



Part of the
Enginuity Group

Qualification Manual

EAL Level 3 NVQ Extended Diploma in
Mechanical Manufacturing Engineering

Qualification Number: 600/1701/6

Issue 4

www.eal.org.uk



Table of Contents

| | | |
|-----|---|----|
| 1.0 | About EAL..... | 2 |
| 2.0 | Introduction to the Qualification..... | 3 |
| 3.0 | Qualification Structure..... | 4 |
| 4.0 | Centre and Qualification Approval..... | 23 |
| 5.0 | Profiles and Requirements..... | 24 |
| 6.0 | Assessment..... | 27 |
| 7.0 | Quality Control of Assessments..... | 35 |
| | Appendix 1: Unit Summaries..... | 36 |
| | Appendix 2: Learner Registration and Certification..... | 37 |



1.0 About EAL

For over fifty years, EAL has been the specialist awarding organisation for engineering, manufacturing, building services and related sectors. Developed to the highest technical standards, our qualifications reflect ever-changing industry and regulatory needs. We support the providers of our qualifications with an unparalleled level of service to ensure that learners are well prepared to take the next step in their journeys, whether study, an apprenticeship or work.

Through industry partnerships with EAL centres and training providers, decades of experience supporting our core sectors, and our role as part of the Enginuity Group, we have built unrivalled knowledge and understanding of employer skills needs. As a result, EAL's skills solutions, including apprenticeship End-Point Assessment, External Quality Assurance and qualifications are respected and chosen by employers to deliver real lifelong career benefits for all our learners. That's why in the last ten years, 1.2 million people across the UK have taken EAL qualifications.

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 Introduction to the Qualification

This NVQ qualification is gained when all the necessary units have been achieved. 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 completed, which can be used as accredited prior learning to complete a qualification.

2.1 Qualification Support Materials

The following assessment support materials are available for this qualification:

- Units of competence

This qualification is made up of a number of units of competence, which EAL has derived from the National Occupational Standards (NOS) which set out the collective performance, skills requirements and underpinning knowledge requirements. These documents allow both the apprentices 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 apprentices to demonstrate their skills.

All units in this qualification contain the following information:

- Unit title
- Unit summary
- Performance and skills to be assessed and evidenced
- Underpinning knowledge to be assessed and evidenced.

2.2 Learner's Portfolio Building and Referencing

For guidance to assessment and exemplars on completing documentation including assessment planning documentation refer to EAL centre guidance.

For further information please contact:

EAL Customer Experience

Tel: +44(0)1923 652 400

Email: Customer.Experience@eal.org.uk

2.3 Achievement of the Qualification

The EAL Level 3 NVQ Extended Diploma in Mechanical Manufacturing Engineering has been designed to allow a learner to specialise in **one** of the **nine** pathways listed.

In order to achieve this qualification each learner will be required to attain **three** Mandatory Units, Level 2 PEO Units, the required number of optional units and the specified number of additional units, as detailed within the selected pathway. The overall grading type for this qualification is Pass/Fail. Units will be assessed and endorsed against the learners chosen discipline. Learners will be required to create a Portfolio of Evidence to prove their competence in the workplace. Learners should therefore select the unit that reflects the job they carry out in the workplace to be able to obtain the required workplace evidence.

Learners will be assessed in relation to their chosen discipline and endorsed accordingly. The endorsement will be printed on the certificate to show future employers which discipline was covered during their assessment.

3.0 Qualification Structure

3.1 Rule of Combination

This qualification has a credit value of **106**, a minimum of (GLH) of **439** and a Total Qualification Time of **1060** hours, the notional time required by the learner to complete the qualification.

Structure of the EAL Level 3 NVQ Extended Diploma

The Extended Diploma is comprised of a Level 3 Engineering Qualification **extended** by inclusion of technically specific PEO Units as follows:-

Mandatory Units – A combination of Level 2 & 3

Group A – Level 2 PEO Units x 3 (Engineering Practices pathway)

OR

Group B – Level 2 PEO Units x 5 (Technical Support pathway)

And

Group C - One of the Mechanical Manufacturing Engineering pathways

Delivery requirements

The technically specific Level 2 PEO Units **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:

To support these basic engineering skills and techniques, the learner must be trained in, and continuously practice the relevant Health and Safety, 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 units in this period.

Level 3:

On completion of the PEO2 Units, the Learner moves on to the units from the Level 3 qualification which can only be assessed within a workplace environment.

The learner must complete the required number of optional units of competence, from **one** of the **nine** pathways listed.

Mandatory Units:

Learners must complete all **three** units

| EAL Code | Unit Title | Level | Credit | GLH | Ofqual Code |
|-----------|---|-------|--------|-----|-------------|
| QMME2/001 | Complying with statutory regulations and organisational safety requirements | 2 | 5 | 35 | A/601/5013 |
| QMME2/002 | Using and interpreting engineering data and documentation | 2 | 5 | 25 | Y/601/5102 |
| QMME3/003 | Working efficiently and effectively in engineering | 3 | 5 | 25 | K/601/5055 |

Group A (Engineering practices)

Optional Units: Learners must complete **three** more units from the following:

Notes:

Only one unit from **4, 32** and **61** may be included in the learner's choice of three units.

If unit **65** is selected units **5, 6, 8, 11, 12, 15, 16, 17** cannot be included in the learner's choice of three units.

If unit **66** is selected units **10, 22, 23, 25, 26, 27, 28, 29, 30, 34** cannot be included in the learner's choice of three units.

If unit **67** is selected units **33, 35, 36, 40** cannot be included in the learner's choice of three units.

If unit **68** is selected units **19, 21, 37, 38, 39, 40, 58, 59** cannot be included in the learner's choice of three units

| | | | | | |
|------------|--|---|----|----|------------|
| 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 | 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, modelmaking 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 |

OR

Group B (Technical Support)

Optional Units: Learners must complete **one** Level 2 PEO unit from the following:

| EAL Code | Unit Title | Level | Credit | 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 |

Optional Units: Learners must complete **two** Level 2 PEO Units 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 |

Optional Units: Learners must complete **two** Level 2 PEO Units 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 requirements in Group A or B, learners must complete the unit requirements for **one** of the following Level 3 Mechanical Manufacturing Engineering Pathways within Group C:

[Pathway MMA: Machining](#)

Learners must complete any **functional pair** of the following units:

| EAL code | Unit title | Level | Credit | GLH | Ofqual code |
|-----------|--|-------|--------|-----|-------------|
| QMME3/004 | Setting centre lathes for production | 3 | 91 | 210 | T /600/5385 |
| QMME3/005 | Machining components using centre lathes | 3 | 77 | 161 | A/600/5386 |
| QMME3/006 | Setting turret lathes for production | 3 | 91 | 210 | F/600/5387 |
| QMME3/007 | Machining components using turret lathes | 3 | 77 | 161 | J/600/5388 |
| QMME3/008 | Setting milling machines for production | 3 | 91 | 210 | J/600/5391 |
| QMME3/009 | Machining components using milling machines | 3 | 77 | 161 | L/600/5392 |
| QMME3/010 | Setting shaping, planing or slotting machines for production | 3 | 78 | 175 | R/600/5393 |
| QMME3/011 | Machining components using shaping, planing or slotting machines | 3 | 69 | 126 | Y/600/5394 |
| QMME3/012 | Setting gear cutting machines for production | 3 | 91 | 210 | D/600/5395 |
| QMME3/013 | Machining components using gear cutting machines | 3 | 77 | 161 | K/600/5397 |
| QMME3/014 | Setting gear grinding machines for production | 3 | 91 | 210 | M/600/5398 |
| QMME3/015 | Machining components using gear grinding machines | 3 | 77 | 161 | D/600/5400 |
| QMME3/016 | Setting horizontal boring machines for production | 3 | 91 | 210 | K/600/5402 |
| QMME3/017 | Machining components using horizontal boring machines | 3 | 77 | 161 | L/600/5411 |
| QMME3/018 | Setting vertical boring machines for production | 3 | 91 | 210 | F/600/5423 |
| QMME3/019 | Machining components using vertical boring machines | 3 | 77 | 161 | Y/600/5430 |



| | | | | | |
|-----------|--|---|----|-----|------------|
| QMME3/020 | Setting electro-discharge machines for production | 3 | 91 | 210 | H/600/5432 |
| QMME3/021 | Machining components using electro- discharge machines | 3 | 77 | 161 | L/600/5439 |
| QMME3/022 | Setting grinding machines for production | 3 | 91 | 210 | M/600/5448 |
| QMME3/023 | Machining components using grinding machines | 3 | 77 | 161 | Y/600/5458 |
| QMME3/024 | Setting honing and lapping machines for production | 3 | 78 | 175 | L/600/5473 |
| QMME3/025 | Machining components using honing and lapping machines | 3 | 33 | 119 | L/600/5487 |
| QMME3/026 | Setting broaching machines for production | 3 | 78 | 175 | L/600/5490 |
| QMME3/027 | Machining components using broaching machines | 3 | 33 | 119 | A/600/5503 |
| QMME3/028 | Setting metal spinning machines for production | 3 | 78 | 175 | D/600/5509 |
| QMME3/029 | Producing components using metal spinning machines | 3 | 77 | 161 | K/600/5514 |

Pathway MMB: CNC Machining

Learners must complete **one** of the following units:

| EAL code | Unit Title | Level | Credit | GLH | Ofqual code |
|-----------|---|-------|--------|-----|-------------|
| QMME3/030 | Loading and proving CNC machine tool programs | 3 | 24 | 91 | L/600/5523 |
| QMME3/031 | Carrying out CNC machine tool programming | 3 | 84 | 231 | M/600/5529 |

Plus: Learners must complete **one** functional pair of the following units:

| | | | | | |
|-----------|---|---|----|-----|------------|
| QMME3/032 | Setting CNC turning machines for production | 3 | 70 | 140 | H/600/5561 |
| QMME3/033 | Machining components using CNC turning machines | 3 | 63 | 126 | F/600/5566 |
| QMME3/034 | Setting CNC milling machines for production | 3 | 70 | 140 | R/600/5572 |
| QMME3/035 | Machining components using CNC milling machines | 3 | 63 | 126 | K/600/5576 |
| QMME3/036 | Setting CNC grinding machines for production | 3 | 70 | 140 | J/600/5584 |
| QMME3/037 | Machining components using CNC grinding machines | 3 | 63 | 126 | R/600/5622 |
| QMME3/038 | Setting CNC punching machines for production | 3 | 70 | 140 | K/600/5643 |
| QMME3/039 | Machining components using CNC punching machines | 3 | 63 | 126 | T/600/5662 |
| QMME3/040 | Setting CNC laser profiling machines for production | 3 | 70 | 140 | R/600/5670 |
| QMME3/041 | Machining components using CNC laser profiling machines | 3 | 63 | 126 | H/600/5916 |
| QMME3/042 | Setting CNC electro-discharge machines for production | 3 | 70 | 140 | M/600/5921 |
| QMME3/043 | Machining components using CNC electro-discharge machines | 3 | 63 | 126 | F/600/5924 |
| QMME3/044 | Setting CNC vertical boring machines for production | 3 | 70 | 140 | R/600/5927 |
| QMME3/045 | Machining components using CNC vertical boring machines | 3 | 63 | 126 | Y/600/5928 |



| | | | | | |
|-----------|---|---|----|-----|------------|
| QMME3/046 | Setting CNC horizontal boring machines for production | 3 | 70 | 140 | K/600/5951 |
| QMME3/047 | Machining components using CNC horizontal boring machines | 3 | 63 | 126 | K/600/5965 |
| QMME3/048 | Setting CNC gear cutting machines for production | 3 | 70 | 140 | L/600/5974 |
| QMME3/049 | Machining components using CNC gear cutting machines | 3 | 63 | 126 | D/600/5980 |
| QMME3/050 | Setting CNC machining centres for production | 3 | 70 | 140 | L/600/5991 |
| QMME3/051 | Machining components using CNC machining centres | 3 | 63 | 126 | D/600/5994 |

Pathway MMC: Machine Tool Setting

Learners must complete **the following** unit:

| EAL code | Unit title | Level | Credit | GLH | Ofqual code |
|-----------|--|-------|--------|-----|-------------|
| QMME3/052 | Handing over machine tools to production operators | 3 | 38 | 98 | A/600/5436 |

Plus: Learners must complete **one** of the following units:

| | | | | | |
|-----------|---|---|----|-----|------------|
| QMME3/053 | Setting capstan and turret lathes for production | 3 | 91 | 210 | Y/600/5444 |
| QMME3/054 | Setting single-spindle automatic turning machines for production | 3 | 91 | 210 | K/600/5450 |
| QMME3/055 | Setting multi-spindle automatic turning machines for production | 3 | 77 | 161 | T/600/5452 |
| QMME3/056 | Setting single and multi-spindle drilling machines for production | 3 | 77 | 161 | J/600/5455 |
| QMME3/057 | Setting tool and cutter grinding machines for production | 3 | 77 | 161 | Y/600/5461 |
| QMME3/058 | Setting special-purpose machines for production | 3 | 91 | 210 | D/600/5462 |
| QMME3/059 | Setting power presses for production | 3 | 91 | 210 | A/600/5467 |
| QMME3/008 | Setting milling machines for production | 3 | 91 | 210 | J/600/5391 |
| QMME3/022 | Setting grinding machines for production | 3 | 91 | 210 | M/600/5448 |
| QMME3/010 | Setting shaping, planing or slotting machines for production | 3 | 78 | 175 | R/600/5393 |
| QMME3/012 | Setting gear cutting machines for production | 3 | 91 | 210 | D/600/5395 |
| QMME3/014 | Setting gear grinding machines for production | 3 | 91 | 210 | M/600/5398 |
| QMME3/020 | Setting electro-discharge machines for production | 3 | 91 | 210 | H/600/5432 |
| QMME3/024 | Setting honing and lapping machines for production | 3 | 78 | 175 | L/600/5473 |
| QMME3/026 | Setting broaching machines for production | 3 | 78 | 175 | L/600/5490 |
| QMME3/032 | Setting CNC turning machines for production | 3 | 70 | 140 | H/600/5561 |
| QMME3/034 | Setting CNC milling machines for production | 3 | 70 | 140 | R/600/5572 |
| QMME3/036 | Setting CNC grinding machines for production | 3 | 70 | 140 | J/600/5584 |
| QMME3/038 | Setting CNC punching machines for production | 3 | 70 | 140 | K/600/5643 |
| QMME3/040 | Setting CNC laser profiling machines for production | 3 | 70 | 140 | R/600/5670 |



| | | | | | |
|-----------|---|---|----|-----|------------|
| QMME3/042 | Setting CNC electro-discharge machines for production | 3 | 70 | 140 | M/600/5921 |
| QMME3/048 | Setting CNC gear cutting machines for production | 3 | 70 | 140 | L/600/5974 |
| QMME3/050 | Setting CNC machining centres for production | 3 | 70 | 140 | L/600/5991 |

Pathway MMD: Fitting and Assembly

Optional Units: Learners must complete **three** of the following units:

| EAL code | Unit title | Level | Credit | GLH | Ofqual code |
|-----------|---|-------|--------|-----|-------------|
| QMME3/060 | Producing components using hand fitting techniques | 3 | 70 | 210 | A/600/5470 |
| QMME3/061 | Assembling mechanical products | 3 | 70 | 210 | J/600/5472 |
| QMME3/062 | Producing components by manual machining | 3 | 70 | 210 | H/600/5477 |
| QMME3/063 | Fitting fluid power components to mechanical assemblies | 3 | 60 | 161 | H/600/5480 |
| QMME3/064 | Fitting pipework systems to mechanical assemblies | 3 | 60 | 161 | F/600/5485 |
| QMME3/065 | Fitting electrical/electronic components to mechanical assemblies | 3 | 60 | 161 | R/600/5488 |
| QMME3/066 | Producing power turbine combustion assemblies | 3 | 70 | 210 | Y/600/5492 |
| QMME3/067 | Producing power turbine compressor assemblies | 3 | 70 | 210 | A/600/5498 |
| QMME3/068 | Producing turbine assemblies | 3 | 70 | 210 | F/600/5504 |
| QMME3/069 | Producing power turbine gearbox assemblies | 3 | 70 | 210 | R/600/5510 |
| QMME3/070 | Producing power turbine major assemblies | 3 | 70 | 210 | M/600/5515 |
| QMME3/071 | Producing piston engine assemblies | 3 | 70 | 210 | J/600/5522 |
| QMME3/072 | Repairing and modifying mechanical assemblies | 3 | 70 | 210 | H/600/5527 |
| QMME3/073 | Checking that completed assemblies comply with specification | 3 | 30 | 91 | L/600/5537 |

Pathway MME: Pipe Fitting and Assembly

Optional Units: Learners must complete **one** of the following units

| EAL code | Unit title | Level | Credit | GLH | Ofqual code |
|-----------|---|-------|--------|-----|-------------|
| QMME3/074 | Pipe bending and forming by hand methods | 3 | 46 | 50 | Y/600/5542 |
| QMME3/075 | Pipe bending and forming using bending machines | 3 | 46 | 150 | T/600/5547 |

Plus: Learners must complete **two** of the following units:

| | | | | | |
|-----------|---|---|----|-----|------------|
| QMME3/076 | Assembling screwed pipework | 3 | 30 | 91 | L/600/5554 |
| QMME3/077 | Assembling small bore non-ferrous pipework | 3 | 30 | 91 | D/600/5557 |
| QMME3/078 | Assembling non-metallic pipework | 3 | 30 | 91 | K/600/5562 |
| QMME3/079 | Preparing and testing pipework systems | 3 | 46 | 150 | J/600/5567 |
| QMME3/080 | Producing socket and flange fillet welded joints in pipe using a manual welding process | 3 | 86 | 210 | L/600/5571 |

Pathway MMF: Composite Manufacture Engineering

Optional Units: Learners must complete **one** of the following units:

| EAL code | Unit title | Level | Credit | GLH | Ofqual code |
|-----------|--|-------|--------|-----|-------------|
| QMME3/081 | Producing composite mouldings using pre-preg laminating techniques | 3 | 86 | 210 | D/600/5574 |
| QMME3/082 | Producing composite mouldings using wet lay-up techniques | 3 | 86 | 210 | T/600/5578 |
| QMME3/083 | Producing composite assemblies | 3 | 86 | 210 | M/600/5580 |

Plus: Learners must complete **one** of the following units:

| | | | | | |
|-----------|--|---|----|-----|------------|
| QMME3/081 | Producing composite mouldings using pre-preg laminating techniques | 3 | 86 | 210 | D/600/5574 |
| QMME3/082 | Producing composite mouldings using wet lay-up techniques | 3 | 86 | 210 | T/600/5578 |
| QMME3/083 | Producing composite assemblies | 3 | 86 | 210 | M/600/5580 |
| QMME3/084 | Bonding composite mouldings | 3 | 30 | 91 | F/600/5583 |
| QMME3/085 | Repairing composite mouldings | 3 | 77 | 161 | Y/600/5587 |
| QMME3/086 | Applying finishes to composite mouldings | 3 | 46 | 150 | D/600/5588 |
| QMME3/087 | Trimming composite mouldings using hand tools | 3 | 46 | 150 | K/600/5593 |
| QMME3/088 | Identifying defects in composite mouldings | 3 | 30 | 91 | A/600/5596 |

Note: Two different units must be taken.

Pathway MMH: Mechanical Overhaul and Test

Optional Units: Learners must complete **two** of the following units:

| EAL code | Unit title | Level | Credit value | GLH | Ofqual code |
|-----------|--|-------|--------------|-----|-------------|
| QMME3/100 | Slinging, lifting and moving equipment, components or materials for overhauling activities | 3 | 24 | 89 | T/600/5600 |
| QMME3/101 | Dismantling mechanical equipment in preparation for overhaul | 3 | 49 | 161 | R/600/5605 |
| QMME3/102 | Checking mechanical components for serviceability during overhauling activities | 3 | 24 | 89 | H/600/5611 |
| QMME3/103 | Carrying out non-destructive flaw detection on components during overhauling activities | 3 | 24 | 89 | A/600/5615 |
| QMME3/104 | Restoring mechanical components to usable condition by repair | 3 | 49 | 161 | R/600/5619 |
| QMME3/105 | Producing replacement components for overhauling activities | 3 | 49 | 161 | D/600/5624 |
| QMME3/106 | Checking that overhauled mechanical assemblies comply with specification | 3 | 30 | 91 | A/600/5629 |

Plus: Learners must complete **one** of the following units:

| | | | | | |
|-----------|---|---|----|-----|------------|
| QMME3/107 | Overhauling industrial power turbines by module replacement | 3 | 86 | 210 | T/600/5631 |
| QMME3/108 | Overhauling industrial power turbine compressor assemblies | 3 | 86 | 210 | R/600/5636 |
| QMME3/109 | Overhauling industrial power turbine combustion assemblies | 3 | 86 | 210 | Y/600/5640 |
| QMME3/110 | Overhauling turbine assemblies from industrial power turbines | 3 | 86 | 210 | A/600/5646 |
| QMME3/111 | Overhauling piston engines | 3 | 86 | 210 | F/600/5650 |
| QMME3/112 | Overhauling gearbox assemblies | 3 | 86 | 210 | Y/600/5654 |
| QMME3/113 | Overhauling industrial clutch and brake assemblies | 3 | 77 | 161 | K/600/5657 |
| QMME3/114 | Overhauling pump assemblies | 3 | 77 | 161 | F/600/5468 |
| QMME3/115 | Overhauling valve assemblies | 3 | 77 | 161 | K/600/5478 |
| QMME3/116 | Overhauling components of hydraulic equipment | 3 | 77 | 161 | J/600/5486 |
| QMME3/117 | Overhauling components of pneumatic, vacuum or compressed air equipment | 3 | 77 | 161 | D/600/5493 |
| QMME3/118 | Carrying out tests on overhauled industrial power turbines | 3 | 70 | 210 | K/600/5500 |
| QMME3/119 | Carrying Out tests on overhauled piston engines (fixed dynamometer) | 3 | 70 | 210 | D/600/5512 |

Pathway MMI: Spring Making

Optional Units: Learners must complete **four** of the following units:

| EAL code | Unit title | Level | Credit | GLH | Ofqual code |
|-----------|--|-------|--------|-----|-------------|
| QMME3/120 | Making compression springs using hand forming methods | 3 | 46 | 150 | F/600/5521 |
| QMME3/121 | Making torsion springs using hand forming methods | 3 | 46 | 150 | K/600/5531 |
| QMME3/122 | Making extension springs using hand forming methods | 3 | 46 | 150 | Y/600/5539 |
| QMME3/123 | Making spring wire forms using hand forming methods | 3 | 46 | 150 | A/600/5548 |
| QMME3/124 | Grinding spring ends by hand | 3 | 16 | 57 | D/600/5560 |
| QMME3/125 | Setting automatic cold wire compression spring making machines for production | 3 | 46 | 150 | H/600/5575 |
| QMME3/126 | Setting automatic cold wire torsion spring making machines for production | 3 | 46 | 150 | L/600/5635 |
| QMME3/127 | Setting automatic cold wire extension spring making machines for production | 3 | 46 | 150 | J/600/5648 |
| QMME3/128 | Setting automatic spring making machines for the production of clock, power, scroll and volute springs | 3 | 46 | 150 | R/600/5653 |
| QMME3/129 | Setting automatic cold wire forming machines to produce spring wire forms | 3 | 46 | 150 | M/600/5661 |
| QMME3/130 | Setting automatic hot wire compression spring making machines for production | 3 | 46 | 150 | D/600/5672 |
| QMME3/131 | Setting automatic spring end grinding machines for production | 3 | 16 | 60 | L/600/5683 |
| QMME3/132 | Programming CNC spring making machines | 3 | 84 | 231 | H/600/5687 |
| QMME3/133 | Setting CNC spring making machines for production | 3 | 46 | 150 | H/600/5690 |
| QMME3/134 | Operating CNC spring making machines | 3 | 30 | 91 | T/600/5693 |
| QMME3/135 | Setting and using a fly press for spring making activities | 3 | 30 | 91 | F/600/5695 |
| QMME3/136 | Making strip spring components using shearing machines | 3 | 30 | 91 | Y/600/5699 |
| QMME3/137 | Forming strip spring components using power rolling machines | 3 | 30 | 91 | L/600/5702 |
| QMME3/138 | Bending strip spring components using press brakes | 3 | 30 | 91 | Y/600/5704 |
| QMME3/139 | Forming strip spring components using power presses | 3 | 30 | 91 | M/600/5708 |



| | | | | | |
|-----------|--|---|----|-----|------------|
| QMME3/140 | Drilling and finishing holes in strip spring components | 3 | 16 | 57 | M/600/5711 |
| QMME3/141 | Using heat to assist with the bending and forming of spring components | 3 | 16 | 57 | L/600/5716 |
| QMME3/142 | Carrying out heat treatment of springs | 3 | 30 | 91 | D/600/5719 |
| QMME3/143 | Carrying out shot peening of springs | 3 | 30 | 91 | H/600/5723 |
| QMME3/144 | Carrying out quality control of spring making activities | 3 | 46 | 150 | M/600/5725 |
| QMME3/145 | Manufacturing one-off tooling for spring making activities | 3 | 77 | 161 | M/600/5739 |
| QMME3/146 | Setting and operating CNC laser profiling machines for strip spring making | 3 | 77 | 161 | A/600/5744 |

Pathway MMJ: Photonics Engineering

Optional Units: Learners must complete **three** of the following units:

| EAL code | Unit title | Level | Credit | GLH | Ofqual code |
|-----------|--|-------|--------|-----|-------------|
| QMME3/150 | Machining infra-red/special material lenses | 3 | 77 | 161 | J/600/5746 |
| QMME3/151 | Machining optical glass lenses | 3 | 77 | 161 | R/600/5751 |
| QMME3/152 | Machining optical prism and flat components | 3 | 77 | 161 | H/600/5754 |
| QMME3/153 | Setting CNC aspheric glass and diamond turning machines | 3 | 78 | 175 | A/600/5758 |
| QMME3/154 | Machining components using CNC aspheric glass and diamond turning machines | 3 | 46 | 150 | F/600/5762 |
| QMME3/155 | Setting CNC optical grinding and polishing machines for production | 3 | 78 | 175 | Y/600/5766 |
| QMME3/156 | Machining components using CNC optical grinding and polishing machines | 3 | 46 | 150 | D/600/5770 |
| QMME3/157 | Machining optical cylinders and domes | 3 | 77 | 161 | J/600/5813 |
| QMME3/158 | Machining optical plastic components | 3 | 77 | 161 | L/600/5814 |
| QMME3/159 | Polishing and smoothing of lens or mirror surfaces | 3 | 77 | 161 | R/600/5815 |
| QMME3/160 | Vacuum coating optical materials | 3 | 30 | 91 | Y/600/5816 |
| QMME3/161 | Inspecting optical components using mechanical instruments | 3 | 30 | 91 | D/600/5817 |
| QMME3/162 | Inspecting optical components using Co-ordinate Measuring Machines (CMM) | 3 | 46 | 150 | K/600/5819 |
| QMME3/163 | Carrying out laser/optic metrology | 3 | 46 | 150 | D/600/5820 |
| QMME3/164 | Terminating fibre-optic cables | 3 | 30 | 91 | K/600/5822 |
| QMME3/165 | Building optical systems | 3 | 78 | 175 | M/600/5823 |
| QMME3/166 | Performing laser optical system alignment | 3 | 46 | 150 | F/600/5826 |
| QMME3/167 | Aligning and setting up holographic equipment | 3 | 77 | 161 | J/600/5827 |
| QMME3/168 | Following clean room/clean work area protocols | 3 | 16 | 57 | R/600/5829 |



4.0 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 the 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 their 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 Experience will be happy to help. Please contact them on:

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

5.0 Profiles and Requirements

5.1 Staff Responsible for Registering and Certification of Learners

Centres are required to appoint a suitable member of staff who can take responsibility for registering learners onto qualifications, submitting entries for assessments to EAL and taking receipt of external assessment procedures (if appropriate). They may also be responsible for applying to EAL for learner certificates. The role may be undertaken by the same person who undertakes quality assurance.

5.2 Learners

The Level 3 Units have been designed to cover those learners who are either:

- Individuals that need to acquire Mechanical Manufacturing Engineering competencies for the engineering sectors.
- Individuals employed in the Mechanical Manufacturing Engineering sectors but require additional competencies as part of an existing job role or to enable career progression.

There are no formal entry requirements for this qualification. Learners must have been initially assessed to ensure they have both the potential and opportunity to achieve the assessment criteria set out in the qualification units and gain evidence from the workplace.

If the qualification is used to support implementation and delivery of an apprenticeship standard, the formal entry requirements will be listed within the standard assessment plan.

Learners are required to obtain evidence against each assessment criteria when competence has been proven.

Performance, Skills and Knowledge evidence must be sufficiently covered and recorded in the Evidence Reference boxes contained within the units, to ensure all criteria has been met.

5.3 Assessors

Assessment must be carried out by competent assessors who, as a minimum, must hold the 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 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 learning outcomes and associated performance criteria within the unit.

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 learners in the units being assessed.

Assessors must also:

Be fully conversant with the EAL assessment recording documentation used for the units of competence, against which the assessments and verification are to be carried out, plus any other relevant documentation and system and procedures to support the QA process.

5.4 Internal Quality Assurers

Internal quality assurance (IQA) must be carried out by competent IQA's that as a minimum must hold the Level 4 Award in the Internal Quality Assurance of Assessment Processes and Practices. Current and operational IQA that hold internal verification units V1 or D34 will not be required to achieve the Level 4 Award as they are still appropriate for the verification requirements set out in this Unit Assessment Strategy.

Internal quality assurers 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 NOS.

Internal quality assurers will also be expected to be fully conversant with the terminology used in the units of competence against which the assessments and verification are to be carried out, the appropriate Regulatory Body's systems and procedures and the relevant EAL documentation, systems and procedures within which the assessment and verification is taking place.

Specific technical requirements for persons undertaking the role of external quality assurance

Internal and external quality assurers for the units of competence 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 engineering industry.

The following tables show the recommended levels of technical competence for assessors, internal and external quality assurers.

Technical requirements for Assessors and Quality Assurers

| Position | Prime activity requirements | Support activity requirements | Technical requirements (see notes) |
|----------------------------------|-----------------------------|------------------------------------|---|
| Assessor | Assessment skills | Internal Quality Assurance Systems | Technical competence in the areas covered by the units being assessed |
| Internal Quality Assurance (IQA) | Quality Assurance skills | Assessment knowledge | Technical understanding of the areas covered by the qualification |
| External Quality Assurance (EQA) | Quality Assurance skills | Assessment understanding | Technical awareness of the areas covered by the qualification |

Notes

1. Technical competence is defined here as a combination of practical skills, knowledge, and the ability to apply both, 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 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 Job role: | An ability to discuss the general principles of the competences being assessed | An ability to describe the practical aspects of the competences being assessed | An ability to demonstrate the practical competences being assessed |
|---|---|---|---|
| Assessor | | | |
| Internal Quality Assurance | | | |
| External Quality Assurance | | | |

6.0 Assessment

6.1 Assessment environment

PEO: Assessment environment

The PEO Level 1 and 2 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 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 earners 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 and techniques required by the 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.

NVQ Assessment environment

Assessment of all learners in the mechanical manufacturing engineering related occupations, against the NOS developed by the employers in the engineering sector, will be undertaken in accordance with the following criteria:

- Evidence of occupational competence should be generated and collected through real work activities in a real working environment.
- Real work activities are those undertaken to provide a secure product or service under typical business conditions.
- A real working environment is one that reflects typical employment conditions relevant to the work activities being assessed.
- The evidence collected under these conditions should also be as naturally occurring as possible.

Taking account of the above, it is not acceptable to undertake assessments in a classroom, or similar environment that has been set up specifically for training. Where opportunities for evidence collection are not available at the workplace, simulation is permitted, in accordance with the criteria listed in section 6.3 below.

6.2 Access to assessment

16 is the minimum age limit required by learners to undertake the 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 criteria set out in the units.

When used as part of an apprenticeship standard apprentices must have achieved the requirements of the foundation phase of the apprenticeship in line with the apprenticeship standard they are working towards.

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

6.3 Carrying out assessment

The EAL Level 3 Extended Diploma in Mechanical Manufacturing Engineering units have been specifically developed to cover a wide range of activities.

The PEO and NVQ Units were specifically developed to cover a wide range of activities. The evidence produced for the units will, therefore, depend on the learners 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 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.

PEO: 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 of the unit activity will be required. Items of performance evidence often contain features that apply to more than one unit and can be used as evidence in any unit where they are suitable.

Performance evidence must be:

- Products of the learners’ work, such as items that have been produced or worked on, plans, charts, reports, standard operating procedures, documents produced as part of a work activity, records, or photographs of the completed activity.

Together with:

- Evidence of the way the learners carried out the activities, such as witness testimonies, assessor observations or authenticated learner reports of the activity undertaken.

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 various features and techniques. Where this is the case, separate fragments of evidence would not provide this combination of features and techniques and, therefore, will not be acceptable as demonstrating competent performance.

If there is any doubt as to what constitutes suitable evidence the internal/external Quality Assurer should be consulted.

Example:

Unit 11: Preparing and Using Lathes for Turning Operations Level 2

Unit specific additional assessment requirements:

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 1.11.

NVQ: Minimum performance evidence requirements

The evidence produced for the units will, therefore, depend on the learner’s choice of “bulleted items” listed in the unit performance criteria. Where the performance 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 above, 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.

Performance evidence

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 of the unit activity will be required, unless otherwise stated. Items of performance evidence often contain features that apply to more than one unit and can be used as evidence in any unit where they are suitable.

- Products of the learners' work, such as items that have been produced or worked on, plans, charts, reports, standard operating procedures, documents produced as part of a work activity, records, or photographs of the completed activity.

Together with:

- Evidence of the way the learners carried out the activities, such as witness testimonies, assessor observations or authenticated learner reports of the activity undertaken.

Competence 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 various features and techniques. Where this is the case, separate fragments of evidence would not provide this combination of features and techniques and, therefore, will not be acceptable as demonstrating competent performance.

Simulation

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.

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.

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

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.

Please note: Knowledge and understanding can be demonstrated in a number of different ways.

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 apprentice. 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.

Specific Assessment Requirements:

| Unit | Unit specific additional assessment requirements: Performance Learning Outcomes |
|--------------|--|
| 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 1.13 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 include |
| 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's 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 |

7.0 Quality Control of Assessments

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 qualification/units.

EAL may decide to visit a Centre to view evidence or may undertake this via other means 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 apprentice, 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 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 quality assurer (EQA).
- That reviews of EAL's external auditing arrangements are undertaken.



Part of the
Enginuity Group

Appendix 1: Unit Summaries

All **QMME3** and Level 2 **PEO** unit summaries are available in the Qualification Specification unit summaries document. For more information, please visit the [EAL Qualification Website](#)

Appendix 2: 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](#). For paper-based registration and certification use the appropriate forms. These are located on the EAL Website, for guidance on registration and certification please refer to the Registration and Certification User Guide.

| Qualification Title: | Code: |
|--|--------------|
| Level 3 NVQ Extended Diploma in Mechanical Manufacturing Engineering | 600/1701/6 |

To register the learner on the chosen Qualification/Pathway Code

The following table is for those learners who follow the **Engineering practices** pathway within the qualification (**Group A**)

| Pathway Title: Engineering Practices | Code: |
|---|---------------|
| Machining | 600/1701/6MMA |
| CNC Machining | 600/1701/6MMB |
| Machine tool setting | 600/1701/6MMC |
| Fitting and assembly | 600/1701/6MMD |
| Pipe fitting and assembly | 600/1701/6MME |
| Composite manufacture engineering | 600/1701/6MMF |
| Mechanical overhaul and test | 600/1701/6MMH |
| Spring making | 600/1701/6MMI |
| Photonics engineering | 600/1701/6MMJ |

The following table is for those learners who follow the Technical Support pathway within the qualification (**Group B**)

| Pathway Title: Technical Support | Code: |
|---|----------------|
| Machining | 600/1701/6MMAZ |
| CNC Machining | 600/1701/6MMBZ |
| Machine tool setting | 600/1701/6MMCZ |
| Fitting and assembly | 600/1701/6MMDZ |
| Pipe fitting and assembly | 600/1701/6MMEZ |
| Composite manufacture engineering | 600/1701/6MMFZ |
| Mechanical overhaul and test | 600/1701/6MMHZ |
| Spring making | 600/1701/6MMIZ |
| Photonics engineering | 600/1701/6MMJZ |



Part of the
Enginuity Group



Part of the
Enginuity Group

Published by:

EAL
Unit 2, The Orient Centre
Greycaine Road
Watford
Herts
WD24 7GP

© Excellence Achievement Learning Ltd 2022

EAL has made every effort to ensure that the information contained within this publication is accurate at the time of going to print. However, EAL products and services are subject to continuous development and improvement and the right is reserved to change products and services from time to time.

This manual has been prepared as a downloadable resource. It may be freely printed without further permission from EAL on the condition that it is used solely within the purchasing organisation and is not offered for sale in any format.