

T Level Technical Qualification in Engineering, Manufacturing, Process and Control

**Employer-Set Project
(8713-033)**

Sample Tasks

**First teaching from September 2022
Version 1.0**

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Task 1 – Research

You have been asked to review the project brief and research the specific and general issues which have to be overcome.

You are to conduct research to determine:

- options for how the component could be held in position in the correct orientation whilst being drilled
- options for how the design of the holding mechanism can allow for small changes in component size due to manufacturing tolerances
- identification of a standard method of how the drill bit can be supported by mechanical means such as guide holes or guide bushes so that it drills a hole in the correct position without requiring any centre marking or drilling
- options which show how the component can be easily inserted and removed from the jig
- whether any potential materials considered for use present any health and safety issues
- the maximum mass the jig could be without presenting any handling issues for the operator.

Record notes on the findings of your research and initial analysis. Your notes may include:

- sketches
- basic calculations
- research materials that identify potential solutions
- standard parts that may be incorporated into your design
- downloads of existing drill jigs
- sections taken from manufacturers of tooling aids such as bushes, pins, clamping aids and standard blocks
- specifications such as BS, DIN, ASME, BS EN and/or ISO relating to tooling aids, limits and fits and materials.

The research notes and analysis will typically be 1500 words (not including sources). You must include a list of your references/sources alongside your research notes. How well you have planned your research will contribute to marks achieved for this task.

Timing of assessment

- You will have **three hours** to complete the research and record your findings.

Conditions of assessment

- Your research should be completed working alone under supervised conditions.
- You must not share or discuss your work with other candidates.
- You will have access to the Internet to conduct your research.
- Assessment evidence must be handed in at the end of each session for secure storage which cannot be accessed.

What you must submit on completion of this task

- Research notes (typically 1500 words) hard copy or file saved securely (e.g. on memory stick to be handed in).
- List of references/sources.

Additional evidence of your performance that will be captured for marking

- N/A

Marks available

- 15

Task 2 – Report

You are to create a written response to the project brief outlining your suggestions for responding to the brief and the presented issues.

With reference to the project brief and your research notes, write a report detailing your intended initial approach to designing a drill jig with consideration of:

- how the component will be held in position whilst being drilled
- how the design of the holding mechanism will allow for small changes in component size due to manufacturing tolerances
- how the drill bit will be supported by mechanical means such as guide holes or guide brushes so that it drills a hole in the correct position without requiring any centre marking or drilling
- how the component will be inserted and removed from the jig
- whether any potential materials considered for use present any health and safety issues
- the maximum mass the jig could be without presenting any handling issues for the operator
- health and safety considerations relating to the approach proposed
- quality assurance considerations relating to the approach proposed.

The written report will typically be 2000 words.

You can include downloads from Original Equipment Manufacturers (OEM) catalogues showing tooling aids and basic design sketches to support your intended approach as detailed in your report.

Timing of assessment

- You will have **four hours** to complete your report.

Conditions of assessment

- Your report should be completed working alone under supervised conditions.
- You must not share or discuss your work with other candidates.
- You will have access to a copy of your response to the previous task (for review purposes only).
- You will have access to the Internet for the completion of this task.
- Assessment evidence must be handed in at the end of each session for secure storage which cannot be accessed.

What you must submit on completion of this task

- Written report (typically 2000 words) hard copy or file saved securely (e.g. in a secure online location or on memory stick to be handed in).

Additional evidence of your performance that will be captured for marking

- N/A

Marks available

- 18

Task 3 – Design

You are to develop your initial approach design solution in response to the project brief.

With reference to the project brief, and your research from task one, you must produce a detailed design of a drill jig with consideration of:

- how the component will be held in position whilst being drilled
- how the design of the holding mechanism will allow for small changes in component size due to manufacturing tolerances
- how the drill bit will be supported by mechanical means such as guide holes or guide brushes so that it drills a hole in the correct position without requiring any centre marking or drilling
- how the component will be inserted and removed from the jig
- whether any potential materials considered for use present any health and safety issues
- the maximum mass the jig could be without presenting any handling issues for the operator.

Create a dimensioned assembly drawing for a drill jig that addresses the brief detailing:

- the component located within the jig, differentiated from being part of the assembly - this means that a drawing needs to be produced showing the workpiece seated within the jig but differentiated by use of dashed lines or differing colours
- the method of component insertion and extraction - this can be achieved by either a separate drawing or use of dashed lines and colours to indicate the path of the workpiece when being inserted or removed
- the method of component retention in the correct orientation - a view on the drawing(s) should show that the axis of any drill is presented perpendicular to the face of the workpiece nut. Also, in the correct longitudinal and axial position such that the hole will be drilled as shown detailed on the workpiece assembly drawing.

You do not need to create all detail drawings and assemblies, just a dimensioned assembly drawing containing all the critical dimensions and identification of standard parts.

Include any relevant design calculations related to your assembly drawing and notes reflecting on how well the drill jig meets the outlined requirements.

You can include draft iterations of your design to show how your design idea has developed.

Assembly drawings can either be produced using a CAD package or by hand as a paper-based drawing. Assembly drawings must be produced in 3rd Angle Projection and in accordance with the drawing standard BS8888.

The submission for this task will typically be two A3 drawings and two A4 sides of supporting calculations and notes.

Timing of assessment

- You will have **six hours** to complete your design and calculations.

Conditions of assessment

- Your design should be completed working alone under supervised conditions.
- You must not share or discuss your work with other candidates.
- You will have access to copies of your responses to the previous tasks (for review purposes only).
- You will have access to relevant CAD software for the completion of drawings.
- You will **not** have access to the Internet for the completion of this task.
- Assessment evidence must be handed in at the end of each session for secure storage which cannot be accessed.

What you must submit on completion of this task

- Assembly drawing (typically two A3 drawings) – this may include design iterations if you wish to include them.
- Supporting design calculations and reflection notes (typically two sides of A4) – hard copy or file saved securely (e.g. in a secure online location or on memory stick to be handed in).

Additional evidence of your performance that will be captured for marking

- N/A

Marks available

- 24

Task 4 – Present

You are to prepare and deliver a presentation to present the findings from your report, and your designs, to the DH Engineering Manager.

You must use digital technology for the presentation.

You must cover:

- consideration of both the specific and general issues identified in the brief
- challenges that were found when selecting and designing for the process (e.g. materials, design ideas, components)
- how well you think your design and proposal addresses the requirements of the brief.

Your assessor will take on the role of a manager from DH Engineering. They will ask questions relating to your presentation from the client's perspective.

Timing of assessment

- You will have **two hours** to prepare your presentation.
- You will have **30 minutes** to present your findings and respond to questions (typically split with 20 minutes for presenting your findings and ten minutes for responding to questions).

Conditions of assessment

- Your presentation should be developed and delivered working alone under supervised conditions.
- You must not share or discuss your work with other candidates.
- You will have access to copies of your responses to the previous tasks (for review purposes only) as well as any presentation materials or notes (e.g. PowerPoint slides).
- You will have access to digital technology for the presentation of your findings - you can choose the format or program you wish to use (e.g. PowerPoint, Keynote).
- You will **not** have access to the Internet for the completion of this task.
- Assessment evidence must be handed in at the end of each session for secure storage which cannot be accessed.

What you must submit on completion of this task

- Presentation materials – e.g. slides, handouts etc. hard copy or file saved securely (e.g. in a secure online location or on memory stick to be handed in).

Additional evidence of your performance that will be captured for marking

- Video recording of presentation.

Marks available

- 24

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