



Level 3 NVQ Diploma in

MECHANICAL MANUFACTURING ENGINEERING

Qualification Specification

Overview

A qualification designed to cover the skills and knowledge of a wide variety of mechanical manufacturing engineering activities such as machining, pipe fitting and assembly and spring making.

Typical Job

Engineering Craft/CNC Machinist, Manufacturing Production Planner, Mechanical Engineer, Mechanical Engineering Technician, Plastics Process Operative, Production Engineer.

Qualification code:	500/9852/4
Level:	3
Total qualification time:	790 Hours
Guided learning hours:	316
Minimum age	16

Issue 1.2

Purpose of the qualification

What does this qualification cover?

The qualification comprises of nine pathways – Machining, CNC Machining, Machine Tool Setting, Fitting and Assembly, Pipe Fitting and Assembly, Composite Manufacture Engineering, Mechanical Overhaul and Test, Spring Making and Photonics Engineering. From their chosen pathway, the learner is required to complete all three mandatory assessment routes, plus the required number of assessment route(s). It involves the skills and knowledge needed to do the job, ability to organise work and identify and prevent problems, which ensures the learner is competent in a particular task. The achievement will encourage an employee to value their contribution to the workplace, and it will develop their skills and potential. This qualification forms part of a Senta Apprenticeship.

Who supports this qualification?

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

What could this qualification lead to?

Progress onto other mechanical manufacturing engineering based qualifications such as:

- Any EAL Level 4 qualification
- Any EAL Level 3 Engineering qualification
- EAL Level 4 NVQ Diploma in Business Improvement Techniques
- EAL Level 3 Diploma in Mechanical Engineering Technology (Technical Certificate)
- EAL Level 4 Diploma in Engineering Leadership
- EAL Level 3 Diploma in Business Improvement Techniques
- EAL Level 3 NVQ Diploma in Mechanical Manufacturing Engineering.

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

This qualification can be obtained by following either one of the following pathways. The learner is required to complete the mandatory assessment routes, and may also be able to choose from a selection of optional assessment routes.

Pathway MMA: Machining

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

EAL code	Assessment route title	Level	Guided learning hours	Ofqual code
QMME3/001	Complying with Statutory Regulations and Organisational Safety Requirements	2	35	A/601/5013
QMME3/002	Using and Interpreting Engineering Data and Documentation	2	25	Y/601/5102
QMME3/003	Working Efficiently and Effectively in Engineering	3	25	K/601/5055

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

QMME3/004	Setting Centre Lathes for Production	3	210	T /600/5385
QMME3/005	Machining Components using Centre Lathes	3	161	A/600/5386
QMME3/006	Setting Turret Lathes for Production	3	210	F/600/5387
QMME3/007	Machining Components using Turret Lathes	3	161	J/600/5388
QMME3/008	Setting Milling Machines for Production	3	210	J/600/5391
QMME3/009	Machining Components using Milling Machines	3	161	L/600/5392
QMME3/010	Setting Shaping, Planing or Slotting Machines for Production	3	175	R/600/5393
QMME3/011	Machining Components using Shaping, Planing or Slotting Machines	3	126	Y/600/5394
QMME3/012	Setting Gear Cutting Machines for Production	3	210	D/600/5395
QMME3/013	Machining Components using Gear Cutting Machines	3	161	K/600/5397



QMME3/014	Setting Gear Grinding Machines for Production	3	210	M/600/5398
QMME3/015	Machining Components using Gear Grinding Machines	3	161	D/600/5400



QMME3/016	Setting Horizontal Boring Machines for Production	3	210	K/600/5402
QMME3/017	Machining Components using Horizontal Boring Machines	3	161	L/600/5411
QMME3/018	Setting Vertical Boring Machines for Production	3	210	F/600/5423
QMME3/019	Machining Components using Vertical Boring Machines	3	161	Y/600/5430
QMME3/020	Setting Electro-Discharge Machines for Production	3	210	H/600/5432
QMME3/021	Machining Components using Electro-Discharge Machines	3	161	L/600/5439
QMME3/022	Setting Grinding Machines for Production	3	210	M/600/5448
QMME3/023	Machining Components using Grinding Machines	3	161	Y/600/5458
QMME3/024	Setting Honing and Lapping Machines for Production	3	175	L/600/5473
QMME3/025	Machining Components using Honing and Lapping Machines	3	119	L/600/5487
QMME3/026	Setting Broaching Machines for Production	3	175	L/600/5490
QMME3/027	Machining Components using Broaching Machines	3	119	A/600/5503
QMME3/028	Setting Metal Spinning Machines for Production	3	175	D/600/5509
QMME3/029	Producing Components using Metal Spinning Machines	3	161	K/600/5514

Pathway MMB: CNC Machining

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

EAL code	Assessment route title	Level	Guided learning hours	Ofqual code
QMME3/001	Complying with Statutory Regulations and Organisational Safety Requirements	2	35	A/601/5013
QMME3/002	Using and Interpreting Engineering Data and Documentation	2	25	Y/601/5102
QMME3/003	Working Efficiently and Effectively in Engineering	3	25	K/601/5055

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

QMME3/030	Loading and Proving CNC Machine Tool Programs	3	91	L/600/5523
QMME3/031	Carrying Out CNC Machine Tool Programming	3	231	M/600/5529

Plus: One functional pair of the following assessment routes must be taken:

QMME3/032	Setting CNC Turning Machines for Production	3	140	H/600/5561
QMME3/033	Machining Components using CNC Turning Machines	3	126	F/600/5566
QMME3/034	Setting CNC Milling Machines for Production	3	140	R/600/5572
QMME3/035	Machining Components using CNC Milling Machines	3	126	K/600/5576
QMME3/036	Setting CNC Grinding Machines for Production	3	140	J/600/5584
QMME3/037	Machining Components using CNC Grinding Machines	3	126	R/600/5622
QMME3/038	Setting CNC Punching Machines for Production	3	140	K/600/5643
QMME3/039	Machining Components using CNC Punching Machines	3	126	T/600/5662
QMME3/040	Setting CNC Laser Profiling Machines for Production	3	140	R/600/5670
QMME3/041	Machining Components using CNC Laser Profiling Machines	3	126	H/600/5916

QMME3/042	Setting CNC Electro-Discharge Machines for Production	3	140	M/600/5921
QMME3/043	Machining Components using CNC Electro-Discharge Machines	3	126	F/600/5924
QMME3/044	Setting CNC Vertical Boring Machines for Production	3	140	R/600/5927
QMME3/045	Machining Components using CNC Vertical Boring Machines	3	126	Y/600/5928
QMME3/046	Setting CNC Horizontal Boring Machines for Production	3	140	K/600/5951
QMME3/047	Machining Components using CNC Horizontal Boring Machines	3	126	K/600/5965
QMME3/048	Setting CNC Gear Cutting Machines for Production	3	140	L/600/5974
QMME3/049	Machining Components using CNC Gear Cutting Machines	3	126	D/600/5980
QMME3/050	Setting CNC Machining Centres for Production	3	140	L/600/5991
QMME3/051	Machining Components using CNC Machining Centres	3	126	D/600/5994

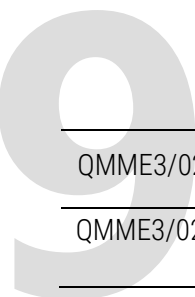
Pathway MMC: Machine Tool Setting

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

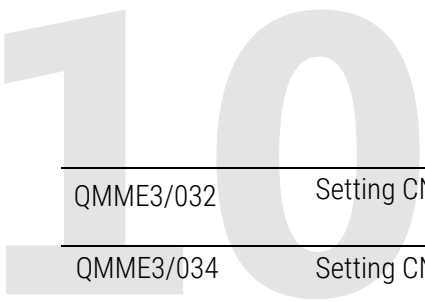
EAL code	Assessment route title	Level	Guided learning hours	Ofqual code
QMME3/001	Complying with Statutory Regulations and Organisational Safety Requirements	2	35	A/601/5013
QMME3/002	Using and Interpreting Engineering Data and Documentation	2	25	Y/601/5102
QMME3/003	Working Efficiently and Effectively in Engineering	3	25	K/601/5055
QMME3/052	Handing Over Machine Tools to Production Operators	3	98	A/600/5436

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

QMME3/053	Setting Capstan and Turret Lathes for Production	3	210	Y/600/5444
QMME3/054	Setting Single-Spindle Automatic Turning Machines for Production	3	210	K/600/5450
QMME3/055	Setting Multi-Spindle Automatic Turning Machines for Production	3	161	T/600/5452
QMME3/056	Setting Single and Multi-Spindle Drilling Machines for Production	3	161	J/600/5455
QMME3/057	Setting Tool and Cutter Grinding Machines for Production	3	161	Y/600/5461
QMME3/058	Setting Special-Purpose Machines for Production	3	210	D/600/5462
QMME3/059	Setting Power Presses for Production	3	210	A/600/5467
QMME3/008	Setting Milling Machines for Production	3	210	J/600/5391
QMME3/022	Setting Grinding Machines for Production	3	210	M/600/5448
QMME3/010	Setting Shaping, Planing or Slotting Machines for Production	3	175	R/600/5393
QMME3/012	Setting Gear Cutting Machines for Production	3	210	D/600/5395
QMME3/014	Setting Gear Grinding Machines for Production	3	210	M/600/5398
QMME3/020	Setting Electro-Discharge Machines for Production	3	210	H/600/5432



QMME3/024	Setting Honing and Lapping Machines for Production	3	175	L/600/5473
QMME3/026	Setting Broaching Machines for Production	3	175	L/600/5490



QMME3/032	Setting CNC Turning Machines for production	3	140	H/600/5561
QMME3/034	Setting CNC Milling Machines for Production	3	140	R/600/5572
QMME3/036	Setting CNC Grinding Machines for Production	3	140	J/600/5584
QMME3/038	Setting CNC Punching Machines for Production	3	140	K/600/5643
QMME3/040	Setting CNC Laser Profiling Machines for Production	3	140	R/600/5670
QMME3/042	Setting CNC Electro-Discharge Machines for Production	3	140	M/600/5921
QMME3/048	Setting CNC Gear Cutting Machines for Production	3	140	L/600/5974
QMME3/050	Setting CNC Machining Centers for Production	3	140	L/600/5991

Pathway MMD: Fitting and Assembly

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

EAL code	Assessment route title	Level	Guided learning hours	Ofqual code
QMME3/001	Complying with Statutory Regulations and Organisational Safety Requirements	2	35	A/601/5013
QMME3/002	Using and Interpreting Engineering Data and Documentation	2	25	Y/601/5102
QMME3/003	Working Efficiently and Effectively in Engineering	3	25	K/601/5055

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

QMME3/060	Producing Components using Hand Fitting Techniques	3	210	A/600/5470
QMME3/061	Assembling Mechanical Products	3	210	J/600/5472
QMME3/062	Producing Components by Manual Machining	3	210	H/600/5477
QMME3/063	Fitting Fluid Power Components to Mechanical Assemblies	3	161	H/600/5480
QMME3/064	Fitting Pipework Systems to Mechanical Assemblies	3	161	F/600/5485
QMME3/065	Fitting Electrical/Electronic Components to Mechanical Assemblies	3	161	R/600/5488
QMME3/066	Producing Power Turbine Combustion Assemblies	3	210	Y/600/5492
QMME3/067	Producing Power Turbine Compressor Assemblies	3	210	A/600/5498
QMME3/068	Producing Turbine Assemblies	3	210	F/600/5504
QMME3/069	Producing Power Turbine Gearbox Assemblies	3	210	R/600/5510
QMME3/070	Producing Power Turbine Major Assemblies	3	210	M/600/5515
QMME3/071	Producing Piston Engine Assemblies	3	210	J/600/5522
QMME3/072	Repairing and Modifying Mechanical Assemblies	3	210	H/600/5527
QMME3/073	Checking that Completed Assemblies Comply with Specification	3	91	L/600/5537

Pathway MME: Pipe Fitting and Assembly

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

EAL code	Assessment route title	Level	Guided learning hours	Ofqual code
QMME3/001	Complying with Statutory Regulations and Organisational Safety Requirements	2	35	A/601/5013
QMME3/002	Using and Interpreting Engineering Data and Documentation	2	25	Y/601/5102
QMME3/003	Working Efficiently and Effectively in Engineering	3	25	K/601/5055

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

QMME3/074	Pipe Bending and Forming by Hand Methods	3	150	Y/600/5542
QMME3/075	Pipe Bending and Forming using Bending Machines	3	150	T/600/5547

Plus: Two of the following assessment routes must be taken:

QMME3/076	Assembling Screwed Pipework	3	91	L/600/5554
QMME3/077	Assembling Small Bore Non-Ferrous Pipework	3	91	D/600/5557
QMME3/078	Assembling Non-Metallic Pipework	3	91	K/600/5562
QMME3/079	Preparing and Testing Pipework Systems	3	150	J/600/5567
QMME3/080	Producing Socket and Flange Fillet Welded Joints in Pipe using a Manual Welding Process	3	210	L/600/5571

Pathway MMF: Composite Manufacture Engineering

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

EAL code	Assessment route title	Level	Guided learning hours	Ofqual code
QMME3/001	Complying with Statutory Regulations and Organisational Safety Requirements	2	35	A/601/5013
QMME3/002	Using and Interpreting Engineering Data and Documentation	2	25	Y/601/5102
QMME3/003	Working Efficiently and Effectively in Engineering	3	25	K/601/5055

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

QMME3/081	Producing Composite Mouldings using Pre-Preg Laminating Techniques	3	210	D/600/5574
QMME3/082	Producing Composite Mouldings using Wet Lay-up Techniques	3	210	T/600/5578
QMME3/083	Producing Composite Assemblies	3	210	M/600/5580

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

QMME3/081	Producing Composite Mouldings using Pre-Preg Laminating Techniques	3	210	D/600/5574
QMME3/082	Producing Composite Mouldings using Wet Lay-up Techniques	3	210	T/600/5578
QMME3/083	Producing Composite Assemblies	3	210	M/600/5580
QMME3/084	Bonding Composite Mouldings	3	91	F/600/5583
QMME3/085	Repairing Composite Mouldings	3	161	Y/600/5587
QMME3/086	Applying Finishes to Composite Mouldings	3	150	D/600/5588
QMME3/087	Trimming Composite Mouldings using Hand Tools	3	150	K/600/5593
QMME3/088	Identifying Defects in Composite Mouldings	3	91	A/600/5596

Note: Two different assessment routes must be taken.

Pathway MMH: Mechanical Overhaul and Test

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

EAL code	Assessment route title	Level	Guided learning hours	Ofqual code
QMME3/001	Complying with Statutory Regulations and Organisational Safety Requirements	2	35	A/601/5013
QMME3/002	Using and Interpreting Engineering Data and Documentation	2	25	Y/601/5102
QMME3/003	Working Efficiently and Effectively in Engineering	3	25	K/601/5055

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

QMME3/100	Slinging, Lifting and Moving Equipment, Components or Materials for Overhauling Activities	3	89	T/600/5600
QMME3/101	Dismantling Mechanical Equipment in Preparation for Overhaul	3	161	R/600/5605
QMME3/102	Checking Mechanical Components for Serviceability During Overhauling Activities	3	89	H/600/5611
QMME3/103	Carrying Out Non-Destructive Flaw Detection on Components During Overhauling Activities	3	89	A/600/5615
QMME3/104	Restoring Mechanical Components to Usable Condition by Repair	3	161	R/600/5619
QMME3/105	Producing Replacement Components for Overhauling Activities	3	161	D/600/5624
QMME3/106	Checking that Overhauled Mechanical Assemblies Comply with Specification	3	91	A/600/5629

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

QMME3/107	Overhauling Industrial Power Turbines by Module Replacement	3	210	T/600/5631
QMME3/108	Overhauling Industrial Power Turbine Compressor Assemblies	3	210	R/600/5636
QMME3/109	Overhauling Industrial Power Turbine Combustion Assemblies	3	210	Y/600/5640
QMME3/110	Overhauling Turbine Assemblies from Industrial Power Turbines	3	210	A/600/5646
QMME3/111	Overhauling Piston Engines	3	210	F/600/5650
QMME3/112	Overhauling Gearbox Assemblies	3	210	Y/600/5654
QMME3/113	Overhauling Industrial Clutch and Brake Assemblies	3	161	K/600/5657

QMME3/114	Overhauling Pump Assemblies	3	161	F/600/5468
QMME3/115	Overhauling Valve Assemblies	3	161	K/600/5478
QMME3/116	Overhauling Components of Hydraulic Equipment	3	161	J/600/5486
QMME3/117	Overhauling Components of Pneumatic, Vacuum or Compressed Air Equipment	3	161	D/600/5493
QMME3/118	Carrying Out Tests on Overhauled Industrial Power Turbines	3	210	K/600/5500
QMME3/119	Carrying Out Tests on Overhauled Piston Engines (Fixed Dynamometer)	3	210	D/600/5512

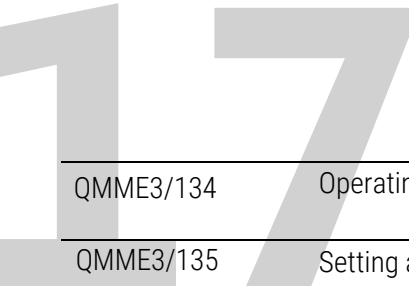
Pathway MMI: Spring Making

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

EAL code	Assessment route title	Level	Guided learning hours	Ofqual code
QMME3/001	Complying with Statutory Regulations and Organisational Safety Requirements	2	35	A/601/5013
QMME3/002	Using and Interpreting Engineering Data and Documentation	2	25	Y/601/5102
QMME3/003	Working Efficiently and Effectively in Engineering	3	25	K/601/5055

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

QMME3/120	Making Compression Springs using Hand Forming Methods	3	150	F/600/5521
QMME3/121	Making Torsion Springs using Hand Forming Methods	3	150	K/600/5531
QMME3/122	Making Extension Springs using Hand Forming Methods	3	150	Y/600/5539
QMME3/123	Making Spring Wire Forms using Hand Forming Methods	3	150	A/600/5548
QMME3/124	Grinding Spring Ends by Hand	3	57	D/600/5560
QMME3/125	Setting Automatic Cold Wire Compression Spring Making Machines for Production	3	150	H/600/5575
QMME3/126	Setting Automatic Cold Wire Torsion Spring Making Machines for Production	3	150	L/600/5635
QMME3/127	Setting Automatic Cold Wire Extension Spring Making Machines for Production	3	150	J/600/5648
QMME3/128	Setting Automatic Spring Making Machines for the Production of Clock, Power, Scroll and Volute Springs	3	150	R/600/5653
QMME3/129	Setting Automatic Cold Wire Forming Machines to Produce Spring Wire Forms	3	150	M/600/5661
QMME3/130	Setting Automatic Hot Wire Compression Spring Making Machines for Production	3	150	D/600/5672
QMME3/131	Setting Automatic Spring End Grinding Machines for Production	3	60	L/600/5683
QMME3/132	Programming CNC Spring Making Machines	3	231	H/600/5687
QMME3/133	Setting CNC Spring Making Machines for Production	3	150	H/600/5690



QMME3/134	Operating CNC Spring Making Machines	3	91	T/600/5693
QMME3/135	Setting and Using a Fly Press for Spring Making Activities	3	91	F/600/5695

QMME3/136	Making Strip Spring Components using Shearing Machines	3	91	Y/600/5699
QMME3/137	Forming Strip Spring Components using Power Rolling Machines	3	91	L/600/5702
QMME3/138	Bending Strip Spring Components using Press Brakes	3	91	Y/600/5704
QMME3/139	Forming Strip Spring Components using Power Presses	3	91	M/600/5708
QMME3/140	Drilling and Finishing Holes in Strip Spring Components	3	57	M/600/5711
QMME3/141	Using Heat to Assist with the Bending and Forming of Spring Components	3	57	L/600/5716
QMME3/142	Carrying Out Heat Treatment of Springs	3	91	D/600/5719
QMME3/143	Carrying Out Shot Peening of Springs	3	91	H/600/5723
QMME3/144	Carrying Out Quality Control of Spring Making Activities	3	150	M/600/5725
QMME3/145	Manufacturing One-Off Tooling for Spring Making Activities	3	161	M/600/5739
QMME3/146	Setting and Operating CNC Laser Profiling Machines for Strip Spring Making	3	161	A/600/5744

Pathway MMJ: Photonics Engineering

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

EAL code	Assessment route title	Level	Guided learning hours	Ofqual code
QMME3/001	Complying with Statutory Regulations and Organisational Safety Requirements	2	35	A/601/5013
QMME3/002	Using and Interpreting Engineering Data and Documentation	2	25	Y/601/5102
QMME3/003	Working Efficiently and Effectively in Engineering	3	25	K/601/5055

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

QMME3/150	Machining Infra-Red/Special Material Lenses	3	161	J/600/5746
QMME3/151	Machining Optical Glass Lenses	3	161	R/600/5751
QMME3/152	Machining Optical Prism and Flat Components	3	161	H/600/5754
QMME3/153	Setting CNC Aspheric Glass and Diamond Turning Machines	3	175	A/600/5758
QMME3/154	Machining Components using CNC Aspheric Glass and Diamond Turning Machines	3	150	F/600/5762
QMME3/155	Setting CNC Optical Grinding and Polishing Machines for Production	3	175	Y/600/5766
QMME3/156	Machining Components using CNC Optical Grinding and Polishing Machines	3	150	D/600/5770
QMME3/157	Machining Optical Cylinders and Domes	3	161	J/600/5813
QMME3/158	Machining Optical Plastic Components	3	161	L/600/5814
QMME3/159	Polishing and Smoothing of Lens or Mirror Surfaces	3	161	R/600/5815
QMME3/160	Vacuum Coating Optical Materials	3	91	Y/600/5816
QMME3/161	Inspecting Optical Components using Mechanical Instruments	3	91	D/600/5817
QMME3/162	Inspecting Optical Components using Co-ordinate Measuring Machines (CMM)	3	150	K/600/5819
QMME3/163	Carrying Out Laser/Optic Metrology	3	150	D/600/5820
QMME3/164	Terminating Fibre-Optic Cables	3	91	K/600/5822

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QMME3/165	Building Optical Systems	3	175	M/600/5823
QMME3/166	Performing Laser Optical System Alignment	3	150	F/600/5826

QMME3/167	Aligning and Setting Up Holographic Equipment	3	161	J/600/5827
QMME3/168	Following Clean Room/Clean Work Area Protocols	3	57	R/600/5829

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