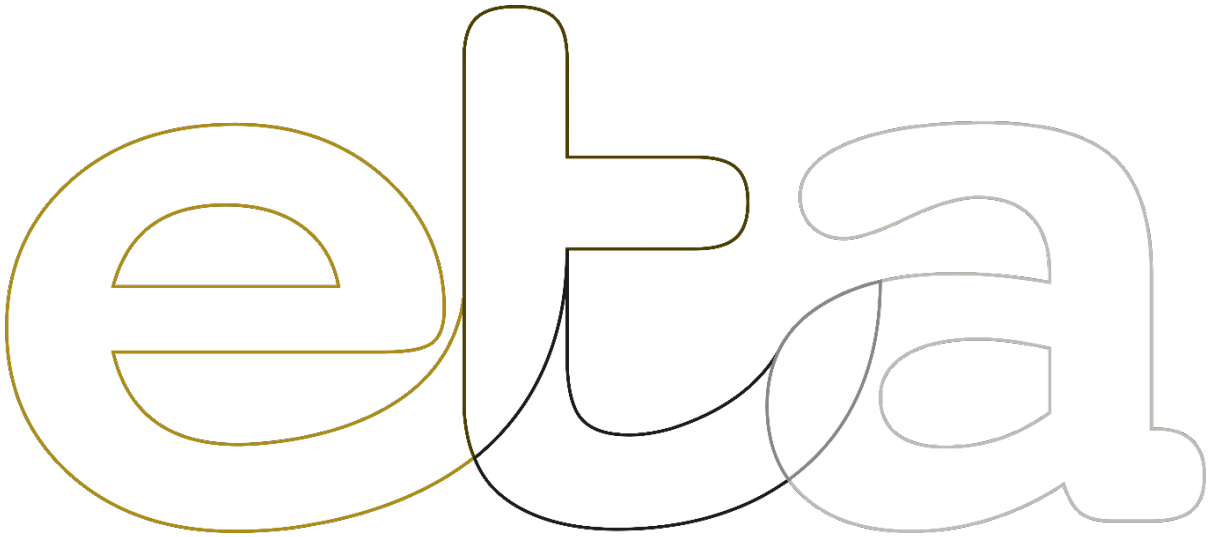

ETCAL Level 3 NVQ Diploma in Mechanical Manufacturing Engineering
600/3428/2
Structure

Qualification aim

This qualification is designed to support those learners training in Mechanical Manufacturing Engineering, however, it is also available for individuals who are not following an apprenticeship. It provides a structured individualised route with knowledge and skills for those who wish to achieve a qualification in Mechanical Manufacturing Engineering.

Qualification introduction

This qualification is made up of 3 mandatory units that will help learners to develop an understanding of the knowledge and skills required as relevant to their capabilities and aspirations. Its mandatory units form a foundation to extend the understanding and skills in specific areas through the optional routes. In addition to these learners are required to achieve additional units selected from a suite of 9 Pathways and in accordance with the achievement definition. Learners who complete the qualification will be equipped with the knowledge and skills to underpin career development within the industry.

Assessment

In order to achieve this qualification a learner must complete all units as mandatory. The assessment criteria determine the standard required to achieve each unit and allow for a variety of assessment methods to be used as appropriate to the environment the qualification is delivered in. There is no examined assessment element in this qualification.

Achievement

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 required optional units from the suite of Pathways.

Qualification Number		600/3428/2
Qualification Framework		RQF
Title		ETCAL Level 3 NVQ Diploma in Mechanical Manufacturing Engineering
Qualification Level		Level 3
Total Qualification Time		790 TQT
Guided Learning Hours		316 GLH
Qualification Credit Value		79 Credits
Qualification Grading Structure		Pass / Fail

Unit Title	Mandatory/Optional	GLH	TQT	Credit Value	Grading
Mandatory Group – all units must be completed					
Complying with Statutory Regulations and Organisational Safety Requirements	M	35		5	Pass/Fail
Using and Interpreting Engineering Drawings and Documents	M	25		5	Pass/Fail
Working Efficiently and Effectively in Engineering	M	25		5	Pass/Fail
Machining - Must complete any functional pair of the following units:					
Setting Centre Lathes for Production	O	210		91	Pass/Fail
Machining Components using Centre Lathes	O	161		77	Pass/Fail
Setting Turret Lathes for Production	O	210		91	Pass/Fail
Machining Components using Turret Lathes	O	161		77	Pass/Fail
Setting Milling Machines for Production	O	210		91	Pass/Fail
Machining Components using Milling Machines	O	161		77	Pass/Fail
Setting Shaping, Planning or Slotting Machines for Production	O	175		78	Pass/Fail
Machining Components using Shaping, Planning or Slotting Machines	O	126		69	Pass/Fail

Setting Gear Cutting Machines for Production	O	210		91	Pass/Fail
Machining Components using Gear Cutting Machines	O	161		77	Pass/Fail
Setting Gear Grinding Machines for Production	O	210		91	Pass/Fail
Machining Components using Gear Grinding Machines	O	161		77	Pass/Fail
Setting Horizontal Boring Machines for Production	O	210		91	Pass/Fail
Machining Components using Horizontal Boring Machines	O	161		77	Pass/Fail
Setting Vertical Boring Machines for Production	O	210		91	Pass/Fail
Machining Components using Vertical Boring Machines	O	161		77	Pass/Fail
Setting Electro-Discharge Machines for Production	O	210		91	Pass/Fail
Machining Components using Electro-Discharge Machines	O	161		77	Pass/Fail
Setting Grinding Machines for Production	O	210		91	Pass/Fail
Machining Components using Grinding Machines	O	161		77	Pass/Fail
Setting Honing and Lapping Machines for Production	O	175		78	Pass/Fail
Machining Components using Honing and Lapping Machines	O	119		33	Pass/Fail
Setting Broaching Machines for Production	O	125		78	Pass/Fail
Machining Components using Broaching Machines	O	119		33	Pass/Fail
Setting Metal Spinning Machines for Production	O	175		78	Pass/Fail
Producing Components using Metal Spinning Machines	O	161		77	Pass/Fail
CNC Machining - Must complete one of the following units:					
Loading and Proving CNC Machine Tool Programs	O	91		24	Pass/Fail
Carrying Out CNC Machine Tool Programming	O	231		84	Pass/Fail
Plus one functional pair of units from the following:					
Setting CNC Turning Machines for Production	O	140		70	Pass/Fail
Machining Components using CNC Turning Machines	O	126		63	Pass/Fail
Setting CNC Milling Machines for Production	O	140		70	Pass/Fail
Machining Components using CNC Milling Machines	O	126		63	Pass/Fail
Setting CNC Grinding Machines for Production	O	140		70	Pass/Fail
Machining Components using CNC Grinding Machines	O	126		63	Pass/Fail
Setting CNC Punching Machines for Production	O	140		70	Pass/Fail

Machining Components using CNC Punching Machines	O	126		63	Pass/Fail
Setting CNC Laser Profiling Machines for Production	O	140		70	Pass/Fail
Machining Components using CNC Laser Profiling Machines	O	126		63	Pass/Fail
Setting CNC Electro-Discharge Machines for Production	O	140		70	Pass/Fail
Machining Components using CNC Electro-Discharge Machines	O	126		63	Pass/Fail
Setting CNC Vertical Boring Machines for Production	O	140		70	Pass/Fail
Machining Components using CNC Vertical Boring Machines	O	126		63	Pass/Fail
Setting CNC Horizontal Boring Machines for Production	O	140		70	Pass/Fail
Machining Components using CNC Horizontal Boring Machines	O	126		63	Pass/Fail
Setting CNC Gear Cutting Machines for Production	O	140		70	Pass/Fail
Machining Components using CNC Gear Cutting Machines	O	126		63	Pass/Fail
Setting CNC Machining Centres for Production	O	140		70	Pass/Fail
Machining Components using CNC Machining Centres	O	126		63	Pass/Fail
Machine Tool Setting - Must complete the following unit:					
Handing Over Machine Tools to Production Operators	O	198		38	Pass/Fail
Plus one more from the following units:					
Setting Capstan and Turret Lathes for Production	O	210		91	Pass/Fail
Setting Single-Spindle Automatic Turning Machines for Production	O	210		91	Pass/Fail
Setting Multi-Spindle Automatic Turning Machines for Production	O	161		77	Pass/Fail
Setting Single and Multi-Spindle Drilling Machines for Production	O	161		77	Pass/Fail
Setting Tool and Cutter Grinding Machines for Production	O	161		77	Pass/Fail
Setting Special-Purpose Machines for Production	O	210		91	Pass/Fail
Setting Power Presses for Production	O	210		91	Pass/Fail
Setting Milling Machines for Production	O	210		91	Pass/Fail
Setting Grinding Machines for Production	O	210		91	Pass/Fail
Setting Shaping, Planing or Slotting Machines for Production	O	175		78	Pass/Fail
Setting Gear Cutting Machines for Production	O	210		91	Pass/Fail
Setting Gear Grinding Machines for Production	O	210		91	Pass/Fail
Setting Electro-Discharge Machines for Production	O	210		91	Pass/Fail
Setting Honing and Lapping Machines for Production	O	175		78	Pass/Fail
Setting Broaching Machines for Production	O	175		78	Pass/Fail
Setting CNC Turning Machines for production	O	140		70	Pass/Fail
Setting CNC Milling Machines for Production	O	140		70	Pass/Fail
Setting CNC Grinding Machines for Production	O	140		70	Pass/Fail
Setting CNC Punching Machines for Production	O	140		70	Pass/Fail
Setting CNC Laser Profiling Machines for Production	O	140		70	Pass/Fail
Setting CNC Electro-Discharge Machines for Production	O	140		70	Pass/Fail
Setting CNC Gear Cutting Machines for Production	O	140		70	Pass/Fail
Setting CNC Machining Centers for Production	O	140		70	Pass/Fail

Fitting and Assembly - Must complete three of the following units:					
Producing Components using Hand Fitting Techniques	O	210		70	Pass/Fail
Assembling Mechanical Products	O	210		70	Pass/Fail
Producing Components by Manual Machining	O	210		70	Pass/Fail
Fitting Fluid Power Components to Mechanical Assemblies	O	161		60	Pass/Fail
Fitting Pipework Systems to Mechanical Assemblies	O	161		60	Pass/Fail
Fitting Electrical/Electronic Components to Mechanical Assemblies	O	161		60	Pass/Fail
Producing Power Turbine Combustion Assemblies	O	210		70	Pass/Fail
Producing Power Turbine Compressor Assemblies	O	210		70	Pass/Fail
Producing Turbine Assemblies	O	210		70	Pass/Fail
Producing Power Turbine Gearbox Assemblies	O	210		70	Pass/Fail
Producing Power Turbine Major Assemblies	O	210		70	Pass/Fail
Producing Piston Engine Assemblies	O	210		70	Pass/Fail
Repairing and Modifying Mechanical Assemblies	O	210		70	Pass/Fail
Checking that Completed Assemblies Comply with Specification	O	91		30	Pass/Fail
Pipe Fitting and Assembly - Must complete one unit from the following:					
Pipe Bending and Forming by Hand Methods	O	150		46	Pass/Fail
Pipe Bending and Forming using Bending Machines	O	150		46	Pass/Fail
Plus two more from the following:					
Assembling Screwed Pipework	O	91		30	Pass/Fail
Assembling Small Bore Non-Ferrous Pipework	O	91		30	Pass/Fail
Assembling Non-Metallic Pipework	O	91		30	Pass/Fail
Preparing and Testing Pipework Systems	O	150		46	Pass/Fail
Producing Socket and Flange Fillet Welded Joints in Pipe using a Manual Welding Process	O	210		86	Pass/Fail
Composite Manufacture Engineering - Must complete one of the following units:					
Producing Composite Mouldings using Pre-Preg Laminating Techniques	O	210		86	Pass/Fail
Producing Composite Mouldings using Wet lay-up Techniques	O	210		86	Pass/Fail
Producing Composite assemblies	O	210		86	Pass/Fail
Plus one more unit from the following:					
Producing Composite Mouldings using Pre-Preg Laminating Techniques	O	210		86	Pass/Fail
Producing Composite Mouldings using Wet Lay-up Techniques	O	210		86	Pass/Fail
Producing Composite Assemblies	O	210		86	Pass/Fail
Bonding Composite Mouldings	O	91		30	Pass/Fail
Repairing Composite Mouldings	O	161		77	Pass/Fail
Applying Finishes to Composite Mouldings	O	150		46	Pass/Fail
Trimming Composite Mouldings using Hand Tools	O	150		46	Pass/Fail

Identifying Defects in Composite Mouldings	O	91		30	Pass/Fail
NOTE: Two different units must be selected					
Mechanical Overhaul and Test - Must complete two of the following units:					
Slinging, Lifting and Moving Equipment, Components or Materials for Overhauling Activities	O	89		24	Pass/Fail
Dismantling Mechanical Equipment in Preparation for Overhaul	O	161		49	Pass/Fail
Checking Mechanical Components for Serviceability During Overhauling Activities	O	89		24	Pass/Fail
Carrying Out Non-Destructive Flaw Detection on Components During Overhauling Activities	O	89		24	Pass/Fail
Restoring Mechanical Components to Usable Condition by Repair	O	161		49	Pass/Fail
Producing Replacement Components for Overhauling Activities	O	161		49	Pass/Fail
Checking that Overhauled Mechanical Assemblies Comply with Specification	O	91		30	Pass/Fail
Plus one more unit from the following units:					
Overhauling Industrial Power Turbines by Module Replacement	O	210		86	Pass/Fail
Overhauling Industrial Power Turbine Compressor Assemblies	O	210		86	Pass/Fail
Overhauling Industrial Power Turbine Combustion Assemblies	O	210		86	Pass/Fail
Overhauling Turbine Assemblies from Industrial Power Turbines	O	210		86	Pass/Fail
Overhauling Piston Engines	O	210		86	Pass/Fail
Overhauling Gearbox Assemblies	O	210		86	Pass/Fail
Overhauling Industrial Clutch and Brake Assemblies	O	161		77	Pass/Fail
Overhauling Pump Assemblies	O	161		77	Pass/Fail
Overhauling Valve Assemblies	O	161		77	Pass/Fail
Overhauling Components of Hydraulic Equipment	O	161		77	Pass/Fail
Overhauling Components of Pneumatic, Vacuum or Compressed Air Equipment	O	161		77	Pass/Fail
Carrying Out Tests on Overhauled Industrial Power Turbines	O	210		70	Pass/Fail
Carrying out Tests on Overhauled Piston Engines (Fixed Dynamometer)	O	210		70	Pass/Fail
Spring Making - Must complete four of the following units:					
Making Compression Springs using Hand Forming Methods	O	150		46	Pass/Fail
Making Torsion Springs using Hand Forming Methods	O	150		46	Pass/Fail
Making Extension Springs using Hand Forming Methods	O	150		46	Pass/Fail
Making Spring Wire Forms using Hand Forming Methods	O	150		46	Pass/Fail
Grinding Spring Ends by Hand	O	57		16	Pass/Fail
Setting Automatic Cold Wire Compression Spring Making Machines for Production	O	150		46	Pass/Fail

Setting Automatic Cold Wire Torsion Spring Making Machines for Production	O	150		46	Pass/Fail
Setting Automatic Cold Wire Extension Spring Making Machines for Production	O	150		46	Pass/Fail
Setting Automatic Spring Making Machines for Production of Clock, Power, Scroll and Volute Springs	O	150		46	Pass/Fail
Setting Automatic Cold Wire Forming Machines to Produce Spring Wire Forms	O	150		46	Pass/Fail
Setting Automatic Hot Wire Compression Spring Making Machines for Production	O	150		46	Pass/Fail
Setting Automatic Spring End Grinding Machines for Production	O	60		16	Pass/Fail
Programming CNC Spring Making Machines	O	231		84	Pass/Fail
Setting CNC Spring Making Machines	O	150		46	Pass/Fail
Operating CNC Spring Making Machines	O	91		30	Pass/Fail
Setting and Using a Fly Press for Spring Making Activities	O	91		30	Pass/Fail
Making Strip Spring Components using Shearing Machines	O	91		30	Pass/Fail
Forming Strip Spring Components using Power Rolling Machines	O	91		30	Pass/Fail
Bending Strip Spring Components using Press Brakes	O	91		30	Pass/Fail
Forming Strip Spring Components using Power Press	O	91		30	Pass/Fail
Drilling and Finishing Holes in Strip Spring Components	O	57		16	Pass/Fail
Using Heat to Assist with the Bending and Forming of Spring Components	O	57		16	Pass/Fail
Carrying Out Heat Treatment of Springs	O	91		30	Pass/Fail
Carrying Out Shot Peening of Springs	O	91		30	Pass/Fail
Carrying Out Quality Control of Spring Making Activities	O	150		46	Pass/Fail
Manufacturing One-Off Tooling for Spring Making Activities	O	161		77	Pass/Fail
Setting and Operating CNC Laser Profiling Machines for Strip Spring Making	O	161		77	Pass/Fail
Photonics Engineering - Must complete three of the following units:					
Machining Infra-Red/Special Material Lenses	O	161		77	Pass/Fail
Machining Optical Glass Lenses	O	161		77	Pass/Fail
Machining Optical Prism and Flat Components	O	161		77	Pass/Fail
Setting CNC Aspheric Glass and Diamond Turning Machines	O	175		78	Pass/Fail
Machining Components using CNC Aspheric Glass and Diamond Turning Machines	O	150		46	Pass/Fail
Setting CNC Optical Grinding and Polishing Machines for Production	O	175		78	Pass/Fail
Machining Components using CNC Optical Grinding and Polishing Machines	O	150		46	Pass/Fail
Machining Optical Cylinders and Domes	O	161		77	Pass/Fail

Machining Optical Plastic Components	O	161		77	Pass/Fail
Polishing and Smoothing of Lens or Mirror Surfaces	O	161		77	Pass/Fail
Vacuum Coating Optical Materials	O	91		30	Pass/Fail
Inspecting Optical Components using Mechanical Instruments	O	91		30	Pass/Fail
Inspecting Optical Components using Co-ordinate Measuring Machines (CMM)	O	150		46	Pass/Fail
Carrying Out Laser/Optic Metrology	O	150		46	Pass/Fail
Terminating Fibre-Optic Cables	O	91		30	Pass/Fail
Building Optical Systems	O	175		78	Pass/Fail
Performing Laser Optical System Alignment	O	150		46	Pass/Fail
Aligning and Setting Up Holographic Equipment	O	161		77	Pass/Fail
Following Clean Room/Clean Work Area Protocols	O	57		16	Pass/Fail
Note: The Following unit numbers have not been included in this qualification structure: 88 to 99 and 147 to 149					