ENERGY & ENVIRONMENT AWARDS

EEA Level 2 Foundation Apprenticeship for FA0006 Engineering and Manufacturing

Specification

QAN 610/6473/7

Contents

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Updates to this Specification

Since the first publication of this Qualification Specification, the following updates have been made.

Version	Date	Details
V1.0	1 December 2025	First published

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Introduction

Energy & Environment Awards is the specialist awarding organisation for the energy and utilities sector, dedicated to supporting employers in addressing the growing demand for safety-critical, technical and sustainable workforce skills.

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Qualification at a Glance

Title	**Size**
EEA Level 2 Foundation Apprenticeship Qualification in Engineering and Manufacturing QAN 610/6473/7	Typical duration: 8 months with a minimum 187 hours off-the-job learning.
Purpose	**Target audience**
The purpose of the EEA Level 2 Foundation Apprenticeship Qualification in Engineering and Manufacturing is to build the apprentice's confidence in the workplace and motivate them to develop their occupational competence. This apprenticeship qualification provides a mix of employability skills and behaviours, technical knowledge and skills, and associated English and maths. It combines valuable hands-on practice in the workplace with off-the-job learning. The apprentice's experiences will not only help them to grow their skills but will also help to inform their next career steps.	16-21 year old people who will benefit from a wide range of experiences within Manufacturing and Engineering. The typical progression routes will likely include employment or progression onto another skills product such as a level 2 or level 3 apprenticeship.
Content Overview	**Entry Requirements**
Introductory knowledge and skills, and associated behaviours, to prepare for engineering operative roles in: • Electrical and electronic engineering • Fabrication • Mechanical Manufacturing • Engineering Maintenance	There are no formal entry requirements for learners undertaking these qualifications. The qualifications can be undertaken without any previous training or qualifications in this subject area. Apprentices must follow the English and maths formal qualification requirements as set out in the Department for Education Apprenticeship funding rules. Learners must normally be aged 16-21
Assessment and resits	**Additional resources**
• Multiple choice Test – assessed by EEA – graded Pass/Fail • Workbook – assessed by Centre* or by EEA - graded Passs/Fail • Portfolio- assessed by Centre* or by EEA – graded Pass/Fail Overall grading: Pass/Fail **Resits**: permitted subject to provider and employer agreement * Subject to Centre approval	• Practice assessment materials • Work Book Template • Portfolio Template • Apprentice Guide Contact: **enquiries@energyenvironmentawards.co.uk**

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1. Overview of Qualification

Foundation apprenticeships are employed positions and are for younger people who will benefit from a wide range of experiences. Each foundation occupation provides a mix of employability skills and behaviours, technical knowledge and skills, and associated English and maths. It combines valuable hands-on practice in the workplace with off-the-job learning. The apprentice's experiences will not only help them to grow their skills but will also help to inform their next career steps. Completion of this foundation apprenticeship will certify competency in all of the technical knowledge and skills, together with all of the employability skills and behaviours described. The typical progression routes will likely include employment or progression onto another skills product such as a level 2 or level 3 apprenticeship.

Foundation apprenticeships benefit employers as they get to see the apprentice in work-based settings while the apprentice receives extra support. Employers also benefit from accessing a broader talent pool of young learners than they might otherwise do.

General engineering and manufacturing operatives are found in environments supporting, for example, production, maintenance, assembly of components and systems, machining operations, fabrication and welding and additive manufacturing functions. They may work across many sectors including automotive, aerospace, energy, advanced and general manufacturing. The apprentice will carry out general engineering and manufacturing tasks consistently using safe working practices, planning and organising resources, and completing tasks within timeframes. The qualification focuses on introductory knowledge and skills for four engineering operative roles:

- Electrical and electronic engineering
- Fabrication
- Mechanical Manufacturing
- Engineering Maintenance

This Foundation Apprenticeship requires a minimum 187 hours off-the-job learning. Upon successful completion, the apprentice will be competent in the knowledge, skills and behaviours outlined in this standard. Someone who completes some or all of this content will be part-way through a journey to a more specialist occupation. Taking another apprenticeship after this Foundation Apprenticeship is one progression route available to apprentices.

1.1 Entry Requirements

The apprentice must normally be age 16 to 21 at the start of their apprenticeship. Exceptions to this are set out in the Department for Education Apprenticeship funding rules.

1.2 Progression Routes

The typical progression routes will likely include employment or progression onto another skills product such as a level 2 or level 3 apprenticeship.

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2. Qualification Details

2.1 Structure

This qualification is designed to deliver the requirements of the Engineering and manufacturing foundation apprenticeship, FA0006, version 1.0

Assessment Outcome (AO)	Mapping to standard	Assessment Method and timing
AO1(K) Health, safety, regulatory and environmental responsibilities **knowledge:** the apprentice demonstrates understanding of health, safety and regulatory requirements including the understanding of appropriate sustainability practices and waste disposal	K1, K2, K3, K5	**Assessment Component 1**: Multiple Choice Test, externally set and externally marked by Energy & Environment Awards Typically 8 weeks after programme start
AO1(S) Health, safety, regulatory and environmental responsibilities **skills:** the apprentice demonstrates compliance with health, safety and regulatory requirements including sustainable waste disposal practices	S1, S2, S3	**Assessment Component 2**: Work Book, marked by Centre* or Energy & Environment Awards. Typically 8 weeks after programme start *Subject to Centre approval – see Section 3
AO2 Preparation, interpretation and quality: the apprentice demonstrates knowledge and skills in operational responsibilities, work area preparation and use of technical documentation to support effective preparation and quality outcomes	K4, K6, K7, K13, S4, S5, S10	**Assessment Component 3**: Portfolio of evidence, marked by Centre* or Energy & Environment Awards. Complete and submit 8 months after programme start *Subject to Centre approval – see Section 3
AO3 Components, tools, and techniques: the apprentice demonstrates knowledge and skills in the use of common components and relevant tools and techniques for hand and machine engineering and manufacturing tasks	K8, K9, K10, K11, K12, S6, S7, S8, S9	
Employability Skills and Behaviours	EB1 – EB8	Centres must supply confirmation from employers that Employability Skills and Behaviours have been suitably demonstrated* over the course of the apprenticeship.

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		This qualification cannot be awarded without confirmation. *EB6 (Seek ways to manage own financial, health and wellbeing needs using available resources.) does not need to be confirmed by the employer but should form a key element of the apprentice's off-the-job training package.

2.2 Assessment and Evidence

All assessments are set by Energy & Environment Awards. – see Section 5 for more information.

- The Multiple Choice Test is typically taken on-screen on Centre premises in controlled conditions, with Centre invigilation. It is marked by Energy & Environment Awards.
- The Health and Safety Skills Workbook, supplied by Energy & Environment Awards, is completed under controlled conditions and typically submitted electronically. Assessment evidence must comply with the Assessment Evidence Requirements set out below. The Workbook is marked by Energy & Environment Awards or it may be Centre marked, subject to Centre approval (see Section 3).
- The Portfolio is completed on programme using a Portfolio Template supplied by Energy & Environment Awards. Assessment evidence must comply with the Assessment Evidence Requirements set out below. The Portfolio is marked by Energy & Environment Awards or it may be Centre marked, subject to Centre approval (see Section 3).

Assessment Evidence Requirements

Assessment component 1 is a knowledge test set and marked by Energy & Environment Awards. It is delivered on-screen on Centre premises and invigilated by an approved invigilator from the Centre who will confirm the identity of the learners and confirm that the test took place in secure conditions with no malpractice.

Assessment components 2 and 3 comprise evidence compiled by the learner over time.

Suitable types of evidence includes but is not limited to:

- Apprentice writeup
- Assessor observations
- Detailed witness testimonies
- Photographs, plans and/or sketches of activities, with details of the work activity in which the learner has been involved
- Assessor questioning and answers
- Written/recorded responses to questions asked by the assessor

An approved member of Centre staff must confirm that the evidence is:

Valid – evidence relates to what is being assessed, including its breadth and depth

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Authentic – all work is solely the apprentice's work and countersigned by an authorised person to confirm it is authentic

Current – the evidence relates to activities undertaken by the apprentice in the course of their training programme

Sufficient – there must be enough evidence to cover the required range

2.3 Learners with Particular Requirements

Please see the Energy & Environment Awards Reasonable Adjustments and Special Considerations Policy on our website at Policies and Fees - Energy & Environment Awards.

This policy gives clear guidance on the reasonable adjustments and arrangements that can be made to take account of disability or learning difficulty without compromising the assessment validity.

2.4 Pre-requisites and recognition of prior learning

Apprentices must achieve English and mathematics qualifications in line with the apprenticeship funding rule before certification.

Energy & Environment Awards does not recognise any apprentice prior learning (RPL) or prior achievement (RPA) for the purpose of amending the assessment requirements of any apprenticeship qualifications. Please refer to Energy & Environment Awards RPL and RPA policy at https://energyenvironmentawards.co.uk/policies-and-fees

In order for Energy & Environment Awards to award an apprenticeship qualification, the apprentice must successfully complete all required assessment components with Energy & Environment Awards. This means that:

- each of the assessment components must be completed in full with Energy & Environment Awards
- where an apprentice transfers to Energy & Environment Awards from another AO they have to undertake the entire assessment with Energy & Environment Awards
- components of this qualification cannot be certificated in isolation
- evidence produced for the portfolio and workbook must relate to the time the apprentice is on their apprenticeship programme to demonstrate current practice

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3. Centre Information

3.1 Centre Approval

There are two centre approval routes for this qualification depending on the approach to assessing Assessment Component 2 and Assessment Component 3.

- End-point assessment centre approval route:

This is for Centres who want Energy & Environment Awards to assess Components 2 and 3.

  - There is no requirement for a Centre to have approved assessors, an approved IQA or an IQA process
  - Refer to the Energy & Environment Awards EPA Centre Guidance for further information

- Qualification centre approval route:

This is for Centres who want to assess Components 2 and 3 themselves.

  - Centres are required to have a suitably qualified and experienced assessor and IQA, and to use an effective IQA process
  - Refer to the Energy & Environment Awards Qualification Centre Handbook for further guidance

3.2 Trainers, Assessors and IQAs – for Centres opting to assess components 2 and 3

Centres must comply with both the qualification and sector experience requirements for Trainers, Assessors and IQAs, as outlined below.

Assessors are responsible for marking and recording assessment decisions. Internal Quality Assurers (IQAs) are responsible for sampling learners' assessment decisions and documentation and observing assessment discussions between the Assessor and the learner according to the Centre's internal quality assurance sampling approach, which will have been approved by Energy & Environment Awards as meeting the quality assurance requirements for these qualifications. IQAs are also required to verify the Trainer's competence to deliver the qualification as part of their monitoring activities.

Centres are responsible for maintaining up-to-date information on Trainers, Assessors and IQAs and for ensuring the currency of the competence of all those involved in assessment and quality assurance.

Assessors

In order to assess this qualification, Assessors must have relevant occupational competence and hold, or be working towards, one of the recognised Assessor qualifications, e.g.:

- Level 3 Award in Assessing Competence in the Work Environment

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- Level 3 Certificate in Assessing Vocational Achievement
- Assessing Candidates Using a Range of Methods (A1)
- D32 or D33 – Assess Candidate Performance / Assess Candidate Performance Using Diverse Evidence.

Further information regarding the Energy & Environment Awards requirements for Centre Delivery staff, including Assessors is found in the Energy & Environment Awards Qualification Centre Handbook.

Internal Quality Assurance and IQAs

The Centre's IQA will sample learners' assessment documentation according to the Centre's internal quality assurance Sampling approach, which will have been approved by Energy & Environment Awards as meeting the quality assurance requirements for this qualification.

As with Assessors, the expectation is that the Centre's IQA will have relevant occupational competence and hold, or be working towards, one of the recognised IQA qualifications, e.g.:

- Level 4 Award in the Internal Quality Assurance of Assessment Process and Practice
- Level 4 Certificate in Leading the Internal Quality Assurance of Assessment Processes and Practice

Further information regarding the Energy & Environment Awards requirements for Centre Delivery staff, including Assessors is found in the Energy & Environment Awards Qualification Centre Handbook.

IQAs will keep records of the assessments which are sampled in line with their internal quality assurance policy and process. These reports provide essential evidence for the Energy & Environment Awards EQA for determining whether the learners are being assessed in line with the Energy & Environment Awards requirements and the Centre's own Quality Assurance policies and procedures.

IQAs are also required to ensure consistency across the Centre's Assessors through monitoring assessment decisions, holding regular standardisation meetings and ensuring the Energy & Environment Awards requirements are being implemented appropriately. IQAs are also involved in the escalation and/or investigation of any issues or queries or potential malpractice relating to the assessment, grading decisions and the Assessor's occupational competence.

3.3 External Quality Assurance - – for Centres opting to assess components 2 and 3

Energy & Environment Awards externally quality assures through appointing each Centre an EQA, who is responsible for checking and monitoring the assessment and quality assurance practices within the Centre to ensure assessments are conducted and quality assured in a robust, consistent manner, in line with Energy & Environment Awards requirements. The EQA does this through:-

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- Approving Centres according to our qualification Centre Approval Criteria and carrying out a visit as part of this approval, where required.
- Determining the sampling approach and frequency of visits for each Centre, according to their risk, volume of learners and history as an approved Centre.
- Observing live assessments, sampling learner's evidence and assessment decisions and reviewing internal quality assurance documentation and practices to ensure the Centre is delivering a robust internal quality assurance of the assessment decisions which Assessors make.
- Writing a report on their findings for both the Centre and Energy & Environment Awards which details the EQAs findings, including any areas where remedial action is required and an action plan to be agreed with the Centre.
- Providing advice and support to Centres in relation to meeting Energy & Environment Awards requirements.

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4. Indicative Content

The standard for this apprenticeship specifies that provider's "coverage of each knowledge and skill statement must include each and every occupation it is mapped to. Coverage will be a blend of on and off the job training." The mapping document is available here.

This section provides indicative content relevant to the whole qualification. This information is intended to indicate the minimum coverage of knowledge and skills as taught content.

It is important to note that all content is aligned to the context and purpose of the qualification, which is to is to build the apprentice's confidence in the workplace and motivate them to develop their occupational competence as an engineering operative.

4.1 Component 1: Health, safety, regulatory and environmental responsibilities knowledge

Employee responsibilities under relevant health, safety and welfare regulations (K1)
Main Responsibilities of Employees (under HSW 1974) 1. Take Reasonable Care for Health and Safety • Employees must take care of their own health and safety and that of others who may be affected by their actions or omissions at work. 2. Cooperate with Employers • Workers must cooperate with their employer on health and safety matters, including following procedures and using equipment correctly. 3. Use Equipment Properly • PPE and other safety equipment must be used as instructed. Misuse or neglect of safety gear can lead to disciplinary action or legal consequences. 4. Report Hazards and Incidents • Employees are expected to report unsafe conditions, near misses, or accidents promptly to supervisors or safety officers. 5. Follow Training and Instructions • Workers must adhere to health and safety training, risk assessments, and safe systems of work provided by the employer. • Specific training and instructions apply to • Hazardous substances • Use of power tools • Working at heights 6. Avoid Interference or Misuse • It is illegal to intentionally misuse or interfere with anything provided for health, safety, or welfare purposes.
Sustainability principles and practices relevant to the role, including waste disposal and the impact of engineering and manufacturing on the environment. (K2)
Principles and practices aimed at minimizing environmental impact, conserving resources, Sustainability Principles in Engineering & Manufacturing 1. Resource Efficiency • Use materials, energy, and water efficiently throughout the product lifecycle. • Design for minimal waste and maximum reuse or recycling. • Consider environmental impacts from raw material extraction to end-of-life disposal. 2. Pollution Prevention

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- Reduce emissions, effluents, and waste generation at the source.
- Use cleaner production techniques and non-toxic materials.

3. Eco-Design / Sustainable Design
    - Integrate environmental considerations into product design.
    - Design products for reuse, remanufacturing, and recycling.

Sustainable Practices in Engineering & Manufacturing

1. Green Manufacturing
    - Use renewable energy sources (e.g., solar, wind).
    - Implement energy-efficient machinery and processes.
    - Replace scarce or harmful materials with sustainable alternatives.
    - Use biodegradable or recycled materials where possible.
    - Use virtual models to optimize design and reduce physical prototyping.
    - Predict and mitigate environmental impacts before implementation.
2. Additive Manufacturing (3D Printing) (related to K11)
    - Reduce material waste and enable localized production.
    - Support lightweight and optimized designs.
3. Certifications & Standards
    - Adhere to ISO 14001 (Environmental Management), ISO 50001 (Energy Management), and other relevant standards.
    - Pursue certifications like Carbon Trust Certified, Green Mark, Cradle to Cradle

Types, use and storage of personal protective equipment (PPE). (K3)

Main Types of PPE

1. Head Protection
    - Examples: Hard hats, bump caps.
    - Use: Protects against falling objects, head bumps, and electrical hazards.
2. Eye and Face Protection
    - Examples: Safety goggles, face shields, welding helmets.
    - Use: Shields eyes and face from flying particles, chemical splashes, and intense light (e.g., welding arcs).
3. Hearing Protection
    - Examples: Earplugs, earmuffs.
    - Use: Reduces exposure to high noise levels in manufacturing plants or near heavy machinery.
4. Respiratory Protection
    - Examples: Dust masks, respirators (half/full face)
    - Use: Protects against inhalation of dust, fumes, vapours, and other airborne contaminants.
5. Hand Protection
    - Examples: Gloves (cut-resistant, chemical-resistant, heat-resistant).
    - Use: Prevents injuries from sharp objects, chemicals, heat, and abrasion.
6. Body Protection
    - Examples: Coveralls, lab coats, high-visibility vests, flame-resistant clothing.
    - Use: Shields the body from chemicals, heat, sparks, and visibility hazards.
7. Foot Protection
    - Examples: Steel-toe boots, anti-static footwear, slip-resistant shoes.
    - Use: Protects feet from crushing injuries, punctures, slips, and electrical hazards.
8. Fall Protection
    - Examples: Harnesses, lanyards, anchor points.

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• Use: Prevents falls from height during maintenance or construction work. Storage of PPE Proper storage is crucial to maintain the integrity and hygiene of PPE: 1. Clean and dry areas 2. Designated storage units 3. Regular inspection 4. Separation of clean and used PPE
Workplace safety and operating procedures. What they are and why they are important. (K5)
Rules and practices designed to keep people safe and ensure equipment is used correctly, which are important in order to: 1. Prevent accidents and injuries 2. Protect equipment and environment 3. Build good habits for your career They are part of the apprentice's legal and professional responsibility Examples include: 1. Wearing PPE 2. Following lockout procedures 3. Using tools as instructed 4. Reporting hazards

4.2 Component 2: Health, safety, regulatory and environmental responsibilities skills

Comply with employee responsibilities under health, safety and welfare regulations. (S1)
Demonstrate ability to 1. Take Reasonable Care for Health and Safety • Take care of their own health and safety • Take care of health and safety of others. 2. Cooperate with Employers • Cooperate with their employer on health and safety matters, including following procedures and using equipment correctly. 3. Use Equipment Properly • Use PPE and other safety equipment as instructed. 4. Report Hazards and Incidents • Report unsafe conditions, near misses, or accidents promptly to supervisors or safety officers. 5. Follow Training and Instructions • Adhere to health and safety training, risk assessments, and safe systems of work provided by the employer. • Specific training and instructions apply to • Hazardous substances • Use of power tools • Working at heights
Dispose of waste safely and sustainably. Segregate resources for reuse and recycling. (S2)
Safe and sustainable waste disposal Demonstrate ability to: • Use correct containers: e.g., hazardous waste, e-waste, batteries, general waste, recycling.

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- Follow signage and colour codes: Adhere to site-specific labelling for bins and storage.
- Wear PPE: Use gloves, goggles, or masks as required when handling hazardous or sharp waste.
- Handle hazardous waste properly: Use spill kits, follow COSHH (Control of Substances Hazardous to Health) procedures, and never mix incompatible wastes.
- Document disposal: Complete waste transfer notes or log sheets if required.

Segregating Resources for Reuse and Recycling
Demonstrate ability to:

- Sort at source: e.g., keep clean metal swarf apart from oily rags.
- Use dedicated bins/areas: Place items in clearly marked recycling or reuse containers.
- Prepare materials for recycling: Clean or decontaminate where necessary e.g., remove oil from metal parts; remove batteries, separate circuit boards from casings.
- Store reusable items safely: Keep reusable components or materials in a designated area for future use.

Use and store PPE. (S3)
Use PPE Demonstrate ability to apply and use correctly PPE relevant to the occupation including: Main types of PPE listed for K3 Store PPE Demonstrate ability to remove and correctly store PPE relevant to the occupation including: Main types of PPE listed for K3

4.3 Component 3: Preparation, interpretation, quality, components, tools and techniques

Indicative content for Component 3 is divided into two parts:

- Underpinning knowledge (K4, K6, K7, K8, K9, K10, K11, K12, K13)
- Engineering and manufacturing skills (S4, S5, S6, S7, S8, S9, S10)

4.3.1 Underpinning knowledge

Preparation The engineering and manufacturing function and role and responsibilities of the operative.(K4) Work area preparation and maintenance techniques.K6)	
The function of engineering and manufacturing industry in the UK economy: • Driving economic output • Providing employment • Innovation and R&D • Exports • Infrastructure and Energy The role of an engineering operative in engineering and manufacturing industry:	Workplace preparation techniques: • Clear the area • Check equipment and tools • Layout planning • Safety checks • Environmental controls Maintenance techniques: • Regular cleaning • Tool storage

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• Operating Machinery and Equipment • Following Technical Instructions • Quality Control • Supporting Production Processes • Continuous Improvement • Fabrication example: How to prepare materials, supporting welding or assembly • Maintenance example: How to keep machines operational and support repairs • Mechanical manufacturing example: How mechanical components are assembled • Electrical and electronic example: How basic circuits are assembled and installed	• Waste management • Inspection and reporting • Preventative maintenance
Interpretation Use and characteristics of job specifications, engineering and manufacturing drawings, and technical information. (K7)	
Job specifications (job cards) • Task description • Technical details • Sequence of operations • Time allocation • Quality checks and sign-offs • Safety instructions • Traceability information e.g. job number; part numbers • Sign-off and verification Fabrication example: fabrication drawings; Maintenance example: manuals and schematics; Mechanical manufacturing example: assembly instructions Electrical and electronic example: Wiring diagrams	Engineering and manufacturing drawings: • Precision and scale • Standard symbols and notations: (e.g., BS 8888). • Views and sections • Material and tolerance info • Revision history Characteristics of technical information from manuals, data sheets, specifications: • Detailed content • Structured format • Compliance and standards • Safety information • Diagrams and charts
Quality Techniques to carry out simple quality checks: visual inspections and basic operational testing. (K13)	
Know how to conduct simple quality checks • Visual inspection to checks for obvious defects • Dimensional and weight checks using appropriate tools • Fit, assembly and basic functional testing • Fabrication example: visual inspection, measuring dimensions • Maintenance example: checking alignment, lubrication, operational test • Mechanical manufacturing example: visual inspection, measuring assemblies • Electrical and electronic example: continuity testing, polarity, component placement	

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Components and tools

Use, basic maintenance and storage techniques of tools, equipment and machinery associated with engineering and manufacturing tasks.(K8)

Types and use of common components, connections and fastenings associated with engineering and manufacturing tasks.(K9)

Mechanical Manufacturing hand tools

- Spanners and wrenches
- Screwdrivers
- Pliers and cutters
- Files and deburring tools
- Hacksaws
- Allen keys (Hex keys)
- Measuring tools
- Marking tools

Fabrication hand tools

- Measuring & marking Tools:
  - Steel rulers
  - Vernier callipers
  - Marking gauges
  - Centre punches
  - Scribes and chalk lines
- Cutting Tools:
  - Hacksaws
  - Tin snips
  - Hand shears
  - Files and rasps
- Forming & Shaping Tools:
  - Hammers (ball-peen, soft-faced)
  - Mallets
  - Hand benders
  - Vices and clamps
- Assembly Tools:
  - Spanners and wrenches
  - Screwdrivers
  - Rivet guns
  - Pliers and grips

Electrical and Electronic Engineering hand tools

- Screwdrivers
  - Flat-head
  - Phillips-head
  - Precision screwdrivers (for small electronic components)
- Pliers
  - Needle-nose pliers
  - Combination pliers
  - Diagonal cutting pliers

Mechanical Manufacturing power tools

- Lathes (Manual and CNC)
- Milling machines
- Drilling machines
- Grinding machines
- CNC machines
- Hydraulic or mechanical presses
- Welding machines (MIG, TIG, Arc)

Fabrication power tools

- Cutting & shaping machines:
  - Guillotines (sheet metal cutting)
  - Bandsaws
  - Laser cutters
- Forming Machines:
  - Press brakes (for bending sheet metal)
  - Rollers (for curving metal sheets)
  - Power hammers
  - Hydraulic presses
- Joining Equipment:
  - MIG, TIG, and Arc welding machines
  - Spot welders
  - Soldering irons
  - Adhesive applicators
- Finishing Tools:
  - Angle grinders
  - Belt sanders
  - Buffing and polishing machines

Electrical and Electronic Engineering power tools

- Multimeter
- Oscilloscope
- Clamp meter
- Insulation resistance tester
- Function generator
- Soldering iron and soldering station
- Desoldering pump or wick
- Heat gun

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○ Wire strippers • Wrenches ○ Adjustable spanners ○ Hex keys (Allen wrenches) • Cutting Tools ○ Cable cutters ○ Utility knives • Crimping Tools • Tweezers Maintenance engineering hand tools • Inspection mirror • Flashlight / headlamp • Lubrication equipment • Cleaning equipment Mechanical manufacturing components and connections • Bearings • Gears • Shafts and couplings • Bushes, seals and gaskets • Springs • Pulleys and belts • Threaded connections • Joints – welded and riveted • Adhesive bonding • Press fit / interference fit • Crimped connections Electrical and electronic engineering components and connections • Resistors • Capacitors • Inductors • Diodes • Transistors • Integrated circuits (ICs) • Relays and contactors • Switches and push buttons • Connectors and terminals • Printed circuit boards (PCBs) • Soldered connections • Crimped connections • Screw terminals • Plug and socket connectors • Terminal blocks • Breadboards	Maintenance engineering power tools • Thermal imaging camera • Vibration analyser • Portable inspection camera Fabrication components and connections • Metal sheets, plates, and sections • Tubes and pipes • Angles, channels, and beams • Flanges • Brackets and mounts • Bushes and sleeves • Joints – welded and riveted • Bolted connections • Threaded connections • Adhesive bonding • Interlocking joints
Techniques	

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Techniques to carry out basic hand-based engineering and manufacturing tasks, including measuring and marking out, bench fitting and hand tool tasks. (K10) Techniques to carry out basic machine-based engineering and manufacturing tasks: drilling, milling, turning, grinding, basic Computer Numerical Control (CNC) operations, and additive manufacturing. (K11)
Apprentices know the techniques to carry out basic engineering and manufacturing tasks. Examples of basic hand-based engineering and manufacturing tasks: Filing and Deburring • Task: Use hand files to smooth edges or remove burrs from cut or machined metal parts. • Purpose: Ensures parts are safe to handle and meet finish requirements. Assembling Components • Task: Use hand tools like screwdrivers, spanners, and Allen keys to assemble mechanical parts. • Example: Assemble a bracket to a frame using bolts and washers. Marking Out • Task: Use scribers, rulers, and centre punches to mark lines and hole positions on metal or plastic before machining. • Example: Mark out a hole pattern on a steel plate using a template and centre punch. Hand Drilling • Task: Use a hand drill or pillar drill to create holes in materials. • Example: Drill a 6mm hole in aluminium using a hand drill and check alignment with a drawing. Tapping and Threading • Task: Tap a hole to create an internal thread (e.g., M6) using a hand tap set. • Skills Used: Lubrication, correct tap sequence (taper, second, plug), checking thread with a gauge or bolt. Examples of basic machine-based engineering and manufacturing tasks: Drilling • Technique: Use a bench or pillar drill to create holes in metal or plastic workpieces. • Example Task: Drill a 10mm hole in a mild steel plate using a marked-out position. • Skills Involved: Selecting correct drill bit, setting speed, clamping work securely, using coolant if needed. Milling • Technique: Use a manual milling machine to remove material and create flat surfaces or slots. • Example Task: Mill a 5mm deep slot across a steel block using an end mill. • Skills Involved: Setting up the workpiece, choosing correct cutter, adjusting feed rate and depth of cut. Turning • Technique: Use a centre lathe to shape cylindrical components. • Example Task: Turn down a steel rod from 25mm to 20mm diameter over a 50mm length. • Skills Involved: Mounting work in chuck, selecting cutting tool, setting spindle speed, measuring with callipers. Grinding • Technique: Use a surface grinder to achieve a smooth, flat finish on metal parts. • Example Task: Grind a steel plate to remove surface imperfections and achieve a flat finish.

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- Skills Involved: Setting up magnetic chuck, adjusting grinding wheel height, using coolant, checking finish.

Basic CNC Operations

- Technique: Operate a CNC lathe or milling machine using pre-written programs or simple manual input.
- Example Task: Load and run a CNC program to machine a stepped shaft from aluminium.
- Skills Involved: Understanding G-code basics, loading tools, setting zero points, running simulations.

Additive Manufacturing (3D Printing)

- Technique: Use a FDM 3D printer to produce plastic components from digital models.
- Example Task: Print a small bracket using PLA material from a provided STL file.
- Skills Involved: Preparing the model in slicing software, setting print parameters, monitoring the print, post-processing (e.g., removing supports).

4.3.2 Engineering and manufacturing skills

Preparation

Prepare and maintain the work area. (S4)

Preparing the work area

- Review Job Instructions: Understand the task, materials, tools, and safety requirements.
- Inspect Equipment and Tools: Check for damage or wear and ensure everything is functioning properly.
- Gather Materials: Collect and organise all required components and resources.
- Set Up Safely: Arrange tools and materials ergonomically to prevent accidents and improve workflow.
- Wear Appropriate PPE: Ensure personal protective equipment is worn correctly (e.g., gloves, goggles, boots).

Maintain the work area

- Keep Area Clean and Tidy: Regularly remove waste, spills, and clutter to prevent hazards.
- Follow Safety Procedures: Adhere to health and safety guidelines throughout the task.
- Monitor Equipment: Continuously check that machines and tools are operating safely.
- Report Issues Promptly: Notify supervisors of any faults, hazards, or incidents.
- End-of-Shift Checks: Clean down equipment, store tools properly, and prepare the area for the next shift.

Interpretation

Interpret engineering and manufacturing information for example, job specifications, engineering and manufacturing drawings, and technical information. (S5)

Be able to use job specifications (job cards) to carry out and complete relevant tasks, referencing drawings and technical information.

Job specification example:

- Specification: "Drill a 10mm hole in a mild steel plate to a depth of 20mm using a pillar drill."

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- Interpretation: The apprentice identifies the correct drill bit size (10mm), selects mild steel from stock, sets the drill depth stop to 20mm, and ensures the machine is safe and ready to use.

Engineering drawing example:

- Drawing Detail: A 2D orthographic drawing showing a bracket with three holes, each 6mm in diameter, spaced 20mm apart.
- Interpretation: The apprentice reads the drawing to understand the layout, uses measuring tools to mark hole positions accurately, and checks tolerances before and after machining.

Manufacturing information example:

- Instruction: Machine a stepped shaft from aluminium using a CNC lathe. The shaft has two diameters: 25mm and 15mm, with a total length of 100mm. Use a finishing pass with a feed rate of 0.2 mm/rev and spindle speed of 1200 RPM
- Interpretation: the apprentice selects the correct stock and sets up the CNC with required instructions/dimensions. The apprentice selects the correct tools for the rough pass and finish, and sets the correct feed rate and spindle speed and completes the task with a quality check.

Technical data sheet example:

- Data Sheet: A cutting tool specification showing recommended speeds and feeds for aluminium
- Interpretation: The apprentice uses the chart to set the lathe speed and feed rate correctly when machining aluminium, ensuring efficient and safe operation.

Quality

Carry out simple quality checks of own work. (S10)

Be able to carry out quality checks on own work following company procedures, document and record quality checks and escalate non-conformance in line with company procedure.

Visual inspection example:

- Example: Check a machined part for surface defects such as scratches, burrs, or tool marks.
- Purpose: Ensures the part is clean and free from obvious damage before moving to the next stage.

Dimensional check example:

- Example: Use a vernier calliper to measure the diameter of a turned shaft to confirm it matches the drawing (e.g., 25.00 mm ± 0.05 mm).
- Purpose: Verifies the part is within tolerance and suitable for assembly or use.

Cleanliness check:

- Example: Inspect a part after machining to ensure all swarf and coolant residue has been removed.
- Purpose: Prepares the part for finishing or assembly and avoids contamination.

Components and tools

Use and store tools, equipment and machinery associated with engineering and manufacturing tasks, including carrying out basic maintenance.(S6)

Assist co-workers in engineering and manufacturing activity when required. For example, holding and positioning work-piece assembly. (S7)

Use and correctly store tools equipment and machinery, for example those listed in section 4.3.1 (Components and Tools|)

Cleaning tools and equipment example:

- Example: Wipe down hand tools (e.g. spanners, callipers) after use to remove oil, swarf, or debris.
- Purpose: Prevents corrosion and keeps tools in good working condition.

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Lubrication example: • Example: Apply grease or oil to moving parts of a bench drill or lathe according to the maintenance schedule. • Purpose: Reduces wear and ensures smooth operation. Checking for wear and damage example: • Example: Inspect belts, gears, or bearings on a machine for signs of wear or cracking. • Purpose: Identifies issues early to prevent breakdowns or unsafe operation. Visual Electrical Safety Checks example: • Example: Look for frayed cables or loose plugs on portable tools. • Purpose: Helps prevent electrical hazards and ensures compliance with safety standards.
Techniques Apply techniques to carry out basic hand-based engineering and manufacturing tasks. (S8) Apply techniques to carry out basic machine-based engineering and manufacturing tasks. (S9)
The apprentice will use and apply skills to carry out basic engineering and manufacturing tasks for example those listed in section 4.3.1 (Techniques)

5. Assessment

5.1 Assessment Design

Component 1: Multiple Choice Test

The multiple choice test is 30 minutes duration and consists of 20 questions each with one correct and three incorrect choices. The test focusses on employee health and safety responsibilities, sustainability practices and personal protective equipment. It is taken early in the training programme, typically after the apprentice's induction period.

The test is set and marked by Energy & Environment Awards and administered by the employer or training provider through the Energy & Environment Awards online assessment system, XAMS. Tests will be conducted in full examination conditions, with no additional notes, handouts or personal electronic devices permitted. Invigilation is carried out by entre staff approved by Energy & Environment Awards.

The Multiple choice Test is graded Pass/Fail and the pass mark is 14.

The questions relate to K1, K2, K3 and K5 as follows:

Element	Number of questions
K1	6
K2	6
K3	4
K5	4

Component 2: Workbook, supplied by Energy & Environment Awards

The Workbook will contain evidence of the apprentice complying with health and safety requirements, demonstrating sustainability practices and using personal protective equipment.

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It is completed by the apprentice at the end of their induction period. It is mapped to S1, S2 and S3.

Completed Workbooks are submitted to and marked by Energy & Environment Awards or by an approved assessor where the Centre has been approved by Energy & Environment Awards – see Section 3. The Workbook is graded Pass/Fail.

It may be completed manually and submitted to Energy & Environment Awards or set up within an e-portfolio which can be accessed by Energy and Environment Award assessors and IQAs when complete.

Component 3: Portfolio

The Portfolio is a portfolio of evidence compiled by the apprentice using a Portfolio Template supplied by Energy & Environment Awards towards the end of the apprentice's training, typically in the last 6-8 weeks on programme. It may be completed manually and submitted to Energy & Environment Awards or set up within an e-portfolio which can be accessed by Energy and Environment Award assessors and IQAs when complete.

The portfolio has two sections.

- Knowledge section is mapped to K4, K6, K7, K8, K9, K10, K11, K12, K13 and is the underpinning knowledge relating to operational responsibilities, work area preparation, and use of technical documentation to support effective preparation and quality outcomes
- Engineering and manufacturing skills section is mapped to S4, S5, S6, S7, S8,S9,S10. This section contains evidence of the apprentice completing engineering and manufacturing tasks

The evidence in the portfolio can be drawn from one or more occupations.

The portfolio is marked by Energy & Environment Awards or by an approved assessor at the Centre, subject to Centre approval.

The Portfolio is graded Pass/Fail

5.2 Grading and grading criteria

In order to pass the apprentice is required to demonstrate the requirements, as set out in the occupational standard:

- Reliably
- Effectively
- To an appropriate degree for the level of the standard

5.2.1 Knowledge test (assessment component 1)

The knowledge test is marked out of 20. The pass mark is 14.

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5.2.2 Work Book (assessment component 2)

The apprentice demonstrates in one or more occupations that they can:

S1: Comply with employee responsibilities under health, safety and welfare regulations.

S2: Dispose of waste safely and sustainably. Segregate resources for reuse and recycling.

S3: Use and store PPE.

All criteria must be chieved to achieve a Pass for the Work Book.

5.2.3 Portfolio (assessment component 3)

The apprentice demonstrates in one or more occupations their knowledge of:

K4: The engineering and manufacturing function and role and responsibilities of the operative.

K6: Work area preparation and maintenance techniques.

K7: Use and characteristics of job specifications, engineering and manufacturing drawings, and technical information.

K8: Use, basic maintenance and storage techniques of tools, equipment and machinery associated with engineering and manufacturing tasks.

K9: Types and use of common components, connections and fastenings associated with engineering and manufacturing tasks.

K10: Techniques to carry out basic hand-based engineering and manufacturing tasks, including measuring and marking out, bench fitting and hand tool tasks.

K11: Techniques to carry out basic machine-based engineering and manufacturing tasks: drilling, milling, turning, grinding, basic Computer Numerical Control (CNC) operations, and additive manufacturing.

K12: Methods of assisting in tasks, for example preparatory work, pre-assembly, monitoring equipment, lifting, holding and positioning materials and components.

K13: Techniques to carry out simple quality checks: visual inspections and basic operational testing.

The apprentice demonstrates in one or more occupations that they can:

S4: Prepare and maintain the work area.

S5: Interpret engineering and manufacturing information for example, job specifications, engineering and manufacturing drawings, and technical information.

S6: Use and store tools, equipment and machinery associated with engineering and manufacturing tasks, including carrying out basic maintenance.

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S7: Assist co-workers in engineering and manufacturing activity when required. For example, holding and positioning work-piece assembly.

S8: Apply techniques to carry out basic hand-based engineering and manufacturing tasks.

S9: Apply techniques to carry out basic machine-based engineering and manufacturing tasks.

S10: Carry out simple quality checks of own work.

All criteria must be chieved to a achieve a Pass for the Portfolio.

5.2.4 Overall Grade

A Pass is required in every component to achieve an overall Pass.

5.2.5 Verification of Behaviours

Employers are responsible for verifying that apprentices have sufficiently demonstrated the behaviours outlined in the occupational standard. Assessment organisations and providers are not required to assess behaviours or quality assure employer judgements. Certification cannot be requested until the employer has confirmed the verification of all behaviours.

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