

Overview of the role

The set-up and operation of a cold forming machine that enables components to be mass produced in the most economically viable way.

Standard in development

L3: Cold forming setter technician

Title of occupation

Cold forming setter technician

UOS reference number

ST1355

Core and options

No

Level of occupation

Level 3

Occupational maps data

Route: Engineering and manufacturing

Pathway: Engineering, Manufacturing, Process and Control

Cluster: Manufacturing and process operative or technician

Typical duration of apprenticeship

36 months

Target date for approval

01/09/2024

Resubmission

No

Would your proposed apprenticeship standard replace an existing framework?

No

Does professional recognition exist for the occupation?

Yes

Occupation summary

This occupation is found in the manufacturing supply chain of high value and strategically critical industries including automotive, aerospace, construction, military, renewable energy and general industry.

The broad purpose of the occupation is to set-up, configure, operate and monitor complex high value machinery that enables components to be mass produced in the most economically viable way. The process includes a series of steps using uniquely designed tooling and processes such as drawing, extrusion, upsetting, heading, piercing and trimming in order to make the completed component. The setter technician will interpret complex engineering drawings and diagrams to enable them to set up the machine appropriately. They are responsible for the set up, running, maintenance and management of the machinery and process to ensure that production meets tolerances and quality standards. They would also be expected to take part in the development of new products and have a considerable involvement in quality assurance activities and process efficiency improvements. Typical products produced using this process will include bolts, nuts, screws, bushes, rivets, solid and hollow formed parts. The cold forming process is extremely efficient compared to other manufacturing processes and results in significantly less product waste being produced.

In their daily work, an employee in this occupation interacts with managers or supervisors, technical or production personnel, purchasing, maintenance, quality and other operatives on the shop floor. A cold forming setter technician will typically spend most of their time working on the factory floor, with some time spent away from this environment if working on new product evaluation and feedback.

An employee in this occupation will be responsible for the complete set-up, operation and management of high value cold forming manufacturing equipment capable of high-volume production while meeting customer specifications and achieving consistently high tolerances and quality and environmental standards. They will also autonomously carry out a range of maintenance, quality assurance, process monitoring and adjustments, to ensure the machinery is operating at required efficiency and accuracy levels. A cold forming setter technician will work as part of a wider manufacturing team, however they will usually work autonomously and will exercise considerable responsibility and judgement on machine operation with a high-level of personal decision making and influence on the process. Depending on the size of the organisation, a cold forming machine setter technician would typically report to the production manager, supervisor or engineer. They will have an understanding of follow-on processes such as cleaning, heat treatment and coating. They need to work safely at all times taking into consideration the equipment being used and the working environment.

Typical job titles

Cold forming machine operator Cold forming machine setter Cold forming setter technician Heading operator Heading setter

Are there any statutory/regulatory or other typical entry requirements?

Yes

Entry requirements

Typical academic entry requirements may be GCSE grades 4+ in subjects such as maths, English, a science or design and technology. Entrants may also come from other routes, such as within organisations working in a different role, or with vocational qualifications such as an NVQ in manufacturing, or from a relevant level two apprenticeship.

Occupation duties

DUTY	KSBS
Duty 1 Interpret complex engineering drawings and specifications to determine requirements.	K1 K29 S1 B1
Duty 2 Schedule and complete routine and preventative maintenance checks and activities, such as lubrication systems, mechanical mechanisms and pneumatic systems.	K19 K20 K25 K29 K32 K37 S11 S12 S18 S19 S22 S24 S25 S27 S28 B1 B4 B6 B7
Duty 3 Diagnose machine issues and variations to determine and complete reactive maintenance.	K3 K17 K19 K20 K25 K28 K29 K38 S1 S6 S9 S10 S12 S18 S21 S24 B1 B3 B4 B6 B7
Duty 4 Set up, adjust and operate the heading machine to run efficiently, producing parts within drawing tolerances. Make autonomous decisions to correct any abnormal conditions to produce precise progressions.	K1 K2 K3 K4 K5 K6 K7 K8 K9 K10 K11 K12 K13 K16 K17 K18 K20 K29 K37 K38 S1 S2 S3 S4 S5 S6 S8 S9 S10 S12 S18 S22 S26 S27 S28 B1 B2 B3 B4 B6 B7 B8
Duty 5 Configure process monitoring equipment to enable accurate feedback of process stability. Interpret the results and interrogate set-up of machine making micro adjustments and tool changes to improve process control.	K1 K7 K8 K9 K10 K12 K20 K29 K38 S3 S4 S5 S6 S7 S8 S9 S10 S12 S13 S18 S25 S28 B1 B2 B3 B4 B6 B7 B8
Duty 6 Complete dimensional and visual inspections, including first off and last off inspections. Utilise gauges and measuring devices and record the	K1 K5 K8 K9 K10 K11 K13 K17 K26 K30 K38 S1 S5 S7 S8 S9 S10 S12 S18 S28 B1 B2 B3 B4 B6 B7 B8

DUTY**KSBS**

results. Evaluate both statistical and visual results and make decisions on what action is required to correct any abnormalities or dimensional trends.

Duty 7 Troubleshoot and correct abnormal production running issues, evaluating tooling and machine set-up to establish root cause. Make decisions when to change tooling and adjust machine positions, returning the process to normal operating conditions to maintain product quality.

K1 K2 K5 K6 K7 K8 K9 K10 K11 K12 K13 K15
K17 K20 K26 K29 K36 K38
S1 S3 S4 S6 S8 S10 S12 S13 S18 S21 S25 S26
B1 B2 B3 B4 B6 B7 B8

Duty 8 Identify, record and process non-conforming products using recognised problem-solving techniques in line with organisational procedures.

K1 K8 K9 K10 K11 K12 K13 K15 K16 K17 K2
1 K23 K26 K27 K28 K30 K33 K34 K36 K38
S1 S5 S6 S7 S9 S11 S12 S15 S18 S19 S21 S26
S27 S28
B1 B2 B3 B4 B6 B7 B8

Duty 9 Clean the work area to reduce risk of contamination, and return materials and equipment in line with organisational procedures.

K2 K5 K11 K20 K21 K26 K27 K29 K30 K34 K
36 K37
S1 S11 S12 S18 S19 S23 S25 S26 S27 S28
B1 B2 B3 B4 B6 B7 B8

Duty 10 Identify and complete continuous improvement activities and report any anomalies outside of own remit to relevant stakeholders.

K1 K2 K5 K6 K7 K8 K9 K10 K11 K12 K14 K15
K16 K21 K23 K38
S1 S3 S4 S6 S8 S9 S10 S11 S12 S14 S15 S16 S
18 S21 S28
B1 B2 B3 B4 B5 B6 B7 B8

Duty 11 Work to required environmental and quality standards to reduce waste and maintain process quality and address or raise concerns where appropriate.

K23 K27 K28 K29 K30 K33 K34 K36 K37
S1 S5 S6 S7 S9 S12 S18 S19 S21 S22 S26 S27
S28
B1 B2 B4 B5 B6 B7 B8

Duty 12 Complete documentation such as quality documentation, handover logs, maintenance sheets, daily production logs and process checks in line with organisational procedures.

K11 K13 K20 K25 K29 K30 K32 K37
S1 S7 S12 S18 S19 S26 S28
B1 B2 B5 B6

Duty 13 Make technical contributions and recommendations for products and processes. Provide feedback and evaluation of tooling and optimum machine settings.

K11 K21 K31 K38
S1 S8 S9 S10 S11 S14 S15 S16 S17 S18 S28
B1 B2 B3 B4 B5 B6 B8

Duty 14 Develop and maintain effective working relationships with colleagues, technical support staff and other

K11 K14 K21 K22 K24 K28 K31 K32 K33 K35
S11 S14 S15 S16 S17 S18 S20 S28
B3 B5 B6 B7 B8

relevant stakeholders to ensure that customer and business requirements are met.

KSBS

Knowledge

K1: Principles of reading and interpreting engineering drawings and documentation.

K2: Part numbers for tooling and wire.

K3: Types of cold forming machinery. The differences between machines and the mechanisms that they use.

K4: Wire: loading, setting the drawer and feeding into the machine

K5: Tooling: visual inspection, assembly and securing.

K6: Principles of setting-up a cold forming machine.

K7: Principles of high-volume metal cold forming techniques in a continuous production environment to build and form the progressions to achieve final shape.

K8: Gauges and measurement systems used in cold forming.

K9: How to complete visual inspection of the parts as they are made and how to recognise defects and tooling wear.

K10: Tooling failure mechanisms. How tools fail and the impact that the set-up of the machine has on tooling failure.

K11: Documentation: methods and requirements – electronic and paper.

K12: Process monitoring equipment: what the process monitor does and why it is required. How it is used to check machine set-up and to monitor variation in the process.

K13: Statistical Process Control (SPC) data input and how to interpret SPC charts.

K14: Team working principles.

K15: Problem solving techniques for root cause analysis: 5 Whys, Fishbone Diagram, PDCA (Plan Do Check Act), Pareto Chart, Change Analysis, Fault Tree Analysis, FMEA (Failure Mode Effects Analysis), DMAIC (Define, Measure, Analyse, Improve, Control).

K16: Principles of properties of materials. Metallurgical properties of metals: mild steel, carbon steel, stainless steel, titanium, copper, brass and aluminium. Effect on materials during the forming process.

K17: Principles of steel and wire manufacturing processes.

K18: Principles of tooling materials and manufacturing processes.

K19: Machine mechanisms, lubrication, air and drive systems.

K20: Awareness of health and safety regulations, relevance to the occupation and the technician's responsibilities: Control of Substances Hazardous to Health (COSHH), electrical safety and compliance, emergency evacuation procedures, Health and Safety at Work Act – responsibilities, isolation and emergency stop procedures, Lifting Operations and Lifting Equipment Regulations (LOLER), manual handling, near miss reporting, noise regulations, Provision and use of Work Equipment Regulations (PUWER), Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR), safe systems of work, safety equipment: guards, signage, fire extinguishers, situational awareness, slips, trips and falls, types of hazards, Personal Protective Equipment (PPE), working at height, working in confined spaces.

K21: Verbal communication techniques. Giving and receiving information. Matching style to audience. Barriers in communication and how to overcome them. Engineering terminology.

K22: Non-verbal communication techniques: gestures, facial expressions, tone of voice, eye contact, body language.

K23: Continuous improvement techniques: lean, 6-sigma, KAIZEN, 5S (sort, set shine, standardise and sustain), SMED (Single minute exchange of dies).

K24: Equality Act. Equality, diversity and inclusion in the workplace. Unconscious bias.

K25: Maintenance practices and techniques: planned, preventative, predictive and reactive methods and their frequency.

K26: Stock requirements. Control systems. Stock rotation. Stock considerations: availability, stock lead times, stock value, faulty stock, salvageability of parts removed.

K27: Standard operating procedures (SOP). What they are and why they are important. What they need to cover and why. Visuals and symbols used in SOP.

K28: Escalation procedures.

K29: Manufacturers' instructions: what they are and how to use them. Warranties: what they are and the impact on engineering work.

K30: Quality management standards. Quality assurance principles and practice. Record keeping.

K31: The cold forming industry. Types of organisations. Types of products. Supply chain. Customers. Customer requirements. Impact on product demand.

K32: Planning, prioritising, work scheduling, workflow and time management techniques. Work management systems. Work categorisation systems.

K33: Business operation considerations: efficiency, customer satisfaction, competitiveness, minimising risks to operation and ethical issues.

K34: Principles of sustainability and circular economy. Energy efficiency and reuse of materials. Recycling procedures. Principles of control and management of emissions and waste. Efficient use of resources.

K35: Continued professional development: planning and accessing development opportunities.

K36: Principles and requirements of restoring the work area.

K37: Principles of hazard identification and risk assessment.

K38: Principles of recognising variation in the process when conducting dimensional and visual inspection and making adjustments to the process to maintain control.

Skills

S1: Read and interpret information. For example, text, data, engineering drawings, job card, work instructions, risk assessments, method statements, operation manuals, permits to work, instructions.

S2: Load wire onto the wire turntable and prepare the coil to feed into the machine.

S3: Select tooling components.

S4: Inspect, assemble, fit and clamp tooling components.

S5: Build progressions across multiple stations incorporating processes such as forward and backward extrusion, upsetting, heading, trimming and piercing.

S6: Use gauges and measuring equipment.

S7: Input data and assess charts on Statistical Process Control (SPC) software.

S8: Make adjustments to the process to maintain control.

S9: Assess condition of components and equipment. Identify action required such as monitoring tooling for wear during process and make changes.

S10: Troubleshoot machine running issues and take corrective action.

S11: Communication with others verbally for example, colleagues and stakeholders.

S12: Apply health and safety procedures and safe systems of work in compliance with regulations and standards.

- S13:** Use process monitoring equipment.
- S14:** Create, maintain and enhance productive working relationships.
- S15:** Apply continuous improvement techniques. Devise suggestions for improvement.
- S16:** Carry out and record planned and unplanned learning and development activities.
- S17:** Apply team working principles.
- S18:** Record or enter information – paper based or electronic. For example, energy usage, job sheets, risk assessments, equipment service records, test results, handover documents and manufacturers' documentation, asset management records, work sheets, checklists, dimensional records, waste environmental records and any legal reporting requirements.
- S19:** Apply environmental and sustainability procedures in compliance with regulations and standards. for example, segregate resources for reuse, recycling and disposal.
- S20:** Follow equality, diversity and inclusion procedures.
- S21:** Apply problem solving techniques.
- S22:** Identify and document hazards and risks in the workplace.
- S23:** Restore the work area on completion of the activity.
- S24:** Apply maintenance practices. For example, check levels, parts wear, pressure and sensors and grease and lubricate.
- S25:** Obtain and check stock and supplies. Complete returns.
- S26:** Apply standard operating procedures (SOP).
- S27:** Identify, organise and use resources to complete tasks with consideration for cost, quality, safety, security and environmental impact.
- S28:** Plan work.

Behaviours

- B1:** Take responsibility for completing work.
- B2:** Act professionally.
- B3:** Committed to continued professional development (CPD) to maintain and enhance competence in their own area of practice.
- B4:** Respond and adapt to work demands and situations.
- B5:** Take account of diversity and inclusion requirements.
- B6:** Has a focus on quality and promotes improvement.
- B7:** Take personal responsibility for and promote health and safety.
- B8:** Considers the environment and sustainability.

Qualifications

English and Maths

Apprentices without level 2 English and maths will need to achieve this level prior to taking the End-Point Assessment. For those with an education, health and care plan or a legacy statement, the apprenticeship's English and maths minimum requirement is Entry Level 3. A British Sign Language (BSL) qualification is an alternative to the English qualification for those whose primary language is BSL.

Does the apprenticeship need to include any mandated qualifications in addition to the above-mentioned English and maths qualifications?

No

Professional recognition

This standard aligns with the following professional recognition:

- Institute of Mechanical Engineers for Engineering Technician

Consultation

Consultation to go here.

Progression Routes

ST0841 Engineering manufacturing technician 1.0 L4

Supporting uploads

Mandatory qualification uploads

Mandated degree evidence uploads

Professional body confirmation uploads

Involved employers

Atlas Copco, Carlo Salvi UK, Clevedon Fasteners, Complex Cold Forming, Confederation of British Metalforming, Fixfast Ltd, Gesipa, Howmet, JCS Hi-Torque, LISI Aerospace, National Machinery, Optimas, PCC Aerostructures

Subject sector area

4.2 Manufacturing technologies