

600/3428/2 - ETCAL Level 3 NVQ Diploma in Mechanical Manufacturing Engineering (QCF)

1 Introduction to the Qualification

1.1 Who is the qualification for?

- This qualification has been designed to cover those learners who are:
 - employed but require additional engineering competencies as part of an existing job role or to enable career progression.

1.2 Learner entry requirements

There are no formal entry requirements for learners undertaking this qualification. However, centres must ensure that learners have the potential and opportunity to gain the qualification successfully.

1.3 Age restrictions

This qualification is not approved for use by learners under the age of 16, and ETA cannot accept any registrations for learners in this age group.

1.4 What does the qualification cover?

- Mandatory units cover those areas which have a common approach such as organisational safety requirements, team working and using technical information
- There are XX optional pathways, offering a choice of units applicable to individual workplaces and working environments

2 Qualification Structure

Learners must achieve a minimum of 79 credits to gain the qualification. 15 credits must be achieved by completing the 3 mandatory units and the remaining credits achieved by completing the unit requirements from the selected pathway.

Mandatory Units – all units must be completed

Ofqual code	Unit Title	Level	CV	GLH
A/601/5013	Complying with Statutory Regulations and Organisational Safety Requirements	2	5	35
Y/601/5102	Using and Interpreting Engineering Data and Documentation	2	5	25
K/601/5055	Working Efficiently and Effectively in Engineering	3	5	25

Machining Optional Pathway – any functional pair of units must be selected from the following.

Ofqual code	Unit Title	Level	CV	GLH
T/600/5385	Setting Centre Lathes for Production	3	91	210
A/600/5386	Machining Components using Centre Lathes	3	77	161
F/600/5387	Setting Turret Lathes for Production	3	91	210
J/600/5388	Machining Components using Turret Lathes	3	77	161
J/600/5391	Setting Milling Machines for Production	3	91	210
L/600/5392	Machining Components using Milling Machines	3	77	161
R/600/5393	Setting Shaping, Planning or Slotting Machines for Production	3	78	175
Y/600/5394	Machining Components using Shaping, Planning or Slotting Machines	3	69	126
D/600/5395	Setting Gear Cutting Machines for Production	3	91	210
K/600/5397	Machining Components using Gear Cutting Machines	3	77	161
M/600/5398	Setting Gear Grinding Machines for Production	3	91	210
D/600/5400	Machining Components using Gear Grinding Machines	3	77	161
K/600/5402	Setting Horizontal Boring Machines for Production	3	91	210
L/600/5411	Machining Components using Horizontal Boring Machines	3	77	161
F/600/5423	Setting Vertical Boring Machines for Production	3	91	210
Y/600/5430	Machining Components using Vertical Boring Machines	3	77	161

H/600/5432	Setting Electro-Discharge Machines for Production	3	91	210
L/600/5439	Machining Components using Electro-Discharge Machines	3	77	161
M/600/5448	Setting Grinding Machines for Production	3	91	210
Y/600/5458	Machining Components using Grinding Machines	3	77	161
L/600/5473	Setting Honing and Lapping Machines for Production	3	78	175
L/600/5487	Machining Components using Honing and Lapping Machines	3	33	119
L/600/5490	Setting Broaching Machines for Production	3	78	125
A/600/5503	Machining Components using Broaching Machines	3	33	119
D/600/5509	Setting Metal Spinning Machines for Production	3	78	175
K/600/5514	Producing Components using Metal Spinning Machines	3	77	161
CNC Machining Optional Pathway – one of the following units must be selected.				
L/600/5523	Loading and Proving CNC Machine Tool Programs	3	24	91
M/600/5529	Carrying Out CNC Machine Tool Programming	3	84	231
CNC Machining Optional Pathway – plus any functional pair of units must be selected from the following.				
H/600/5561	Setting CNC Turning Machines for Production	3	70	140
F/600/5566	Machining Components using CNC Turning Machines	3	63	126
R/600/5572	Setting CNC Milling Machines for Production	3	70	140
K/600/5576	Machining Components using CNC Milling Machines	3	63	126
J/600/5584	Setting CNC Grinding Machines for Production	3	70	140

R/600/5622	Machining Components using CNC Grinding Machines	3	63	126
K/600/5643	Setting CNC Punching Machines for Production	3	70	140
T/600/5662	Machining Components using CNC Punching Machines	3	63	126
R/600/5670	Setting CNC Laser Profiling Machines for Production	3	70	140
H/600/5916	Machining Components using CNC Laser Profiling Machines	3	63	126
M/600/5921	Setting CNC Electro-Discharge Machines for Production	3	70	140
F/600/5924	Machining Components using CNC Electro-Discharge Machines	3	63	126
R/600/5927	Setting CNC Vertical Boring Machines for Production	3	70	140
Y/600/5928	Machining Components using CNC Vertical Boring Machines	3	63	126
K/600/5951	Setting CNC Horizontal Boring Machines for Production	3	70	140
K/600/5965	Machining Components using CNC Horizontal Boring Machines	3	63	126
L/600/5974	Setting CNC Gear Cutting Machines for Production	3	70	140
D/600/5980	Machining Components using CNC Gear Cutting Machines	3	63	126
L/600/5991	Setting CNC Machining Centres for Production	3	70	140
D/600/5994	Machining Components using CNC Machining Centres	3	63	126
Machine Tool Setting Mandatory Pathway – this unit must be selected.				
A/600/5436	Handing Over Machine Tools to Production Operators	3	38	98
Machine Tool Setting Optional Pathway – plus one more unit must be selected from the following.				

Y/600/5444	Setting Capstan and Turret Lathes for Production	3	91	210
K/600/5450	Setting Single-Spindle Automatic Turning Machines for Production	3	91	210
T/600/5452	Setting Multi-Spindle Automatic Turning Machines for Production	3	77	161
J/600/5455	Setting Single and Multi-Spindle Drilling Machines for Production	3	77	161
Y/600/5461	Setting Tool and Cutter Grinding Machines for Production	3	77	161
D/600/5462	Setting Special-Purpose Machines for Production	3	91	210
A/600/5467	Setting Power Presses for Production	3	91	210
J/600/5391	Setting Milling Machines for Production	3	91	210
M/600/5448	Setting Grinding Machines for Production	3	91	210
R/600/5393	Setting Shaping, Planing or Slotting Machines for Production	3	78	175
D/600/5395	Setting Gear Cutting Machines for Production	3	91	210
M/600/5398	Setting Gear Grinding Machines for Production	3	91	210
H/600/5432	Setting Electro-Discharge Machines for Production	3	91	210
L/600/5473	Setting Honing and Lapping Machines for Production	3	78	175
L/600/5490	Setting Broaching Machines for Production	3	78	175
H/600/5561	Setting CNC Turning Machines for production	3	70	140
R/600/5572	Setting CNC Milling Machines for Production	3	70	140
J/600/5584	Setting CNC Grinding Machines for Production	3	70	140
K/600/5643	Setting CNC Punching Machines for Production	3	70	140
R/600/5670	Setting CNC Laser Profiling Machines for Production	3	70	140
M/600/5921	Setting CNC Electro-Discharge Machines for Production	3	70	140
L/60/5974	Setting CNC Gear Cutting Machines for Production	3	70	140
L/600/5991	Setting CNC Machining Centers for Production	3	70	140

Fitting and Assembly Optional Pathway – three units must be selected from the following.

A/600/5470	Producing Components using Hand Fitting Techniques	3	70	210
J/600/5472	Assembling Mechanical Products	3	70	210
H/600/5477	Producing Components by Manual Machining	3	70	210
H/600/5480	Fitting Fluid Power Components to Mechanical Assemblies	3	60	161
F/600/5485	Fitting Pipework Systems to Mechanical Assemblies	3	60	161
R/600/5488	Fitting Electrical/Electronic Components to Mechanical Assemblies	3	60	161
Y/600/5492	Producing Power Turbine Combustion Assemblies	3	70	210
A/600/5498	Producing Power Turbine Compressor Assemblies	3	70	210
F/600/5504	Producing Turbine Assemblies	3	70	210
R/600/5510	Producing Power Turbine Gearbox Assemblies	3	70	210
M/600/5515	Producing Power Turbine Major Assemblies	3	70	210
J/600/5522	Producing Piston Engine Assemblies	3	70	210
H/600/5527	Repairing and Modifying Mechanical Assemblies	3	70	210
L/600/5537	Checking that Completed Assemblies Comply with Specification	3	30	91
Pipe Fitting and Assembly Optional Pathway – one unit must be selected from the following.				
Y/600/5542	Pipe Bending and Forming by Hand Methods	3	46	150
T/600/5547	Pipe Bending and Forming using Bending Machines	3	46	150
Pipe Fitting and Assembly Optional Pathway – plus two more units must be selected from the following.				
L/600/5554	Assembling Screwed Pipework	3	30	91
D/600/5557	Assembling Small Bore Non-Ferrous Pipework	3	30	91
K/600/5562	Assembling Non-Metallic Pipework	3	30	91
J/600/5567	Preparing and Testing Pipework Systems	3	46	150
L/600/5571	Producing Socket and Flange Fillet Welded Joints in Pipe using a Manual Welding Process	3	86	210

Composite Manufacture Engineering Optional Pathway – one unit must be selected from the following.

D/600/5574	Producing Composite Mouldings using Pre-Preg Laminating Techniques	3	86	210
T/600/5578	Producing Composite Mouldings using Wet lay-up Techniques	3	86	210
M/600/5580	Producing Composite assemblies	3	86	210

Composite Manufacture Engineering Optional Pathway – plus one more unit must be selected from the following.

Note: D/600/5574, T/600/5578, M/600/5580 can only be selected once.

D/600/5574	Producing Composite Mouldings using Pre-Preg Laminating Techniques	3	86	210
T/600/5578	Producing Composite Mouldings using Wet Lay-up Techniques	3	86	210
M/600/5580	Producing Composite Assemblies	3	86	210
F/600/5583	Bonding Composite Mouldings	3	30	91
Y/600/5587	Repairing Composite Mouldings	3	77	161
D/600/5588	Applying Finishes to Composite Mouldings	3	46	150
K/600/5593	Trimming Composite Mouldings using Hand Tools	3	46	150
A/600/5596	Identifying Defects in Composite Mouldings	3	30	91

Mechanical Overhaul and Test Optional Pathway – two units must be selected from the following.

T/600/5600	Slinging, Lifting and Moving Equipment, Components or Materials for Overhauling Activities	3	24	89
R/600/5605	Dismantling Mechanical Equipment in Preparation for Overhaul	3	49	161
H/600/5611	Checking Mechanical Components for Serviceability During Overhauling Activities	3	24	89
A/600/5615	Carrying Out Non-Destructive Flaw Detection on Components During Overhauling Activities	3	24	89
R/600/5619	Restoring Mechanical Components to Usable Condition by Repair	3	49	161
D/600/5624	Producing Replacement Components for Overhauling Activities	3	49	161
A/600/5629	Checking that Overhauled Mechanical Assemblies Comply with Specification	3	30	91

Mechanical Overhaul and Test Optional Pathway – plus one more unit must be selected from the following.

T/600/5631	Overhauling Industrial Power Turbines by Module Replacement	3	86	210
R/600/5636	Overhauling Industrial Power Turbine Compressor Assemblies	3	86	210
Y/600/5640	Overhauling Industrial Power Turbine Combustion Assemblies	3	86	210
A/600/5646	Overhauling Turbine Assemblies from Industrial Power Turbines	3	86	210
F/600/5650	Overhauling Piston Engines	3	86	210
Y/600/5654	Overhauling Gearbox Assemblies	3	86	210
K/600/5657	Overhauling Industrial Clutch and Brake Assemblies	3	77	161
F/600/5468	Overhauling Pump Assemblies	3	77	161
K/600/5478	Overhauling Valve Assemblies	3	77	161
J/600/5486	Overhauling Components of Hydraulic Equipment	3	77	161
D/600/5493	Overhauling Components of Pneumatic, Vacuum or Compressed Air Equipment	3	77	161
K/600/5500	Carrying Out Tests on Overhauled Industrial Power Turbines	3	70	210
D/600/5512	Carrying out Tests on Overhauled Piston Engines (Fixed Dynamometer)	3	70	210

Spring Making Optional Pathway – four units must be selected from the following.

F/600/5521	Making Compression Springs using Hand Forming Methods	3	46	150
K/600/5531	Making Torsion Springs using Hand Forming Methods	3	46	150
Y/600/5539	Making Extension Springs using Hand Forming Methods	3	46	150
A/600/5548	Making Spring Wire Forms using Hand Forming Methods	3	46	150
D/600/5560	Grinding Spring Ends by Hand	3	16	57
H/600/5575	Setting Automatic Cold Wire Compression Spring Making Machines for Production	3	46	150
L/600/5635	Setting Automatic Cold Wire Torsion Spring Making Machines for Production	3	46	150
J/600/5648	Setting Automatic Cold Wire Extension Spring Making Machines for Production	3	46	150

R/600/5643	Setting Automatic Spring Making Machines for Production of Clock, Power, Scroll and Volute Springs	3	46	150
M/600/5661	Setting Automatic Cold Wire Forming Machines to Produce Spring Wire Forms	3	46	150
D/600/5672	Setting Automatic Hot Wire Compression Spring Making Machines for Production	3	46	150
L/600/5683	Setting Automatic Spring End Grinding Machines for Production	3	16	60
H/600/5687	Programming CNC Spring Making Machines	3	84	231
H/600/5690	Setting CNC Spring Making Machines	3	46	150
T/600/5693	Operating CNC Spring Making Machines	3	30	91
F/600/5695	Setting and Using a Fly Press for Spring Making Activities	3	30	91
Y/600/5699	Making Strip Spring Components using Shearing Machines	3	30	91
L/600/5702	Forming Strip Spring Components using Power Rolling Machines	3	30	91
Y/600/5704	Bending Strip Spring Components using Press Brakes	3	30	91
M/600/5708	Forming Strip Spring Components using Power Press	3	30	91
M/600/5711	Drilling and Finishing Holes in Strip Spring Components	3	16	57
L/600/5716	Using Heat to Assist with the Bending and Forming of Spring Components	3	16	57
D/600/5719	Carrying Out Heat Treatment of Springs	3	30	91
H/600/5723	Carrying Out Shot Peening of Springs	3	30	91
M/600/5725	Carrying Out Quality Control of Spring Making Activities	3	46	150
M/600/5739	Manufacturing One-Off Tooling for Spring Making Activities	3	77	161
A/600/5744	Setting and Operating CNC Laser Profiling Machines for Strip Spring Making	3	77	161
Photonics Engineering Optional Pathway – three units must be selected from the following.				
J/600/5746	Machining Infra-Red/Special Material Lenses	3	77	161
R/600/5751	Machining Optical Glass Lenses	3	77	161
H/600/5754	Machining Optical Prism and Flat Components	3	77	161

A/600/5758	Setting CNC Aspheric Glass and Diamond Turning Machines	3	78	175
F/600/5762	Machining Components using CNC Aspheric Glass and Diamond Turning Machines	3	46	150
Y/600/5766	Setting CNC Optical Grinding and Polishing Machines for Production	3	78	175
D/600/5770	Machining Components using CNC Optical Grinding and Polishing Machines	3	46	150
J/600/5813	Machining Optical Cylinders and Domes	3	77	161
L/600/5814	Machining Optical Plastic Components	3	77	161
R/600/5815	Polishing and Smoothing of Lens or Mirror Surfaces	3	77	161
Y/600/5816	Vacuum Coating Optical Materials	3	30	91
D/600/5817	Inspecting Optical Components using Mechanical Instruments	3	30	91
K/600/5819	Inspecting Optical Components using Co-ordinate Measuring Machines (CMM)	3	46	150
D/600/5820	Carrying Out Laser/Optic Metrology	3	46	150
K/600/5822	Terminating Fiber-Optic Cables	3	30	91
M/600/5823	Building Optical Systems	3	78	175
F/600/5826	Performing Laser Optical System Alignment	3	46	150
J/600/5827	Aligning and Setting Up Holographic Equipment	3	77	161
R/600/5829	Following Clean Room/Clean Work Area Protocols	3	16	57

2.1 Unit requirements are available as a separate document

2.2 Unit Endorsement

These units are endorsed by the Sector Skills Council for Science, Engineering and Manufacturing Technologies (SEMTA).

3 Centre & Qualification Approval

Centres wishing to offer the qualification will need to gain ETA's approval to do so. Current ETA centres can do this via Quartz Web. For non ETA Centres to gain approval to run the qualification please provide your details via <http://quartz.etawards/quartz-system.com> and the ETA team will start the process of approval.

4 Resource Requirements

4.1 Assessors

Assessment must be carried out by competent assessors who hold, or are working towards, a current assessor qualification. 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.

Assessors must be able to demonstrate that they have relevant and sufficient technical competence to evaluate and judge performance and knowledge evidence of this qualification, the units being taken and the associated assessment criteria. This will be demonstrated either by holding a relevant technical qualification or by proven experience in the learner's industry. The assessor's competence must, at the very least, be at the same level as that required of the learner in the assessment so that they are able to demonstrate the skills needed.

4.2 Internal Quality Assurance Advisors

Internal quality assurance (IQA) must be carried out by competent quality assurers who should hold or be working towards, a current internal quality assurance qualification. 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.

Persons carrying out the role of internal quality assurance will also be expected to be fully conversant with the ETA requirements for IQA in centres. These are detailed in the centre manual.

IQAAs must be able to demonstrate that they have relevant and sufficient technical competence to understand performance and knowledge evidence of this qualification, the units being taken and the associated assessment criteria. This will be demonstrated either by holding a relevant technical qualification or by proven experience in the learner's industry. The IQAA's competence must be sufficient to recognise what constitutes acceptable performance, knowledge and understanding as required by this qualification.

4.3 External Quality Assurance Advisors

ETA will appoint an appropriately qualified person to provide advice and guidance to the centre team and act as their external quality assurance advisor (EQAA).

External quality assurance (EQA) must be carried out by competent quality assurers who should hold, or be working towards, a current external quality assurance qualification. 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.

EQAAs must be able to demonstrate that they have relevant and sufficient technical competence to recognise performance and knowledge evidence of this qualification as required by the units being taken and the associated assessment criteria.

4.4 Assessment environment

The evidence of a learner's competence, knowledge and understanding for this qualification can only be regarded as valid, reliable, sufficient and authentic if demonstrated in a real working environment.