



# Level 3 NVQ Extended Diploma in **Engineering Toolmaking (QCF)**

# ENGINEERING

## Qualification Specification

### Overview

This level 3 qualification is based on national occupational standards for engineering, which are statements of performance that describe what competent people in a particular occupation or task are expected to be able to do. It involves the skills and knowledge needed for occupations in engineering toolmaking including producing and working with engineering drawings, using machinery, producing components and working with composites.

### Typical Job

The qualification is applicable to a variety of engineering toolmaking occupations dependent on the pathway chosen.

Qualification code:	600/1667/X
Level:	3
Total qualification time:	TBC
Guided learning hours:	439 (min) 1,027 (max)
Credits:	132
Minimum age	16

Issue 1.0



## Purpose of the qualification

It is designed for individuals who need recognition of their competence in one or more of a variety of engineering toolmaking activities and also need a nationally recognised qualification at Level 3, including learners who are undertaking a Semta apprenticeship and those who are working in a general engineering environment and would like to specialise in toolmaking activities. It covers the skills and knowledge in one or more of a variety of competencies including:

- tool making
- toolroom CNC machining
- mould, tool and die equipment maintenance
- jig and fixture manufacture
- toolroom manual machining.

## Who supports this qualification?

The qualification is supported by the Engineering Council, and recognised by the The Institute of Mechanical Engineers for EngTech status.

## What could this qualification lead to?

It can form part of an Apprenticeship framework at Level 3, and provide a base for other Level 3 qualifications, and progression to a range of Level 4 qualifications and employment.

## Entry Requirements

Learners must have the potential to achieve the assessment criteria set out in the units.

## How is the qualification achieved?

The learner must present evidence (portfolio) which clearly shows they have met the assessment criteria and learning outcomes. The learner must achieve the mandatory and optional units relevant to their pathway (occupational role).

## What will be assessed?

All evidence submitted by the learner against the assessment criteria.

## How will it be assessed?

Evidence for this qualification will be assessed in accordance with the SEMTA engineering assessment strategy, which has been created from engagement with stakeholders (employers etc.) in the engineering sector.

The qualification is not graded and only a pass can be achieved – which indicates the learner’s competence.

## Structure

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** - Engineering Pathway – Level 3 optional Units

### Delivery requirements

In the context of the Apprenticeship Framework, 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

This qualification will be achieved when the learner has successfully completed the common mandatory Assessment route followed by the required number of optional Assessment route.

**Mandatory units for all pathways: All three assessment routes must be completed**

EAL code	Assessment route title	Level	Credit value	Guided learning hours	Ofqual code
QETM2/001	Complying with Statutory Regulations and Organisational Safety Requirements	2	5	35	A/601/5013
QETM2/002	Using and Interpreting Engineering Data and Documentation	2	5	25	Y/601/5102
QETM3/003	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

QPE02/004N	Producing Mechanical Engineering Drawings using a CAD System	2	11	61	F/504/6348
QPE02/005N	Producing Components using Hand Fitting Techniques	2	14	64	J/504/6349
QPE02/006N	Producing Mechanical Assemblies	2	15	68	F/504/6351
QPE02/007N	Forming and Assembling Pipework Systems	2	14	64	L/504/6353
QPE02/008N	Carrying Out Aircraft Detail Fitting Activities	2	14	64	R/504/6354
QPE02/009N	Installing Aircraft Mechanical Fasteners	2	11	61	L/504/6367
QPE02/010N	Producing Aircraft Detail Assemblies	2	14	65	L/504/6370
QPE02/011N	Preparing and Using Lathes for Turning Operations	2	15	68	Y/504/6372
QPE02/012N	Preparing and Using Milling Machines	2	15	68	K/504/6375
QPE02/013N	Preparing and Using Grinding Machines	2	15	68	T/504/6377
QPE02/014N	Preparing and Proving CNC Machine Tool Programs	2	14	64	F/504/6379
QPE02/015N	Preparing and Using CNC Turning Machines	2	14	64	F/504/6382
QPE02/016N	Preparing and Using CNC Milling Machines	2	14	64	L/504/6384
QPE02/017N	Preparing and Using CNC Machining Centres	2	14	64	D/504/6387
QPE02/018N	Preparing and Using Industrial Robots	2	14	64	D/504/6390
QPE02/019N	Maintaining Mechanical Devices and Equipment	2	14	64	T/504/6394
QPE02/020N	Assembling and Testing Fluid Power Systems	2	14	64	J/504/6397
QPE02/021N	Maintaining Fluid Power Equipment	2	14	64	F/504/6401
QPE02/022N	Producing Sheet Metal Components and Assemblies	2	14	64	J/504/6402
QPE02/023N	Producing Platework Components and Assemblies	2	14	64	L/504/6403
QPE02/024N	Cutting and Shaping Materials using Thermal Cutting Equipment	2	14	64	R/504/6404
QPE02/025N	Preparing and Proving CNC Fabrication Machine Tool Programs	2	14	64	Y/504/6405
QPE02/026N	Preparing and Using CNC Fabrication Machinery	2	14	64	D/504/6406
QPE02/027N	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, 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):**

**Learners must complete one of the following PEO Level 2 assessment routes**

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 from the following PEO Level 2 assessment routes:

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 from the following PEO Level 2 assessment routes:

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 B, learners must complete the unit requirements for one of the following Level 3 Engineering Toolmaking Pathways

## Group C

### Pathway ETA: Toolmaker

Optional assessment routes: All the following assessment routes must be taken:

QETM3/004	Assembling Press Tools	3	70	210	F/602/2562
QETM3/005	Assembling Injection Mould Tools	3	70	210	L/602/2564
QETM3/006	Assembling Blow Mould Tools	3	70	210	R/602/2565
QETM3/007	Assembling Vacuum Forming Tools	3	70	210	K/602/2569
QETM3/008	Assembling Dies	3	70	210	D/602/2570

Plus two assessment routes from the following:

QETM3/009	Producing/Finishing Mould, Press Tool or Die Components using Hand Fitting Techniques	3	70	210	H/602/2571
QETM3/010	Unit 10: Repairing or Modifying Mould, Press Tool or Die Components	3	70	210	L/602/2581
QETM3/011	Producing Mould, Press Tool or Die Components by Manual Machining	3	70	210	R/602/2582
QETM3/012	Checking that Toolroom Assemblies Comply with Specification	3	30	91	J/602/2644
QETM3/013	Handing Over and Confirming the Completion of Mould, Press Tool or Die Equipment	3	38	98	L/602/2645
QETM3/014	Preparing and Setting Power Presses	3	91	210	K/602/2653
QETM3/015	Trying Out and Proving Dies	3	70	210	M/602/2654
QETM3/016	Trying Out and Proving Injection Moulds	3	70	210	T/602/2655





## Pathway ETB: Toolroom CNC Machining

Optional assessment routes: One of the following assessment routes must be taken:

QETM3/017	Loading and Proving CNC Machine Tool Programs	3	24	91	Y/602/3006
QETM3/018	Carrying Out CNC Machine Tool Programming	3	84	231	H/602/3008

Plus one assessment route from the following:

QETM3/019	Producing Toolroom Components using CNC Turning Machines	3	66	140	J/602/2658
QETM3/020	Producing Toolroom Components using CNC Milling Machines	3	66	140	T/602/2672
QETM3/021	Producing Toolroom Components using CNC Grinding Machines	3	66	140	A/602/2673
QETM3/022	Producing Toolroom Components using CNC Laser Profiling Machines	3	66	140	F/602/2688
QETM3/023	Producing Toolroom Components using CNC Electro-Discharge Machines	3	66	140	F/602/2691
QETM3/024	Producing Toolroom Components using CNC Machining Centres	3	66	140	L/602/2693



## Pathway ETC: Mould, Tool and Die Equipment Maintenance

Optional assessment routes: All the following assessment routes must be taken:

QETM3/025	Carrying Out Fault Diagnosis on Mould, Press Tool or Die equipment	3	49	56	R/602/2694
QETM3/026	Maintaining Mould, Press Tool or Die Equipment	3	70	119	Y/602/2695
QETM3/027	Handing Over and Confirming the Completion of Mould, Press Tool or Die Equipment Maintenance Activities	3	38	98	D/602/2696

Plus two assessment routes from the following:

QETM3/010	Repairing or Modifying Mould, Press Tool or Die Components	3	70	210	L/602/2581
QETM3/011	Producing Mould, Press Tool or Die Components by Manual Machining	3	70	210	R/602/2582
QETM3/014	Preparing and Setting Power Presses	3	91	210	K/602/2653
QETM3/028	Carrying Out Condition Monitoring of Mould, Press Tool or Die Equipment	3	39	77	K/602/2698
QETM3/029	Carrying Out Planned Maintenance on Mould, Press Tool or Die Equipment	3	38	70	M/602/2699
QETM3/030	Carrying Out Planned Maintenance on Power Presses	3	70	119	D/602/2777

## Pathway ETD: Jig and Fixture Manufacture

Optional assessment routes: Three of the following assessment routes must be taken:

QETM3/031	Producing Jig and Fixture Components using Hand Fitting Techniques	3	70	210	J/602/2787
QETM3/032	Machining Components for Jigs and Fixtures	3	70	210	L/602/2788
QETM3/033	Fabricating Structural Components for Jigs and Fixtures	3	54	216	R/602/2789
QETM3/034	Assembling Jigs and Fixtures using Mechanical Methods	3	70	210	M/602/2802
QETM3/035	Assembling Jig and Fixture Structures using a Manual Welding Process	3	54	216	F/602/2805
QETM3/036	Carrying Out Repairs or Modifications to Jigs or Fixtures	3	70	210	L/602/2807
QETM3/012	Checking that Toolroom Assemblies Comply with Specification	3	30	91	J/602/2644

## Pathway ETE: Toolroom Manual Machining

Optional assessment routes: Any pair of the following assessment routes must be taken;

QETM3/037	Setting a Range of Machines to Produce Toolroom Components	3	164	378	Y/602/2809
QETM3/038	Machining Toolroom Components using a Range of Machines	3	139	294	H/602/2831
QETM3/039	Setting Centre Lathes to Produce Toolroom Components	3	91	210	T/602/2834
QETM3/040	Machining Toolroom Components using Centre Lathes	3	77	161	A/602/2835
QETM3/041	Setting Milling Machines to Produce Toolroom Components	3	91	210	J/602/2837
QETM3/042	Machining Toolroom Components using Milling Machines	3	77	161	F/602/2951
QETM3/043	Setting Electro-Discharge Machines to Produce Toolroom Components	3	91	210	L/602/2953
QETM3/044	Machining Toolroom Components using Electro-Discharge Machines	3	77	161	Y/602/2955
QETM3/045	Setting Grinding Machines to Produce Toolroom Components	3	91	210	D/602/2956
QETM3/046	Machining Toolroom Components using Grinding Machines	3	77	161	H/602/2957

