City & Guilds Level 2 Extended Technical Occupational Entry in Engineering (Diploma) – Production Engineering pathway (2145-12)

Version 1.0 (November 2024)

Practical Assignment Pack 2145-252 Assessor Pack (Sample)

Version and date	Change detail	Section
V1.0 November 2024	Initial version	All

Contents

1. Assessment overview

This guidance contains assessment documentation for the **Level 2 Extended Technical Occupational Entry in Engineering (Diploma) Production Engineering pathway.**

The assessment for this component consists of an assignment that includes an assignment brief and then a number of tasks for the candidate to complete.

Each task is assessed by grading descriptors which detail achievement required for a Fail level and Pass level.

2. Assignment guidance

General task guidance

Please read **all** information carefully before the assessment.

Overarching conditions
For this assignment, the candidates will be completing a number of tasks as specified in the task details below.
These are:

- a production plan task
- a manufacturing task
- an update of production plan for volume production
- a CAD drawing
- a CAD/CAM file including CNC code.

Candidates are required to complete all tasks successfully to achieve the practical assessment for the Level 2 Extended Technical Occupational Entry in Engineering (Diploma).

The expected total time for completion of this assignment is 18 hours (not including preparation or recording time). Reasonable adjustment to the duration of the practical tasks is permitted if, in the professional opinion of the assessor/tutor, this is a reasonable adjustment in line with industry procedures and practices.

Tasks can be released at once to the candidates. The tasks must be completed in order.

Internet access
Where internet access is allowed as part of a task (e.g. for research or report writing purposes) candidates must be advised that this is the case and reminded of the importance of submitting their own work and the seriousness of plagiarism, malpractice and collusion. Candidates should be advised that their browser history can be monitored and checked.

Use of Artificial Intelligence (AI)
Candidates should be reminded that the purpose of this assessment is to reflect their own abilities at responding to and generating evidence for the tasks. AI misuse constitutes malpractice which may result in malpractice sanctions for the candidate involved. Centres should ensure candidates are aware of the guidance on the use/misuse of AI.

What is permitted
AI may be used by a candidate as a source where use of the Internet is allowed for a research task or where production of evidence is allowed outside of controlled/supervised conditions. The candidate must be able to demonstrate that the work is their own. Where candidates use AI, they must acknowledge its use and show clearly how they have used it. How candidates have decided to use it could impact on the overall mark they are allocated.

What is not permitted
AI misuse is where a candidate uses an AI tool in an assessment or fails to appropriately reference it in an assessment where internet use is permitted. Examples include the following:

- Copying sections of AI-generated content so that the work is no longer the candidate's own will be treated as plagiarism.
- Copying whole responses of AI-generated content will be treated as plagiarism.

- Any use of AI which means students have not independently demonstrated their own attainment is likely to be considered malpractice.
- Failing to reference use of AI tools when they have been used as a source of information.
- Incomplete or poor referencing of AI tools.
- Submitting work with intentionally incomplete or misleading references or bibliographies.

AI misuse constitutes malpractice as defined in the JCQ Suspected Malpractice: Policies and Procedures (https://www.jcq.org.uk/exams-office/malpractice/).
We encourage providers to read and reference this guidance. The malpractice sanctions available for the offences of 'making a false declaration of authenticity' and 'plagiarism' include disqualification.

Time
The total time for completion of this assessment is **18 hours** divided per task as follows:

- Task 1 – 3 hours
- Task 2 – 12 hours
- Task 3 – 3 hours

Tasks should be completed within a period of 3 days.

All allocated task timings include time for candidates to work on and produce the required evidence, as well time for thinking, reflection, and application of prior knowledge from the specification content.

Candidates are not required to have formal reading time for the scenario and brief, this is included within the duration for Task 1.

When working under controlled conditions for longer sessions, breaks can be facilitated outside of the controlled conditions, ensuring the room is locked and all candidates have vacated once the break begins. All materials must be kept securely during the break.

Resources
Candidates must have access to a suitable range of resources to carry out the tasks and, where appropriate, to have the opportunity to choose components, tools and equipment that demonstrate their ability to select from a range of appropriate materials.

Where candidates need access to evidence that has been submitted as part of a previous task, this will be provided as a copy of the original evidence and will be given at the start of the relevant task.

Candidates must use blank versions of appendices 1 and 2 as featured in the Candidate Pack.

Assessor versions of appendices 1 and 2 are provided in this Assessor Pack.

The candidate should have access to the following to select and carry out each task:

- CAD/CAM equipment
- workshop and machining facilities, including metal lathes and milling machines

- 20 mm diameter mild steel bar stock (approximately 50 mm length per candidate)
- mild steel flat bar stock for clamp arms, 11 mm thickness, 50 mm width (approximately 300 mm length per candidate)
- M8 x 1.0 mild steel screw rod (approximately 200 mm per candidate).

General hand tools

- Rules
- Tapes
- Scribers
- Centre punch
- Internal and external callipers
- Combination sets
- Engineer's square
- Micrometers
- Verniers
- Spirit level
- Protractors
- Socket sets: metric and imperial
- Torque wrench
- Taps and dies (metric and imperial)
- Hammers and mallets
- Files: flat, diamond point and half round
- Cold chisels
- Clamps: G clamps, mole grips, ratchet, carver and sash clamps
- Spanners: open-ended, combination, podger and adjustable (metric and imperial)
- Allen keys (metric and imperial)
- Screwdriver sets: cross and flat head
- Pliers: combination, snipe nose and circlip
- Hacksaws/junior hacksaws
- Tin snips/hand shears
- Crimping tools/pliers
- Battery-operated drills, screwdrivers etc
- Drill bits
- Battery-operated angle grinder
- Compressed air tools: impact wrench, air screwdriver, air drills, air die grinder and air angle grinder
- Hand and angle grinders
- Electric nibbler – shears

Standing machine equipment

- Pistol, bench, pillar and radial drills
- Band and circular saws
- Welding equipment
- Guillotine
- Box and pan folder
- Bench/pedestal grinders
- Bench shears
- Lathes
- Millers

- Surface grinders
- Plasma cutters
- Oxy-fuel cutting equipment

Turning

Machine and machining tools/equipment

- Centre lathe
- Work holding equipment
- Cutting tools
- Callipers, rule, micrometers, dial test indicators (DTIs) and surface finish comparison gauges
- Suitable CNC software
- V-blocks
- 3-jaw chuck
- 4-jaw chuck
- Live and dead/revolving centres
- Plain mandrel
- Machine vice
- Drive plate
- Centres
- Collet chuck
- Chuck key
- Allen keys

Cutting tools

- High speed steel (HSS) and tungsten carbide
- Roughing
- Turn and facing
- Knife
- Parting
- Grooving
- Centre drill
- Boring
- Knurling
- Slab, face and end mill
- Slot drill
- Side and face cutter
- Angle cutter
- Chamfer
- Gear cutter
- Centre drills
- Twist drills
- Stock
- Die
- Taps and tap wrench
- Hacksaw
- Emery cloth
- Files

Production engineering hand tools

- Square
- Scriber
- Protractor/combination set
- Callipers
- Rule
- Micrometers
- DTIs
- Verniers
- Vernier height gauges
- Comparison gauges
- Surface finish comparison gauges
- Wrenches and Allen keys

Milling

Machine and machine tooling

- Milling machine (horizontal and vertical)
- Suitable CNC software
- Work holding equipment
- Milling machine vice
- Clamps and T-slot nuts/bolts
- V-blocks
- Edge/centre finder
- Collets
- Angle plate
- Parallel strip

Task-specific guidance

- These tasks should be undertaken individually in a controlled workshop assessment area, with access to facilities to enable the candidates to complete paperwork as required.
- Before the assignment commences, ensure that the candidate understands the task to be performed. Ask the candidate to sign the Declaration of Authenticity to confirm that the work produced is the candidate's work.

Task 1 – Prototype planning

- Candidates must carry out the task on their own, under controlled conditions.
- Ratio of candidates to assessor: flexible based on local conditions and support, and it can be up to a maximum of 15:1.
- Resources
    - Candidates must be given the following at the start of the task:
        - assignment brief including Figures 1, 2 and 3
        - Appendix 1 – Process operation sequence template
        - non-programmable scientific calculators – their use is allowed.
    - Appropriate ICT equipment and software to complete production plan
    - Access to relevant information sources (digital or hard copy)

Task 2 – Manufacture prototype

- Candidates must carry out the task on their own, under controlled conditions.
- Ratio of candidates to assessor: flexible based on local conditions and support, and it can up to a maximum of 6:1.
- The use of non-programmable scientific calculators is allowed.
- Setup
    - The adjustment caps could be manufactured from a piece of bar stock in a single operation and separated by parting off. The centre can add small bevels to the ends of the adjustment caps if required to avoid sharp edges and burrs.
    - Manual taps can be used to make internal threads.
    - The screwed rod can be cut manually and dressed using dies or die nuts.
    - The maximum appropriate tolerances applied must be 0.2mm.
- Resources
    - Candidates must be given the following at the start of the task:
        - pre-cut templates for the top and bottom plate
        - assignment brief including Figures 1, 2 and 3
        - Appendix 2 – Assessor quality record check template
        - copy of their completed plan (Process operation sequence) from Task 1 (for reference only)
        - access to appropriate reference materials, such as machining datasheets and risk assessments are allowed. All reference material used must be listed within the assignment.
    - Workshop and machining facilities, including lathes and milling machines
    - Camera and/or video equipment for taking photos/videos of the finished component
    - A suitable range of resources to carry out the tasks and, where appropriate, to have the opportunity to choose materials demonstrating the ability to select from a range of appropriate materials
    - 20mm diameter mild steel bar stock (2 x 25mm minimum length per candidate)
    - Mild steel flat bar stock for clamp arms, 11mm thickness, 50mm width (2 x 150mm minimum length per candidate)
    - M8 x 1.0 mild steel screw rod (2 x 100mm minimum length per candidate)

Task 3 – CAD/CAM file for volume production

- Candidates must carry out the task on their own, under controlled conditions.
- Ratio of candidates to assessor: flexible based on local conditions and support, and it can be up to a maximum of 15:1.
- Candidates cannot use this time to amend their Task 1 plan, which should have been saved separately from Task 3.
- Resources
    - Candidates must be given the following at the start of the task:
        - assignment brief including Figures 1, 2 and 3
        - copy of their completed plan (process operation sequence) from Task 1 and quality record check from Task 2 (for reference only).

- CAD/CAM software package
- Access to relevant information sources (digital or hard copy)
- Appropriate ICT equipment and software to update the production plan

- Following the completion of all tasks, candidates and assessors will be required to sign a Declaration of Authenticity to confirm that the work produced is their own.

Resit opportunities
Candidates must achieve a Pass in **all three tasks** to achieve a Pass for the assessment overall.

In cases where candidates fail a task, they will be required to complete a further period of learning before then resitting all tasks within a different version of the assessment.

Candidates can retake a different version of the assignment up to maximum of **three** times before re-registration is required.

3. Assignment brief

You work for a manufacturing company as a production engineer. You have been asked to produce a prototype of a hand clamp tool. The client has provided some technical sketches containing all the key features and dimensions (Figures 1, 2 and 3).

The clamp comprises six components: a top plate and a bottom plate, which have been pre-prepared, two pieces of screw-bar and two adjustment caps. These are all to be made from mild steel.

You must decide which processes to use to manufacture the components and then carry out the manufacturing operations. The operation must be carried out using manual machining processes. If the prototype is successful, the product will be manufactured in large quantities, and you will need to produce a CAD/CAM file for volume production.

To complete this task, you must:

- Produce a production plan for the prototype clamp with reference to Figures 1, 2 and 3.
- Manufacture and assemble the components based on the production plan, and evaluate the completed prototype against Figures 1, 2 and 3.
- Update the production plan with a CAD/CAM file for volume production.

This assignment has a total duration of **18 hours**.

Figure 1

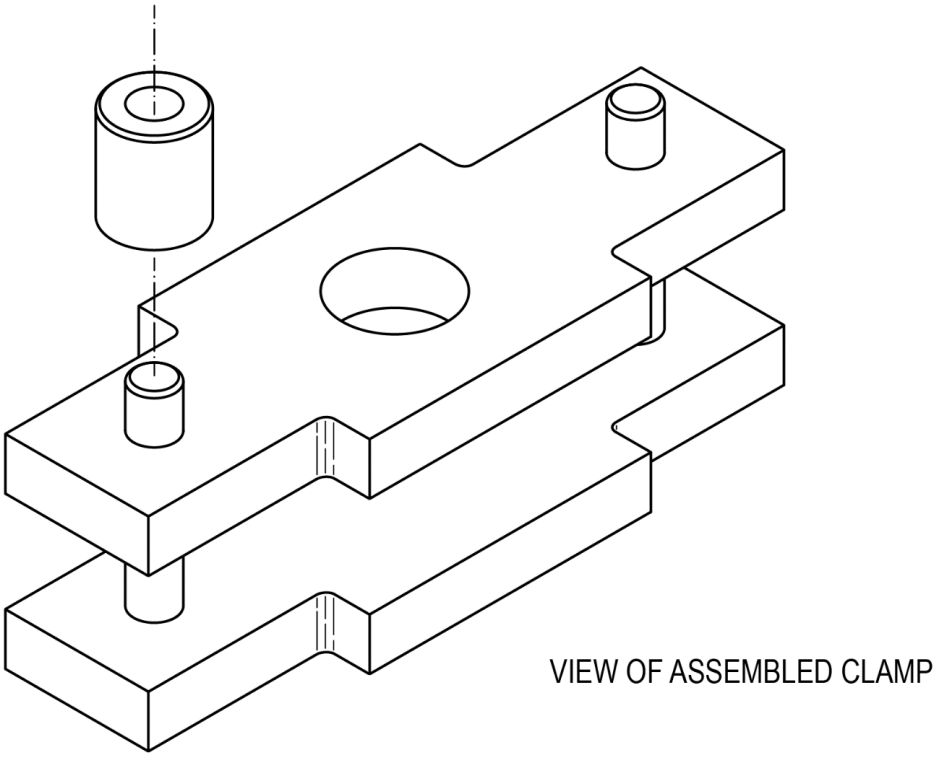


Figure 2 [1]

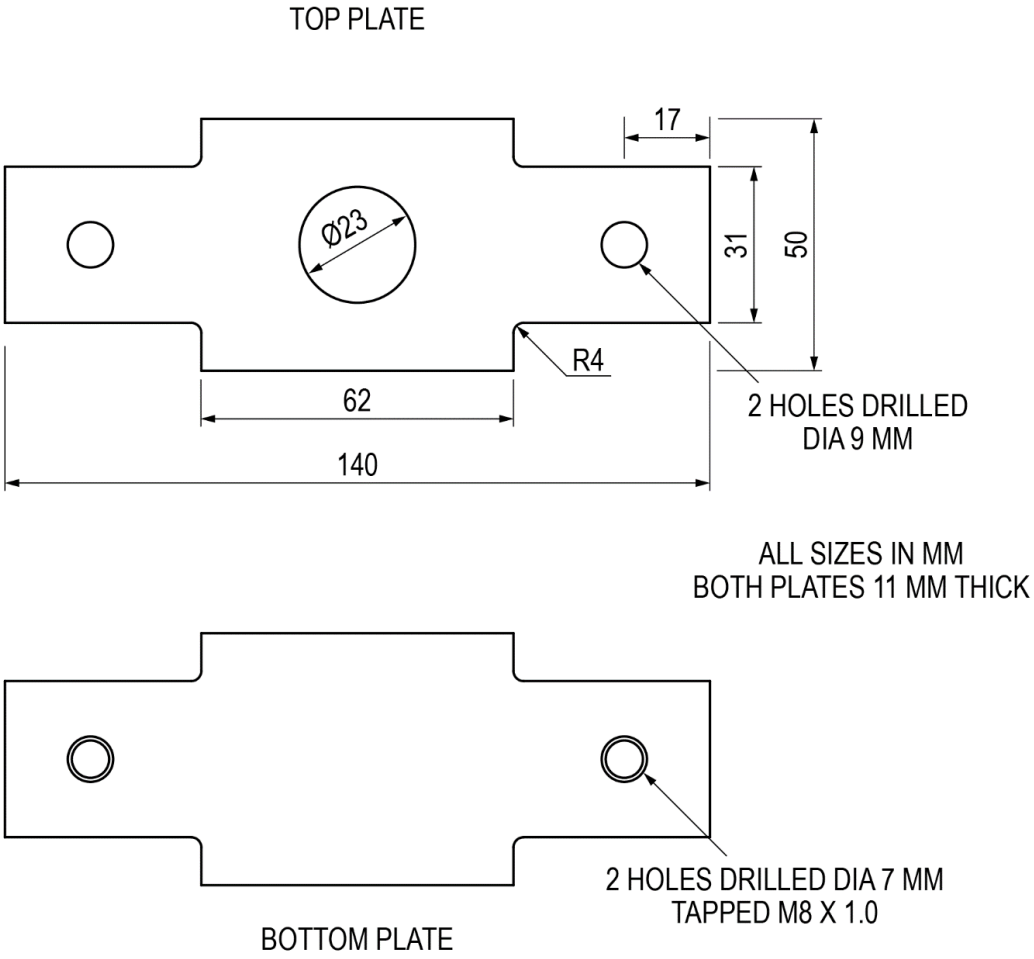
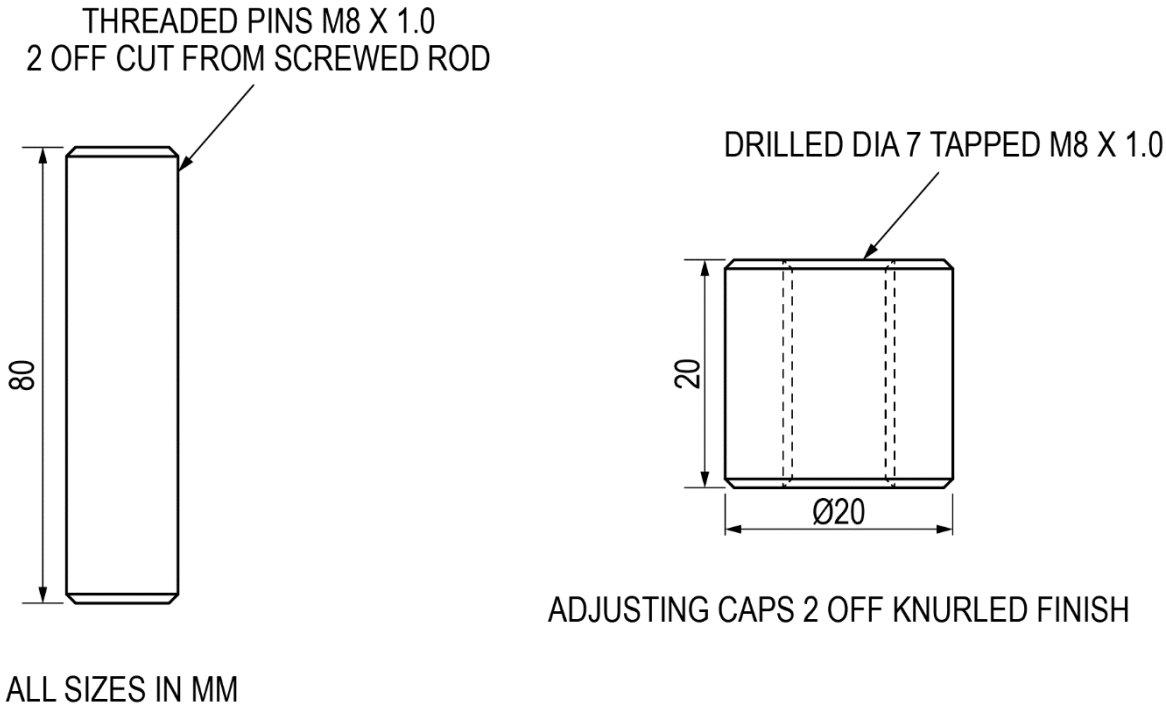


Figure 3[2]



[1] Tolerance of 0.2mm

[2] Tolerance of 0.2mm

4. Tasks

Task 1 – Prototype planning

The candidate must:

a) Read the assignment brief and analyse the sketches provided in Figures 1, 2 and 3 in the assignment brief to determine which processes will be used to produce the different components of the hand clamp prototype.

b) Produce a production plan for the prototype using Appendix 1 – Process operation sequence template (provided); this must include:
- project details, eg the hand clamp and materials
- equipment and tools
- planning the activity of component operations in relation to:
  - a top plate
  - a bottom plate
  - two pieces of screw-bar
  - two adjustment caps.

Conditions of assessment
- The time allocated for this task is **3 hours.**
- Candidates must carry out the task on their own, under **controlled conditions** while being observed.

Controlled conditions
- Candidates must only work on the task in the allocated time.
- Assessment evidence must be handed in at the end of each session for secure storage which cannot be accessed.
- Candidates must not share or discuss their work with other candidates.
- Candidates are not permitted to bring any additional materials into the assessment session.

What must be produced for grading
- Production plan for the prototype using Appendix 1 – Process operation sequence template

Resources
- Access to relevant information sources (digital or hard copy)
- Appendix 1 – Process operation sequence template
- Appropriate ICT equipment and software

Task 2 – Manufacture prototype

Candidates must:

Make the prototype, working safely at all times:

- Prepare the work area and refer to the risk assessment provided by the assessor.
- Manufacture the components.
- Assemble the components.
- Evaluate the machined features against the sketches in Figures 1, 2 and 3 and record measurements in Appendix 2 – Assessor quality record check template.
- Restore the work area.

Conditions of assessment

- The time allocated for this task is **12 hours.**
- Candidates must carry out the task on their own, under **controlled conditions** while being observed.

Controlled conditions

- Candidates must only work on the task in the allocated time.
- Assessment evidence must be handed in at the end of each session for secure storage which cannot be accessed.
- Candidates must be provided with top and bottom templates by the assessor in advance of Task 2.
- Candidates must not share or discuss their work with other candidates.
- Candidates are not permitted to bring any additional materials into the assessment session.

What must be produced for grading

- Completed prototype
- A minimum of **four** photographs or videos of the completed prototype components from multiple angles and positions
- Completed quality record check

Additional evidence for this task

- Assessor observation of the candidate's working practice describing the quality, consistency and accuracy of the finished work
- Photo or video evidence of the manufacturing activity

Resources

- Appendix 2 – Assessor quality record check template
- Non-programmable scientific calculator
- 20mm diameter mild steel bar stock (2 x 25mm minimum length)
- Mild steel flat bar stock for clamp arms, 11mm thickness, 50mm width (2 x 150mm minimum length)
- M8 x 1.0 mild steel screw rod (2 x 100mm minimum length)
- Appropriate personal protective equipment (PPE)

- Access to appropriate reference materials, such as machining datasheets and risk assessments are allowed. All reference material used must be listed within the assignment.

Task 3 – CAD/CAM file for volume production

Candidates must:

a) Plan and produce a CAD/CAM file for volume production of the adjusting cap.
   - Update their production plan from Task 1 for volume production of 1000 adjusting caps to include:
     - advantages and disadvantages of the process and the level of automation in comparison to the prototype, referring to the quality record check from Task 2
     - producing a CAD drawing of adjusting cap(s) for the CAD/CAM file.

   - Candidates need to produce a 2D CAD/CAM file that must include:
     - the CNC code for the adjusting cap.

Conditions of assessment

- The time allocated for this task is **3 hours.**
- Candidates must carry out the task on their own, under **controlled conditions** while being observed.

Controlled conditions

- Candidates must only work on the task in the allocated time.
- Assessment evidence must be handed in at the end of each session for secure storage which cannot be accessed.
- Candidates must not share or discuss their work with other candidates.
- Candidates are permitted to have access to their Task 1 production plan (process operation sequence) and quality record check from Task 2 (for reference only), but are not permitted to bring any other materials into the assessment session.

What must be produced for grading

- Updated production plan (process operation sequence) for volume production of adjustment cap in the form of a new document
- CAD/CAM file

Resources

- Access to relevant information sources (digital or hard copy)
- Appropriate ICT equipment and software
- CAD/CAM software
- Internet access, if required for CAD/CAM software

5. Grading

Task grading descriptors

Grading descriptors for each task are displayed in the tables below. Each table includes a descriptor of candidate evidence at minimum 'Pass' level and just below Pass level, ie Fail.

Assessors should consider the grading descriptors in each task table and consider whether candidates have met each of the descriptors that define the minimal performance required for a Pass grade.

The indicative content is specific for **this version** of the assignment and is provided to supplement the grade descriptors, giving a sense of the intentions of the task evidence and expected parameters of the response for the given assignment version. The indicative content is not, however, exhaustive. The assessor should use the indicative content to support their judgement, but ultimately the judgement should be based on whether the candidate evidence meets the minimal pass requirements as outlined by the grading descriptors.

The Fail descriptor may be helpful to support the assessor to confirm that the evidence presented meets the Pass requirement – but note, **all** individual grading descriptors within a grading grid **must** be met at the Pass descriptor in order to confirm a Pass grade for the task.

All tasks must be completed successfully for a Pass grade to be awarded.

Task 1 – Prototype planning

Fail	Pass
Incomplete planning, including missing content would result in a failed or significantly flawed component: **Planning** • Processes of production identified that would fail to manufacture the required specification. • Materials, equipment and tools are incomplete, inaccurate and/or inappropriate. • Plan misses key steps and/or is not a logical sequence of work, resulting in failure to meet the required specification. • Partial completion of required planning documentation.	Planning would result in component made and assembled within tolerance: **Planning** • Identified suitable processes of production to manufacture component(s) to specification. • Identified materials, equipment and tools are accurate and appropriate. • Work planned with key steps identified in a logical sequence. • Required planning documentation completed.

Indicative content (what will be seen for **this version** of the task)

Planning

- Project details
  - Material: mild steel
  - Dimensional tolerances: ±0.2mm
  - Surface finish requirements: clean and smooth finish, without scratches or other imperfections
- Equipment and tools
  - Use of lathes and machine calibration
  - Cutting tool(s): drill
- Sequence
  - Start-up procedures
  - Manufacture
  - Assemble
  - Evaluate
  - Shut-down procedures

Task 2 – Manufacture prototype

Fail	Pass

Manufactured component does not meet the specifications of the brief, drawings and task:
 	
Safe working
• Work area set up for safe working, without consideration of major hazards and risks. Unsuitable and/or insufficient control measures employed to mitigate the risks.
• Didn't consistently follow safe working practices. Missed pre-use checks and control measures when using tools, equipment and machinery.
• Risk assessment has not been followed.
 	
Process/method
• Work area set-up with incorrect resources, tools, equipment, and machinery for the task.
• Sequence of work was not logical, resulting in missed processes and failing to meet the specification.
• Tools, equipment, and machinery not set up or used correctly for their intended purpose. Minimal dexterity when using tools.
• Measuring and marking out was inaccurate and used unsuitable methods and techniques resulting in wastage.
• Inaccurate cutting of materials.
• Inaccurate assembly of component
• Partial completion of required records, lacking required information.
 	
Quality of work
• Set up machinery with inaccuracies; didn't refer to sources of information resulting in finished component not fully meeting specification.
• Component:
  ○ not within tolerance
  ○ not effectively cleaned
  ○ no finish applied.
	Manufactured component carried out to specification of the brief, drawings and task:
	
	Safe working
	• Work area set up for safe working, removing risks and employing control measures as appropriate.
	• Consistently followed safe working practices and applied appropriate pre-use checks and control measures when using tools, equipment and machinery.
	• Risk assessment followed to ensure safe working, with identification of relevant hazards, who is at risk and suitable control measures to mitigate risks.
	
	Process/method
	• Work area set up with correct tools, equipment and machinery.
	• Followed appropriate sequence of work to ensure specification met and completed within time allocated.
	• Used and prepared appropriate materials, equipment and tools.
	• Proficient, dexterous use of tools and equipment, and machinery safely and correctly for their intended purpose.
	• Accurately measured and marked out material(s) for cutting/drilling and assembly (as applicable), using suitable techniques.
	• Accurately cut required components from engineering material(s) using suitable forms of supply.
	• Accurate assembly of component.
	• Records accurately completed with relevant information.
	
	Quality of work
	• Referred to specification/sources of information to ensure finished component met specification.
	• Completed component:
	  ○ within specified tolerance
	  ○ clean
	  ○ has correct finish (if applicable).

Indicative content (what will be seen for **this version** of the task)

Prototype manufactured to requirements of brief and task.

Safe working

- PPE selected and used: apron, safety boots, ear protection, gloves, headshield and goggles
- Control measures employed: PPE, manual handling tools, maintained clean and clear walkways, and checked guards and automatic stop on machinery
- Assessor observation of safe working, including clean and clear workspace, manual handling, use of PPE, application of control measures, following centre policies and shutting-down procedures

Process/method

Used suitable sequence and processes/methods of production engineering to meet the specification:

- prepared materials
- accurate measuring and marking out, making efficient use of correct materials
- drilling: holes – two x 9mm in top plate, one x 23mm hole in top plate and two x 7mm in bottom plate – and two adjusting caps
- cutting: threaded caps from screw rod, adjusting caps, and top and bottom plate
- assembly: thread pins join the top and bottom plates, and adjusting caps fit threaded pins
- cleaned assembled component
- shutting-down procedures
- disposed of waste
- tidied work area
- returned tools, equipment and machinery to storage.

Suitable tools, equipment and machinery inspected before use and used safely and correctly – measuring and marking out rule, tape measure and straight edge.

Quality of work

- Referred to Figures 1, 2 and 3 and measurements throughout
- Completing Appendix 2 with accurate measurements and confirmation of tolerances being met
- Referred to and followed process sequencing operation plan throughout
- Dimensions of completed component meet specification, within tolerance of +/- 0.2mm

Task 3 – CAD/CAM file for volume production

Fail	Pass
Updated plan and CAD/CAM file would not result in successful volume production of component(s), if mass produced. **Process/method** • Demonstrates no or little knowledge of the requirements of the updated plan. • No reference to the quality record check from Task 2. • Incomplete or inaccurate CAD drawing. • Simulated manufacture errors are not corrected. • Fails to show basic understanding of G and M command codes. • Fails to generate correct CNC code. **Quality of work** • No or inappropriate reference to original production operation sequence plan from Task 1. • Fails to complete a quality check of drawing, CNC code and/or simulated product not within tolerance.	Updated plan and CAD/CAM file would result in successful volume production of component(s), if mass produced. **Process/method** • Demonstrates knowledge of the requirements needed to update their plan for volume production. • Reference to quality record checks in Task 2. • Accurate CAD drawing as per the requirements of the task. • Applies G&M codes correctly to produce CNC code. • Any errors in CAD/CAM file production are rectified before final simulation is produced. **Quality of work** • Updates their original plan from Task 1 to meet the requirements of the brief in Task 3. • Completes quality checks throughout the process of drawing CAD/CAM file. • Simulated product within tolerance.

Indicative content (what will be seen for **this version** of the task)

CAD/CAM file created to meet requirements of brief and task.
 	
Process/method
Update of production plan from Task 1:
• listed advantages and disadvantages of using automation over manual/machine processes used in prototype with references to any of the following:
  ○ cost
  ○ time
  ○ make v buy
  ○ technology

Indicative content (what will be seen for **this version** of the task)

- quality
- quality of product
- quantity
- ethics.

- used assessor quality record check (Appendix 2) to update plan for volume production considering accuracy using CAD and CNC and minimising of defects including burrs and poor surface finish on the completed components.

Quality of work

CAD/CAM file:

- Completed CAD drawing in 2D of adjustment cap
- Simulated manufacture in the CAD/CAM software package
- Generated the CNC code for the adjusting cap
- Completed quality checks of CNC code referring to brief and task.

6. Centre guidance

Guidance provided in this document supports the administration of this assessment.

This assessment is designed to require the candidate to make use of the knowledge, understanding and the practical skills they have developed over the course of their learning to complete tasks/problems/challenges.

This approach to assessment emphasises to candidates the importance of applying the full range of their learning into practice in their chosen industry area.

Candidates are provided with an assignment brief. They must draw on their knowledge and skills and independently select and apply the correct processes, tools, equipment, materials and approaches to take, to complete the brief.

During the learning programme, it is expected that tutors will have taken the opportunity to set shorter, formative tasks that uses the learning they have so far covered, drawing this together in a similar way, so they are familiar with the format, conditions and expectations of the assessment.

Candidates should be made aware during the learning programme what the assessment will be measuring, and how the assessment will be marked. Candidates should understand the level of performance that will be required as a minimum to demonstrate the level of competence required.

Candidates should not be entered for the assessment until the end of the course of learning for the qualification, so they are prepared to complete the assignment successfully.

Health and safety

Candidates must not be entered for assessment without being clear on the importance of working safely and having attended sufficient practical training to be able to work safely. The assessor must immediately stop an assessment if a candidate works unsafely. At the discretion of the assessor, depending on the severity of the incident, the candidate may be given a warning. If they continue to work unsafely, risking the safety of themselves or others, the assessment must be ended, and they must retake the assessment in a future series after significant further training has taken place. Any warnings issued to a candidate must be considered as part of the grading process and recorded on the Assessor Observation Record Form. Any actions that have led to that warning must be detailed on the Assessor Observation Record Form so they can be considered along with the other evidence when applying the grading descriptors.

Compliance with timings

Due to the nature of this assessment, the maximum time allowances provided for each task must be adhered to. They refer directly to assessment time, not any additional setting up times the centre needs to create an appropriate assessment environment.

Word counts

Typical word counts, where indicated, are to be used as approximates for guidance to support the production of sufficient evidence. The grading will relate to the quality of the evidence produced and not whether the word count has been met.

Assessor student ratios

The number of candidates an assessor will be able to observe at one time will vary depending on local conditions relating to:

- monitoring and maintaining safety during assessment
    - any specific hazards related to the task that pose a risk of harm in relation to the competence of the learners
    - availability of supervisory staff to support the assessor
- the practicalities of collecting evidence
    - the complexity of evidence collection for the task
    - whether there are any peak times where there is a lot of evidence to collect that will need additional support or any that are quieter which may be eased through staggered starts etc
    - local conditions e.g.
        - layout of the assessment environment and sufficient assessor line of sight to task activity throughout the assessment period
        - amount of additional support available (e.g. to capture image/video evidence)
        - availability of suitable workspaces/bays or of shared resources and equipment.

Centres are advised to trial the planned arrangements during formative assessment, reviewing the quality of evidence captured and manageability. It is expected that for straight forward observations, with favourable local conditions and support, (and unless otherwise specified) no more than six candidates will be observed by a single assessor at one time, and the number will usually be fewer than this maximum. The key factors to consider are the logistics of collecting sufficient evidence and ability to remain working safely in the assessment environment. A timetable of assessments and layout of the workspaces, detailing:

- the students being assessed at each workstation
- the assessor(s)
- support staff present

must be available for verification on request.

Observation evidence

Observation notes form part of the candidate's evidence and must capture evidence of student performance during the practical tasks describing how well the activity has been carried out, rather than stating the steps/actions, the candidate has taken. The notes must be very descriptive and focus on the quality of the performance that are notable in relation to the quality indicators in the grading descriptors. They must provide sufficient, appropriate evidence that can be used by the assessor (and for verification) to assess the performance against the grade descriptors.

Identifying what it is about the performances that is different between candidates can clarify the qualities that are important to record. Each candidate is likely to carry out the same steps, so a checklist of this information would not help differentiate between them. However, qualitative comments on how well they do it, and quantitative records of accuracy and tolerances would.

The assessor should refer to the grading grid to ensure appropriate aspects of performance are recorded. These notes will be used for grading and verification purposes and so must be detailed, accurate and differentiating.

Assessors should ensure that any required additional supporting evidence including e.g. photographs or video can be easily matched to the correct candidate, are clear, well-lit and

showing the areas of particular interest in sufficient detail and clarity for assessment (ie taken at appropriate points in production, showing accuracy of measurements where appropriate).

Assessor grading and justification is completed on a separate form (Candidate Record Form).

As far as possible candidates must not be distracted, or their performance affected by the process of observation and evidence collection.

Video and photograph evidence

The assessment materials for each assignment identify the minimum candidate and assessor evidence requirements to support grading and verification. Where ephemeral evidence (e.g. areas of candidate performance that may be hard to capture with photographs and assessor notes alone) plays a significant part in the practical assessment. If this is the case City & Guilds will prescribe the type/capture where the use of video is necessary for practical assessment components (e.g. specifying exactly which elements of the practical must be videoed, or photographed), and any technical specifications for these forms of evidence e.g. length of videos, maximum file sizes etc will also be supplied. Photographic and video evidence will be submitted along with the written candidate evidence and assessor evidence as described in the additional evidence section of the task.

Please note that centres must ensure that video evidence and photo evidence is clear and meets the minimum requirements. The ability of the External Quality Assurer (EQA) to take this evidence into account may be impaired and delay the verification process if the requirements are not met.

Minimum evidence requirements for grading

These sections in the assignment list the minimum requirements of evidence to be submitted for grading and the verification sample:

- ***What must be produced for grading***
- ***Additional evidence for this task.***

Evidence produced during assessment above and beyond this may be submitted, as long as it provides useful information for grading and verification and has been produced under appropriate conditions.

Preparation of candidates

Candidates should be aware of which aspects of their performance will support them achieving a Pass in assessment. This is best carried out through routinely pointing out good or poor performance during the learning period, and through formative assessment. Although candidates will not have access to the grading descriptors during the assessment.

During the learning programme, direct tutor instruction in how to approach tasks through modelling, support, guidance and feedback are critical. However, gradual removal of this support is necessary in preparation for summative assessment. This supported approach is not valid for summative assessment.

The purpose of summative assessment is to confirm the standard the candidate has reached as a result of participating in the learning process. Candidates should be encouraged to do the best they can and be made aware of the difference between these summative assessments and any formative assessments they have been subject to.

Guidance on assessment conditions

The assessment conditions that are in place for this assignment are to:

- ensure the rigour of the assessment process
- provide fairness for candidates
- give confidence in the outcome.

They can be thought of as the rules that ensure that all candidates who take an assessment are being treated fairly, equally and in a manner that ensures their result reflects their true ability.

The conditions outlined below relate to the tasks within this assignment. These do not affect any formative assessment work that takes place, although it is advised that candidates are prepared for the conditions they will need to work under during summative assessment.

The evidence for the tasks that make up this assignment must be completed under the specified conditions. This is to ensure authenticity and prevent malpractice as well as to assess and record candidate performance for assessment in the practical tasks. It is the centre's responsibility to ensure that local administration and oversight gives the assessor sufficient confidence to be able to confirm the authenticity of the candidate's work.

Security and authentication of candidate work

Candidate evidence must be kept secure to prevent unsupervised access by the candidate or others. Where evidence is produced over a number of sessions, the assessor must ensure learners and others cannot access the evidence without supervision. This might include storing written work or artefacts in locked cupboards and collecting memory sticks of evidence produced electronically at the end of each session.

Candidates are required to sign declarations of authenticity, as is the assessor. The relevant form is included in this assignment pack and must be signed after the production of all evidence.

Where the candidate or assessor is unable to or does not confirm authenticity through signing the declaration form, the work cannot be accepted, and a grade of Fail will be given. If any question of authenticity arises eg at verification, the Centre may be contacted for justification of authentication.

Accessibility and fairness

Where a candidate has special requirements, assessors should refer to the *Access arrangements and reasonable adjustments* section of the City & Guilds website.

Assessors can support access where necessary by providing clarification to any candidate on the requirements or timings of any aspect of this assignment. Assessors should not provide more guidance than the candidate needs as this may impact on the candidate's grade, see the guidance and feedback section below.

All candidates must be provided with an environment, time frame and resources that allow them reasonable access to a Pass grade.

Guidance and feedback

To support centre file management, assessors may specify a suitable file format and referencing format for evidence (unless otherwise specified e.g. if file naming is an assessment point for the assignment). Guidance must only support access to the assignment brief and must not provide feedback for improvement. The level and frequency of clarification and guidance must be

- recorded fully on the Assessor Observation Record Form
- taken into account along with the candidate's final evidence during grading
- made available for verification.

Assessors must not provide feedback on the quality of the performance or how the quality of evidence can be improved. This would be classed as malpractice. However, this does not apply if the assessor asks questions as part of the assessment process. Such requirements will be specifically stated within task centre guidance.

Assessors should, however, provide general reminders to candidates throughout the assessment period to check their work thoroughly before submitting it, and to be sure that they are happy with their final evidence as it may not be worked on further after submission.

Candidates can rework any evidence that has been produced for each task during the time allowed.

Assessors should check and be aware of the candidates' plans and designs to ensure management of time and resources is appropriate, and so any allowed intervention can take place at an appropriate time.

The information on the guidance given and captured on the Assessor Observation Record Form is part of the evidence that must be taken into account along with the other evidence for the task when grading. It is up to the assessor to decide if the guidance the candidate has required suggests they are lacking in any performance outcome and consider the severity of the issue when applying the grading criteria. The assessor must record where and how guidance has had an impact on the grade given, so this is available should queries arise at verification or appeal.

What is, and is not, an appropriate level of guidance

- An assessor should intervene with caution if a candidate has taken a course of action that will result in them not being able to submit the full range of evidence for assessment. However, this should only take place once the assessor has prompted the candidate to check that they have covered all the requirements. Where the assessor has to be explicit as to what the issue is, this is likely to demonstrate a lack of understanding on the part of the candidate rather than a simple error, and full details should be recorded on the Candidate Record Form.
- The assessor should not provide guidance if the candidate is thought to be able to correct the issue without it, and a prompt would suffice. In other words, only the minimum support the candidate actually needs should be given, since the more assessor guidance provided, the less of the candidate's own performance is being demonstrated and therefore the larger the impact on the grade awarded.
- The assessor must not provide guidance that the candidate's work is not at the required standard or how to improve their work. In this way, candidates are given the chance to identify and correct any errors on their own, providing valid evidence of knowledge and skills that will be credited during grading.
- The assessor must not produce any templates, pro-formas, work logs etc. If templates are provided by City & Guilds as part of the assignment, these should not be adapted but can be provided to candidates either electronically or as paper based. Compliance of this requirement may be checked as part of the verification process.

All specific prompts and details of the nature of any further guidance must be recorded on the relevant form and reviewed during grading and verification.

Submission of/ retention of evidence

In order to fully support candidates, centres are required to retain candidates' evidence until the next External Quality Assurer sampling activity. However, where this is not practical, the centre must keep all the relevant assessment records in place to show progress of the candidate throughout their qualification. Candidate assessment records must be retained for three years after certification.

See Appendix 4 Centre Handbook: Quality Assurance Standards for details.

7. Assessor Observation Record Form

Task	Qualification number
	2145-12
Candidate name	**Candidate number**
Centre name	**Centre number**

Complete the tables below referring to the relevant grading grid/grade descriptors, found in the assessment pack.

Assessor observation	**Notes –** *capture detailed, accurate and differentiating notes which identify how the evidence meets the requirements of the grading descriptors. Also capture any other information relevant to the assessment of this task/assessment, eg any support/feedback/warnings provided.*

Assessor signature	Date

8. Candidate Record Form

Assessment ID	Qualification number
2145-252	2145-12
Candidate name	**Candidate number**
Centre name	**Centre number**

Marker Notes *– Please always refer to the relevant grading grid for guidance on criteria and make notes which describe the quality of the evidence and justification of how the grading descriptors have been met. Expand boxes as required*

Task	Notes and justification	Outcome
Task 1		Pass/Fail
Task 2		Pass/Fail
Task 3		Pass/Fail
Overall outcome		Pass/Fail

Assessor signature	Date

9. Declaration of Authenticity

Assessment ID	Qualification number
2145-252	2145-12
Candidate name	**Candidate number**
Centre name	**Centre number**

Additional Support

Has the candidate received any additional support in the production of this work?

No □ **Yes** □ (Please tick appropriate)

If yes, give details below (and on a separate sheet if necessary).

Candidate:

I confirm that all work submitted is my own, and that I have acknowledged all sources I have used.

Candidate signature	Date

Assessor:

I confirm that all work was conducted under conditions designed to assure the authenticity of the candidate's work, and am satisfied that, to the best of my knowledge, the work produced is solely that of the candidate.

Assessor signature	Date

Note: Where the candidate and/or assessor is unable to or does not confirm authenticity through signing this declaration form, the work will be returned to the centre and this will delay the verification process. If any question of authenticity arises, the assessor may be contacted for justification of authentication.

Appendix 1 – Process operation sequence template for assessor (Task 1)

Task	Qualification number
Task 1 – Prototype planning	2145-12
Candidate name	**Candidate number**
Centre name	**Centre number**

Project details	Adjustable clamp prototype
Material:	
Dimensional tolerances:	
Surface finish requirements:	Eg smooth finish

Equipment and tools	
Machine type	[Type of machine, eg milling, drilling, lathe]
Cutting tools	[Insert type, tool materials, eg end mills, face end mills, ball end mills, drill, reamer]
Work-holding device	[Type of chuck, eg m/c vice, collet]
Coolant system	[Type and settings]

Planning the production activity:

Op no.	Component	Feature name/appearance	Tools and equipment
1	**Top plate**	**Datum**	**Lathe**

Op no.	Component	Feature name/appearance	Tools and equipment

Problem solving
[If any issues or flaws occur during the process, describe how you address and resolve them.]

Assessor signature	Date

Appendix 2 – Assessor quality record check template (Task 2)

Task	Qualification number
Task 2 – Manufacture prototype	2145-12
Candidate name	**Candidate number**
Centre name	**Centre number**

Quality check against adjustable clamp			
Dimensional check: top plate	**Required**	**Record actual**	**Pass/Fail**
Diameter (mm)	[23]		
Diameter (mm)	[9]		
Length (mm) x Width (mm)	[62] x [31]		
Length (mm) x Width (mm)	[140] x [50]		
Radius (mm) x 4	[4]		

Dimensional check: bottom plate	**Required**	**Record actual**	**Pass/Fail** *(within or not within tolerance)*
Diameter (mm)	[23]		
Diameter (mm)	[9]		
Length (mm) x Width (mm)	[62] x [31]		
Length (mm) x Width (mm)	[140] x [50]		
Radius (mm) x 4	[4]		
Internal thread (mm) x 2	[M8]		

Dimensional check: threaded pins (2)	Required	Record actual	Pass/Fail
Diameter (mm)	[M8]		
Diameter (mm)	[M8]		
Length (mm)	[80]		
Length (mm)	[80]		

Dimensional check: adjusting caps (2)	Required	Record actual	Pass/Fail
Diameter (mm)	[20]		
Diameter (mm)	[20]		
Length (mm)	[20]		
Length (mm)	[20]		
Knurled	[medium depth]		

Visual inspection	Required	Observations describe	Pass/Fail
Scratches or defects	[No visual damage]		
Burrs	[None]		
Surface irregularities (false tool cuts)	[No visual damage]		

Assembly of parts	Comments: Pass/Fail
Perpendicular aligned	
Functional	

Candidate signature	Date
Assessor signature	**Date**

Appendix 3 – Mapping of tasks to transferrable employability skills

The following transferable employability skills underpin the content of this qualification. The grid below provides an overview of where the employability skills map to and are best demonstrated within this practical assessment.

Transferrable employability skills	Task 1	Task 2	Task 3
Communication in the workplace			
Selects appropriate formats for written communication for different purposes and audiences, in line with workplace conventions or procedures, where appropriate **(CSW1)**	Y		Y
Uses available software appropriately to present written communication, including numerical information **(CSW4)**			Y
Problem solving			
Gathers appropriate information or advice from different sources to help solve a specific work-related problem **(PSW1)**	Y	Y	Y
Assesses a range of potential solutions, applying appropriate problem-solving strategies **(PSW2)**	Y	Y	Y
Selects a specific solution, justifying why this one is the most likely to prove effective **(PSW3)**	Y		Y
Time management skills			
Plans work: • according to priority • taking into account length of time needed to complete tasks • in order to meet deadlines • including appropriate breaks **(TMS1)**	Y	Y	Y
Works at an appropriate pace to carry out tasks in accordance with plan **(TMS2)**			Y
Self-management skills			
Plans and manages resources effectively **(SMS2)**	Y	Y	Y

Appendix 4 – Sources of general information

The following documents contain essential information for centres delivering City & Guilds qualifications. They should be referred to in conjunction with this handbook. To download the documents and to find other useful documents, go to the Centre document library on www.cityandguilds.com or click on the links below:

Centre Handbook: Quality Assurance Standards

This document is for all approved centres and provides guidance to support their delivery of our qualifications. It includes information on:

- centre quality assurance criteria and monitoring activities
- administration and assessment systems
- centre-facing support teams at City & Guilds/ILM
- centre quality assurance roles and responsibilities.

The Centre Handbook should be used to ensure compliance with the terms and conditions of the centre contract.

Centre Assessment: Quality Assurance Standards

This document sets out the minimum common quality assurance requirements for our regulated and non-regulated qualifications that feature centre-assessed components. Specific guidance will also be included in relevant qualification handbooks and/or assessment documentation.

It incorporates our expectations for centre internal quality assurance and the external quality assurance methods we use to ensure that assessment standards are met and upheld. It also details the range of sanctions that may be put in place when centres do not comply with our requirements or actions that will be taken to align centre grading/assessment to required standards. Additionally, it provides detailed guidance on the secure and valid administration of centre assessments.

Access arrangements: When and how applications need to be made to City & Guilds provides full details of the arrangements that may be made to facilitate access to assessments and qualifications for candidates who are eligible for adjustments in assessment.

The Centre document library also contains useful information on such things as:

- conducting examinations
- registering learners
- appeals and malpractice.

Useful contacts

Please visit the Contact us section of the City & Guilds website, **Contact us**

City & Guilds

For over 140 years, we have worked with people, organisations and economies to help them identify and develop the skills they need to thrive. We understand the life-changing link between skills development, social mobility, prosperity and success. Everything we do is focused on developing and delivering high-quality training, qualifications, assessments and credentials that lead to jobs and meet the changing needs of industry.

We partner with our customers to deliver work-based learning programmes that builds competency to support better prospects for people, organisations and wider society. We create flexible learning pathways that support lifelong employability because we believe that people deserve the opportunity to (re)train and (re)learn again and again – gaining new skills at every stage of life, regardless of where they start.

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