



Qualification Manual

Qualification title: EAL Level 3 NVQ Extended Diploma in Composite Engineering (QCF)

Qualification code: 600/8284/7

Issue: A

EAL Level 3 NVQ Extended Diploma in Composite Engineering (QCF) - Issue A

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Contents

Contents	2
1.0 About EAL	3
1.1 Equality and diversity statement	3
1.2 Complaints	3
2.0 Achievement of the qualification	4
2.1 Qualification support materials	4
2.2 Funding for this qualification	4
3.0 Centre and qualification approval	5
4.0 Qualification specific information	6
5.0 Assessment strategy	14
5.1 Learners.....	14
5.2 Assessors.....	14
5.3 Verifier requirements (internal and external)	15
5.4 Assessment environment.....	17
5.5 Witness testimony	22
5.6 Quality control of assessment	23
5.7 Specific assessment requirements.....	24
6.0 About the NVQ units	28
Appendix 1: Qualification and Credit Framework (QCF)	29
Appendix 2: Functional Skills and Essential Skills Wales	30
Appendix 3: Learner registration and certification	31

1.0 About EAL

Since 1964, **EAL (Excellence, Achievement and Learning)** has been awarding superior 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 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 Equality and diversity statement

EAL expects its centres to enable individuals to have equal access to training and assessment for qualifications irrespective of their sex, marital status, age, religion, colour, race, nationality, ethnic origin or disability. In essence, centres must deliver our qualifications and units in accordance with relevant Equalities Legislation.

Centres are required to have in place a policy to ensure that such discrimination does not occur either directly, indirectly or as a result of pressure from other bodies. This policy should apply to all satellite centres and there should be arrangements in place to monitor its application and effectiveness.

1.2 Complaints

Customer service is a fundamental part of EAL's commitment to industry. Our long-term partnership with industry and recognised centres – which is underpinned by our unique external verification service and world class customer service – means our support is based on unrivalled understanding of our customers' needs.

EAL aims to ensure that all customers receive a high quality and efficient service and we continually monitor the levels of service provided. There may be times, however, when you may feel that we have not provided an adequate service. In these situations, please contact our customer services team:

EAL Customer Services
Tel: +44 (0)1923 652 400
Email: customercare@eal.org.uk

2.0 Achievement of the qualification

This qualification is achieved when all the necessary units have been completed. The centre will then be able to apply for the learner's NVQ certificate of achievement. The learner will also receive a certificate of unit credit, listing all the units they have achieved.

However if learners do not complete the full qualification they have been registered on they can still claim a certificate of unit credit for the units achieved. This will mean that learners will still have proof of their ability and could complete the full qualification at a later date.

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

There are various other qualifications which this qualification could relate to. Details on these can be obtained from the [EAL website](#) or alternatively contact:

EAL Customer Services
Tel: +44 (0)1923 652 400
Email: customercare@eal.org.uk

2.1 Qualification support materials

The following assessment support materials are available for this qualification:

- **Assessment routes:**
These contain the details of the nationally recognised units. These documents allow both the learner and the assessor to record the 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.

EAL have also provided for centres a series of mini guides that will assist centres on all necessary documentation and advice.

2.2 Funding for this qualification

EAL accredits qualifications via regulatory bodies. The regulatory bodies then pass the information to the relevant funding agencies. Once funding is available, centres will be able to check and register against the learning aim to ensure funding is drawn down. If you are unsure whether funding is available, the first point of contact should be via your internal funding system, or alternatively contact EAL for information.

3.0 Centre and qualification approval

Centres wishing to run this qualification will need to comply with this qualification manual and EAL's centre approval criteria for this qualification. Centres must also put in place the appropriate physical and human resources and administration systems to deliver the qualification effectively.

For *existing* EAL centres to put this qualification on your centre 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 this qualification:

EAL Customer Services will be pleased to help. Please contact them on:

EAL Customer Services

Tel: +44 (0)1923 652 400

Email: customercare@eal.org.uk

4.0 Qualification specific information

Structure of the EAL Level 3 Extended Diploma

This Extended Diploma is comprised of a Level 3 qualification **extended** by the inclusion of technically specific assessment routes from the Level 2 Performing Engineering Operations (PEO) qualification.

Rule of combination (qualification structure):

Mandatory assessment routes – three assessment routes (a combination of two Level 2 assessment routes and one Level 3 assessment route)

Group A – three Level 2 PEO assessment routes (Engineering Practices pathway)

OR

Group B – five Level 2 PEO assessment routes (Technical Support pathway)

AND

Group C – the stated number of Level 3 optional assessment routes

Delivery requirements:

In the context of the Apprenticeship Framework, the technically specific Level 2 PEO assessment routes **must** be delivered and assessed in a sheltered work environment **before** starting delivery and assessment of the Level 3 components in the working environment.

PEO qualification:

To support these basic engineering skills and techniques, the learner must be trained in, and continuously practice the relevant health and safety and engineering communication requirements along with all the other mandatory unit(s) listed within that qualification. The learner cannot be signed off as being competent for these assessment routes in this period.

Level 3 qualification:

On completion of the PEO2 assessment routes, the learner moves on to the assessment routes from the Level 3 qualification which can only be assessed within a workplace environment.

EAL Level 3 NVQ Extended Diploma in Composite Engineering (QCF)

This qualification will be achieved when the learner has successfully completed the mandatory assessment routes followed by the required number of optional assessment routes from Performing Engineering Operations (Engineering Practices **OR** Technical Support), and Composite Engineering suite of assessment routes.

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

EAL code	Assessment route title	Level	CV	GLH	Ofqual code
QCOM2/001N ■	Complying with statutory regulations and organisational safety requirements	2	5	35	A/601/5013
QCOM2/002N ■	Using and interpreting engineering data and documentation	2	5	25	Y/601/5102
QCOM3/003N ■	Working efficiently and effectively in engineering	3	5	25	K/601/5055

Performing Engineering Operations

Group A: (Engineering Practices)

Optional units: learners must complete three more units from the following

Notes:

Only one unit from **QPEO2/004N, /032N** and **/061N** may be included in the learner's choice of three units.

If unit **/065N** is selected units **/005N, /006N, /008N, /011N, /012N, /015N, /016N, /017N** cannot be included in the learner's choice of three units.

If unit **/066N** is selected units **/010N, /022N, /023N, /025N, /026N, /027N, /028N, /029N, /030N, /034N** cannot be included in the learner's choice of three units.

If unit **/067N** is selected units **/033N, /035N, /036N, /040N** cannot be included in the learner's choice of three units.

If unit **/068N** is selected units **/019N, /021N, /037N, /038N, /039N, /040N, /058N, /059N** cannot be included in the learner's choice of three units

EAL code	Assessment route title	Level	CV	GLH	Ofqual code
QPEO2/004N	Producing mechanical engineering drawings using a CAD system	2	11	61	F/504/6348
QPEO2/005N	Producing components using hand fitting techniques	2	14	64	J/504/6349
QPEO2/006N	Producing mechanical assemblies	2	15	68	F/504/6351
QPEO2/007N	Forming and assembling pipework systems	2	14	64	L/504/6353
QPEO2/008N	Carrying out aircraft detail fitting activities	2	14	64	R/504/6354
QPEO2/009N	Installing aircraft mechanical fasteners	2	11	61	L/504/6367
QPEO2/010N	Producing aircraft detail assemblies	2	14	65	L/504/6370
QPEO2/011N	Preparing and using lathes for turning operations	2	15	68	Y/504/6372
QPEO2/012N	Preparing and using milling machines	2	15	68	K/504/6375
QPEO2/013N	Preparing and using grinding machines	2	15	68	T/504/6377
QPEO2/014N	Preparing and proving CNC machine tool programs	2	14	64	F/504/6379
QPEO2/015N	Preparing and using CNC turning machines	2	14	64	F/504/6382
QPEO2/016N	Preparing and using CNC milling machines	2	14	64	L/504/6384
QPEO2/017N	Preparing and using CNC machining centres	2	14	64	D/504/6387
QPEO2/018N	Preparing and using industrial robots	2	14	64	D/504/6390
QPEO2/019N	Maintaining mechanical devices and equipment	2	14	64	T/504/6394

QPEO2/020N	■	Assembling and testing fluid power systems	2	14	64	J/504/6397
QPEO2/021N	■	Maintaining fluid power equipment	2	14	64	F/504/6401
QPEO2/022N	■	Producing sheet metal components and assemblies	2	14	64	J/504/6402
QPEO2/023N	■	Producing platework components and assemblies	2	14	64	L/504/6403
QPEO2/024N	■	Cutting and shaping materials using thermal cutting equipment	2	14	64	R/504/6404
QPEO2/025N	■	Preparing and proving CNC fabrication machine tool programs	2	14	64	Y/504/6405
QPEO2/026N	■	Preparing and using CNC fabrication machinery	2	14	64	D/504/6406
QPEO2/027N	■	Preparing and using Manual Metal Arc welding equipment	2	15	68	K/504/6408
QPEO2/028N	■	Preparing and using manual TIG or plasma-arc welding equipment	2	15	68	M/504/6409
QPEO2/029N	■	Preparing and using semi-automatic MIG, MAG and flux cored arc welding equipment	2	15	68	H/504/6410
QPEO2/030N	■	Preparing and using manual Oxy/fuel gas welding equipment	2	14	64	Y/504/6419
QPEO2/031N	■	Preparing and using manual flame brazing and braze welding equipment	2	11	61	L/504/6420
QPEO2/032N	■	Producing electrical or electronic engineering drawings using a CAD system	2	11	61	R/504/6421
QPEO2/033N	■	Wiring and testing electrical equipment and circuits	2	14	64	Y/504/6422
QPEO2/034N	■	Forming and assembling electrical cable enclosure and support systems	2	13	65	D/504/6423
QPEO2/035N	■	Assembling, wiring and testing electrical panels/components mounted in enclosures	2	14	64	H/504/6424
QPEO2/036N	■	Assembling and testing electronic circuits	2	14	64	K/504/6425
QPEO2/037N	■	Maintaining electrical equipment/systems	2	15	68	M/504/6426
QPEO2/038N	■	Maintaining electronic equipment/systems	2	15	68	T/504/6427
QPEO2/039N	■	Maintaining and testing process instrumentation and control devices	2	15	68	A/504/6428
QPEO2/040N	■	Wiring and testing programmable controller based systems	2	15	68	F/504/6429
QPEO2/041N	■	Using wood for pattern, model making and other engineering applications	2	15	68	T/504/6430
QPEO2/042N	■	Assembling pattern, model and engineering woodwork components	2	14	64	A/504/6431
QPEO2/043N	■	Producing composite mouldings using wet lay-up techniques	2	14	64	F/504/6432

QPEO2/044N	■	Producing composite mouldings using pre-preg laminating techniques	2	14	64	L/504/6434
QPEO2/045N	■	Producing composite mouldings using resin flow infusion techniques	2	14	64	R/504/6435
QPEO2/046N	■	Producing composite assemblies	2	14	64	Y/504/6436
QPEO2/047N	■	Producing components by rapid prototyping techniques	2	11	61	D/504/6437
QPEO2/048N	■	Producing and preparing sand moulds and cores for casting	2	14	64	H/504/6438
QPEO2/049N	■	Producing and preparing molten materials for casting	2	14	64	K/504/6439
QPEO2/050N	■	Producing cast components by manual means	2	13	65	D/504/6440
QPEO2/051N	■	Fettling, finishing and checking cast components	2	11	61	H/504/6441
QPEO2/052N	■	Finishing surfaces by applying coatings or coverings	2	9	41	M/504/6443
QPEO2/053N	■	Finishing surfaces by applying treatments	2	9	41	T/504/6444
QPEO2/054N	■	Carrying out heat treatment of engineering materials	2	9	41	A/504/6445
QPEO2/055N	■	Carrying out hand forging of engineering materials	2	9	41	F/504/6446
QPEO2/056N	■	Stripping and rebuilding motorsport vehicles (pre-Competition)	2	14	64	J/504/6447
QPEO2/057N	■	Inspecting a motorsport vehicle during competition	2	14	64	L/504/6448
QPEO2/058N	■	Diagnosing and rectifying faults on motorsport vehicle systems (during a competition)	2	15	68	R/504/6449
QPEO2/059N	■	Carrying out maintenance activities on motor vehicle electrical equipment	2	15	68	J/504/6450
QPEO2/060N	■	Stripping and rebuilding motorsport engines (pre – competition)	2	14	64	L/504/6451
QPEO2/061N	■	Producing CAD models (drawings) using a CAD system	2	11	61	R/504/6452
QPEO2/065N	■	General machining, fitting and assembly applications	2	12	55	K/504/6456
QPEO2/066N	■	General fabrication and welding applications	2	12	55	M/504/6457
QPEO2/067N	■	General electrical and electronic engineering applications	2	12	55	T/504/6458
QPEO2/068N	■	General maintenance engineering applications	2	12	55	A/504/6459
QPEO2/069N	■	Joining public service vehicle components by mechanical processes	2	11	61	L/503/4056

QPEO2/070N	■	Assembling structural sub assemblies to produce a public service vehicle	2	14	64	R/503/4057
QPEO2/071N	■	Fitting sub assemblies and components to public service vehicles	2	14	64	Y/503/4058
QPEO2/072N	■	Preparing and manoeuvring armoured fighting vehicles (AFVs) for maintenance and transportation	2	14	64	R/503/7198
QPEO2/073N	■	Producing composite mouldings using resin film infusion techniques	2	14	64	J/504/3404

Group B (Technical Support)

Learners must complete one of the following assessment routes:

EAL code	Assessment route title	Level	CV	GLH	Ofqual code
QPEO2/004N	■ Producing mechanical engineering drawings using a CAD system	2	11	61	F/504/6348
QPEO2/032N	■ Producing electrical or electronic engineering drawings using a CAD system	2	11	61	R/504/6421
QPEO2/061N	■ Producing CAD models (drawings) using a CAD system	2	11	61	R/504/6452

Plus two more assessment routes from the following:

QPEO2/062N	■ Producing engineering project plans	2	8	37	Y/504/6453
QPEO2/063N	■ Using computer software packages to assist with engineering activities	2	8	37	D/504/6454
QPEO2/064N	■ Conducting business improvement activities	2	8	41	H/504/6455

Plus two more assessment routes from the following:

QPEO2/065N	■ General machining, fitting and assembly applications	2	12	55	K/504/6456
QPEO2/066N	■ General fabrication and welding applications	2	12	55	M/504/6457
QPEO2/067N	■ General electrical and electronic engineering applications	2	12	55	T/504/6458
QPEO2/068N	■ General maintenance engineering applications	2	12	55	A/504/6459

In addition to the PEO Level 2 unit requirement in Group A or Group B, learners must complete the unit requirements for the Level 3 Composite Engineering qualification.

EAL Level 3 NVQ Diploma in Composite Engineering (QCF)

Group C: Composite Engineering

Learners must complete two of the following assessment routes:

EAL code	Assessment route title	Level	CV	GLH	Ofqual code
QCOM3-004N	Producing composite mouldings using wet lay up laminating techniques	3	86	210	F/503/8248
QCOM3-005N	Producing composite mouldings using spray lay up laminating techniques	3	86	210	J/503/8249
QCOM3-006N	Producing composite mouldings using resin flow infusion techniques	3	86	210	A/503/8250
QCOM3-007N	Producing composite mouldings using resin film infusion techniques	3	86	210	F/503/8251
QCOM3-008N	Producing composite mouldings using pre-preg laminating techniques	3	86	210	J/503/8252
QCOM3-009N	Producing composite mouldings using resin transfer moulding techniques	3	86	210	L/503/8253
QCOM3-010N	Producing composite mouldings using hot press moulding techniques	3	86	210	R/503/8254
QCOM3-011N	Producing composite mouldings using filament winding techniques	3	86	210	Y/503/8255
QCOM3-012N	Producing composite mouldings using pultrusion techniques	3	86	210	D/503/8256
QCOM3-013N	Producing Composite Mouldings using ATL/AFP Laminating Techniques	3	86	210	H/503/8257
QCOM3-014N	Using curing and consolidation equipment for composite mouldings	3	46	150	K/503/8258
QCOM3-015N	Trimming composite mouldings using hand tools	3	46	150	M/503/8259
QCOM3-016N	Bonding composite mouldings	3	30	91	H/503/8260
QCOM3-017N	Producing composite assemblies	3	86	210	K/503/8261
QCOM3-018N	Installing composite mouldings	3	30	91	M/503/8262
QCOM3-019N	Applying finishes to composite mouldings	3	46	150	T/503/8263
QCOM3-020N	Repairing composite mouldings	3	77	161	A/503/8264
QCOM3-021N	Identifying defects in composite mouldings	3	46	150	F/503/8265

5.0 Assessment strategy

5.1 Learners

If applicable – learners undertaking qualifications must meet any applicable entry requirements including, entry qualifications, legal requirements of the process or the environment, or any other specific restrictions. Where these exist, assessment will be open to any learner who has met entry requirements) and has the potential to achieve the assessment criteria set out in the units.

Aids or appliances, which are designed to alleviate disability, may be used during assessment, providing they do not compromise the standard required.

5.2 Assessors

Assessor requirements to demonstrate effective assessment practice

Assessment must be carried out by competent assessors that as a minimum must hold the QCF Level 3 Award in Assessing Competence in the Work Environment. Current and operational assessors that hold units D32 and/or D33 or A1 and/or A2 as appropriate to the assessment being carried out, will not be required to achieve the QCF Level 3 Award as they are still appropriate for the assessment requirements set out in this unit assessment strategy. However, they will be expected to regularly review their skills, knowledge and understanding and where applicable undertake continuing professional development to ensure that they are carrying out workplace assessment to the most up to date national occupational standards (NOS).

Assessor technical requirements

Assessors must be able to demonstrate that they have verifiable, relevant and sufficient technical competence to evaluate and judge performance and knowledge evidence requirements as set out in the relevant QCF unit learning outcomes and associated assessment criteria.

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, at the very least, be at the same level as that required of the learner(s) in the units being assessed.

Assessors must also be:

Fully conversant with the EAL's assessment recording documentation used for the QCF NVQ units against which the assessments and verification are to be carried out, other relevant documentation and system and procedures to support the quality assurance process.

5.3 Verifier requirements (internal and external)

Internal quality assurance (internal verification) must be carried out by competent verifiers that as a minimum must hold the QCF Level 4 Award in the Internal Quality Assurance of Assessment Processes and Practices. Current and operational internal verifiers that hold internal verification units V1 or D34 will not be required to achieve the QCF Level 4 Award as they are still appropriate for the verification requirements set out in this unit assessment strategy. Verifiers must be familiar with, and preferably hold, either the nationally recognised assessor units D32 and/or D33 or A1 and/or A2 or the QCF Level 3 Award in Assessing Competence in the Work Environment.

External quality assurance (external verification) must be carried out by competent external verifiers that as a minimum must hold the QCF Level 4 Award in the External Quality Assurance of Assessment Processes and Practices. Current and operational external verifiers that hold external verification units V2 or D35 will not be required to achieve the QCF Level 4 Award as they are still appropriate for the verification requirements set out in this unit assessment strategy. Verifiers must be familiar with, and preferably hold, either the nationally recognised assessor units D32 and/or D33 or A1 and/or A2 or the QCF Level 3 Award in Assessing Competence in the Work Environment.

External and internal verifiers will be expected to regularly review their skills, knowledge and understanding and where applicable undertake continuing professional development to ensure that they are carrying out workplace quality assurance (verification) of assessment processes and practices to the most up to date national occupational standards.

Verifiers, both internal and external, will also be expected to be fully conversant with the terminology used in the QCF NVQ units against which the assessments and verification are to be carried out, the appropriate regulatory body's systems and procedures and EAL's documentation, systems and procedures within which the assessment and verification is taking place.

Specific technical requirements for internal and external verifiers

Internal and external verifiers of this qualification must be able to demonstrate that have verifiable, sufficient and relevant industrial experience, and must have a working knowledge of the processes, techniques and procedures that are used in the relevant sector/occupation.

The tables on the following page show the recommended levels of technical competence for assessors, internal verifiers, and external verifiers.

Technical requirements for assessors and verifiers

Position	Prime activity requirements	Support activity requirements	Technical requirements (see notes)
Assessor	Assessment skills	Internal verification systems	Technical competence of the areas covered by the QCF units being assessed
Internal verifier	Verification skills	Assessment knowledge	Technical understanding of the areas covered by the qualifications
External verifier	Verification skills	Assessment understanding	Technical awareness 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 and 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 competence required by the assessor, internal verifier and external verifier, 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 discuss the general principles of the competences being assessed	An ability to describe the practical aspects of the competence being assessed	An ability to demonstrate the practical competences being assessed
Assessor			
Internal verifier			
External verifier			

5.4 Assessment environment

Performing Engineering Operations (PEO)

The PEO units are 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 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.

It is recognised that not all learners who wish to achieve PEO QCF NVQ units would require this form of assessment. Only those who are judged to be potentially at risk would need to provide evidence of a minimum level of skills, knowledge and understanding to 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 to be used or worked on by approved, licensed or competent people (such as the aircraft industry) learners can only provide the necessary evidence that they have achieved a level of skills, knowledge and understanding in-order that they may prepare themselves for future employment.
- penal institutions where learners wish to provide evidence of a vocational achievement in-order that they may prepare themselves for future employment.

For the above reasons the assessment of a learners competence in a sheltered environment is acceptable for this qualification, 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. Workpieces or work outcomes assessed must be the learners own work and should be actual work examples that combine the skills, techniques required by the QCF units so that achievement will properly reflect the learners competence as specified in the unit assessment criteria.

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

The NVQ

The evidence put forward for this qualification can only be regarded valid, reliable, sufficient and authentic if it achieved and obtained in the working environment and be clearly attributable to the learner. However, in certain circumstances, simulation/replication of work activities may be acceptable.

The use of high quality, realistic simulations/replication, which imposes pressures which are consistent with workplace expectations, should only be used in relation to the assessment of the following:

- rare or dangerous occurrences, such as those associated with health, safety and the environment issues, emergency scenarios and rare operations at work
- the response to faults and problems for which no opportunity has presented for the use of naturally occurring workplace evidence of learners competence
- aspects of working relationships and communications for which no opportunity has presented for the use of naturally occurring workplace evidence of learners competence

Simulations/replications will require prior approval from EAL and should be designed in relation to the following parameters:

- the environment in which simulations take place must be designed to match the characteristics of the working environment
- competencies achieved via simulation/replication must be transferable to the working environment

- simulations which are designed to assess competence in dealing with emergencies, accidents and incidents must be verified as complying with relevant health, safety and environmental legislation by a competent health and safety/environmental control officer before being used
- simulated activities should place learners under the same pressures of time, access to resources and access to information as would be expected if the activity was real
- simulated activities should require learners to demonstrate their competence using plant and/or equipment used in the working environment
- simulated activities which require interaction with colleagues and contacts should require the learner to use the communication media that would be expected at the workplace
- for health and safety reason simulations need not involve the use of genuine substances/materials. Any simulations which require the learner to handle or otherwise deal with materials substances/should ensure that the substitute takes the same form as in the workplace

Access to assessment

There are no entry qualifications or age limits required by learners to undertake the NVQ units unless this is a legal requirement of the process or the environment. Assessment is open to any learner who has the potential to achieve the assessment criteria set out in the units.

Aids or appliances, which are designed to alleviate disability, may be used during assessment, providing they do not compromise the standard required.

Carrying out assessment

The NVQ units were specifically developed to cover a wide range of activities. The evidence produced for the units will, therefore, depend on the learner's choice of 'bulleted items' listed in the unit assessment criteria.

Where the assessment criteria gives a choice of bulleted items (for example 'any three from five'), assessors should note that learners do not need to provide evidence of the other items to complete the unit (in this example, two) items, particularly where these additional items may relate to other activities or methods that are not part of the learners normal workplace activity or area of expertise.

Minimum performance evidence requirements

Performance evidence must be the main form of evidence gathered. In order to demonstrate consistent, competent performance for a unit, a minimum of three different examples of performance must be provided, and must be sufficient to show that the assessment criteria have been achieved to the prescribed standards. It is possible that some of the bulleted items in the assessment criteria may be covered more than once.

The assessor and learner need to devise an assessment plan to ensure that performance evidence is sufficient to cover all the specified assessment criteria and which maximises the opportunities to gather evidence. Where applicable, performance evidence may be used for more than one unit.

The most effective way of assessing competence, 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, for example, maintenance or installation activities is only valid when it clearly relates to the learners specific and individual contribution to the activity, and not to the general outcome(s).

Each example of performance evidence will 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:

- outputs of the learner's work, such as items that have been manufactured, installed, maintained, designed, planned or quality assured, and documents produced as part of a work activity

together with:

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

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.

Unit specific additional assessment requirements:

Example: QPEO2/011N - Preparing and using lathes for turning operations

'In order to prove their ability to combine different turning operations, at least one of the machined components produced must be of a significant nature, and must have a minimum of six of the features listed in assessment criteria 11.'

If there is any doubt as to what constitutes valid, authentic and reliable evidence, the internal and/or external verifier should be consulted.

NVQ: Minimum performance evidence requirements

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Where applicable, performance evidence may be used for more than one unit.

The most effective way of assessing competence, 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, for example, maintenance or installation activities is only valid when it clearly relates to the learners specific and individual contribution to the activity, and not to the general outcome(s). Each example of performance evidence will 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:

- outputs of the learner's work, such as items that have been manufactured, installed, maintained, designed, planned or quality assured, and documents produced as part of a work activity

Together with:

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

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 means and be supported by suitable evidence.

Knowledge and understanding can be demonstrated in a number of different ways. The Sector Skills Council Semta expects oral questioning and practical demonstrations to be used, as these are considered the most appropriate for these units.

Assessors should ask enough questions to make sure that the learner has an appropriate level of knowledge and understanding, as required by the unit. Semta allows awarding organisations to choose other methods, which must be supported by a suitable rationale. Evidence of knowledge and understanding will not be required for those bulleted items in the assessment criteria that have not been selected by the learner.

The achievement of the specific knowledge and understanding requirements of the units cannot simply be inferred by the results of tests or assignments from other units, 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 unit.

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

5.5 Witness testimony

Where observation is used to obtain performance evidence, this must be carried out against the unit assessment criteria. Best practice would require that such observation is carried out by a qualified assessor. If this is not practicable, then alternative sources of evidence may be used.

For example, the observation may be carried out against the assessment criteria by someone else that is in close contact with the learner. This could be a team leader, supervisor, mentor or line manager who may be regarded as a suitable witness to the learner's competency. However, the witness must be technically competent in the process or skills that they are providing testimony for, to at least the same level of expertise as that required of the learner. It will be the responsibility of the assessor to make sure that any witness testimonies accepted as evidence of the learner's competency are reliable, auditable and technically valid.

5.6 Quality control of assessment

General

There are two major points where EAL interacts with the centre in relation to the external quality control of assessment for a qualification and these are:

- Approval - when a centre take on new qualifications, EAL, normally through an external verifier ensures that the centre is suitably equipped and prepared to deliver the new qualification
- Monitoring - throughout the ongoing delivery of the qualification EAL, through external verification monitoring and other mechanisms must maintain and the quality and consistency of assessment of the qualification

Approval

In granting approval, EAL, normally through its external verifiers must ensure that the prospective centre:

- meets any procedural requirements specified by EAL
- has sufficient and appropriate physical and staff resources
- meets relevant health and safety and/or equality and access requirements
- has a robust plan for the delivery, assessment and quality assurance for the qualifications

EAL may decide to visit the centre to view the evidence provided and there must be a clear rationale for the method(s) deployed.

Monitoring

EAL, through external monitoring and other mechanisms will ensure:

- that a strategy is developed and deployed for the ongoing EAL 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 candidate assessment
- that sanctions are applied to a centre where necessary and that corrective actions are taken by the centre and monitored by the EAL external verifier
- that reviews of EAL's external auditing arrangements are undertaken

5.7 Specific assessment requirements

Additional unit assessment requirements have been published by the Sector Skills Council, Semta. These additional unit assessment requirements are stated below.

Assessment route	Unit specific additional assessment requirements:
QPEO2 – 004N	In order to prove their ability to combine different drawing features, at least one of the drawings produced must be of a significant nature, and must have a minimum of seven of the features listed in assessment criteria 12
QPEO2 – 005N	In order to prove their ability to combine different fitting operations, at least one of the components produced must be of a significant nature, and must have a minimum of five of the features listed in assessment criteria 13
QPEO2 – 006N	In order to prove their ability to combine different assembly operations, at least one of the assemblies produced must be of a significant nature, and must contain a minimum of six of the components listed in assessment criteria 7
QPEO2 – 007N	In order to prove their ability to combine different pipe assembly operations, at least one of the pipe assemblies produced must be of a significant nature, and must have a minimum of five of the fittings listed in assessment criteria 13
QPEO2 – 008N	In order to prove their ability to combine different aircraft detail fitting operations, at least one of the components produced must be of a significant nature, and must contain a minimum of five of the features listed in assessment criteria 15
QPEO2 – 009N	In order to prove their ability to combine different aircraft fastener installation operations, at least one of the assemblies produced must be of a significant nature, and must contain a minimum of four types of the fasteners listed in assessment criteria 7
QPEO2 – 010N	In order to prove their ability to combine different aircraft detail assembly operations, at least one of the assemblies produced must be of a significant nature, and must contain a minimum of four of the components listed in assessment criteria 6
QPEO2 – 011N	In order to prove their ability to combine different turning operations, at least one of the machined components produced must be of a significant nature, and must have a minimum of six of the features listed in assessment criteria 11
QPEO2 – 012N	In order to prove their ability to combine different milling features, at least one of the components produced must be of a significant nature, and must have a minimum of five of the features listed in assessment criteria 11
QPEO2 – 013N	In order to prove their ability to combine different grinding operations, at least one of the machined components produced must be of a significant nature, and must have a minimum of three of the features listed in assessment criteria 11
QPEO2 – 014N	In order to prove their ability to produce programs that combine different features, at least one of the programs produced must be of a significant nature, and must cover a minimum of five of the features listed in assessment criteria 9
QPEO2 – 015N	In order to prove their ability to combine different turning operations, at least one of the machined components produced must be of a significant nature, and must have a minimum of five of the features listed in assessment criteria 13

QPEO2 – 016N	In order to prove their ability to combine different milling operations, at least one of the machined components produced must be of a significant nature, and must have a minimum of five of the features listed in assessment criteria 13
QPEO2 – 017N	In order to prove their ability to combine different features, at least one of the machined components produced must be of a significant nature, and must have a minimum of six of the features listed in assessment criteria 13
QPEO2 – 019N	In order to prove their ability to combine different maintenance operations, at least one of the maintenance activities must be of a significant nature, and must cover at least seven of the activities listed in assessment criteria 10 plus the removal and replacement of a minimum of five of the components listed in assessment criteria 11
QPEO2 – 020N	In order to prove their ability to combine different fluid power assembly operations, at least one of the fluid power assemblies produced must be of a significant nature, and must contain a minimum of six of the components listed in assessment criteria 7
QPEO2 – 021N	In order to prove their ability to combine different maintenance operations, at least one of the fluid power maintenance activities must be of a significant nature, and must involve the removal and replacement of a minimum of five of the components listed in assessment criteria 12
QPEO2 – 022N	In order to prove their ability to combine different sheet metal cutting and forming operations, at least one of the jobs produced must be of a significant nature, and must contain a minimum of three of the features listed in assessment criteria 13 plus three of the features listed in assessment criteria 15
QPEO2 – 023N	In order to prove their ability to combine different platework cutting and forming operations, at least one of the assemblies produced must be of a significant nature, and must contain components with a minimum of three of the features listed in assessment criteria 12 plus three of the features listed in assessment criteria 14
QPEO2 – 024N	In order to prove their ability to combine different thermal cutting operations, at least one of the components produced must be of a significant nature, and must involve a minimum of four of the operations listed in assessment criteria 11
QPEO2 – 027N	Welded joints must be at least 150mm long, using single or multi-run welds (as appropriate), with at least one stop and start included
QPEO2 – 028N	Welded joints must be at least 150mm long, using single or multi-run welds (as appropriate), with at least one stop and start included
QPEO2 – 029N	Welded joints must be at least 150mm long, using single or multi-run welds (as appropriate), with at least one stop and start included
QPEO2 – 030N	Welded joints must be at least 150mm long, using single or multi-run welds (as appropriate), with at least one stop and start included
QPEO2 – 031N	Brazed or braze welded joints must be at least 100mm long (except for joints in pipe or tube)

QPEO2 – 032N	In order to prove their ability to combine different electrical/electronic drawing features, at least one of the drawings produced must be of a significant nature, and must have a minimum of seven of the features listed in assessment criteria 11
QPEO2 – 033N	In order to prove their ability to combine different electrical assembly and wiring activities, at least one of the electrical assemblies produced must be of a significant nature, and must contain a minimum of five of the components listed in assessment criteria 10 plus five of the activities listed in assessment criteria 13
QPEO2 – 034N	In order to prove their ability to combine different cable enclosure forming and assembly operations, at least one of the cable enclosure and support systems produced must be of a significant nature, and must contain a minimum of four of the features listed in assessment criteria 9
QPEO2 – 035N	In order to prove their ability to combine different electrical panel assembly and wiring operations, at least one of the assemblies produced must be of a significant nature, and must contain a minimum of eight of the components listed in assessment criteria 7 plus six of the activities listed in assessment criteria 8
QPEO2 – 036N	In order to prove their ability to combine different electronic assembly and testing activities, at least one of the electronic assemblies produced must be of a significant nature, and must contain a minimum of ten of the components listed in assessment criteria 10
QPEO2 – 037N	In order to prove their ability to combine different electrical maintenance operations, at least one of the electrical maintenance activities carried out must be of a significant nature, and must cover a minimum of eight of the activities listed in assessment criteria 11
QPEO2 – 038N	In order to prove their ability to combine different electronic maintenance operations, at least one of the electronic maintenance activities carried out must be of a significant nature, and must cover a minimum of seven of the activities listed in assessment criteria 10 plus the removal and replacement of three of the components identified in assessment criteria 11
QPEO2 – 039N	In order to prove their ability to combine different process instrumentation and control maintenance operations, at least one of the instrumentation maintenance activities carried out must be of a significant nature, and must cover a minimum of eight of the activities listed in assessment criteria 10
QPEO2 – 040N	In order to prove their ability to combine different wiring and testing operations, at least one of the PLC systems worked on must be of a significant nature, and must cover a minimum of five of the items listed in assessment criteria 9
QPEO2 – 041N	In order to prove their ability to combine different pattern, model or woodworking operations, at least one of the components produced must be of a significant nature, and must have a minimum of seven of the features listed in assessment criteria 13

QPEO2 – 042N	In order to demonstrate their ability to combine different pattern, model or woodwork assembly operations, at least one of the assemblies produced must be of a significant nature, and must cover a minimum of six of the activities listed in assessment criteria 7
QPEO2 – 043N	In order to prove their ability to combine different wet lay up operations, at least one of the components produced must be of a significant nature, and must have a minimum of three of the features listed in assessment criteria 11
QPEO2 – 044N	In order to prove their ability to combine different pre-preg laminating operations, at least one of the components produced must be of a significant nature, and must have a minimum of three of the features listed in assessment criteria 11
QPEO2 – 045N	In order to prove their ability to combine different resin flow infusion operations, at least one of the components produced must be of a significant nature, and must have a minimum of three of the features listed in assessment criteria 11
QPEO2 – 046N	In order to prove their ability to combine different aircraft detail assembly operations, at least one of the assemblies produced must be of a significant nature, and must contain a minimum of four of the components listed in assessment criteria 11 and 12
QPEO2 – 048N	In order to prove their ability to combine different moulding techniques and procedures, at least one of the moulds produced must be of a significant nature, and must contain a minimum of one core
QPEO2 – 050N	In order to prove their ability to combine different casting techniques and procedures, at least one of the components produced must be of a significant nature, and must contain two of the features listed in assessment criteria 14
QPEO2 – 051N	In order to prove their ability to combine different casting fettling techniques and procedures, at least one of the components fettled must be of a significant nature, and must contain four of the features listed in assessment criteria 10
QPEO2 – 052N	In order to prove their ability to combine different surface preparation and finishing activities, at least one of the finishing activities must be of a significant nature, and must cover five of the activities listed in assessment criteria 5
QPEO2 – 055N	In order to prove their ability to combine different forging operations, at least one of the components produced must be of a significant nature, and must involve a minimum of four of the operations listed in assessment criteria 9
QPEO2 – 061N	In order to prove their ability to combine different 3D modelling features, at least one of the models/drawings produced must be of a significant nature. It must involve a minimum of five of the operations listed in assessment criteria 12, and must include a minimum of seven of the features listed in assessment criteria 13
QPEO2 – 073N	In order to prove their ability to combine different resin film infusion operations, at least one of the components produced must be of a significant nature, and must have a minimum of three of the features listed in assessment criteria 11

6.0 About the NVQ units

This qualification is 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 progress through the 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 and unit title
- unit level
- credit value
- guided learning hours (GLH)
- unit 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 routes, and assessment planning documentation refer to EAL centre guidance.

For further information please contact:

EAL Customer Services

Tel: +44 (0)1923 652 400

Email: customercare@eal.org.uk

Appendix 1: Qualification and Credit Framework (QCF)

This is the framework for creating and accrediting qualifications in England, Wales and Northern Ireland. Units within this qualification have a level and credit. The level is indicative of the challenge. The credit value specifies the number of credits that will be awarded to a learner who successfully achieves the unit.

One credit is equal to 10 hours of learning time. Learning time is defined as the total time taken by the average learner at this level to fully complete the learning outcomes and assessment requirements of a unit. This includes the guided learning hours (GLH) in the classroom/workshop as well as any direct study, homework, practice, preparation and assessment.

QCF requirements for centres

The QCF has requirements for centres in relation to the information provided to the relevant funding bodies. Centres will need to:

- register the centre with the UK Register of Learning Providers (UKRLP) to obtain a UK Provider Reference Number (UKPRN)
- become a Learner Registering Body (LRB). This will ensure that every individual 'centre reference number' or UKPRN will be identifiable on one system which is the UKRLP
- obtain or confirm Unique Learner Numbers (ULNs) for learners through the Learner Registration Service (LRS)

The ULN will be issued from and held on the Learner Registration Service (LRS). This number will enable credit accumulation and transfer of learner achievement, and will create a learner record. The use of the ULN is mandated by government funding bodies. The ULN may not be applicable for all learners, for example if the learner is not a UK national. The ULN relates to England, Wales and Northern Ireland only. Scotland has a similar number, the Scottish Candidate Number (SCN).

Further details of the ULN and LRS can be obtained from the Learner Records Service.

Appendix 2: Functional Skills and Essential Skills Wales

Functional Skills

If individuals don't achieve a level two functionality while at school; they will have other opportunities to do so at college, within an apprenticeship, or in an adult course on day release from work, whatever their age.

Functional skills qualifications will be:

- a constituent of new diplomas at every level,
- a replacement for communication, AoN and ICT key skills qualifications part of apprenticeship frameworks
- part of foundation learning.

Essential Skills Wales (ESW)

Essential Skills Wales are a suite of qualifications to replace Key Skills in Wales. There are currently three ESW qualifications:

- Application of Number (AoN),
- communication,
- Information Communication Technology (ICT).

EAL offer these qualifications at levels one to three. These qualifications are 'stand alone' and are portfolio based; however these can be embedded into other qualifications but must remain a transferable skill.

Appendix 3: Learner registration and certification

Learners must be registered on the qualification using a specific qualification code. Using this code will ensure that you receive the correct materials for the learner.

The registration code for this qualification is as follows:

Qualification Title

EAL Level 3 NVQ Extended Diploma in Composite Engineering (QCF)

Qualification Number

600/8284/7