



Level 3 NVO Extended Diploma in

Electrical and Electronic Engineering

ENGINEERING

Qualification Specification

Overview

This qualification is a National Vocational Qualification (NVQ). It involves the skills and knowledge needed for electrical and electronic engineering. NVQs are based on national occupational standards, which the learner must meet to be competent in a particular task

Typical Job

The qualification is applicable to a wide variety of electrical/electronic occupations within the sector, dependent on the pathway chosen.

Qualification code:	600/9931/8
Level:	3
Total qualification time:	1170
Guided learning hours:	432
Credits:	117
Minimum age	16

Issue 1.1

Purpose of the qualification

It involves the skills and knowledge needed for electrical and electronic engineering in one or more of a wide variety of activities including:

- designing electronic circuits
- controlling semiconductor manufacturing processes
- controlling printed circuit and allied circuit assembly
- leading electronic component manufacture
- leading printed circuit and allied circuit assembly
- leading electronic assembly
- testing electronic circuits
- manufacturing of transformers and inductors
- manufacturing electrical motors and generators
- manufacturing electrical control systems equipment
- testing electrical equipment.

It is designed for learners who are undertaking a SEMTA apprenticeship.

Who supports this qualification?

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

What could this qualification lead to?

A career in the engineering sector, further or higher study such as project management and supervision.

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 occupational competence.

Structure

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

OR

Group B - Level 2 PEO Units x 5

And

Group C - One of the Electrical and Electronic Engineering pathways

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.

3

EAL Level 3 NVQ Extended Diploma in Electrical and Electronic Engineering (QCF)

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 assessment routes: All three assessment routes must be completed

EAL code	Assessment route title	Level	Credit value	Guided learning hours	Ofqual code
QEEE2/001N	Complying with Statutory Regulations and Organisational Safety Requirements	2	5	35	A/601/5013
QEEE2/002N	Using and Interpreting Engineering Data and Documentation	2	5	25	Y/601/5102
QEEE3/003N	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

4
QPE02/007N

Forming and Assembling Pipework Systems

2

14

64

L/504/6353

Group A (Engineering practices) (cont)

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



QPEO2/027N	Preparing and Using Manual Metal Arc Welding Equipment	2	15	68	K/504/6408
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Group A (Engineering practices) (cont)

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



QPE02/045N	Producing Composite Mouldings using Resin Flow Infusion Techniques	2	14	64	R/504/6435
QPE02/046N	Producing Composite Assemblies	2	14	64	Y/504/6436

Group A (Engineering practices) (cont)

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



Group A (Engineering practices) (cont)

QPE02/070N	Assembling Structural Sub Assemblies to Produce a Public Service Vehicle	2	14	64	R/503/4057
QPE02/071N	Fitting Sub Assemblies and Components to Public Service Vehicles	2	14	64	Y/503/4058
QPE02/072N	Preparing and Manoeuvring Armoured Fighting Vehicles AFVs for Maintenance and Transportation	2	14	64	R/503/7198
QPE02/073N	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:

QPE02/004N	Producing Mechanical Engineering Drawings using a CAD System	2	11	61	F/504/6348
QPE02/032N	Producing Electrical or Electronic Engineering Drawings using a CAD System	2	11	61	R/504/6421
QPE02/061N	Producing CAD Models (Drawings) using a CAD System	2	11	61	R/504/6452

Plus two from the following PEO Level 2 assessment routes:

QPE02/062N	Producing Engineering Project Plans	2	8	37	Y/504/6453
QPE02/063N	Using Computer Software Packages to Assist with Engineering Activities	2	8	37	D/504/6454
QPE02/064N	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 Electrical and Electronic Engineering Pathways

Group C:

Pathway EEA: Designing Electronic Circuits

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

EAL code	Assessment route title	Level	Credit value	Guided learning hours	Ofqual code
QEEE3/004N	Designing Electronic Circuit Layouts Using CAD Tools	3	60	126	K/504/9745
QEEE3/005N	Evaluating and Recommending Circuit Design Options	3	70	154	M/504/9746
QEEE3/006N	Providing Technical Guidance to Others	3	35	70	T/504/9747

Pathway EEB: Controlling Semiconductor Manufacturing Processes

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

EAL code	Assessment route title	Level	Credit value	Guided learning hours	Ofqual code
QEEE3/007N	Identifying and Following Clean Room/Clean Work Area Protocols	3	7	28	F/504/9749
QEEE3/008N	Monitoring and Analysing Data from Semiconductor Processes	3	35	77	A/504/9751
QEEE3/009N	Adjusting and Sustaining Semiconductor Processes	3	40	77	F/504/9752

Plus one assessment route from the following:

QEEE3/010N	Selecting and Preparing Materials and Components for Manufacturing	3	18	63	L/504/9754
QEEE3/011N	Preparing Manufacturing Systems Equipment for Operation	3	18	63	R/504/9755
QEEE3/006N	Providing Technical Guidance to Others	3	35	70	T/504/9747

Pathway EEC: Controlling Printed Circuit and Allied Circuit Assembly

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

EAL code	Assessment route title	Level	Credit value	Guided learning hours	Ofqual code
QEEE3/007N	Identifying and Following Clean Room/Clean Work Area Protocols	3	7	28	F/504/9749
QEEE3/012N	Monitoring and Analysing Data from Electronic Circuit Manufacturing Processes	3	35	77	Y/504/9756
QEEE3/013N	Adjusting and Sustaining Electronic Circuit Manufacturing Processes	3	40	77	H/504/9758

Plus one assessment route from the following:

QEEE3/010N	Selecting and Preparing Materials and Components for Manufacturing	3	18	63	L/504/9754
QEEE3/011N	Preparing Manufacturing Systems Equipment for Operation	3	18	63	R/504/9755
QEEE3/006N	Providing Technical Guidance to Others	3	35	70	T/504/9747

Pathway EED: Leading Electronic Component Manufacture

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

EAL code	Assessment route title	Level	Credit value	Guided learning hours	Ofqual code
QEEE3/006N	Providing Technical Guidance to Others	3	35	70	T/504/9747
QEEE3/014N	Processing Electronic Components within the Manufacturing System	3	50	126	D/504/9760

Plus one assessment route from the following:

QEEE3/010N	Selecting and Preparing Materials and Components for Manufacturing	3	18	63	L/504/9754
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QEEE3/011N	Preparing Manufacturing Systems Equipment for Operation	3	18	63	R/504/9755
QEEE3/015N	Checking the Compliance of Electronic Components	3	20	56	R/504/9805

Pathway EEE: Leading Printed Circuit and Allied Circuit Assembly

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

EAL code	Assessment route title	Level	Credit value	Guided learning hours	Ofqual code
QEEE3/006N	Providing Technical Guidance to Others	3	35	70	T/504/9747
QEEE3/007N	Identifying and Following Clean Room/Clean Work Area Protocols	3	7	28	F/504/9749
QEEE3/016N	Assembling and Checking Printed and Allied Electronic Circuits	3	55	98	H/504/9808

Plus one assessment route from the following:

QEEE3/010N	Selecting and Preparing Materials and Components for Manufacturing	3	18	63	L/504/9754
QEEE3/011N	Preparing Manufacturing Systems Equipment for Operation	3	18	63	R/504/9755

Pathway EEF: Leading Electronics Assembly

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

EAL code	Assessment route title	Level	Credit value	Guided learning hours	Ofqual code
QEEE3/006N	Providing Technical Guidance to Others	3	35	70	T/504/9747
QEEE3/017N	Assembling and Wiring Electronic Equipment and Systems	3	45	84	M/504/9813

Plus one assessment route from the following:

QEEE3/010N	Selecting and Preparing Materials and Components for Manufacturing	3	18	63	L/504/9754
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13

QEEE3/011N	Preparing Manufacturing Systems Equipment for Operation	3	18	63	R/504/9755
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Pathway EEG: Testing Electronic Circuits

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

EAL code	Assessment route title	Level	Credit value	Guided learning hours	Ofqual code
QEEE3/018N	Testing Post-Production Electronic Components and Circuits	3	45	77	A/504/9815
QEEE3/019N	Locating and Diagnosing Faults in Post-Production Electronic Components and Circuits	3	47	77	J/504/9817

Plus one assessment route from the following:

QEEE3/020N	Preparing Facilities for Testing Electronic Components and Circuits	3	18	63	J/504/9820
QEEE3/021N	Writing Specifications for Testing Electronic Components or Circuits	3	30	70	Y/504/9823
QEEE3/006N	Providing Technical Guidance to Others	3	35	70	T/504/9747

Pathway EEH: Manufacturing Transformers and Inductors

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

EAL code	Assessment route title	Level	Credit value	Guided learning hours	Ofqual code
QEEE3/022N	Assembling Large Transformer and Inductor Cores	3	55	126	H/504/9825
QEEE3/023N	Winding Transformer and Inductor Coils	3	45	112	M/504/9830
QEEE3/024N	Assembling Transformers and Inductors	3	48	119	T/504/9831
QEEE3/025N	Fitting Small Transformer and Inductor Cores	3	30	112	F/504/9833

15

Pathway EEI: Manufacturing Electrical Motors and Generators

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

EAL code	Assessment route title	Level	Credit value	Guided learning hours	Ofqual code
QEEE3/026N	Assembling Rotor and Armature Windings	3	25	56	J/504/9834
QEEE3/027N	Assembling Stator Windings	3	25	56	R/504/9836
QEEE3/028N	Assembling and Fitting Commutators	3	20	42	Y/504/9837
QEEE3/029N	Balancing Assembled Rotors or Armatures	3	30	63	D/504/9838
QEEE3/030N	Assembling and Fitting Electrical Rotating Equipment	3	50	105	Y/504/9840

Pathway EEJ: Manufacturing Electrical Control Systems Equipment

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

EAL code	Assessment route title	Level	Credit value	Guided learning hours	Ofqual code
QEEE3/031N	Mounting Electrical Components in Enclosures	3	55	133	D/504/9841
QEEE3/032N	Wiring Electrical Components and Equipment in Enclosures	3	60	147	K/504/9843
QEEE3/033N	Selecting and Preparing Materials and Components for Electrical Assembly	3	18	63	M/504/9844

Pathway EEK: Testing Electrical Equipment

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

EAL code	Assessment route title	Level	Credit value	Guided learning hours	Ofqual code
QEEE3/034N	Carrying Out Functional Tests on Electrical Equipment	3	50	105	A/504/9846
QEEE3/035N	Locating and Diagnosing Faults in Electrical Systems and Equipment	3	50	105	J/504/9848
QEEE3/036N	Checking the Compliance of Electrical Equipment	3	20	56	L/504/9849
