T-LEVELS | IfATE Institute for Apprenticeships and Technical Education

T Level Technical Qualification in Engineering, Manufacturing, Processing and Control (8713-31)

Fitting and Assembly Technologies (331)

Guide standard exemplification material

Threshold Competence – Sample 2022

First teaching from September 2022
Version 2.0

City & Guilds | eal

Version and date	Change detail	Section
V2.0 February 2024	Evidence requirements clarified	Task 1

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Introduction

The sample assessment materials within this document refer to the Fitting and Assembly Technologies sample occupational specialism assignment. The aim of these materials is to provide centres with examples of knowledge, skills and understanding that attest to **minimal threshold competence.**

The examples provided do not reflect all evidence from the sample assignment as the focus of this material is the quality and standards that need to be achieved rather than the volume of exemplar evidence provided. However, the examples provided are representative of all tasks in the sample assignment. The evidence presented here has been developed to reflect minimal threshold competence within each task but is not necessarily intended to reflect the work of a single candidate. It is important to note that in live assessments a candidate's performance is very likely to exhibit a spikey profile and the standard of performance will vary across tasks. The **minimal threshold competence** grade boundary will be based on a synoptic mark across all tasks.

The materials in this Guide Standard Exemplification Material (GSEM) are separated into the sections as described below. Materials are presented against a number of tasks from the assignment.

Task

This section details the tasks that the candidate has been asked to carry out, what needs to be submitted for marking and any additional evidence required. Also referenced in this section are the assessment themes the candidates will be marked against when completing the tasks within it. In addition, candidate evidence that has been included or not been included in this GSEM has been identified within this section.

In this GSEM there is candidate evidence from:

- Task 1 - Planning
- Task 2 - Production
- Task 3 - Quality review and evaluation.

Candidate evidence

This section includes exemplars of candidate work, photographs of the work in production (or completed) and practical observation records of the assessment completed by centre assessors. This will be exemplar evidence that was captured as part of the assessment and then internally marked by the centre assessor.

Photographs in this GSEM demonstrate the full process that the candidate has undertaken to complete the drill jig assembly. Commentary sections detail where performance is considered to be at a level reflective of a threshold competence grade. Note, due to the nature of this process, not all individual work activities would provide opportunity to demonstrate a defined level of differentiation beyond a pass – but these images are shown in order to show the cohesiveness of the process being undertaken, and to draw out where differentiation is possible.

Commentary

This section includes detailed comments to demonstrate how the candidate evidence attests to the performance standard of **minimal threshold competence** by directly correlating to the grade descriptors for this occupational area. Centres can compare the evidence against the performance indicators in the marking grid descriptors within the assessor packs, to provide guidance on the standard of knowledge, skills and understanding that need to be met for **minimal threshold competence.**

It is important to note that the commentary section is not part of the evidence or assessment but are evaluative statements on how and why that piece of evidence meets a particular standard.

Grade descriptors

To achieve a pass (threshold competence) a candidate will typically be able to:

Interpret information, plan, assess risk and follow safe working methods when applying practical skills to an acceptable standard in response to the requirements of the brief.

Adequately prepare working areas, acknowledging potential risks and applying acceptable housekeeping techniques during tasks.

Demonstrate the basic technical practical skills in cutting, shaping, fitting and drilling to install components that are in line with industry standards and meet the requirements of the brief.

Demonstrate adequate ability to follow procedures to produce or maintain working components.

Demonstrate basic knowledge and understanding of the principles and processes required for fitting and assembly activities.

Work safely showing an understanding in the selection and use of relevant tools and equipment and demonstrate a basic awareness of straightforward preparation and application processes within the working environments for cutting, shaping, fitting, drilling, assembly and commissioning activities.

Identify causes of problems or common issues related to production control, operating procedures and quality control and have some knowledge and skills in how to rectify them.

Mostly use general industry and technical terminology accurately across different communication methods with some consideration of technical and non-technical audiences.

Task 1 – Planning

(Assessment themes: Health and safety, Planning and preparation)

For task 1, candidates need to produce the following pieces of evidence:

- A resources list with justifications for the selections and measuring equipment calibration check results recorded
- A risk assessment
- A method statement with justifications
- A quality check sheet.

For task 1 candidates will be expected to produce a quality check sheet to use in task 3a during the quality inspection task. This is supporting evidence for assessors to gauge the candidate's planning skills and will not be marked.

Candidate evidence

1. Resources list with justifications for the selections and measuring equipment calibration check results recorded

Requirements and resources	Task	Quantity	Justification
Tools/equipment/materials/consumables			
Writing materials (paper, ruler, pen pencil, eraser)		n/a	To plan the work and to create the quality check sheet.
Low carbon mild steel plate - stock		5	Raw material to machine to stock size and produce the 5 components needed for the drill jig.
Datum table		1	To create the datum reference point.
Pillar drill		1	To drill the holes to size using appropriately sized drill bits.
Drill bits set		A range	Different sized drill bits to create the holes to required size.
Bench vice		1	To secure the stock to create the datum.
Soft jaws		1	To use in bench vice to prevent marking stock.
Scribe		1	To use to measure and mark out holes.
Engineer's square		1	To use to measure and mark out holes.
Hand files (10", 12")		3	To establish a datum on the cut stock.
Hack saw (18YPI blade)		1	To cut the stock to size.
Centre punch		1	To mark/confirm the position of the hole on the stock.
Centre dot		1	To mark the position of the hole on the stock.
Tap wrench		1	To install and remove fasteners, create internal threading.
Tap set (M6, M10)		1 set	To cut threads on holes.
2lb ball pein hammer		1	To use with centre punch and centre dot to mark the position of the hole on the stock.
Parallels		1 set	To support the workpiece and give clearance when drilling.
Steel dowels		4	For assembly, to secure the side supports to the base plate.
Bolts		2	To secure the components on assembly.
Vernier height gauge		1	To mark out hole centres.
Vernier callipers		1	To measure dimensions, confirm sizes.
DTI clock gauge		1	To check for flatness.
Engineer's square		1	For marking out and checking squareness.
Engineer's blue		1	To apply to the workpiece to blue the surface to check for high spots and use when marking out the dimensions.
Trefolex cutting compound		1	To lubricate while drilling and tapping.

Emery cloths	2	One coarse, one fine to polish the components.
Anti-corrosive surface treatment	1	To prevent steel drill jig from rusting during storage.
Computer access	n/a	To prepare the report for handover.
PPE		
Gloves	1 pair	To reduce chances of injury to hands.
Overalls/coat	1	To protect the body from dirt and hot swarf.
Safety shoes/boots	1 pair	To reduce chances of injury to feet.
Safety glasses	1	To protect the eye from swarf and dust.
Technical information/documentation		
Assignment brief	Needed for technical drawings and tolerances.	
Calibration record	To check the measuring equipment calibration is up to date.	
User manuals	For the pillar drill.	
Risk assessment	To be completed before beginning the task to identify risks and hazards that may occur during the activities.	
COSHH data sheets	To check user requirements.	
Method statement	This document sets out what I need to do and in the order in which to do things for the tasks.	
Quality check sheet	To record the results of the quality testing.	
General workshop resources		
Waste disposal bins	Waste to be separated into recyclable and non-recyclable.	
First aid kit	In case of any minor injuries.	
Warning signage and notices	In case of a spillage, to warn others of a wet floor.	
Paper towels, brushes, dustpan	To clean up any waste during and after production.	
Mop and bucket	To clean up any spills of liquids, oils or substances and clean the work area.	
Calibration of measuring equipment		
All measuring equipment checked. Last calibration date was November 2022.		

Commentary

The candidate has interpreted the requirements of the brief and applied their understanding to produce an adequate list of resources required, demonstrating technical knowledge of the requirements required for producing the drill jig assembly.

The candidate has listed amounts of each resource that they have planned to use but their justification is brief and not detailed. The candidate could have provided more considered justifications for their choice, providing more detail around the intended use. The candidate has indicated the task in which the listed resources will be used. The candidate has also included consideration for other resources that should be available in the workshop, for example, access to a first aid kit. They could have also included an eye wash station.

The candidate has recognised the need to refer to supporting technical documentation in order to complete the task. This is not detailed. The candidate could have developed their response further if they had given a more detailed response. For example, the candidate

could have explained why they have listed both the centre dot and a centre punch when they are the same type of tool.

The candidate has demonstrated planning for safe working by identifying appropriate PPE and stating why each piece should be used, but some areas lack additional detail, for example, the type of gloves to be worn and why they are the preferred type. To develop their response the candidate could develop this area further, additional pieces could also be listed, including ear protection and the use of barrier cream.

1. Risk assessment

Fitting and assembly activities and work area

Hazard	Risk	Control	Likelihood	Severity
Tools and equipment.	Cuts and grazes, damage to tools and tooling.	PPE (gloves) should be worn in the workshop. Tools should be handled with care as per PUWER regulations.	3	1
Operation of the pillar drill.	Entanglement in the moving parts.	PPE must be worn (fitted overalls or coat), no loose clothing (baggy sleeves or ties), no jewellery. Hair should be tied back. Guarding to be used.	3	2
	Electric shocks	Check all guarding is in place and no exposed wiring to motor and internal parts of the drill.	3	1
	Malfunction or machine failures	Carry out pre-use safety checks. Check guarding is in place. Check emergency stop and switches are operational. Comply with PUWER regulations.	2	1
Incorrect application of drill speeds.	Broken drill bits, damage to pillar drill, potential damage to the workpiece.	Select and use correct drill bit and apply correct speed, refer to drawings to confirm hole sizes. Wear PPE to prevent eye injuries in event of a broken drill bit.	3	1
Swarf.	Getting swarf in your eyes or cutting your hands. Hot swarf may cause burns.	Wear PPE (gloves, eye protection), use guards. Use brush to clean away hot swarf.	3	1
Incorrect drilling techniques.	Cuts and grazes to hands and arms, eye injuries from ejected swarf or broken drill bits.	Use correct drill bit and speeds to prevent broken bits. Use centre punching to prevent drill bit slipping during drilling holes.	3	1
Debris from machinery.	Swarf coming off the drills, broken bits or tooling.	Wear goggles and ensure that the safety guard is shut.	3	1
Falling objects from work bench.	Risk of dropping material stock or equipment on to feet.	Wear steel toe cap boots while in the workshop. Do not place materials, tools or equipment on edge of workbenches. Good tool management.	2	1

Slips, trips and falls.	Spilt fluids, file dust and chalk which could be slippery, trailing cables.	Clean up spills, area to be clean and tidy at all times following good housekeeping. No cables in walkway. Use signage to warn others. Dispose of waste correctly.	2	1
Noise from the machinery.	Hearing damage, disturbing others.	Ear protection should be worn if overall noise levels in the workshop exceed the Noise at Work regulations.	3	1
Manual handling.	Back injuries, sprains.	Manual handling training is given. Ensure correct manual handling techniques are followed. Avoid handling heavy materials – use other methods (mechanical/team lifting).	3	1
Liquids and chemicals used during production.	Spillages, injuries to eyes, skin and respiratory disorders or irritation (fumes).	Check the COSHH data sheet before using the engineer's blue and anti-corrosive treatment. Wear suitable PPE (gloves, masks, eye protection). Clean up any spillages. Use signage to warn others of spills.	2	1

Likelihood		Severity	
1	Very unlikely to happen	1	Minor injury
2	Unlikely to happen	2	Major injury
3	Possible to happen	3	Loss of limb
4	Likely to happen	4	Death of an individual
5	Very likely to happen	5	Multiple deaths

Commentary

The candidate evidence demonstrates a basic level of knowledge and understanding of the different types of risks and hazards associated with fitting and assembly activities. The candidate has considered and identified some hazards and associated risks for each of the tasks. These could have been expanded and more detail given. For example, detailed where the risk of entanglement was on the drill such as the spindle and drill chuck.

The candidate has demonstrated a basic understanding of the mitigations required that can minimise the risks and hazards and has identified some of the controls necessary.

The likelihood and severity has been identified for each risk and hazard, with some accuracy. The candidate has attributed the severity as a level 1, minor injury, to most of the

hazards, however, the severity could be higher in some instances. For example, working with machinery could be rated as level 2, due to the chance of entanglement which could result in a fracture or amputation and the ejection of swarf which could result in an eye injury or loss of sight (whether temporary or permanent).

The candidate could have developed their response further if they had given more detail regarding the control measures and had considered the likelihood and severity of all identified hazards and risks with a higher degree of accuracy.

1. Method statement

Drill jig assembly

This method statement covers the information needed to produce a brief working plan of the marking out and work schedule activity, including preparing materials, tools and ancillary equipment prior to starting the work.

Tools to be used – See resources list
PPE – overalls, boots, safety glasses.
H&S legislation – HASAWA, COSHH, PUWER, Manual handling.
Drill sizes – see drawings

Work to be carried out:

- I will first check the drawings so I can see what needs to be produced.
- I will do a risk assessment for the tasks to identify any potential risks or hazards and identify the safety measures needed before starting work.
- I will put on my PPE, overalls and boots and prepare my work area. I will use my resource list to collect the materials, tools and equipment needed, check they are fit for purpose and place them in my work area. I will check with the supervisor that the measuring equipment has been calibrated.
- I will check the pillar drill is available for use and guarding is in place. I will follow the workshop SOP to set up the pillar drill and fit the appropriate drill bit. I will put on my safety glasses and check my overalls are secure, so they don't get caught in the pillar drill or snag on any tools.
- To make the first component I will first need to file a datum onto a piece of stock material so I have a square end to make all of my measurements from.
- I will use engineer's blue to blue the surface of the material. I will then use a vernier height gauge to mark out the hole centres and the dimensions of the block.
- With the holes and dimensions all marked out I will cut the stock to the size, punch and drill the holes in to the block as specified by the drawings, following a safe system of work. I will check the drawings to confirm the drill size and check the speeds to be used. I will drill the holes safely, using drilling fluid to prevent overheating the drill. I will remove any swarf build up from around the drill.
- I will repeat these steps to make the other components.
- With all components made, I will cut four steel dowels to secure the side supports, these will be made from a 6mm diameter steel rod.
- I will then use emery cloths to get the correct surface finish for each of the components. I will use a rough emery cloth to remove any lines and marks, then polish with a softer cloth to get a good finish.

- I will assemble the components, in the correct order to complete the drill jig assembly. I will treat the surface with an anti-corrosion spray treatment.

- Once I have finished the task, I will take measurements of the drill jig assembly to check it meets the requirements of the drawing and check the holes are aligned. I will then test the jig and produce a sample part.

- I will then reinstate the work area, sweep the floor, dispose of waste in the designated bins and return all of the tools and equipment used during the task to storage.

Commentary

The candidate has carried out a limited analysis of the brief. The method statement contains basic information relating to the scope, processes, tools and equipment.

The candidate has displayed a basic understanding of the order the activities should take place, giving only a basic level of detail for each stage in terms of the safety checks, material collection, marking out of components, checking for dimensions, manufacturing and assembly.

The level of detail could be improved, for example, the candidate has correctly identified the order of tasks, but the level of detail given is basic. For example, the candidate has omitted to record the drill sizes and include the required speeds and has only mentioned referring to the drawings for the sizes. The candidate could have developed their response and shown more detailed knowledge of the process through explaining how and why different speeds would be required.

There is limited information regarding the pre-use safety checks and in-production checks to be made. For example, the safety checks could have included the selection and checking of the suitability of the PPE and checking that the guarding was in place. The candidate could have detailed the types of checks they were undertaking, such as accuracy checks of the hole positions and sizes using the measuring equipment during the production of the drill jig assembly.

The candidate has referenced application of a surface treatment on the final assembly, but this has not been explained. For example, they could have explained the purpose of the treatment, such as using an anti-corrosion spray to prevent rusting of the steel jig whilst being stored.

Planning is basic and does not fully take into account the implications of issues with the production processes, resulting in potential inaccuracies or defects in the finished product. For example, the candidate plans to check with the supervisor if the calibration has been completed on the measuring equipment, relying on someone else than checking the equipment themselves. Miscommunication could result in potential inaccuracies during the production if equipment has not been calibrated. The candidate should perform the checks themselves; this shows a basic understanding of what is required.

The method statement is mostly accurate with basic justifications for tasks, for example, the need to use datums, marking from tools such as squares etc. The application of the surface treatment is inaccurate, the candidate should apply the surface treatment to all components

prior to assembly and not just to the finished assembly as some surface area may not get treated and could rust in the future.

The candidate has included elements of health and safety which shows a good level of understanding of the need to follow a safe method of work, for example, preparing the work area and making pre-use checks on the machinery. Whilst the candidate has identified health and safety legislation that is applicable, they have not explained how this will affect their work and the choices they make. For example, they could have mentioned the Provision and Use of Work Equipment Regulations (PUWER) in relation to the workshop equipment and the guarding required for the machinery.

1. Quality check sheet

Drill Jig Base

Components Dimensions	Hole Diameter	Tolerance (mm)	Required Size (mm)	Actual Size (mm)	Error (mm)	Instrument Used	Result
Material length	-	±0.50	100			Vernier	
Material width	-	±0.50	80			Vernier	
Material thickness	-	±0.50	10			Vernier	
Hole Positions and size							
A	Ø6.00	±0.50	10 x 20			Vernier	
B	Ø6.00	±0.50	10 x 60			Vernier	
C	Ø6.00	±0.50	22 x 25			Vernier	
D	Ø6.00	±0.50	22 x 55			Vernier	
E	Ø10.00	±0.50	35 x 34			Vernier	
F	Ø6.00	±0.50	40 x 7.5			Vernier	
G	Ø10.00	±0.50	40 x 72.50			Vernier	
H	Ø10.00	±0.50	49 x 40			Vernier	
I	Ø6.00	±0.50	60 x7.5			Vernier	
J	Ø6.00	±0.50	60 x 72.5			Vernier	
K	Ø6.00	±0.50	61 x 49			Vernier	
Surface Finish	-	±0	1.6 µm			Comparison gauge	
Flatness	-	±.05	0			DTI & Datum table	

Drill Jig Front Support Block

Components Dimensions	Hole Diameter	Tolerance (mm)	Required Size (mm)	Actual Size (mm)	Error (mm)	Instrument Used	Result
Material length	-	±0.50	80			Vernier	
Material width	-	±0.50	15			Vernier	
Material thickness	-	±0.50	10.5			Vernier	
Hole Positions and size							
A	Ø6.60	±0.50	20 x 10			Vernier	
B	Ø6.60	±0.50	60 x 10			Vernier	
Surface Finish	-	±0	1.6 µm			Comparison gauge	
Flatness	-	±.05	0			DTI & Datum table	

Drill Jig Side Support Block

Components Dimensions	Hole Diameter	Tolerance (mm)	Required Size(mm)	Actual Size (mm)	Error (mm)	Instrument Used	Result
Material length	-	±0.50	40			Vernier	
Material width	-	±0.50	15			Vernier	
Material thickness	-	±0.50	10.5			Vernier	
Hole Positions and size							
A Part 1	Ø6.00	±0.50	10 x 7.5			Vernier	
B Part 1	Ø6.00	±0.50	30 x 7.5			Vernier	
A Depth Part 1	-	±0.50	8			Vernier	
B Depth Part 1	-	±0.50	8			Vernier	
A Part 2	Ø6.00	±0.50	10 x 7.5			Vernier	
B Part 2	Ø6.00	±0.50	30 x 7.5			Vernier	
A Depth Part 2	-	±0.50	8			Vernier	
B Depth Part 2	-	±0.50	8			Vernier	
C Part 1	Ø6.00	±0.50	20 x 5			Vernier	
C Part 2	Ø6.00	±0.50	20 x 5			Vernier	
Surface Finish	-	±0	1.6 µm			Comparison gauge	
Flatness	-	±.05	0			DTI & datum table	

Drill Jig Top

Components Dimensions	Hole Diameter	Tolerance	Required Size (mm)	Actual Size (mm)	Error (mm)	Instrument Used	Result
Material length	-	±0.50	75			Vernier	
Material width	-	±0.50	60			Vernier	
Material thickness	-	±0.50	10			Vernier	
Hole Positions and size	-						
A	Ø6.50	±0.50	10 x 10			Vernier	
B	Ø6.00	±0.50	10 x 50			Vernier	
C	Ø6.00	±0.50	22 x 15			Vernier	
D	Ø6.00	±0.50	22 x 45			Vernier	
E	Ø10.00	±0.50	35 x 24			Vernier	
F	Ø10.00	±0.50	49 x 30			Vernier	
G	Ø10.00	±0.50	61 x 39			Vernier	
Surface Finish	-	±0	1.6 µm			Comparison gauge	
Flatness	-	±.05	0			DTI & datum table	

Dowels

Components Dimensions	Steel Diameter	Tolerance (mm)	Required Size(mm)	Actual Size (mm)	Error (mm)	Instrument Used	Result
Material length	-	±0.50	18.0			Vernier	
Material width	Ø6.00	±0.50	6.0			Vernier	
Dowel ends	-	±0.50	1.0 x 1.0			Vernier	

Task 2 – Production

(Assessment themes: Health and safety, Production (Measuring and marking out, Cutting components, Techniques and methods, Tools and equipment).

For task 2, candidates need to produce the following piece of evidence:

- functioning drill jig assembly.

For task 2, assessors will need to produce the following pieces of supporting evidence from completing the production activities:

- assessor observation to include:
    - preparation of tools and equipment
    - application of hand skills
    - set up and use of workshop machinery
    - checks carried out before, during and after production
    - work area prior to, during and on completion of tasks.

Note: For the purpose of this GSEM, the assessor observations have been captured on one form. In delivery, assessors may choose to capture their observations on more than one form.

Photographic evidence:

- Photographic evidence showing the prepared work area – *not supplied for this GSEM but it is expected providers will record the condition of the work area prior to the candidate starting the work.*

- Photographic evidence showing stages of production of the drill jig components (including setting up, marking out of materials, removal of material using equipment, finishing and assembly) - *Illustrated in task 2 photographic evidence section below (photographs 1 - 13)*

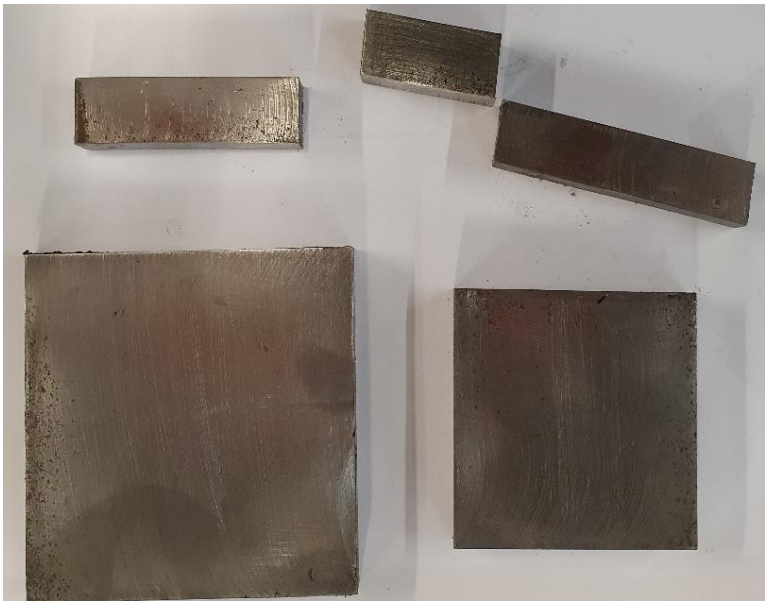
- Photographic evidence showing the completed drill jig assembly – *Illustrated in task 2 photographic evidence section below (photograph 14).*

Note: Additional photographs or video may be used to capture other elements of the production process for reference, although this is not a mandatory requirement.

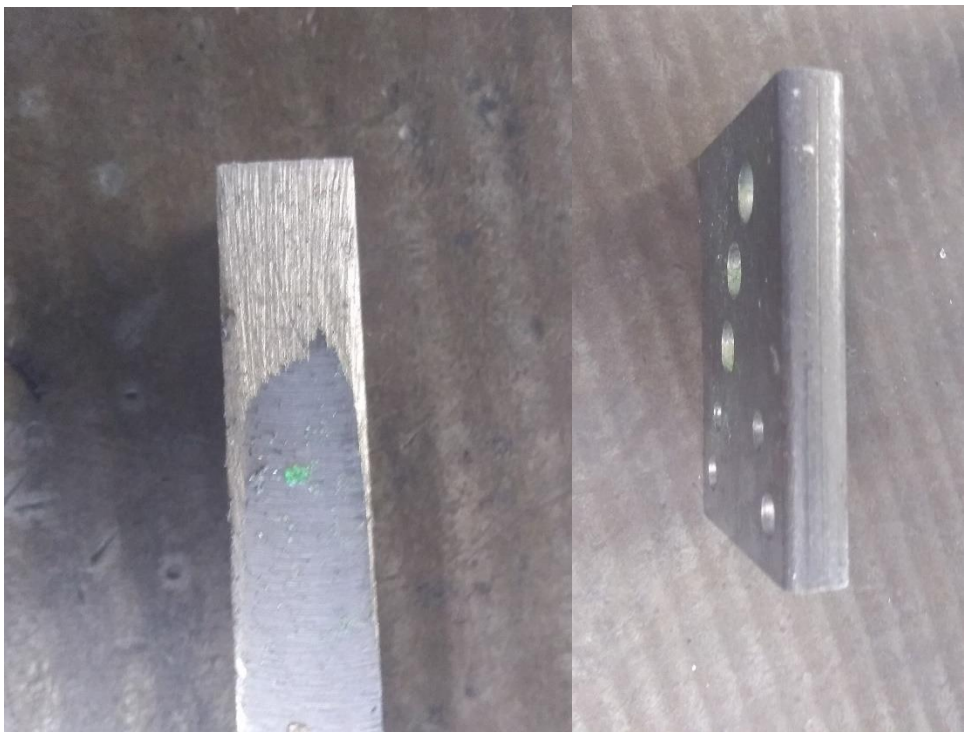
Photographs in this GSEM demonstrate the full process that the candidate has undertaken to complete the drill jig assembly. Commentary sections detail where performance is considered to be at a level reflective of a threshold competence grade. Note, due to the nature of this process, not all individual work activities would provide opportunity to demonstrate a defined level of differentiation beyond a pass – but these images are shown in order to show the cohesiveness of the process being undertaken, and to draw out where differentiation is possible.

2. Photographic evidence - Production

Photograph 1 – showing the raw materials selected for the task. The candidate has not cut the materials to the correct dimensions, nor removed the millscale from the surface which will detract from the final finish.

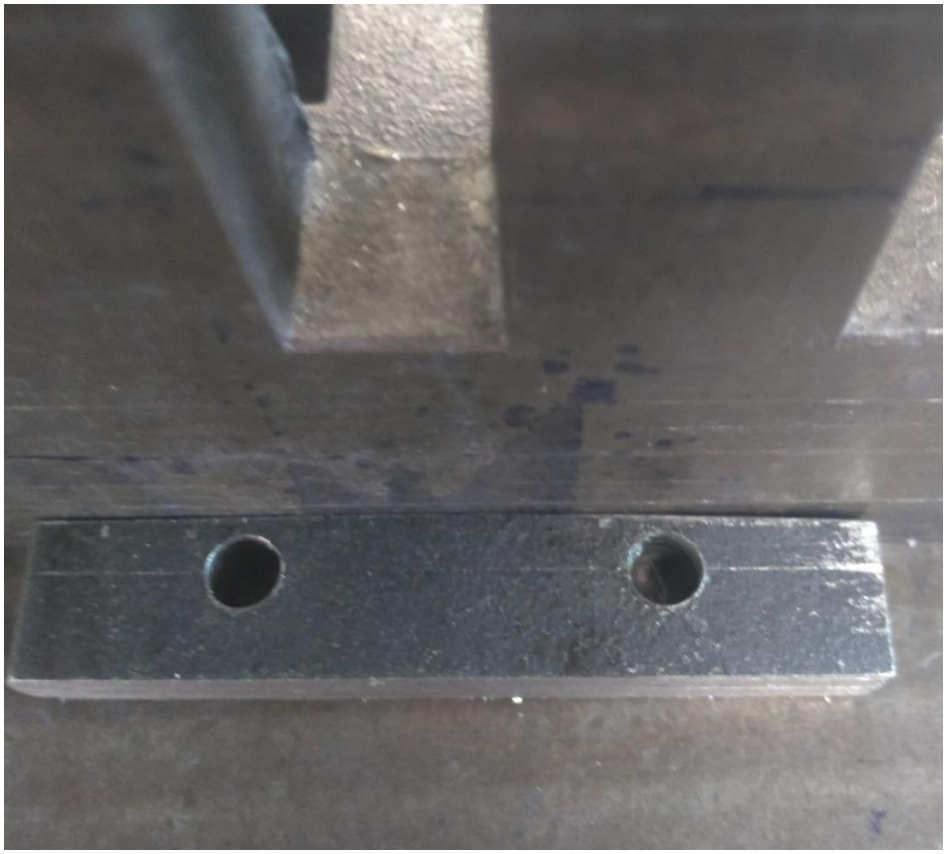


Photographs 2 and 3 – shows an example of where a threshold competence level candidate has not removed the millscale from the stock, resulting in a poorer finish of the finished component.



Photograph 4 – showing the use of tools to check for squareness. The candidate has checked the squareness of the cut stock pieces prior to setting out the position of the drill holes.

Photograph 5 – showing an example of where a threshold competence level candidate has not achieved the squareness, resulting in a poorer finish of the finished component.



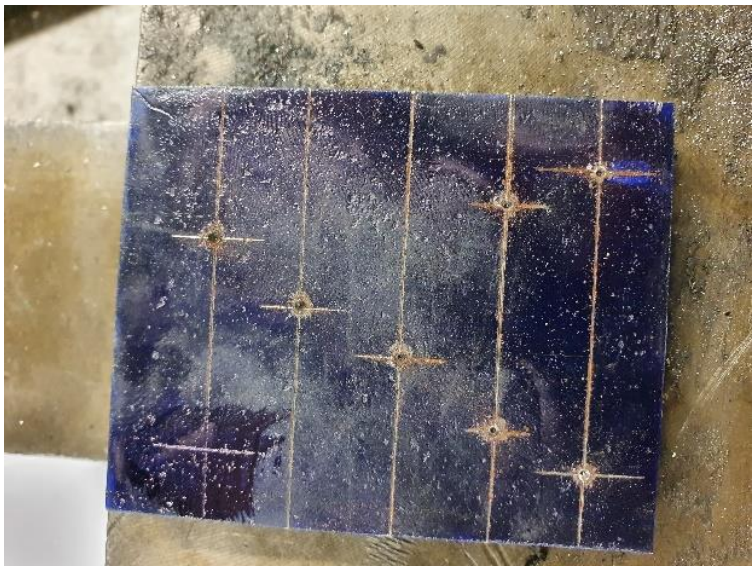
Photograph 6 – showing establishing the datums, using a file.

Photograph 7 - showing the preparation of the material, the application of engineer's blue to stock. This should be an even application and no excess or spillages.

Photograph 8 – showing the safe use of equipment, with the pillar drill operated using correct PPE and with all guarding in place.

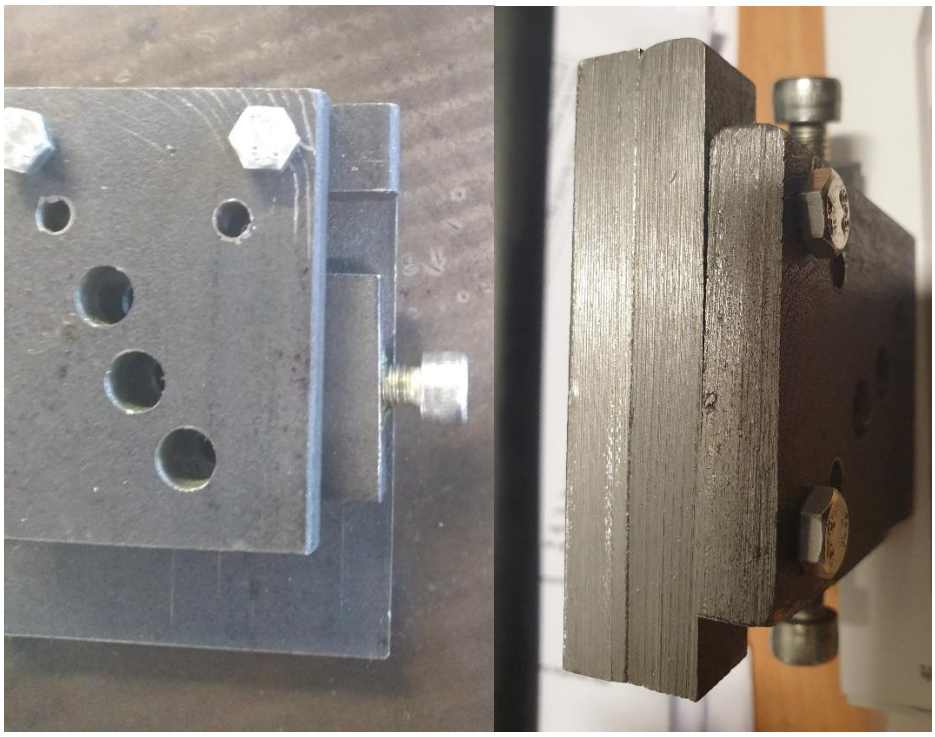
Photograph 9 – showing the correct use of a Vernier height gauge whilst performing in-production checks.

Photograph 10 – showing the pilot holes set out for the drill jig top plate, which has been done so in order to identify any alignment issues with the hole pattern.



Photograph 11 – showing an example of where a threshold competence level candidate has incorrectly set out the hole pattern resulting in some misalignment of the holes on the finished component.

Photographs 12 and 13 – showing an example of where a threshold competence level candidate has demonstrated misalignment of the finished assembly. The alignment of the top plate is off and is not fully flush to the front support block and base plate.



Photograph 14 – showing an example of where a threshold competence level candidate has not achieved squareness on the finished assembly.

2. Practical observation form - Producing the drill jig assembly

Assessment ID	Qualification number
8713-331	8713-331
Candidate name	**Candidate number**
Candidate A	CG12345
Centre name	**Assessment theme**
City & Guilds	Preparation, Production, Health & safety

Complete the table below referring to the relevant marking grid, found in the assessment pack. Do not allocate marks at this stage.

Task	**Notes –** *detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.*
Assessor observation to include: - preparation of tools and equipment - application of hand skills - set up and use of workshop machinery - checks carried out before, during and after production - work area prior to, during and on completion of tasks.	The candidate put on their PPE (safety boots, overalls, safety glasses, barrier cream), undertook pre-use checks and visual inspection. Work area was prepared, risk assessment was used to check control measures. Work area briefly brushed down. Waste disposed of in accordance with workshop procedures. Resources list used to gather the tools and measuring equipment and placed within their workstation. Some pre-use checks conducted. No tools were cleaned. Calibration records briefly checked. A standard workshop SOP was followed in order to set up the machinery. Pre-use serviceability checks completed for the pillar drill, spindle and chuck all free of debris. Visual inspection of the machine guarding completed; functionality not checked. The candidate selected their raw materials. Producing the two side supports first. Datums were established on the two sides to mark out the dimensions and hole centres. Some inaccuracies observed. Some additional surface marks created. Datums established using an intermediate file, removed the appropriate amount of material, checks for high spots made using an engineer's square. Engineer's blue used to blue the surface of the stock to mark out the dimensions and hole centres. Too much fluid was applied and needed to be cleaned up. Holes were marked for the dowel pins and the M10 tapped hole. Centre lines were marked. A centre dot was used to make initial marks, then punched.

Task	**Notes –** *detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.*
	They checked the workpiece was square to the drill, using a set of parallels, placing the workpiece in the vice on top of the parallels. They did not canter the drill bit to the centre punch mark, resulting in some inaccuracies and some poor quality holes. A depth gauge was used to check the depth required on the technical drawings. This process was repeated to create the second side support, the front support and the top and base plates, applying the same methods and techniques. Some inaccuracies were observed. The candidate made four steel dowels to secure the side supports from a 6mm diameter rod. These were cut to fit flush in the side supports. Did not protrude out of the base plate. Measuring tools used effectively to check the dimensions of the machined components, checking against the technical drawings. The candidate operated the pillar drill safely. Cutting compound was correctly used. The candidate was careful not to remove too much material at once, using smaller pilot holes and stepping up the drill bit size to the finished diameter, this is good practice. All holes deburred. Incorrect speed applied causing one drill bit to break, this was replaced following correct procedure. Swarf brushed away; some build up observed during the drilling of the components. This could have been managed better. Each component polished with a rough emery cloth, removing some of the millscale and finished with a smooth emery cloth to the desired surface finish. However, as the millscale had not been fully removed this detracted from the final finish. Drill jig was assembled in correct order using appropriate hand tools. Significant adjustments were required to correct the alignment. An anti-corrosive surface treatment was applied, some areas were missed. Health and safety followed throughout all tasks. Correct PPE was worn throughout. Candidate followed standard operating procedure for machine isolation when changing the broken bit and cleaning down the machinery. On completion of the tasks, machine area was cleaned of most debris. Work area was reinstated, most hand tools, tooling and equipment were briefly checked before returning to the appropriate storage location.

Assessor signature	**Date**
Assessor A	**17.12.2022**

Commentary

The observation evidence shows the candidate has demonstrated adequate understanding and knowledge of preparing the work area and acknowledging potential risks prior to commencing tasks, for example, they made some pre-use checks of the work area and checked some of the guarding on the machinery. The candidate could have developed their response if more thorough pre-use checks had been demonstrated to determine the working condition and serviceability of the equipment. For example, checking all guarding on the machines, ensuring it is in place, not loose, or missing and operates as expected.

The candidate demonstrated adequate ability to prepare the workshop, for example, follow a standard workshop SOP to safely prepare the machinery for use.

There is a basic understanding of measurement techniques when marking out but the methods used lacked efficiency, resulting in some inaccuracies. For example, the marking out process is correct using datums but the application was not always accurate, resulting in some additional marks being made to the surface. The candidate was correct in using an engineer's square to check for high spots. The candidate could have developed their response further if they had performed a full calibration of the equipment prior to use and was more accurate with their measurements.

The techniques and methods used by the candidate showed a basic understanding of material removal and understood the need to perform edge protection and deburring. Material removal was carried out with a basic understanding of the need for accuracy, for example, only removing small amounts of material at a time avoiding removing too much and using a stepped process when drilling holes.

Some in-production checks for accuracy were carried out but this was not consistent. For example, the candidate did not fully align the drill with the centre punch mark which resulted in some errors. Calculation and use of drill speeds contained some errors, for example, one drill bit was broken as the candidate did not apply the correct speed for the bit causing it to overheat and break. Drill sizes were appropriate for the hole, for example, the candidate performed a stepped approach to drilling, ensuring they started with a pilot hole before increasing the drill size. The candidate could have developed their response further if they had carried out more in-production checks for accuracy and had taken more time to check the alignment of the drill to the hole positions prior to drilling. For example, cantering the drill and adjusting the table as necessary.

The candidate demonstrated a basic understanding of the machining process, identifying problems and demonstrating the knowledge, understanding and the skills to be able to resolve and rectify them. For example, an incorrect speed was used causing the drill bit to overheat and break and the candidate demonstrating the correct procedure to replace the broken bit to complete the task.

The candidate demonstrated their ability to work safely and to follow safe operating practices, showing basic knowledge and understanding of health and safety. For example, they referred to their risk assessment to check the control measures were in place and they followed correct isolation procedure when changing the drill bits and cleaning down the machinery. The candidate was inconsistent when removing swarf during the drilling which could have impacted on the performance of the drill or created a health and safety risk with the build-up of swarf.

The candidate demonstrated basic technical practical skills in machining the materials to produce the individual components using machinery and hand tools before assembling following a logical sequence referring to the drawings some of the time. Significant adjustments were made to the fitting of the assembly but a cause was given, for example, as not all tolerances were met, the alignment of the top and bottom plates were not fully aligned. A surface treatment was applied but this was not applied evenly, with some areas missed.

Task 3a: Quality review

(Assessment themes: Health and safety, Quality review and evaluation (quality review, reporting, recording and handover)

For task 3a, candidates need to produce the following pieces of evidence:

- completed quality check sheet
- a sample drilled part (created using the completed drill jig assembly).

For task 3a, assessors will need to produce the following pieces of supporting evidence:

- Assessor observation:
    - usage of measuring equipment
    - accuracy of drilled holes sample and measurements taken.

Photographic evidence required:

- photographic evidence showing the quality review process with consideration of checking of tolerances and use of appropriate measuring equipment *Illustrated in task 3a photographic evidence section below (photograph 12)*

- photographic evidence of the completed drill jig assembly and the sample drilled part - *Illustrated in task 3a photographic evidence section below (photographs 13 - 15)*

Video evidence required:

- video evidence showing the creation of the sample drilled part.

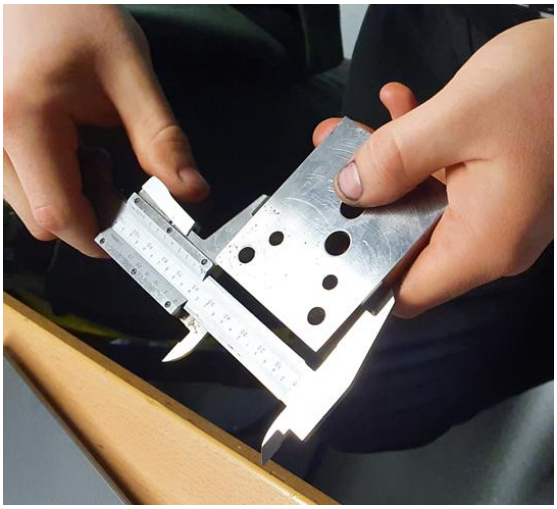
The following task 3a supporting evidence has not been included for this version of the GSEM:

Video evidence

- video evidence showing the creation of the sample drilled part.

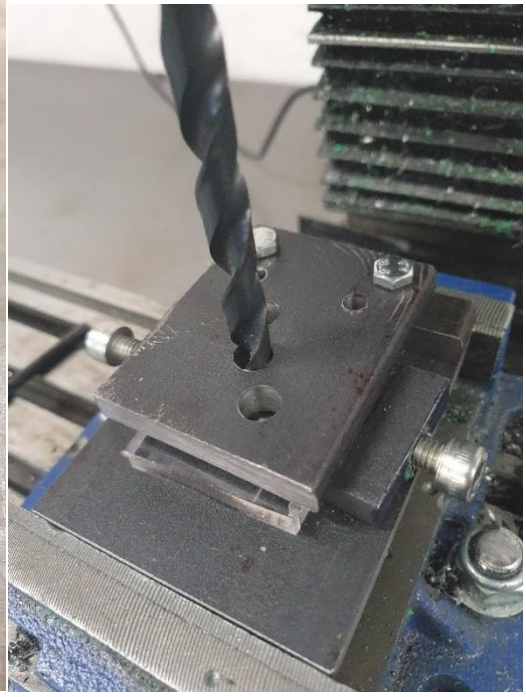
Task 3a - Photographic evidence – Quality review

Photograph 15 – showing the candidate measuring the accuracy of a component.

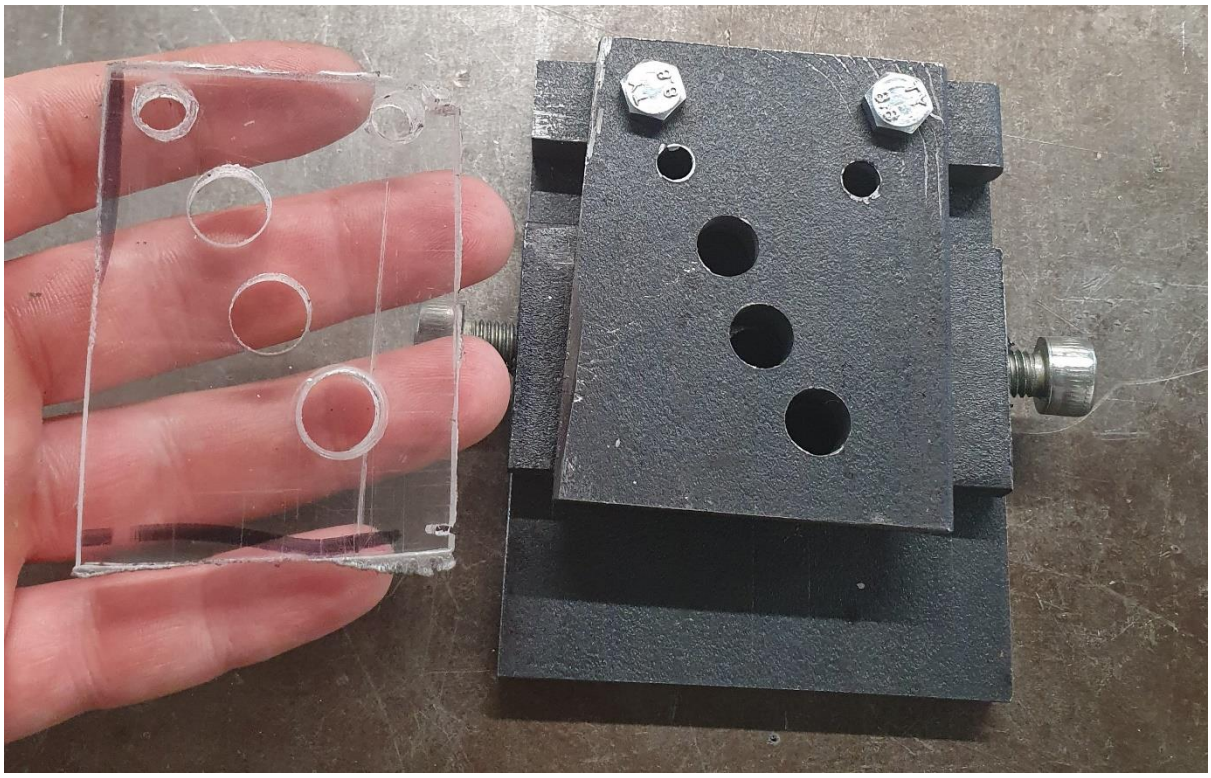


Photographs 16 and 17 – showing the completed drill jig assembly and the misalignment of the drill holes resulting from a compound error with the specified tolerances.

Photographs 18 and 19 – showing the sample part in the jig and being drilled.



Photograph 20 – showing the result of the sample part.



Candidate evidence

3a. Completed quality check sheet

Drill Jig Base

Components Dimensions	Hole Diameter	Tolerance (mm)	Required Size (mm)	Actual Size (mm)	Error (mm)	Instrument Used	Result
Material length	-	±0.50	100	100.50	0.50	Vernier	PASS
Material width	-	±0.50	80	80.24	0.24	Vernier	PASS
Material thickness	-	±0.50	10	9.98	0.02	Vernier	PASS
Hole Positions and size							
A	Ø6.00	±0.50	10 x 20	10.22 X 20.22	0.22 X 0.22	Vernier	PASS
B	Ø6.00	±0.50	10 x 60	10.24 X 60.20	0.24 X 0.20	Vernier	PASS
C	Ø6.00	±0.50	22 x 25	21.72 X 24.82	0.28 X 0.18	Vernier	PASS
D	Ø6.00	±0.50	22 x 55	22.02 X 54.76	0.02 X 0.24	Vernier	PASS
E	Ø10.00	±0.50	35 x 34	35.00 X 34.42	0.00 X 0.42	Vernier	PASS
F	Ø6.00	±0.50	40 x 7.5	40.38 X 7.5	0.38 X 0.00	Vernier	PASS
G	Ø10.00	±0.50	40 x 72.50	40.48 X 72.70	0.48 X 0.20	Vernier	PASS
H	Ø10.00	±0.50	49 x 40	49.02 X 40.20	0.02 X 0.20	Vernier	PASS
I	Ø6.00	±0.50	60 x7.5	60.22 X 7.52	0.22 X 0.02	Vernier	PASS
J	Ø6.00	±0.50	60 x 72.5	60.18 X 72.58	0.18 X 0.08	Vernier	PASS
K	Ø6.00	±0.50	61 x 49	61.28 X 49.18	0.28 X 0.18	Vernier	PASS
Surface Finish	-	±0	1.6 µm	1.6	0	Comparison gauge	PASS
Flatness	-	±.05	0	0.03	0.03	DTI & Datum table	PASS

Drill Jig Front Support Block

Components Dimensions	Hole Diameter	Tolerance (mm)	Required Size (mm)	Actual Size (mm)	Error (mm)	Instrument Used	Result
Material length	-	±0.50	80	79.50	0.50	Vernier	PASS
Material width	-	±0.50	15	15.22	0.22	Vernier	PASS
Material thickness	-	±0.50	10.5	10.3	0.02	Vernier	PASS
Hole Positions and size							
A	Ø6.60	±0.50	20 x 10	20.24 X 10.08	0.24 X 0.08	Vernier	PASS
B	Ø6.60	±0.50	60 x 10	60.24 X 9.98	0.24 X 0.02	Vernier	PASS
Surface Finish	-	±0	1.6 µm	1.6	0	Comparison gauge	PASS
Flatness	-	±.05	0	0.05	0.5	DTI & Datum table	PASS

Drill Jig Side Support Block

Components Dimensions	Hole Diameter	Tolerance (mm)	Required Size(mm)	Actual Size (mm)	Error (mm)	Instrument Used	Result
Material length	-	±0.50	40	40.10	0.10	Vernier	PASS
Material width	-	±0.50	15	15.52	0.52	Vernier	FAIL
Material thickness	-	±0.50	10.5	10.4	0.01	Vernier	PASS
Hole Positions and size							
A Part 1	Ø6.00	±0.50	10 x 7.5	10.24 X 7.56	0.24 X 0.06	Vernier	PASS
B Part 1	Ø6.00	±0.50	30 x 7.5	30.38 X 7.50	0.38 X 0.00	Vernier	PASS
A Depth Part 1	-	±0.50	8	8.40	0.4	Vernier	PASS
B Depth Part 1	-	±0.50	8	8.32	0.32	Vernier	PASS
A Part 2	Ø6.00	±0.50	10 x 7.5	10 X 7.62	0.00 X 0.12	Vernier	PASS
B Part 2	Ø6.00	±0.50	30 x 7.5	30.28 X 7.52	0.28 X 0.02	Vernier	PASS
A Depth Part 2	-	±0.50	8	8.28	0.28	Vernier	PASS
B Depth Part 2	-	±0.50	8	8.12	0.12	Vernier	PASS
C Part 1	Ø6.00	±0.50	20 x 5.25	20.28 X 5.26	0.28 X 0.01	Vernier	PASS
C Part 2	Ø6.00	±0.50	20 x 5.25	20.22 X 5.26	0.22 X 0.01	Vernier	PASS
Surface Finish	-	±0	1.6 µm	1.6	0	Comparison gauge	PASS
Flatness	-	±.05	0	0.04	0.04	DTI & datum table	PASS

Drill Jig Top

Components Dimensions	Hole Diameter	Tolerance	Required Size (mm)	Actual Size (mm)	Error (mm)	Instrument Used	Result
Material length	-	±0.50	75	75.55	0.55	Vernier	FAIL
Material width	-	±0.50	60	60.08	0.08	Vernier	PASS
Material thickness	-	±0.50	10	9.96	0.04	Vernier	PASS
Hole Positions and size	-						
A	Ø6.50	±0.50	10 x 10	10.20 x 10.02	0.20 x 0.02	Vernier	PASS
B	Ø6.00	±0.50	10 x 50	10.04 x 50.36	0.04 x 0.36	Vernier	PASS
C	Ø6.00	±0.50	22 x 15	15.04 x 22.02	0.04 x 0.02	Vernier	PASS
D	Ø6.00	±0.50	22 x 45	45.14 x 21.98	0.14 x 0.02	Vernier	PASS
E	Ø10.00	±0.50	35 x 24	34.98 x 24.02	0.02 x 0.02	Vernier	PASS
F	Ø10.00	±0.50	49 x 30	48.78 x 29.76	0.22 x 0.24	Vernier	PASS
G	Ø10.00	±0.50	61 x 39	61.24 x 39.28	0.24 x 0.28	Vernier	PASS
Surface Finish	-	±0	1.6 µm	1.6	0	Comparison gauge	PASS
Flatness	-	±.05	0	0.02	0.2	DTI & datum table	PASS

Dowels

Components Dimensions	Steel Diameter	Tolerance (mm)	Required Size(mm)	Actual Size (mm)	Error (mm)	Instrument Used	Result
Material length	-	±0.50	18.0	18.10	0.10	Vernier	PASS
Material width	Ø6.00	±0.50	6.0	6.0	0	Vernier	PASS
Dowel ends	-	±0.50	1.0 x 1.0	1.03 X 1.04	0.03 X 0.04	Vernier	PASS

Comments:

Alignment issues with top and bottom plates when assembled. This was a result of not meeting all the required tolerances. Some additional adjustments were made to align holes.

Surface defects – visible tool marks, could be polished out better.

3a. Practical observation form – Quality review

Assessment ID	Qualification number
8713-331	8713-331
Candidate name	**Candidate number**
Candidate A	CG12345
Centre name	**Assessment theme**
City & Guilds	Quality review and evaluation

Complete the table below referring to the relevant marking grid, found in the assessment pack. Do not allocate marks at this stage.

Task	**Notes –** *detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.*
Assessor observation to include: - usage of measuring equipment - accuracy of drilled holes sample and measurements taken.	The candidate put on their PPE and prepared their work area. Measuring tools selected, a brief visual check was observed. No calibration observed. Completed a brief visual inspection of the completed assembly. Disassembled the drill jig assembly using hand tools, checked each component against the drawings. The correct measuring equipment was selected when measuring each component. Dimensional checks made. Some dimensions and findings checked against the given tolerances. Some tolerances were met. Some measurements taken with accuracy, but this was not consistent – with the candidate having to re-check some measurements. All findings recorded on the quality check sheet. Re-assembled the components in the correct sequence, using a selection of hand tools to form the drill jig assembly. The alignments of the drill jig holes were inaccurate. A reasoning was noted. Functionality of the jig was tested by producing a sample part. The sample part contained inaccuracies due to the misalignment of the drill holes as a result of the production fault. Some noticeable surface defects on the finished drill jig, but those were identified, and a solution offered. The surface defects did not affect the operation of the assembly.

Assessor signature	**Date**
Assessor A	**18.12.2022**

Commentary

This commentary also covers the completion of the quality check sheet.

The observation evidence has captured that the candidate undertook the quality inspection of the machined drill jig assembly components and completed assembly.

The candidate utilised appropriate measuring equipment to perform the checks on each of the components to record the final dimensions and to check for compliance with tolerances against the brief. The candidate did not perform calibration checks on the measurement equipment before use.

The candidate performed dimensional checks, a functionality check and a brief surface check for defects, recording their findings on their quality check sheet. The completed quality check sheet could then be utilised within their quality inspection report.

Some dimensions and components were checked for accuracy against the dimensions and tolerances in the given specification and recorded. Not all dimensions were within the given tolerances.

The candidate identified an issue with the production of the drill jig, where the accuracy of their measurements in the previous task had resulted in the drill holes not lining up correctly and the sample part was poor. The candidate indicated a basic reason for the issue with the alignment, showing a lower level of knowledge and understanding of implications resulting from a process or procedural deficiency.

Most detectable surface defects were identified, recorded and attributed to a process or procedural deficiency, for example, where some residual tool marks and guide lines were not fully polished out.

The candidate could have developed their response further if the level of accuracy throughout had been better demonstrated, resulting in a good alignment of the sample part and the candidate had checked most of the dimensions for accuracy against the tolerances in the specification. A more developed response would also have been demonstrated if there were fewer visible defects and a more thorough finishing of the components had taken place.

Task 3b – Evaluation and recording

(Assessment themes: Health and safety, Quality review and evaluation (quality review, reporting, recording and handover)

For task 3b, candidates need to produce the following piece of evidence:

- completed quality inspection report.

Candidate evidence

3b. Quality inspection report

Quality Inspection Report

Introduction

The assignment was to create a drill jig to drill a series of holes quickly and accurately for the manufacturing process for a batch of new components. The completed drill jig was to be tested and a sample part produced for quality checking.

Production process

The drill jig was made up of 5 main components, a top plate, bottom plate, two side supports and a front support. All were manufactured in low carbon mild steel plate which was cut to size and checked for squareness. Each component was marked up with the placement of the drill holes and were then drilled using a pillar drill.

The completed components were assembled using pre-manufactured bolts and dowels to make the final assembly. A sample part was produced to check the accuracy of the drill jig.

All waste was disposed of in accordance with workshop procedures.

Product testing and inspection

I carried out a quality inspection on the completed drill jig assembly. This included a visual check, dimensional accuracy check and functionality test.

I prepared my work area and collected my tools and equipment. I selected a Vernier calliper to measure the finished dimensions of the individual components. The Vernier calliper was checked and calibrated. Hand tools were selected to disassemble the drill jig.

I completed a visual check of the complete assembly. There were some marks and scratches on the surface of the jig. These were caused during the production of the components and were not removable by polishing.

The jig was complete and a sample part had been produced confirming the functionality of the jig.

I used hand tools to disassemble the drill jig assembly. I used the Vernier to carry out dimensional checks on the individual component parts. All components were measured. The finished dimensions were recorded on the quality check sheet. I repeated this process for each component part. I looked at the brief and the technical drawings to check the required tolerances.

Some of the finished dimensions were within the tolerances given and conformed to the dimensional requirements of the brief and technical drawings. The components that were out of tolerance included one side support block and the drill jig top plate. Both of these components both failed on their material sizes. The side support block width was over the tolerance required by 0.10mm and the top plate length was 0.55mm oversize. If I were to repeat this assignment, I would improve my level of accuracy and perform more thorough accuracy checks during the production process.

A copy of my quality check sheet is included below:

Drill Jig Base

Inspection Sheet

Components Dimensions	Tolerance (mm)	Required Size (mm)	Actual Size (mm)	Error (mm)	Instrument Used	Result
Material length	±0.50	100	100.50	0.50	Vernier	PASS
Material width	±0.50	80	80.24	0.24	Vernier	PASS
Material thickness	±0.50	10	9.98	0.02	Vernier	PASS
Hole Positions						
A	±0.50	10 x 20	10.22 X 20.22	0.22 X 0.22	Vernier	PASS
B	±0.50	10 x 60	10.24 X 60.20	0.24 X 0.20	Vernier	PASS
C	±0.50	22 x 25	21.72 X 24.82	0.28 X 0.18	Vernier	PASS
D	±0.50	22 x 55	22.02 X 54.76	0.02 X 0.24	Vernier	PASS
E	±0.50	35 x 34	35.00 X 34.42	0.00 X 0.42	Vernier	PASS
F	±0.50	40 x 7.5	40.38 X 7.5	0.38 X 0.00	Vernier	PASS
G	±0.50	40 x 72.50	40.48 X 72.70	0.48 X 0.20	Vernier	PASS
H	±0.50	49 x 40	49.02 X 40.20	0.02 X 0.20	Vernier	PASS
I	±0.50	60 x7.5	60.22 X 7.52	0.22 X 0.02	Vernier	PASS
J	±0.50	60 x 72.5	60.18 MM X 72.58	0.18 X 0.08	Vernier	PASS
K	±0.50	61 x 49	61.28 X 49.18	0.28 X 0.18	Vernier	PASS
Surface Finish	±0	1.6 µm	1.6	0	Comparison gauge	PASS
Flatness	±.05	0	0.03mm	0.03	DTI & Datum table	PASS

Drill Jig Front Support Block

Components Dimensions	Tolerance (mm)	Required Size (mm)	Actual Size (mm)	Error (mm)	Instrument Used	Result
Material length	±0.50	80	79.50	0.50	Vernier	PASS
Material width	±0.50	15	15.22	0.22	Vernier	PASS
Material thickness	±0.50	10	9.98	0.02	Vernier	PASS
Hole Positions						
A	±0.50	20 x 10	20.24 X 10.08	0.24 X 0.08	Vernier	PASS
B	±0.50	60 x 10	60.24 X 9.98	0.24 X 0.02	Vernier	PASS
Surface Finish	±0	1.6 µm	1.6	0	Comparison gauge	PASS
Flatness	±.05	0	0.05	0.5	DTI & Datum table	PASS

Drill Jig Side Support Block

Components Dimensions	Tolerance (mm)	Required Size(mm)	Actual Size (mm)	Error (mm)	Instrument Used	Result
Material length	±0.50	40	40.10	0.10	Vernier	PASS
Material width	±0.50	15	15.52	0.52	Vernier	FAIL

Material thickness	±0.50	10	9.98	0.02	Vernier	PASS
Hole Positions						
A Part 1	±0.50	10 x 7.5	10.24 X 7.56	0.24 X 0.06	Vernier	PASS
B Part 1	±0.50	30 x 7.5	30.38 X 7.50	0.38 X 0.00	Vernier	PASS
A Depth Part 1	±0.50	8	8.40	0.4	Vernier	PASS
B Depth Part 1	±0.50	8	8.32	0.32	Vernier	PASS
A Part 2		10 x 7.5	10 X 7.62	0.00 X 0.12	Vernier	PASS
B Part 2		30 x 7.5	30.28 X 7.52	0.28 X 0.02	Vernier	PASS
A Depth Part 2		8	8.28	0.28	Vernier	PASS
B Depth Part 2		8	8.12	0.12	Vernier	PASS
C Part 1		20 x 5	20.28 X 4.88	0.28 X 0.12	Vernier	PASS
C Part 2		20 x 5	20.02 X 4.92	0.02 X 0.08	Vernier	PASS
Surface Finish	±0	1.6 µm	1.6	0	Comparison gauge	PASS
Flatness	±.05	0	0.04	0.04	DTI & datum table	PASS

Drill Jig Top

Components Dimensions	**Tolerance**	**Required Size (mm)**	**Actual Size (mm)**	**Error (mm)**	**Instrument Used**	**Result**
Material length	±0.50	75	75.55	0.55	Vernier	FAIL
Material width	±0.50	60	60.08	0.08	Vernier	PASS
Material thickness	±0.50	10	9.96	0.04	Vernier	PASS
Hole Positions						
A	±0.50	10 x 10	10.20 x 10.02	0.20 x 0.02	Vernier	PASS
B	±0.50	10 x 50	10.04 x 50.36	0.04 x 0.36	Vernier	PASS
C	±0.50	22 x 15	15.04 x 22.02	0.04 x 0.02	Vernier	PASS
D	±0.50	22 x 45	45.14 x 21.98	0.14 x 0.02	Vernier	PASS
E	±0.50	35 x 24	34.98 x 24.02	0.02 x 0.02	Vernier	PASS
F	±0.50	49 x 30	48.78 x 29.76	0.22 x 0.24	Vernier	PASS
G	±0.50	61 x 39	61.24 x 39.28	0.24 x 0.28	Vernier	PASS
Surface Finish	±0	1.6 µm	1.6	0	Comparison gauge	PASS
Flatness	±.05	0	0.02	0.2	DTI & datum table	PASS

Comments:

Alignment issues with top and bottom plates when assembled. This was a result of not meeting all the required tolerances. Some additional adjustments were made to align holes.

Surface defects – visible tool marks, could be polished out better.

Evaluation

Whilst I had met most of the tolerances for the components for the drill jig, there were some hole alignment issues with the top and bottom plates. The drill jig did not perform as well as expected when producing the sample part. The misalignment of the plates made the drilling difficult and the holes were not completely accurate.

If I was to remake this drill jig, I would:

- spend longer checking the accuracy of my cutting and marking out

- do more checks during the production of the components

- improve my accuracy to be nearer the 0.25mm tolerance as this would help improve the alignment issues between the top and bottom plates

- improve my drilling technique by centering the drill more carefully before drilling the holes. I could use centre dots to check the position and canter the drill to see the position more clearly

- take more time to remove the mill scale from the workpiece and polish more thoroughly to remove surface marks and get a better finish.

Conclusion

The design of the drill jig is good and would be suitable for the purpose it was intended but the accuracy of the sample part shows that there were issues with the alignment of the holes.

To improve performance, I would suggest to the design department that the tolerances are tightened. This is because the existing tolerances are too large and have caused an alignment error to occur between the positioning of the holes on the top plate and those on the bottom plate. The misalignment of the hole due to the given tolerance of ±0.50mm means that when stacked together the centre of the holes may not align resulting in some inaccurate drilling. This could be avoided if the tolerances were not so generous.

Commentary

The candidate has given a brief description of the methods and techniques undertaken to produce the drill jig assembly and the process of performing the quality testing. To develop the response further, the candidate could have provided more detail, for example, they could have included reference to in-production checks that were carried out during the production of the components.

Evaluation is basic and the candidate has identified a range of improvements to their own performance but has only provided a list with brief justifications.

The candidate has identified some areas for their improvement in their performance and has recorded their concessions and some difficulties encountered during the production of the components. They provided a brief reasoning for why the concessions had occurred; this was lacking in detail. They did not mention the broken drill bit and why this had occurred and how it could be prevented in the future.

The candidate could have developed their response further if they had provided more detailed justifications and had considered preventative measures. For example, attributing the surface marks and scratches to a specific element of the production and how they could have prevented the marks from occurring, such as by taking extra time to check the positioning of the drill bit before drilling the holes and using the correct speeds for the drill.

The candidate has suggested an improvement for the design which is to reduce the given tolerances. The candidate has demonstrated some basic understanding, identifying there is a problem with the tolerances being too generous but does not have full understanding of the problem and how to prevent it from reoccurring. This shows a basic level of understanding of tolerances and how they can affect the end product.

The report is structured appropriately with an introduction, overviews for the production and quality testing, evaluation and conclusion. The inclusion of the completed quality check sheet gives the finished sizes of the components and has captured the key data showing whether the component met the required dimensions.

A basic level of industry terminology has been used consistently throughout, however this could have been developed with the use of more specific and accurate terminology in places. For example, in respect of identifying an error that had occurred with the alignment of the holes, the candidate should have referenced this as a compound error to demonstrate their full understanding of technical terminology.

Task 3c – Handover meeting

(Assessment themes: Health and safety, Quality review and evaluation (quality review, reporting, recording and handover)

For task 3c, candidates must produce the following materials:

- completed drill jig assembly (from task 2)
- sample drilled part (from task 3a)
- quality inspection report (from task 3b).

For task 3c, assessors will need to produce the following pieces of supporting evidence:

- assessor observation:
    - handover meeting.

Video evidence required:

- video evidence showing the handover meeting.

The following task 3c supporting evidence has not been included for this version of the GSEM:

Video evidence

- video evidence showing the handover meeting.

3c. Practical observation form – Handover meeting

Assessment ID	Qualification number
8713-331	8713-331
Candidate name	**Candidate number**
Candidate A	CG12345
Centre name	**Assessment theme**
City & Guilds	Quality review and evaluation

Complete the table below referring to the relevant marking grid, found in the assessment pack. Do not allocate marks at this stage.

Task	**Notes –** *detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.*
Assessor observation to include: • Handover meeting	The candidate described their brief and gave some reasoning for the methods of marking-out procedures and production methods they used to produce the components, but these were not detailed. Some defects were pointed out but not all. They talked through the issues they encountered when assembling the drill jig, briefly mentioning the mis-alignment of the drilling holes in the top and bottom plates, despite most of the tolerances being met with the individual components. Evaluation of the issues was basic. They said if they were to make this again, they would tighten up the tolerances more to avoid the misalignment of the drill holes. No other explanation or course of action was given. The candidate presented the completed drill jig assembly, the sampled drilled part and their quality inspection report. They also supplied their completed quality check sheet. The candidate spoke clearly and mostly used the correct terminology throughout but this was not consistent with some inaccuracies, but this did not detract from what was being explained.

Assessor signature	**Date**
Assessor A	**19.12.2022**

Commentary

The observation evidence has captured the basic requirements of the handover meeting. The candidate had shown a basic level of subject knowledge and understanding in describing the processes undertaken. The candidate could have given more thorough details about the processes they had undertaken and how they created each of the components.

The candidate did offer a brief explanation of why the defects had occurred within the sample drilled part and how they could make improvements in a future run. The candidate correctly identified a problem with the allowed tolerances but was not sure how this could be resolved, this demonstrates a lower level of understanding of tolerances and the need for accuracy.

The candidate could have developed their response further if they had demonstrated a greater understanding of why the tolerances had caused the problem. For example, a compound error due to the generous tolerances given within the brief and how they could resolve this in future production, such as reducing all the tolerances.

The evidence states that the candidate demonstrated good communication skills and used mostly the correct industry terminology at the appropriate level throughout. The candidate could have developed their response further if they had used the correct terminology consistently throughout and with more accuracy.