✓
SCPEO2/022	Producing sheet metal components and assemblies	✓		✓	✓	✓
SCPEO2/023	Producing platework components and assemblies	✓		✓	✓	✓
SCPEO2/024	Cutting and shaping materials using thermal cutting equipment	✓		✓	✓	✓
SCPEO2/025	Preparing and proving CNC fabrication machine tool programs	✓	✓	✓	✓	✓
SCPEO2/026	Preparing and using CNC fabrication machinery	✓	✓	✓	✓	✓
SCPEO2/027	Preparing and using manual metal arc welding equipment	✓		✓	✓	✓
SCPEO2/028	Preparing and using manual TIG or plasma-arc welding equipment	✓		✓	✓	✓
SCPEO2/029	Preparing and using semi-automatic MIG, MAG and flux cored arc welding equipment	✓		✓	✓	✓
SCPEO2/030	Preparing and using manual oxy/fuel gas welding equipment	✓		✓	✓	✓
SCPEO2/031	Preparing and using manual flame brazing and braze welding equipment	✓		✓	✓	✓
SCPEO2/032	Producing electrical or electronic engineering drawings using a CAD system	✓	✓	✓	✓	✓
SCPEO2/033	Wiring and testing electrical equipment and circuits	✓		✓	✓	✓

URN	Unit Title	Communication	ICT	Numeracy	Problem Solving	Working with others
SCPEO2/034	Forming and assembling electrical cable enclosure and support systems	✓		✓	✓	✓
SCPEO2/035	Assembling, wiring and testing electrical panels/components mounted in enclosures	✓		✓	✓	✓
SCPEO2/036	Assembling and testing electronic circuits	✓		✓	✓	✓
SCPEO2/037	Maintaining electrical equipment/systems	✓		✓	✓	✓
SCPEO2/038	Maintaining electronic equipment/systems	✓		✓	✓	✓
SCPEO2/039	Maintaining and testing process instrumentation and control devices	✓		✓	✓	✓
SCPEO2/040	Wiring and testing programmable controller based systems	✓	✓	✓	✓	✓
SCPEO2/041	Using wood for pattern, modelmaking and other engineering applications	✓		✓	✓	✓
SCPEO2/042	Assembling pattern, model and engineering woodwork components	✓		✓	✓	✓
SCPEO2/044	Producing composite mouldings using Pre-Preg techniques	✓		✓	✓	✓
SCPEO2/045	Producing composite mouldings using resin flow infusion techniques	✓		✓	✓	✓
SCPEO2/046	Producing composite assemblies	✓		✓	✓	✓
SCPEO2/052	Finishing surfaces by applying coatings or coverings	✓		✓	✓	✓
SCPEO2/054	Carrying out heat treatment of engineering materials	✓		✓	✓	✓
SCPEO2/061	Producing CAD models (drawings) using a CAD system	✓	✓	✓	✓	✓
SCPEO2/062	Producing engineering project plans	✓		✓	✓	✓
SCPEO2/063	Using computer software packages to assist with engineering activities	✓	✓	✓	✓	✓

URN	Unit Title	Communication	ICT	Numeracy	Problem Solving	Working with others
SCPEO2/064	Conducting business improvement activities	✓		✓	✓	✓
SCPEO2/065	General machining, fitting and assembly applications	✓		✓	✓	✓
SCPEO2/066	General fabrication and welding applications	✓		✓	✓	✓
SCPEO2/067	General electrical and electronic engineering applications	✓		✓	✓	✓
SCPEO2/068	General maintenance engineering applications	✓		✓	✓	✓
SCPEO2/070	Assembling structural sub-assemblies to produce a public service vehicle	✓		✓	✓	✓
SCPEO2/071	Fitting sub-assemblies and components to public service vehicles	✓		✓	✓	✓
SCPEO2/073	Producing composite mouldings using resin film infusion techniques	✓		✓	✓	✓
Group B Optional assessment routes						
SCPEO2/074	Operating centre lathes	✓		✓	✓	✓
SCPEO2/075	Operating milling machines	✓		✓	✓	✓
SCPEO2/076	Operating CNC turning machines	✓		✓	✓	✓
SCPEO2/077	Operating CNC milling machines	✓		✓	✓	✓
SCPEO2/078	Operating CNC electro-discharge machines	✓		✓	✓	✓
SCPEO2/079	Operating CNC machining centres	✓		✓	✓	✓
SCPEO2/080	Producing mechanical sub-assemblies/assemblies	✓		✓	✓	✓
SCPEO2/081	Assembling fluid power components to mechanical equipment	✓		✓	✓	✓
SCPEO2/082	Assembling electrical or electronic components to mechanical equipment	✓		✓	✓	✓
SCPEO2/083	Assembling pipework components to mechanical equipment	✓		✓	✓	✓

URN	Unit Title	Communication	ICT	Numeracy	Problem Solving	Working with others
SCPEO2/084	Handing over and confirming completion of maintenance or installation	✓			✓	✓
SCPEO2/085	Carrying out fault location on mechanical equipment	✓		✓	✓	✓
SCPEO2/086	Carrying out maintenance activities on mechanical equipment	✓		✓	✓	✓
SCPEO2/087	Restoring mechanical components to usable condition by repair	✓		✓	✓	✓
SCPEO2/088	Carrying out scheduled maintenance activities on mechanical equipment	✓		✓	✓	✓
SCPEO2/089	Carrying out fault location on electrical equipment and circuits	✓		✓	✓	✓
SCPEO2/090	Carrying out maintenance activities on electrical equipment	✓		✓	✓	✓
SCPEO2/091	Carrying out modifications or rewiring electrical circuits	✓		✓	✓	✓
SCPEO2/092	Carrying out scheduled maintenance tasks on electrical equipment	✓		✓	✓	✓
SCPEO2/093	Carrying out fault location on fluid power equipment and circuits	✓		✓	✓	✓
SCPEO2/094	Carrying out maintenance activities on fluid power equipment	✓		✓	✓	✓
SCPEO2/095	Carrying out scheduled maintenance tasks on fluid power equipment	✓		✓	✓	✓
SCPEO2/096	Carrying out fault location on service systems and equipment	✓		✓	✓	✓
SCPEO2/097	Carrying out scheduled maintenance tasks on service systems and equipment	✓		✓	✓	✓
SCPEO2/099	Carrying out maintenance on compressed air equipment	✓		✓	✓	✓
SCPEO2/100	Assisting in the installation of mechanical equipment	✓		✓	✓	✓

URN	Unit Title	Communication	ICT	Numeracy	Problem Solving	Working with others
SCPEO2/108	Joining materials by the semi-automatic MIG/MAG and flux cored arc processes	✓		✓	✓	✓
SCPEO2/109	Producing fillet welded joints using a manual/semi-automatic welding process	✓		✓	✓	✓
SCPEO2/110	Welding materials with mechanised arc welding equipment	✓		✓	✓	✓
SCPEO2/111	Marking out components for fabrication	✓		✓	✓	✓
SCPEO2/112	Cutting sheet metal to shape using hand and machine tools	✓		✓	✓	✓
SCPEO2/113	Forming sheet metal using hand and machine tools	✓		✓	✓	✓
SCPEO2/114	Producing sheet metal assemblies	✓		✓	✓	✓
SCPEO2/115	Cutting and shaping materials using CNC laser profiling machines	✓	✓	✓	✓	✓
SCPEO2/116	Cutting and shaping using CNC plasma or gas cutting machines	✓	✓	✓	✓	✓
SCPEO2/117	Assembling components using mechanical fasteners	✓		✓	✓	✓
SCPEO2/118	Slinging, lifting and moving materials and components	✓		✓	✓	✓
SCPEO2/119	Cutting plate and sections using shearing machines	✓		✓	✓	✓
SCPEO2/120	Cutting materials using saws and abrasive discs	✓		✓	✓	✓
SCPEO2/121	Bending and forming plate using power operated machines	✓		✓	✓	✓
SCPEO2/122	Producing platework assemblies	✓		✓	✓	✓
SCPEO2/123	Producing holes using drilling machines	✓		✓	✓	✓
SCPEO2/124	Producing structural steel ancillary components	✓		✓	✓	✓
SCPEO2/125	Assembling structural steelwork	✓		✓	✓	✓
SCPEO2/127	Assisting in the installation of wooden furniture/outfitting units for yachts and boats	✓		✓	✓	✓

URN	Unit Title	Communication	ICT	Numeracy	Problem Solving	Working with others
SCPEO2/129	Fitting seating, interior panels, soft furnishing and trim in yachts and boats	✓		✓	✓	✓
SCPEO2/130	Carrying out repairs to yacht and boat wooden components and assemblies	✓		✓	✓	✓
SCPEO2/131	Carrying out repairs to yacht and boat composite components	✓		✓	✓	✓

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