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

Version 1.0 (November 2024)

Practical Assignment Pack
2145-253
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 **City & Guilds Level Extended Technical Occupational Entry in Engineering (Diploma) Fabrication and Welding 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.

The tasks are 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. Further centre guidance is available in Section 6: Centre guidance.

Overarching conditions

The tasks must be completed in order:

- Assignment brief and technical information must be released at the start of Task 1.
- Task 2 can be released upon completion of Task 1.
- Task 3 can be released upon completion of Task 2.

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 the assignment is **18 hours** broken down per task as follows:

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

These timings for each task must **not** be exceeded.

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 of 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.

Assessment environment
This assessment must be undertaken in specifically designated work areas within the fabrication workshop which allow candidates to undertake this practical assessment safely.

Resources
Candidates must have access to a suitable range of resources to carry out the tasks and, where appropriate, have the opportunity to choose materials, consumables, tools, equipment and machinery 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.

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

Materials
Approximate material requirements per candidate:

- 1200mm x 30mm x 3mm low carbon steel flat bar for the flanges or cut from 3mm plate
- 3mm low carbon steel plate 600mm x 350mm for all parts required
- 4No M8 nuts, hexagon head bolts, spring and flat washers, and 20 mm long bolts.

Tools, equipment and machinery
Suitable workshop with access to appropriate tools and equipment for measuring, marking out, fabrication, welding and assembly, such as the following.

Personal protective equipment (PPE)

Hand tools – one per candidate

- Steel rule (300mm/500mm/1000mm)
- Straight edge
- Steel tape
- Scriber/French chalk
- Centre punch
- Combination square
- Engineer's square
- Plate square
- Back mark
- Protractor
- Dividers
- Trammel head set and bar
- Verniers (depending on integrity of tolerance)
- Marking blue/layout fluid
- Spirit level
- Welding magnets
- Engineer's hammer: ball pein
- Hide head mallet
- Bench stakes and mandrels
- Cold chisels
- Hacksaw
- Files – flat/round/triangle/square
- Clamping – G clamps, carver clamps, sash clamps, ratchet clamps and mole grips
- Spanners – open-ended, combination and adjustable
- Pistol drills – drill bits
- Tongs for handling hot metals
- Brushes for oil application

Machine equipment – shared equipment

- Bench, pillar and radial drills
- Circular saw and band saw
- Pedestal grinder
- Cut-off saw
- Box and pan folder
- Up and down stroking press brakes
- Manual and powered guillotines
- Angle grinder – accessories) grinding disc, cutting disc and flap disc (polishing)
- Portable plasma cutter
- Bench shears
- Universal steelworkers

Welding equipment – shared equipment

- Tungsten active gas shielded (TAGS)
- Consumables including filler wire, gas and tungsten electrodes

Consumables

- Oil for finishing, eg low viscosity multi-grade oil

Pens, paper and computer with software for completing templates.
Computer **must not** have internet access.

Camera for assessor to take photos

Templates
Templates must be provided in printed and digital format; candidates can choose to complete templates by hand or digitally.

- Appendix 1 – Planning template: to be provided at the start of Task 1
- Appendix 2 – Parts and material cutting list template: to be provided at the start of Task 1
- Appendix 3 – Risk assessment template: to be provided at the start of Task 1
- Appendix 4 – Job card template: to be provided at the start of Task 2
- Appendix 5 – Quality inspection report template: to be provided at the start of Task 3

Task-specific guidance

Task 1 – Plan a fabrication and welding activity

- Task 1 must be completed prior to commencing Task 2.
- Task 1 must be undertaken by candidates on their own under controlled conditions.
- Ratio of candidates to assessor: group invigilation.
- The tungsten active gas shielded (TAGS) welding process must be used by all candidates.
- Resources
    - Candidates must be given the following at the start of the task:
        - assignment brief including Figure 1
        - Appendix 1 – Planning template
        - Appendix 2 – Parts and material cutting list template
        - Appendix 3 – Risk assessment template
    - Pens, paper and computer for completing templates (computer **must not** have internet access)
    - Non-programmable calculator

Task 2 – Produce a fabricated component

- Task 2 must be completed prior to commencing Task 3.
- Task 2 must be undertaken by candidates on their own under controlled conditions.
- Ratio of candidates to assessor can be up to 6:1, depending on availability of tools, equipment, machinery and workspace.
- Figure 1: the technical drawing indicates the use of low carbon steel 3mm thick for the task, including flanges.
- The tungsten active gas shielded (TAGS) welding process must be used by all candidates.
- The dimensions stated within Figure 1 must be maintained and within the tolerance given.
- Centres must ensure that the candidate's work is securely labelled for verification.
- Resources
    - Candidates must be given the following at the start of the task:
        - assignment brief including Figure 1
        - Appendix 4 – Job card template
        - copies of their completed planning template, parts and material cutting list and risk assessment from Task 1 (for reference only)
    - Materials and consumables for the fabrication and welding of one rectangular duct (as listed above)
    - Workshop space with appropriate control measures in place for safe fabrication and welding
    - Tools, equipment and machinery as listed above
    - Personal Protective Equipment (PPE)

    - Pens, paper and computer for completing templates (computer **must not** have internet access)
- This task must be photographed by the assessor to support the grading and verification process; photos must be clearly labelled with candidate details, and as a minimum show:
    - workshop setup for safe working
    - the quality of cutting within tolerance
    - quality of the weld
    - general quality of the finished fabrication.

Task 3 – Produce a quality inspection report

- Task 3 must be undertaken by candidates on their own under controlled conditions.
- Ratio of candidates to assessor: group invigilation.
- The dimensions stated within Figure 1 must be maintained and within the tolerance given.
- Resources
    - Candidates must be given the following at the start of the task:
        - assignment brief including Figure 1
        - Appendix 5 – Quality inspection report template
        - their rectangular duct from Task 2 (for reference only)
    - Workshop space with appropriate control measures in place for safe working
    - Tools, equipment and machinery as listed above
    - Personal Protective Equipment (PPE)
    - Pens, paper and computer for completing templates (computer **must not** have internet access).

Following the completion of all tasks, candidates are 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 re-sitting all tasks within a different version of the assessment.

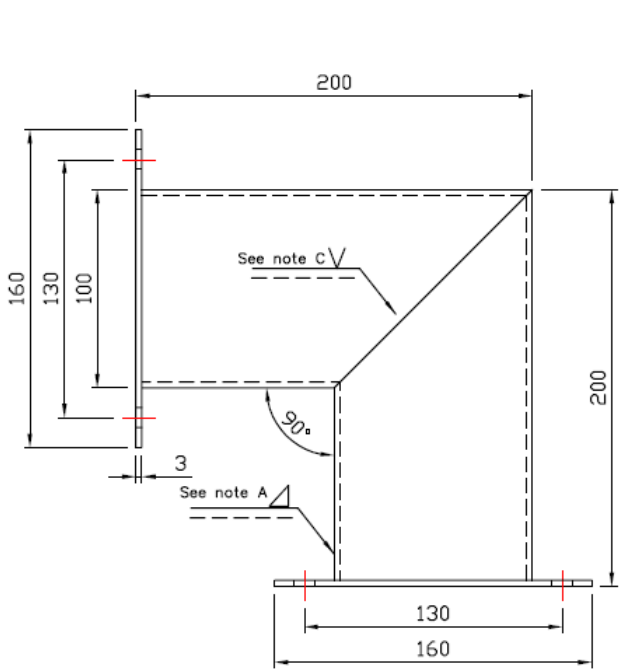
Candidates can retake a different version of the assignment up to maximum of **three** times before re-registration is required.

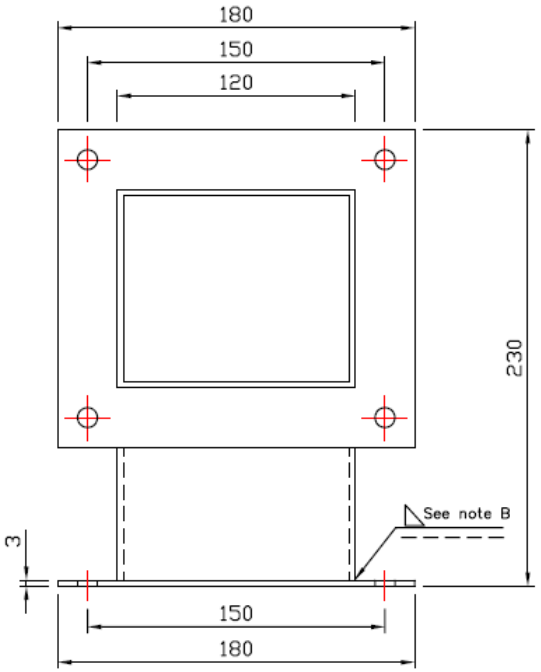
3. Assignment brief

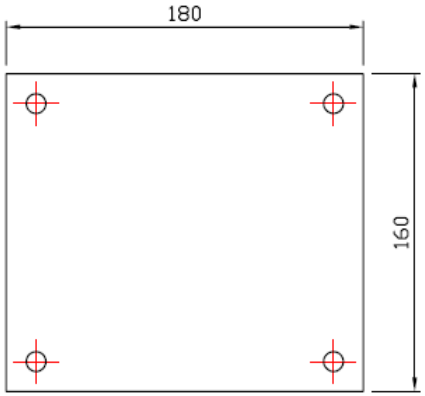
An engineering company needs to produce 25 rectangular ducts, shown in Figure 1, used in grain feed systems.

Candidates must plan the production of one rectangular duct and produce a sample of the rectangular duct.

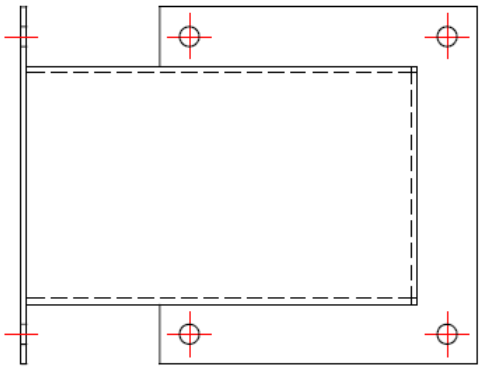
This assignment has a total duration of **18 hours**.

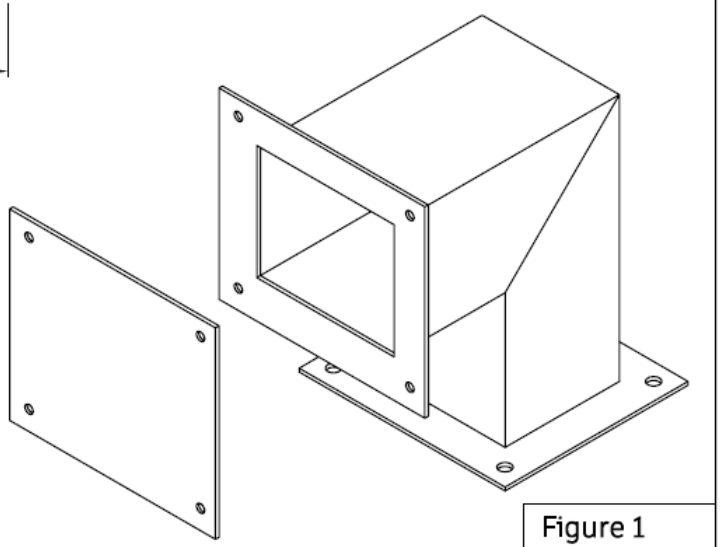






180 x 160 x 3 PLATE BOLTED TO ONE END OF DUCT





Note
A. All joints on 120mm x 100mm duct to be corner to corner fully welded.
B. Flanges welded to duct 25mm long at ends and 15mm long in the centre.
C. V - butt fully welded.

Figure 1

MATERIAL: 3mm LCS PLATE 30x3mm LCS FLAT BAR ALL HOLES FOR M8 BOLTS	SCALE NOT TO SCALE ALL DIMENSIONS mm	TOLERANCE ± 2mm	DRAWING TITLE: Rectangular Duct 120mm x 100mm	First Angle Projection

4. Tasks

Task 1 – Plan a fabrication and welding activity

Plan the production of one sample rectangular duct component shown in Figure 1 that is attached to the assignment brief.

Candidates must use the tungsten active gas shielded (TAGS) welding process for all welding specified in Figure 1.

Candidates must:

a) Plan the production of **one** rectangular duct using Appendix 1 – Planning template. The plan must include:
   - the processes and methods required to cut, form, assemble and weld the rectangular duct
   - time estimates for each step in the plan
   - resources required (tools, equipment, machinery and consumables).

b) Use Appendix 2 – Parts and material cutting list template to produce a list for production of one rectangular duct, including:
   - material type
   - component part sizes
   - estimate of material(s) required for **one** rectangular duct component. Candidates must show their workings.

c) Estimate the material(s) required for **25** rectangular duct components based on a stock material plate size of 2.5 m x 1.25 m. Candidates must show their workings and record their response in the Appendix 2 – Parts and material cutting list template.

d) Complete a risk assessment for the task using Appendix 3 – Risk assessment template, including:
   - identified hazards
   - who is at risk
   - control measures.

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.
- Internet access is **not** permitted for this task.

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

- Completed planning template
- Completed parts and material cutting list, including estimation of materials for 25 rectangular duct components
- Completed risk assessment

Additional evidence for this task

- n/a

Resources

- Pens, paper and computer for completing templates
- Non-programmable calculator

Task 2 – Produce a fabricated component

Produce **one** rectangular duct component to the required standard and tolerance in Figure 1 that is attached to the assignment brief.

Candidates must:

- Safely fabricate **one** rectangular duct to the specification in Figure 1 using the tungsten active gas shielded (TAGS) welding process.
- Apply an oil finish to the component.
- Complete a record of their work using Appendix 4 – Job card template, including actual timings for each step, and the overall timing of the task.

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.
- Internet access is **not** permitted for this task.

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.
- Candidates must be given a copy of their completed plan, parts and material cutting list and risk assessment from Task 1 (for reference only).

What must be produced for grading

- One rectangular duct with a blank plate attached to one end
- Completed job card

Additional evidence for this task

- Assessor observation and photos of the rectangular duct

Resources

- Pens, paper and computer for completing templates
- Appropriate workshop, tools, equipment and machinery
- Materials and consumables for fabrication of one rectangular duct
- Personal protective equipment (PPE)

Task 3 – Produce a quality inspection report

Complete a quality inspection of their rectangular duct produced in Task 2.

Candidates must:

- Inspect the completed fabrication for:
    - dimensional accuracy (tolerance +/- 2mm)
    - weld quality (visual inspection only).
- Complete Appendix 5 – Quality inspection report template with:
    - their findings and comments on the quality of the inspection criteria
    - weld defects, including possible causes, and methods of rectification
    - comments on the impact of variable parameters on the quality of the welded joints – to include current, voltage and gas flow.

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.
- Internet access is **not** permitted for this task.

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.
- Candidate must be given their rectangular duct from Task 2 (for reference only).

What must be produced for grading

- Completed quality inspection report

Additional evidence for this task

- Assessor observation

Resources

- Pens, paper and computer for completing templates
- Appropriate workshop, tools, equipment and machinery
- Personal protective equipment (PPE)

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 – Plan a fabrication and welding activity

Fail	Pass
Planning incomplete or missing content required by the brief and/or task resulting in fabrication that does not meet the requirements of the brief and task: **Process/method** • Processes/methods of fabrication identified that would fail to produce the required specification. **Planning** • Plan misses key process/methods and/or is not a logical sequence of work, resulting in failure to meet the required specification. • Materials, parts, resources, cutting lists and estimations are incomplete, inaccurate and/or inappropriate. • Timing estimates are not included and/or are unrealistic. • Partial completion of required planning documentation. **Safety** • Risk assessment does not include relevant hazards and/or who is at risk. Control measures are unsuitable and/or insufficient to mitigate the risks and ensure safe working.	Planning would result in fabrication meeting the specifications of the brief and task: **Process/method** • Identified suitable processes/methods of fabrication to produce component to specification. **Planning** • Work planned with key processes/ methods identified in a logical sequence, and realistic timing estimates for the full plan. • Materials, parts, resources and cutting lists are accurate and appropriate, with realistic estimates made when appropriate. • Required planning documentation completed. **Safety** • Risk assessment completed to ensure safe working, with identification of relevant hazards, who is at risk and suitable control measures to mitigate risks.

Indicative content (what will be seen for **this version** of the task)
Plan production of one rectangular duct to specification. **Process/method** Suitable processes/methods identified for fabrication and TAGS welding to meet the specification: • measuring and marking out – datums, square and rectangular profiles, and linear hole positions • mechanical cutting: hydraulic guillotine • forming – folding of top and bottom plates on ducts • drilling of flanges • deburring – remove sharp edges using a hand flat file • assembly – use of magnets to hold parts before tack welding to avoid distortion, nuts and bolts for attaching the plate

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

- TAGS welding as specified in task, with use of magnets to hold parts before tack welding
- final inspection
- oil finish evenly applied with a brush (after inspection).

Planning
Logical sequence of work covering full process to achieve the required specification, with realistic timings:

- collect drawing
- safety/PPE and assess work area
- select materials as per specification
- select tools, equipment and machinery and allow time to collect from store
- marking out materials, eg use of datums, punch, scriber, straight edge, measuring tape and chalk line
- mechanical cutting: hydraulic guillotine
- forming – folding of top and bottom plates on ducts
- drilling of flanges and blank plate
- deburring – remove sharp edges using a hand flat file
- assembly – use of magnets to hold parts before tack welding to avoid distortion
- TAGS welding as specified in task, with use of magnets to hold parts before tack welding, sequence to help reduce distortion, identify types of join and dimensions
- finishing – remove burrs
- final inspection
- oiling.

Correct resources identified and listed on template:

- PPE – flame retardant overalls, leather apron, safety boots, ear protection, gloves, welding gauntlets, headshield for welding, full face visor and filter lens
- marking out – rule, tape measure, straight edge, chalk line, scriber, ball pein hammer and centre punch required to mark out LCS plate
- hydraulic guillotine, tools for forming, drills, flat files and welding magnets
- TAGS welding machinery, consumables (fillet/welding wire and gas) and fume extraction.

Materials, parts and cutting list – correct cutting list of parts (including form of supply, material, sizes and quantities) to fabricate **one** rectangular duct to specification:

Part Description	Material Size and Type	Parts Required
Flanges	30 x 180 x 3 Low Carbon Steel plate or flat bar	4
Flanges	30 x 100 x 3 Low Carbon Steel plate or flat bar	4
Duct Sides	200 x 94 x 3 Low Carbon Steel plate	4
Duct Top & Back	200 x 114 x 3 Low Carbon Steel plate	2
Duct underside	100 x 114 x 3 Low Carbon Steel plate	1
Duct inner side	100 x 114 x 3 Low Carbon Steel plate	1
Blank plate	180 x 160 x 3 Low Carbon Steel plate	1
Bolts	M8 x 20 long, hexagon head	4
Nuts	M8	4
Washers	M8 spring	4
Washers	M8 flat	4

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

Appropriate estimate of quantities – calculation uses correct dimensions of parts and may include sketch of nesting parts on sheet metal:

- To make one rectangular duct:
  - Material overall size for duct = 600 x 350 x 3 LCS plate
  - Material for flanges = 1200 x 30 x 3 LCS flat bar

- To make 25 rectangular ducts:
  - Material required for duct = 2No 2500 x 1250 x 3 LCS plate
  - Material for flanges = 5No 6000 x 30 x 3 LCS flat bar

Safety
Risk assessment correctly completed with appropriate control measures for the identified hazards and risks, including:

- identifying hazards and risks:
  - handling materials – sharp edges and manual handling
  - cutting – entrapment, manual handling, noise, missing guards and sharp edges on material
  - forming – entrapment, missing guards and sharp edges on material
  - welding – radiation, fumes, fire, heat, damaged cables, high voltage, electric shock and tripping over cables
  - use of hand tools – cuts
  - drilling – sharp edges and flying debris
  - working in a confined space
- who might be harmed – operator/engineer and others in the workshop
- control measures – training to use tools, equipment and machinery correctly, PPE (see resources list above), welding screens/curtains, fume extraction, manual handling tools and training, clean and clear walkways, debur materials, check cables for wear, guards and emergency/automatic stop on machinery.

Task 2 – Produce a fabricated component

Fail	Pass
Fabricated component does not meet full specification in brief and task: **Safe working** • Work area not set up for safe working, without consideration of hazards and risks, or the risk assessment. 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. **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 steps and failure to meet the specification. • Materials and forms of supply were not as specified. • Tools, equipment and machinery not set up or used correctly for their intended purpose. Minimal dexterity when using tools. • Measuring and marking out inaccurate and used unsuitable methods and/or techniques resulting in wastage/parts outside specified tolerance. • Inaccurate cutting of materials (outside specified tolerance). • Inaccurate assembly of component not using specified method(s) for joining materials. • Parameters incorrectly set up for thermal joining plant, resulting in poor quality welded joints. • Partial completion of required records, lacking required information. **Quality of work** • Didn't refer to specification/sources of information, resulting in finished	Component fabricated to specification in brief and task: **Safe working** • Work area set up for safe working, removing risks and employing control measures, following the risk assessment. • Consistently followed safe working practices and applied appropriate pre-use checks and control measures when using tools, equipment and machinery. **Process/method** • Work area set up with correct tools, equipment and machinery. • Followed appropriate sequence of work to ensure specification was met and worked efficiently. • Used and prepared appropriate materials, forms of supply and resources. • Used tools, equipment and machinery safely and correctly for their intended purpose. • Measured and marked out material(s) for efficient cutting/forming/drilling and assembly (as applicable), using suitable techniques and within specified tolerance. • Cut required parts from engineering material(s) using suitable forms of supply and within specified tolerance. • Assembly of component using specified method(s) for joining materials resulting in component that met specification. • Parameters correctly set for thermal joining process, resulting in suitable quality of welded joints. • Records accurately completed with relevant information. **Quality of work** • Referred to specification/sources of information to ensure finished component fully met specification. • Used controls when welding to achieve suitable quality of welded joints. • Weld joints are accurate and consistent.

component not fully meeting specification.
• Insufficient controls applied, resulting in poor quality welds.
• Types of welds not to specification, resulting in component not being fit for purpose.
• Component:
  ○ not within specified tolerance
  ○ not effectively cleaned or deburred
  ○ no finish applied (if applicable).
	• Completed component:
	  ○ within specified tolerance
	  ○ clean
	  ○ has no burrs
	  ○ has correct finish (if applicable).

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

Produce one rectangular duct to specification.

Safe working

- PPE selected and used: flame retardant overalls, leather apron, safety boots, ear protection, gloves, welding gauntlets, headshield for welding, full face visor and filter lens.
- Control measures employed: PPE, welding screens/curtains, fume extraction, manual handling tools, maintained clean and clear walkways, deburred materials, checked cables for wear and checked guards and automatic stop on machinery.
- Assessor observation of safe working, including clean and clear workspace, referring to risk assessment, 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 fabrication and welding to meet the specification:

- prepared materials by degreasing
- accurate measuring and marking out, eg use of datums, making efficient use of correct materials and forms of supply. Used materials efficiently, eg choosing flat bar or cutting strips from plate for the flanges and deciding whether to have joins on the flange
- mechanical cutting with hydraulic guillotine
- weld preparation – welding magnets and grinding for the v-butt joint
- forming – folding of top and bottom plates on duct, allowing for bend of material
- drilling of flanges to meet specified dimensions and positions
- deburring – removed sharp edges using a hand flat file
- assembly – used magnets to hold parts before tack welding to avoid distortion
- TAGS welding as specified in task, with use of magnets to hold parts before tack welding and parameters appropriate to the task
- use of appropriate welding positions – down hand and horizontal vertical
- use of appropriate welding techniques – tack weld, butt joint and T-fillet weld
- 20mm M8 nuts and hexagon head bolts used to attach the plate; spring and flat washers assembled in the correct order – bolt, plate, flange, flat washer, spring washer and then nut
- final checks

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

- cleaned component
- oil finish applied
- disposed of waste
- tidied work area
- returned tools, equipment and machinery to storage
- job card completed with time spent on each process/method and overall time to complete the fabrication and welding of the component.

Suitable tools, equipment and machinery inspected before use, and used safely and correctly:

- measuring and marking out – rule, measuring tape, straight edge, chalk line, scriber, ball pein hammer and centre punch required to mark out LCS plate.
- hydraulic guillotine, tools for forming, drills, flat files, welding magnets and spanners
- TAGS welding machinery, consumables (fillet/welding wire) and fume extraction.

Quality of work

- Observed referring to Figure 1: Plan, parts and cutting list throughout the task, for example when measuring and marking to ensure compliance with specification
- Preparation before weld: grind v-butt joint
- Used variable parameters correctly to ensure quality of welded joints (eg current), without damage (eg blow through of material)
- Used appropriate order of welding (eg tack welds) to control distortion
- Used magnets to control distortion when welding
- Burrs removed with files
- Oil finish evenly applied
- Dimensions of completed component meet specification, within tolerance of +/- 2mm

Task 3 – Produce a quality inspection report

Fail	Pass
Quality inspection of component incomplete: **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 control measures when using tools and equipment. **Process/method** • Inspection of component missed aspects of specification and/or inspection criteria, resulting in defects being missed. • Inappropriate tools and equipment selected for the required inspection, resulting in errors during the inspection. • Inaccurate measurements recorded. • Test method incorrectly applied and/or incorrect method used (if applicable). • No assessment of quality of fabrication and welding, missing key areas and/or appropriate types of data. • No identification of variations from specification. • No understanding of reasons for faults/defects and/or their rectification. **Record keeping** • Partial completion of required records, lacking required and/or relevant information.	Quality inspection of component: **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 and equipment. **Process/method** • Accurate inspection of the component against the specification and inspection criteria (if applicable). • Appropriate tools and equipment selected for the required inspection. • Accurate measurement of component recorded against specification. • Used specified test methods (if applicable). • Assessment of quality of fabrication and welding techniques collected appropriate types of data. • Identification of variations from specification. • Understanding of reasons for faults/defects and their rectification. **Record keeping** • Records accurately completed with relevant information.

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

Quality inspection of completed fabrication from Task 2.

Safe working

- PPE selected and used: leather apron, safety boots and gloves
- Control measures employed: PPE and maintained clean and clear walkways
- Assessor observation of safe working, including clean and clear workspace, manual handling, use of PPE and following centre policies

Process/method

Used suitable sequence and processes/methods of quality inspection against the specification and inspection criteria given:

- appropriate inspection tools and equipment identified and used for size and tolerance specified on the engineering drawing. All tools used safely: file, protractor, vernier caliper, square and rule.
- visual inspection of the component carried out and all evidence recorded on the quality inspection document template provided:
    - comment on the impact of variable parameters on the quality of the welded joints – impact of increase/decrease of current, voltage and gas flow on the quality of the welded joint (for example poor weld fusion and lack of penetration if the current is too low, and blow through of material if current is too high)
- weld joints visually inspected and defects recorded: for example profile of the weld, defects, sufficient penetration of the weld without wastage (corner to corner welds) and strength of the weld:
    - if defects are identified:
        - state the defect, for example distortion, porosity and lack of penetration
        - state causes, for example poor setup and incorrect parameters
        - state methods of rectification, for example post-heat, rolling and pressing.
- component measured for accuracy of dimensions against specification and tolerance of +/- 2mm
- disposed of waste
- tidied work area
- returned tools and equipment to storage.

Record keeping

- Quality inspection report, including a list of the measurements recorded, causes of any defects observed and suggestions of how these could have been avoided.
- Comments on the quality of the inspection criteria, for example dimensions of cut materials, angles of components, quality of joints, bolt size and evenness of oil application.

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 the ability to work 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.

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 descriptors 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 EQA 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 7 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 marking 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
2145-253	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
2145-253	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 are unable to or do 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– Planning template (Task 1)

Task	Qualification number
Task 1 – Plan a fabrication and welding activity	2145-12
Candidate name	**Candidate number**
Centre name	**Centre number**

	Process/method	Details and equipment	Estimated time
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
		Total number of hours	

Assessor signature	Date

Appendix 2 – Parts and material cutting list (Task 1)

Task	Qualification number
Task 1 – Plan a fabrication and welding activity	2145-12
Candidate name	**Candidate number**
Centre name	**Centre number**

	Part description	Material size and type	Parts required
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

Estimated material required to make **one** of Figure 1 rectangular duct:

Show workings:

Estimated material required to make **25** of Figure 1 rectangular duct: *Show workings:*

Assessor signature	**Date**

Appendix 3 – Risk assessment template (Task 1)

Task	**Qualification number**
Task 1 – Plan a fabrication and welding activity	2145-12
Candidate name	**Candidate number**
Centre name	**Centre number**

Name **(Competent person carrying out the risk assessment)**		**Role** **(Job title/company)**	
Work being carried out			
Date (DD/MM/YYYY)		**Latest date for review** (DD/MM/YYYY)	
Site details (Enter details of the site that the risk assessment is being carried out on, including site information if multiple sites)			
People at risk		Workers Adjacent workers Site wide workers Visitors Members of the public	☐· ☐· ☐· ☐· ☐·

Hazards identified (Consider the hazards specific to the type of activities being assessed)	**Level of risk** (High, medium, low)	**Control measures currently in place** (Enter details of all control measures that are currently in place)	**Additional control measures required** (Enter details of any new actions that need to be taken to reduce, control or eliminate the risks of each hazard)	**Name** (Person responsible for implementing controls)	**Date controls must be actioned by** (DD/MM/YYYY)

Assessor signature	Date

Appendix 4 – Job card template (Task 2)

Task	Qualification number
Task 2 – Produce a fabricated component	2145-12
Candidate name	**Candidate number**
Centre name	**Centre number**

Activity	Start	End	Hours
		Total number of hours	

Assessor signature	Date

Appendix 5 – Quality inspection report template (Task 3)

Task	Qualification number
Task 3 – Produce a quality inspection report	2145-12
Candidate name	**Candidate number**
Centre name	**Centre number**

	Inspection criteria	Checked	Findings and comments on the quality of the inspection criteria
1	Most up –to-date issue of drawing used		
2	Correct material and thickness used as drawing specification		
3	Material cut to correct dimensions as drawing specification		
4	Materials positioned correct to drawing specification		
5	Angles on component cut or formed correctly to drawing specification		

6	Correct hole diameters and location drilled or punched to drawing specification		
7	Quality of welded joints, including: • defects identified • causes of defects • rectification of defects • impact of variable parameters on the quality of the welded joints (to include current, voltage and gas flow).		
8	Specified bolt size used		
9	Post fabrication and thermal joining cleaning process carried out effectively		
10	All burred edges removed; oil finish applied		
11	Overall size of component is within tolerance of +/-2mm; if out of tolerance, explain why		

Assessor signature	**Date**

Appendix 6 – 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
Produces documents of different types that are appropriate (e.g., in terms of length, style and language use) for the purpose and intended audience **(CSW2)**	Y		Y
Accurately and appropriately uses terminology associated with a particular workplace or sector in written communication **(CSW5)**	Y		Y
Problem solving			
Gathers appropriate information or advice from different sources to help solve a specific work-related problem **(PSW1)**	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 **(TMS1)**	Y	Y	Y
Works at an appropriate pace to carry out tasks in accordance with plan **(TMS2)**	Y	Y	Y
Self- management skills			
Plans and manages own time effectively to achieve a balance between personal and work/training-related demands **(SMS1)**	Y	Y	Y
Plans and manages resources effectively **(SMS2)**	Y	Y	Y

Appendix 7 – 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 marking/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.

The City & Guilds community of brands includes Gen2, ILM, Intertrain, Kineo and The Oxford Group.

Copyright

The content of this document is, unless otherwise indicated, © The City & Guilds of London Institute and may not be copied, reproduced or distributed without prior written consent. However, approved City & Guilds centres and learners studying for City & Guilds qualifications may photocopy this document free of charge and/or include a PDF version of it on centre intranets on the following conditions:

- centre staff may copy the material only for the purpose of teaching learners working towards a City & Guilds qualification, or for internal administration purposes
- learners may copy the material only for their own use when working towards a City & Guilds qualification.

The Standard Copying Conditions (see the City & Guilds website) also apply.

Contains public section information licensed under the Open Government Licence v3.0.

Published by City & Guilds, a registered charity established to promote education and training.

City & Guilds of London Institute
Giltspur House
5–6 Giltspur Street
London
EC1A 9DE

cityandguildsgroup.com