

Please check the examination details below before entering your candidate information

Candidate surname					Other names					
Pearson BTEC Level 1/Level 2 Tech Award	Centre Number					Learner Registration Number				
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<b>Friday 17 May 2019</b>										
Supervised hours: 1 hour 30 minutes					Paper Reference <b>21141K</b>					
<b>Engineering</b> <b>Component 3: Responding to an Engineering Brief</b> <b>Set task: Part 2 Task and answer booklet</b>										
<b>You must have:</b> HB or B pencil, eraser, drawing instruments and calculator								Total Marks		

### Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*
- This is **Part 2** of the Set task.
- This task and answer booklet contains material for the completion of **Part 2** of the set task under supervised conditions.
- **Part 2** of the set task is out of 30 marks.
- This task and answer booklet is specific to each series and this material must be issued only to learners who have been entered to take the task in the specified series. This booklet should be kept securely until the start of the 1.5 hour supervised assessment period.
- This set task should be undertaken in the period timetabled by Pearson.

### Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Pearson

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Alternatively, you can get in touch with us using the details on our contact us page at [qualifications.pearson.com/contact us](https://qualifications.pearson.com/contact-us).

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### Instructions for teachers

This assessment is made up of two parts. **Part 1** consists of a practical activity. **Part 1** must be taken before **Part 2**. **Part 2** consists of two written activities.

Both parts of the set task are completed during a one week period timetabled by Pearson. **Part 1** is to be completed in one session of two hours within the first four days of the timetabled period. **Part 2** is to be completed in one session on the Friday of the timetabled period.

This task and answer booklet contains **Part 2** of the set task. Learners must not take any notes from **Part 1** into **Part 2**.

**Part 2** must be completed under supervised conditions within a 1.5 hour supervised session.

Learners must complete **Part 2** of the set task using this task and answer booklet. Learners should take calculators into the supervised session.

This is a formal external assessment and must be conducted with reference to the instructions in this task and answer booklet, and the *Information for Conducting External Assessments (ICEA)* document, to ensure that the supervised session is conducted correctly and that learners have the opportunity to carry out the required activities independently.

Teachers are responsible for maintaining security and for reporting issues to Pearson. In particular:

- only permitted materials can be brought into the supervised environment
- at the end of the session, materials must be kept securely and no items removed from the supervised environment.

After the session, the teacher will confirm that all learner work has been completed independently as part of the authentication submitted to Pearson.

### Outcomes for submission

**Part 1** and **Part 2** task and answer booklets should be submitted to Pearson at the same time.

Each learner must complete an authentication sheet.

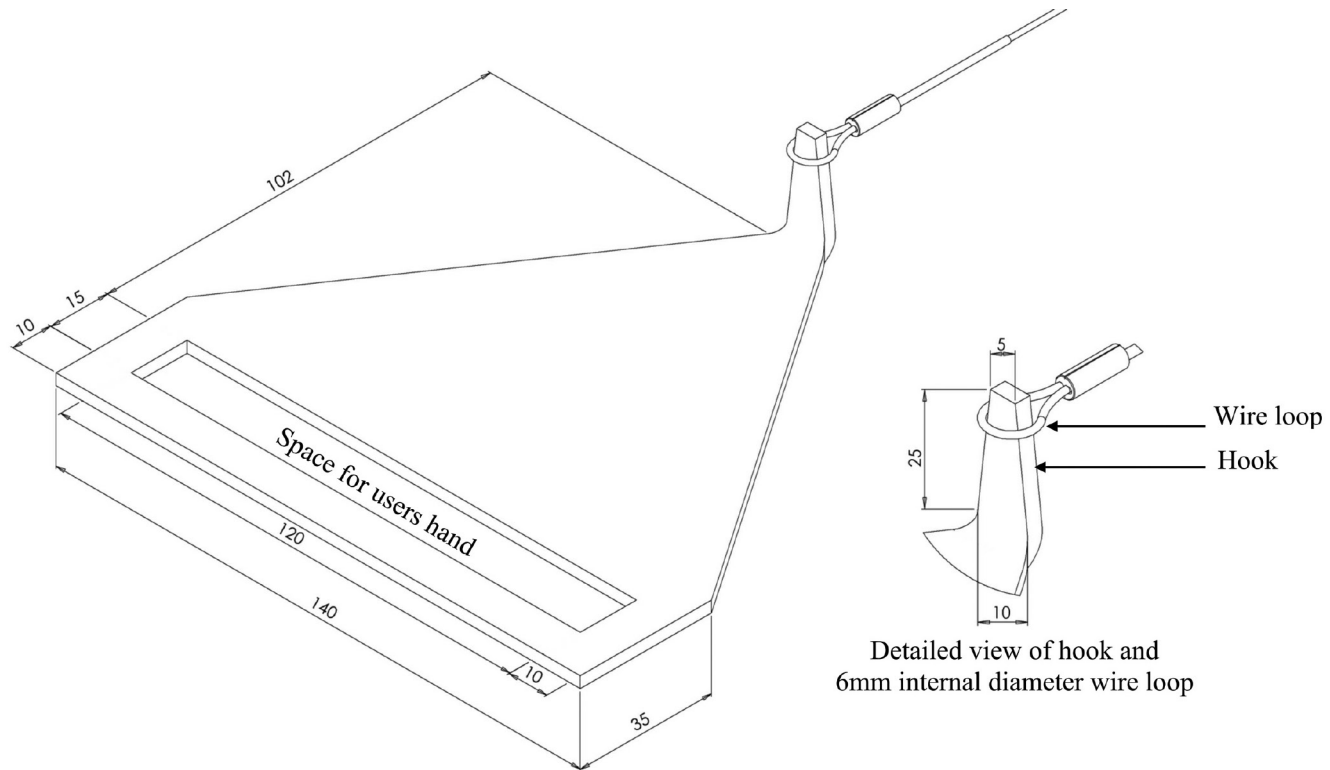
Practical activity notes from the demonstration will be retained securely by the centre after **Part 2** and may be requested by Pearson if there is suspected malpractice.



## Set task information

### Engineering Brief

A customer wants to place an order for 50 handles that are used to pull wire ropes into position. The hook of the handle will be placed into the wire loop, which has an internal diameter of 6 mm. A technician at your company designs and makes the handle shown below as a possible solution. The handle is made from stainless steel which is supplied as a flat sheet that is 3 mm thick.



To make the handle, the technician:

- Used a CAD package to draw the shape
- Plasma cut the shape
- De-burred the edges
- Bent the hook into position using an engineer's vice



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**You must complete ALL activities in Part 2.**

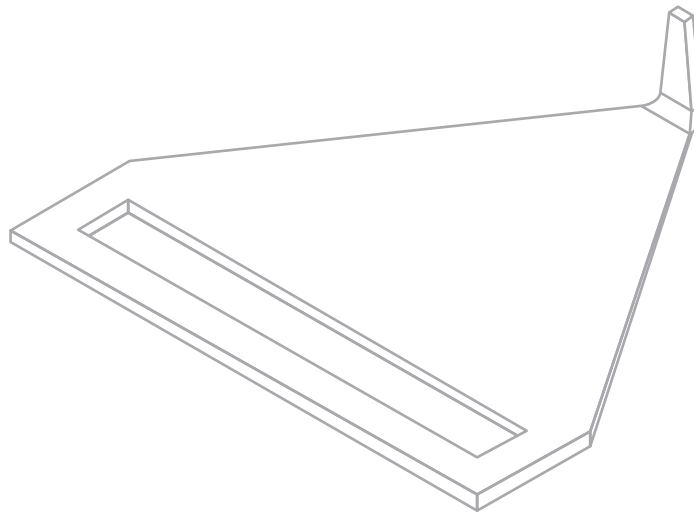
**Activity 2a: Evaluation**

Explain the issues with the design of the handle.

Think about how the handle is made and how it will be used. You should consider dimensions and tolerances, physical form, attributes, materials and processes.

Write your answer in the line space provided on the next page.

You may annotate the diagram to identify the issues with the design of the handle.



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Handwriting practice area with 20 horizontal dotted lines.

You should spend 20 minutes completing Activity 2a.

(Total for Activity 2a = 8 marks)





### Activity 2b: Redesign

You have been asked to consider different ways to manufacture this handle. You should consider different designs and processes to make it.

Sketch a design idea for the handle that is an improvement on the existing design proposal. You may annotate the diagram to indicate design improvements.

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**(Total for Activity 2b = 10 marks)**



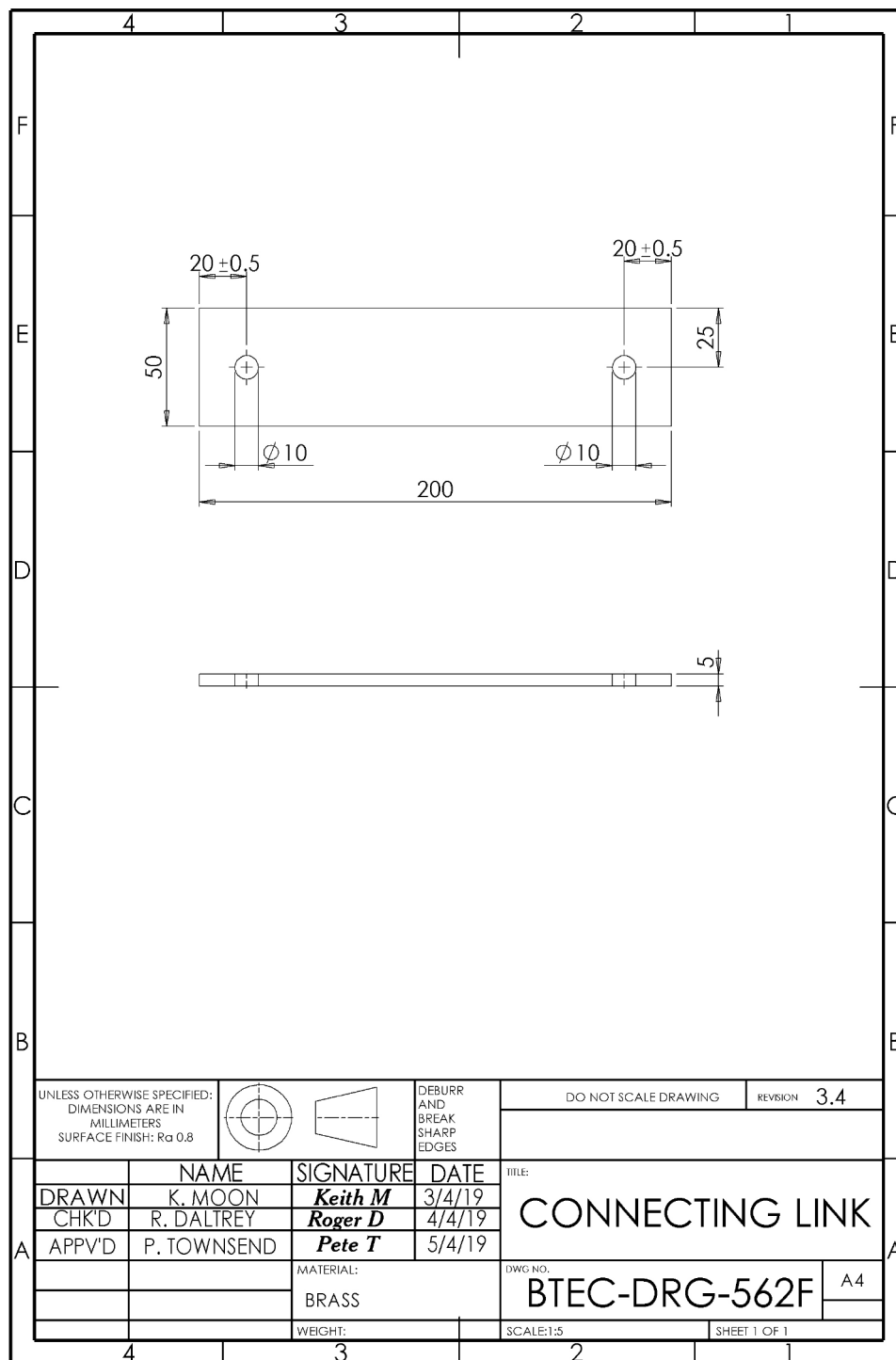
## Set task information

### Engineering brief

Your engineering organisation is interested in the quality of their manufactured components. The quality control inspector has asked you to review a drawing, manufacturing process and production data to try to understand why issues have occurred during the production of a metal connecting link.

The component will be manufactured in batches of 50 and is made of brass.

The drawing for the component is shown below.



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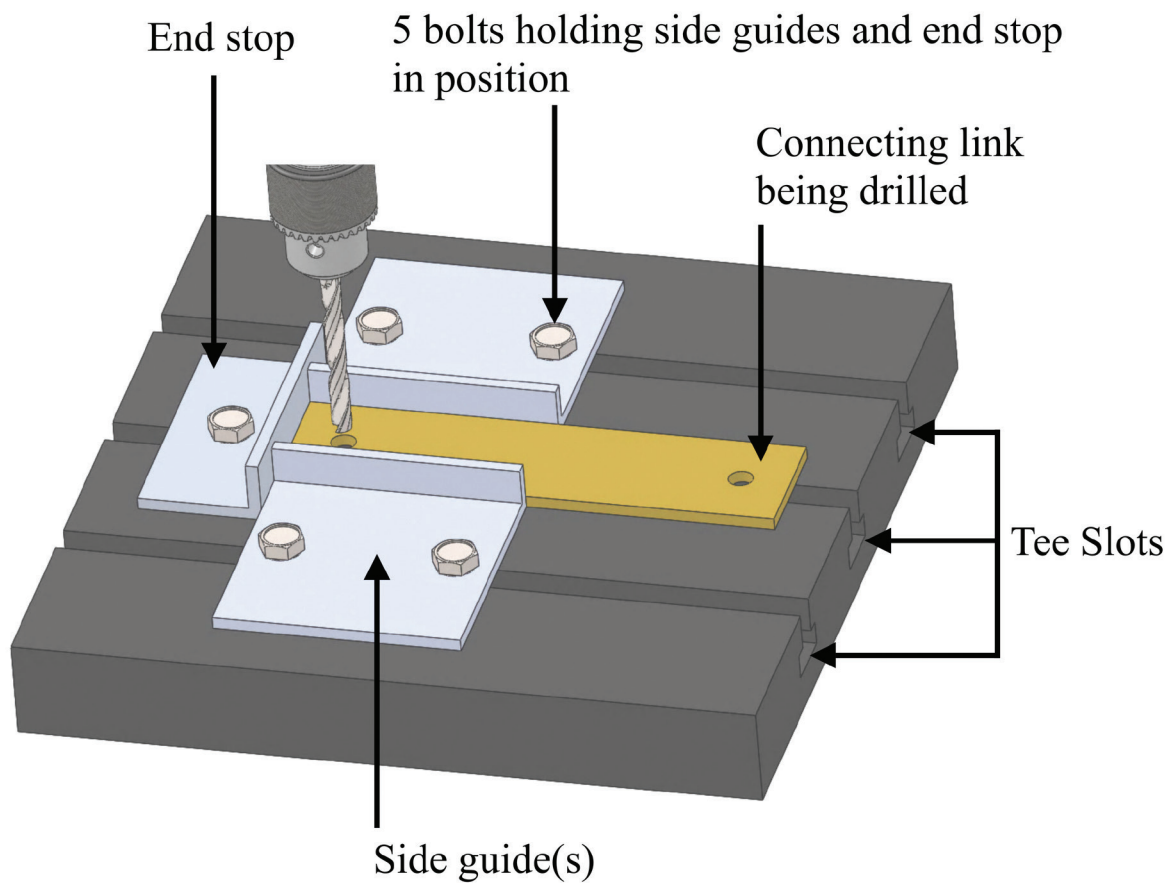
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The first batch of 50 components have been produced by an engineer.

The holes in the ends have been drilled using the fixture shown below.



### Manufacturing process

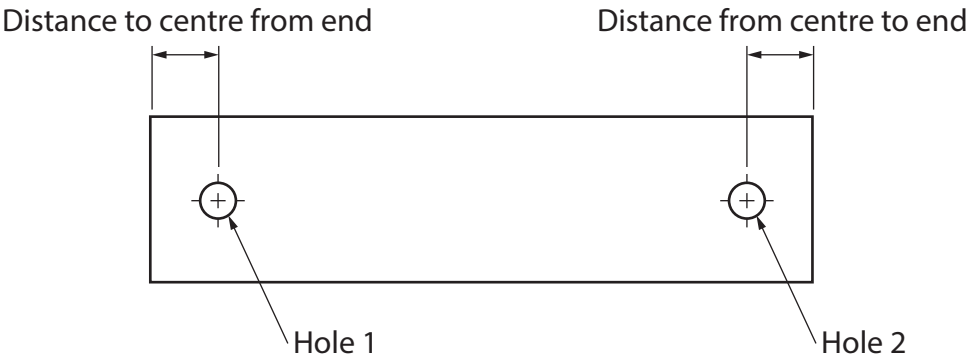
To drill the holes the engineer:

- Fastens the side guides and end stop into the Tee slots, so that the centre of the drill is positioned 20 mm from the end of the connecting link
- Slides the connecting link between the side guides
- Pushes the connecting link up to the end stop
- Drills hole 1
- Turns the connecting link around and pushes the opposite end of the connecting link up to the end stop
- Drills hole 2.



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The table below gives data for the distance from the centre of the hole to the end of the connecting link for the first 15 components.



Connecting link inspection number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Hole 1 distance to centre from end	20.0	20.0	20.0	20.1	20.2	20.4	20.6	20.9	21.2	14.0	21.6	22.0	22.5	23.1	23.8
Hole 2 distance to centre from end	20.0	20.0	20.1	20.1	20.2	20.5	20.8	20.1	21.2	21.5	21.6	19.2	22.8	23.7	24.3

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**You should spend 40 minutes completing Activity 3.**

**(Total for Activity 3 = 12 marks)**

**TOTAL PAPER = 60 MARKS**



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