T Level Technical Qualification in Engineering and Manufacturing – Maintenance, Installation and Repair

8712-311 Mechanical

Grade standard exemplification material

Distinction - summer 2024

Version 1-0

Version and date	Change detail	Section	Question
v1-0 Oct 2024			

Contents

Introduction

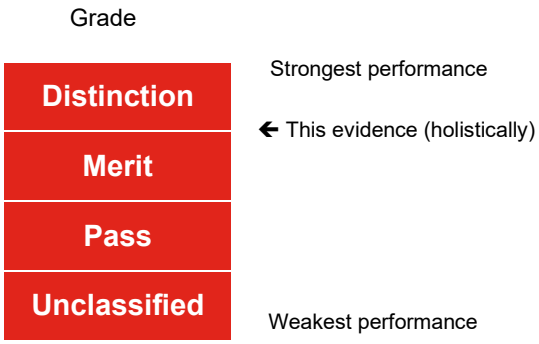
Summer 2024 Results

This document is aimed at providers and learners to help understand the standard that was required in the summer 2024 assessment series to achieve a distinction grade for the 8712-311 Maintenance, Installation and Repair in Mechanical Engineering Occupational Specialism (OS).

The grade standard exemplification evidence (Grade SEM) provided for the distinction grade displays the holistic standard required across the tasks to achieve the distinction grade boundary in the summer 2024 series.

The aim of these materials is to provide examples of knowledge, skills and understanding that attested to distinction competence in summer 2024. It is important to note that in live assessments a candidate's performance is very likely to exhibit a spikey profile and standard of performance will vary across tasks.

The Occupational Specialism is graded Distinction, Merit, Pass or Unclassified.



The distinction grade boundary is based on a synoptic mark across all tasks. The materials in this Grade SEM are separated into two sections as described below. Materials are presented against a number of tasks from the assignment.

Tasks

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 including any photograph/video evidence. Also referenced in this section are the assessment themes the candidates were marked against when completing the tasks within it. In addition, candidate evidence that has been included or not been included in this Grade SEM has been identified within this section.

In this Grade SEM there is candidate evidence from:

Task 1 Plan and prepare
Task 2 Perform and record
Task 3A Review and report
Task 3B Peer review
Task 4 Complete handover

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 was evidence that was captured as part of the assessment and then internally marked by the centre assessor.

The Occupational Specialism brief and tasks can be downloaded from here.

Important things to note:

- We discussed the approach to standard setting/maintaining with Ofqual and the other awarding organisations before awarding this year. We have agreed to take account of the newness of qualifications in how we award this year to recognise that students and teachers are less familiar with the assessments (grading-arrangements-for-vtqsand-technical-qualifications-within-t-levels-in-the-academic-year-2023-to-2024), whilst also recognising the standards required for these qualifications.

- The evidence presented, as a whole, was sufficient to achieve the distinction grade. However, performance across the tasks may vary (i.e. some tasks completed to a higher/lower standard than distinction grade).

Grade descriptors

To achieve a distinction, a candidate will be able to:

Competently and thoroughly interpret technical information, applying technical skills to plan, assess risk and follow safe working methods to practical tasks and procedures to an exemplary standard in response to the requirements of the brief, working systematically, logically and efficiently producing an excellent quality of work that meets regulations and standards.

Thoroughly prepare working area, mitigating potential risks prior to commencing tasks and consistently apply exemplary housekeeping techniques during tasks that allow safe and efficient working.

Demonstrate comprehensive technical skills for diagnosing components, assemblies and sub-assemblies to complete maintenance, installation, service and repair activities, in line with the requirements of the brief, working systematically, logically and efficiently.

Demonstrate exemplary technical skills using tools and equipment for mechanical maintenance, installation and repair, ensuring safe isolation, removal and replacement of components, working systematically, logically and efficiently.

Demonstrate comprehensive knowledge and understanding of the principles and processes required for disassembly, repair, configuration and re-assembly of mechanical systems, ensuring that all tolerances and tightening torques are in-line with specification.

Work safely and make well founded and informed decisions on the selection and appropriate use of tools, materials and equipment within the working environments for maintenance, installation and repair activities.

Task 1 Plan and prepare the service and maintenance activities

Assessment number (eg 1234-033)	8712-311
Assessment title	Mechanical Occupational Specialism

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	1
Evidence title / description	A list of requirements and resources, including justifications for the selections Completed risk assessment Method statement
Date submitted by candidate	DD/MM/YY

Task 1

Assessment themes:

- Health and safety
- Planning and preparation
- Systems and components.

You must analyse the brief and technical information about the machine provided and then:

- create a list of the requirements and resources for the service and maintenance activities, justifying your selections. This should include:
    - all necessary technical information to confirm the type, scope and requirements of the activity
    - tools and equipment
    - materials, components and consumables
    - wastage and disposal requirements
    - time needed to carry out the activity
    - fault diagnosis methods to be used
    - any access requirements
- produce and complete a risk assessment
- produce a method statement.

Additional evidence of your performance that must be captured for marking:
none

Candidate evidence

Task 1 – List of Requirements

Introduction

This document is informing you about what is need to complete the task, how long it is going to take, how the fault could have potentially happened, what is need to correctly service the lathe, and how to dispose of any waste.

Contents:

- Necessary technical information
- Scope and requirements of the activity
- Tools and equipment
- Materials, components and consumables
- Wastage and disposal requirements
- Time needed to carry out the activity
- Fault diagnosis methods to be used
- Any access requirements

Technical information

Information that would be required to fix the fault the model of the lathe this is important because it is needed if any replacement parts are required are it ensure a quick time to find the area the potential fault has occurred so the manual is required. Another beneficial piece of information that would help be to know how long the fault has been there and when the exact date it was last serviced and if it has gradually gotten worse over time.

Scope and requirements

To scope out the task you will need some knowledge of what could be the problem be and why this has happened to the lathe. This can be done by doing some research on what can cause the spindle to vibrate, and what are some of the ways to fix this problem from happening in the future.

Tools and equipment

The correct tools are an important part of getting the task completed successfully to ensure this make sure that you have:

Physical resources		
	Quantity	**Purpose**
Socket set	1	This will get used to remove any easy to access nuts.
Spanner set	1	This will also be used to remove nuts from the lathe that can't be accessed by the socket spanner.
Hex keys	1	Used to remove hex bolts.
Complete screwdriver set	1	Used to remove screws.
Caution tape	1	Used to caution of the area from the anyone else whilst preforming the maintenance.
Safety glasses	1	To protect your eyes from danger
Safety boots/shoes	1	To protect your feet from heavy objects dropping on it.
Oil containers	1	Used to collect old oil found in the machine.
Funnel	1	Used to carefully pour oil back into the machine.
Manual of the lathe	1	To provide information about the lathe you are working on.
Pliers	1	To grab onto objects in tight gaps.
Ruler	1	To measure the length or width of an object.
Digital vernier	1	To get the exact measurement of an object.
DTI (digital test indicator)	1	To see if the tailstock is aligned.
Caution tape	1	To stop people from walking into the operating area.
Lock off lock	1	To make sure no one can turn on the machine whilst it's getting operated on.
Pens (ballpoint and whiteboard)	2	To make note or markings on parts of the lathe.
Drill and drill bits	1	To create new holes in materials if needed to

Materials, components and consumables		
	Quantity	**Purpose**
Steel rods	1	If needed
Metal sheets	1	If needed
Mild steel bar	1	If needed
Aluminium bar	1	If needed
Wooden blocks	1	If needed
Screws	N/a	Order if needed on job
Grub screws	N/a	Order if needed on job
Nuts	N/a	Order if needed on job
Bolts	N/a	Order if needed on job
Washers	N/a	Order if needed on job
V-belts	N/a	Order if needed on job

Gears	N/a	Order if needed on job
Spindle	N/a	Order if needed on job
WD-40	2	To help remove grease, oil or dirt
Degreaser	2	To help remove grease or oil
Oil (3 gallons)	N/a	To refill the oil if needed
Grease (1 KG)	N/a	To apply grease if needed
Grease absorbing grit (5KG)	1	To remove any grease spillages if needed

Wastage and disposal requirements

After the task is done a key thing to think about is making sure that any waste products are discarded properly this could include any old oil this can't be thrown away down a drain or in waste bin this would be given to an oil disposal centre. Another waste product to think about could be the spindle this is would need to be given to either someone which collects scraps of metal or a recycle centre as this is such a heavy and tough object it might not get processed through an ordinary bin service. Remember to check the local legislation in getting rid of the spindle or even oil as they are not ordinary waste products.

Time management

The time needed to complete this maintenance task would be an important factor as you only have a limited amount of time to resolve the problem and get the work space cleaned up and ready for use as soon as possible. With this in mind you will need to manage your time efficiently and make sure that minimum time is wasted thought the time give as this can cause problems.

Fault diagnosis methods

There are many ways in which you can diagnosis the problems one of the ways this can be done is by doing a visual check of the lathe to see if there are any visual signs why the spindle is vibrating for example is there a missing screw, nut or bolt if so then a replacement is needed.

Another simple diagnosis check which can be done is by checking to see if the v-belt is fared or sitting loose on the motor if for example it is fared then you will have to replace the v-belt but if the v-belt is loose then it probably only needs to be tight on the motor a slight bit more.

What can also be done is to see if there are any problems with the chuck for example, is it sitting on the spindle properly is there any debris in-between it and the spindle if there is any then make sure to clean it out and see if this has stopped the problem.

Additionally, you should check it to see if there's enough oil if not then it should get replaced, you should also check if the gears are all operating properly as well it could just be that the gears are chipped and need to be replaced.

Access requirements

The access requirements are the area that is meant to be closed off during the maintenance so you are left alone and won't get distracted and no one gets in the way whilst the maintenance is happening.

Task 1 – Risk Assessment

Introduction

This brief is to show the necessary information required to successfully service and complete the maintenance in adequate time and in a risk-free way to ensure that the task is complete to the correct standard.

Risk assessment

A risk assessment is a major part in complete the maintenance task give without being liable to potential harm that may happen if this isn't taken into account, to make sure of this you will need to be aware of any potential dangers that could happen if you don't take care when operating.

Hazard	Risk	Control	Likelihood	Severity
Getting turned on whilst operated	Injury to a body part, lost limbs	Ensure that area that is getting worked on is taped off and the mains are locked off.	2	3
Any stored electricity	Electrical shock	Remove it from the power sources.	2	2
Debris on the machine whilst operating	Cuts, infections or even splinters	Wear gloves whilst operating in areas with built debris.	5	2
Something going into your eyes	Blindness, infection, cuts	Wear eyewear whilst operating on the machine.	1	3
Something dropping on your feet	Broken bones, fractures, cuts	Wear safety shoes or boots so that there's reduced injury to your feet.	3	3

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

Task 1 – Method Statement

Introduction

This method statement is going to present the potential causes of the lathe vibrating and what you may need to do to stop this from happening the allocated time frame.

Potential fault 1

A potential fault with lathe could be that there's a broken gear this could lead to the lathe to vibrate the spindle a way in which can be fixed is by replacing the broken gear with a brand new one this should hopefully resolve the problem as the spindle wasn't spinning correctly as it was chipping away at the gear over time leading to it to break.

Potential fault 2

Another fault that could be the reason to the spindle vibrating could be that the v-belt could be fared or even lose. If it is loose then all that needs to be done is to tighten in so that there more tension on so that it can spin correctly and hopefully this stops the vibrations.

Potential fault 3

What could have potentially happened that there has been a problem with the oil leading to it not running smoothly so it is vibrating when it is not supposed to. The easiest way to fix this problem would be to replace the oil and re-run the lathe.

Task 2 Perform and record the service and maintenance activities

Assessment number (eg 1234-033)	8712-311
Assessment title	Mechanical Occupational Specialism

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	2
Evidence title / description	Test Record Sheets Maintenance Records and Control Documents Annotated Method Statement Assessor observation of the work area preparation Assessor observation of the service and maintenance activities Photographic evidence

Date submitted by candidate	DD/MM/YY

Task 2

Assessment themes:

- Health and safety
- Planning and preparation
- Systems and components
- Working with faults
- Reviewing and reporting

You must:

- prepare the work area for the maintenance and servicing activities
- perform the annual service and maintenance activities in accordance with the method statement and planning documents produced in Task 1. This should include:
    - decommissioning and inspection of the machine
    - disassembly and reassembly of the machine
    - diagnosing and recording faults within the machine, including carrying out appropriate tests
    - repairing the faults and replacing components and consumables as required
    - safely using the appropriate tools and equipment
    - recommissioning of the machine
    - re-instating the work area
- record the service and maintenance activities, to include:
    - producing and completing test record sheets
    - updating the maintenance record and control documents
    - annotating the method statement, including any recommendations for further investigation if required.

Additional evidence of your performance that must be captured for marking:
none

Candidate evidence

Task 2 – Test Record Sheets

Select which machine you are working on:

BSA

Machine Inspection Report		
Item Checked	**Issues Found**	**Issues Resolved**
Gearbox oil level	No issue with the oil level	Already at the correct measurement
Apron oil level	Oil level reading was correct	No further adjustment were required
V – belt condition	The V – belt was found loose	I increased the tightness of the belt
Chuck alignment	Chuck was aligned properly, just needed so cleaning behind	Took it and put it back on and clear any debris behind away
Chuck jaws	Jaws were miss aligned	Jaws reinstalled back into the correct alignment with no gap
Spindle	Swarf found	Cleaned out any remaining swarf
Tailstock alignment	Miss aligned	Set back to normal using a DTI (Digital Test Indicator)
Tailstock extension and retraction	Extends and retracts with no problems	No alteration were needed as it was in working condition
Tailstock carriage lock engaging	Carriage lock is working as intended locks correctly	No fixes were needed as it locked fine
Free and continuous movement in X direction	Moves in a stable state up and down no problems	No repairs required as it is functioning correctly
Free and continuous movement in Y direction	Moves in a stable state left and right with no problems	No repair required as it is functioning correctly
Free and continuous movement in compound slide	No problems found with the compound slide moves left and right	
Lead screw condition	Slightly dirty	
Feed rod condition	No problems found	
Emergency foot brake condition	In working condition	
Emergency foot brake engaging	Engages properly	
Emergency stop working	Works fine	
All gears engaging	Changes fine	

Task 2 – Maintenance schedule

Maintenance records					
Service No	**Maintenance date**	**Maintenance type**	**Checked by**	**Repair details**	**Signature**
03	07.05.2024	Routine Schedule + fault repair	xx	Broken interlock bracket Damaged V-belt	xx
04	08.05.2024	Routine Schedule + fault repair combination	xx	Chuck jaws aligned Tailstock realigned	xx
Maintenance Schedule – annual unless specified otherwise					
Service No	**Year**	**Detail inspection**	**Recommended planned maintenance**	**Maintenance Head Engineer signature**	**Maintenance Engineer signature**
04	2025	Annual	Annual -routine/ scheduled	xx	xx

Commentary	
Service No	**Recommendations for future maintenance activity**
01	Check oil levels

Task 2 – Annotated Method Statement

Introduction

This method statement is going to present the potential causes of the lathe vibrating and what you may need to do to stop this from happening the allocated time frame.

Potential fault 1

A potential fault with lathe could be that there's a broken gear this could lead to the lathe to vibrate the spindle a way in which can be fixed is by replacing the broken gear with a brand new one this should hopefully resolve the problem as the spindle wasn't spinning correctly as it was chipping away at the gear over time leading to it to break.

Potential fault 2

Another fault that could be the reason to the spindle vibrating could be that the v-belt could be fared or even lose. If it is loose then all that needs to be done is to tighten in so that there more tension on so that it can spin correctly and hopefully this stops the vibrations.

Potential fault 3

What could have potentially happened that there has been a problem with the oil leading to it not running smoothly so it is vibrating when it is not supposed to. The easiest way to fix this problem would be to replace the oil and re-run the lathe.

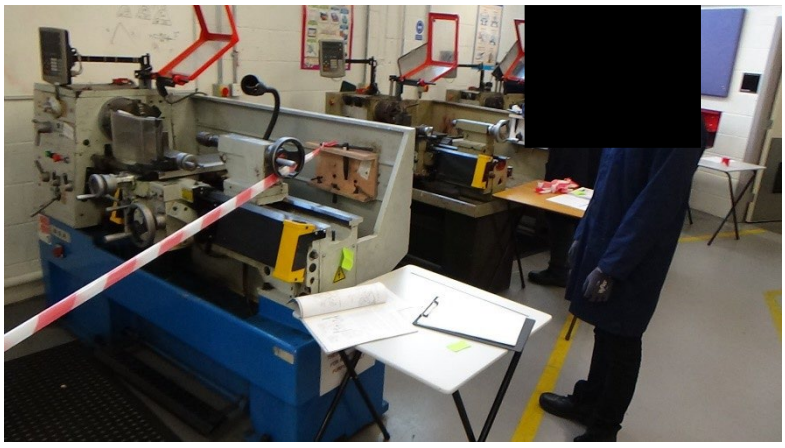
Write out what the faults are and how I fixed them step by step guide with what tools I used to fix it in detail

Task 2 – Assessor Observation and Photographic Evidence

Centre lathe prior to work being carried out.

Candidate was allocated lathe 4 which was functional and fit for purpose

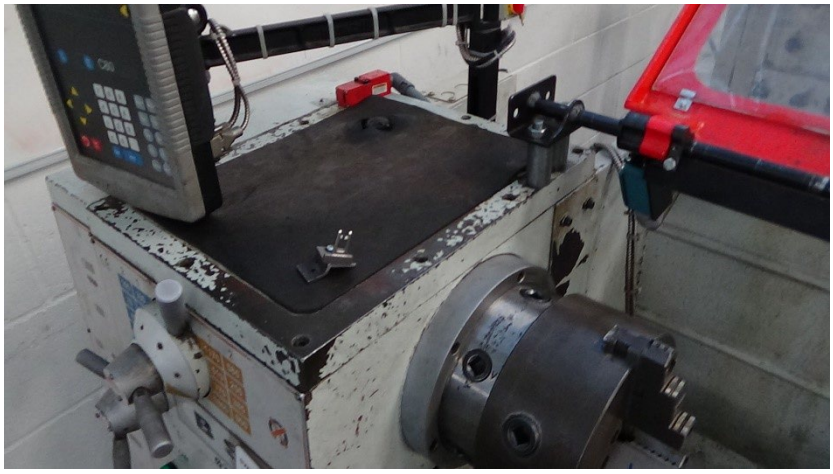
The prepared work area.



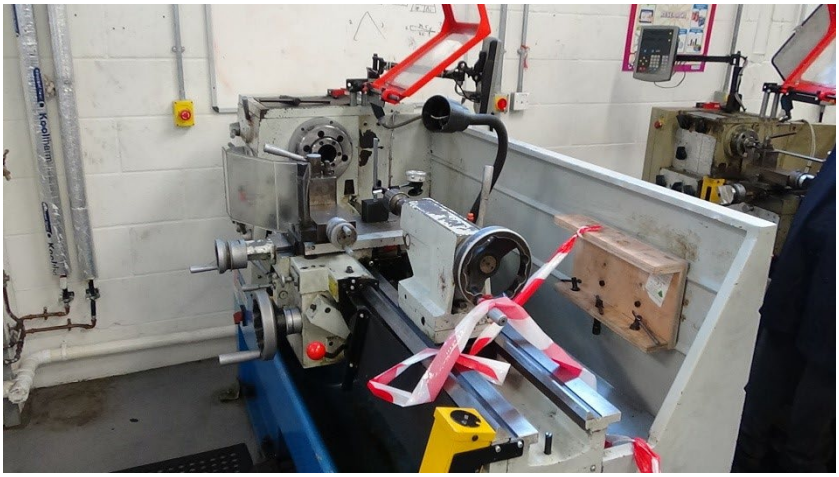
Candidate electrically isolated the lathe and, taped off the area and obtained the manual and his prepared checklist.

Centre lathe disassembled / Working area after disassembly / Faulty components to be repaired or replaced.

Candidate elected to start at the broken interlock bracket.
Note he had obtained WD40



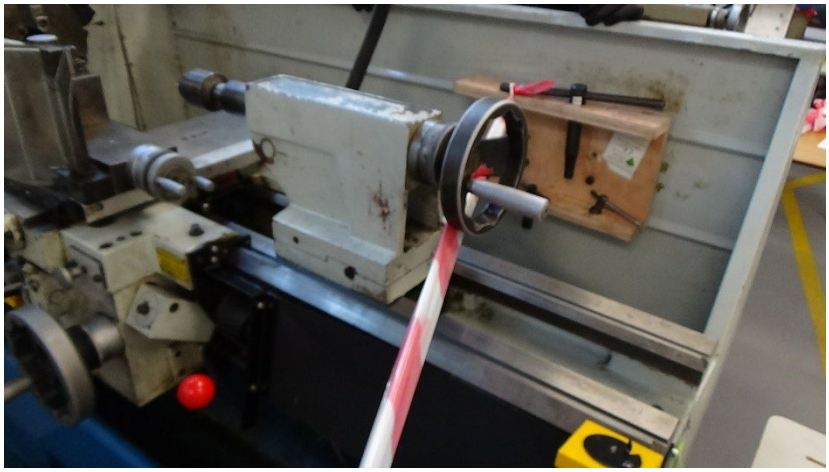
Candidate removed bracket and decided to make a new one.



The chuck is now removed with a view to inspecting and cleaning jaws.

Candidate removed the front panes– probably should have replaced jaws first.

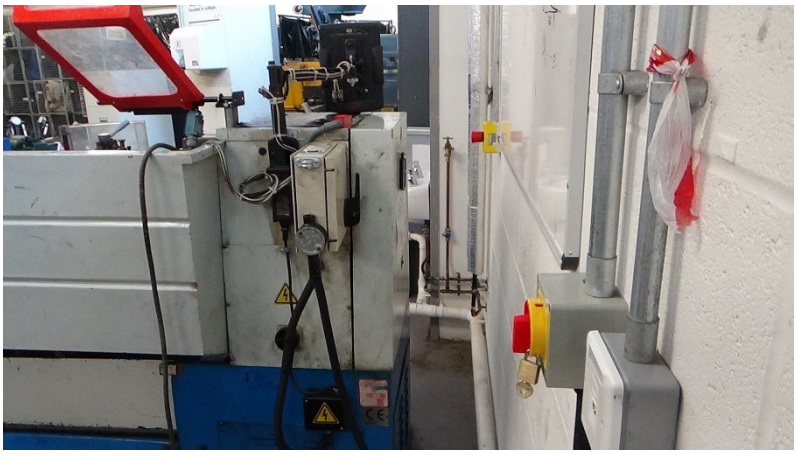
Candidate now has 3 jobs on the go – not best practice.



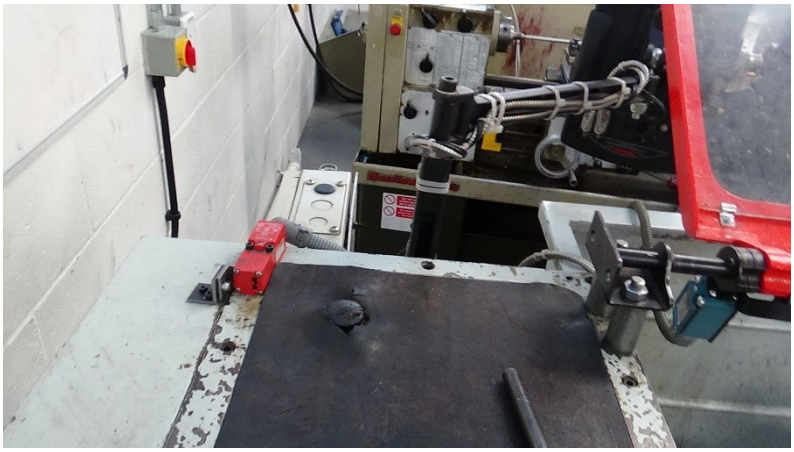
Tailstock off centre – Candidate decided to re align.

This was how candidate left his work area at break – good practice.

<u>Sub-assemblies after repairs.</u>



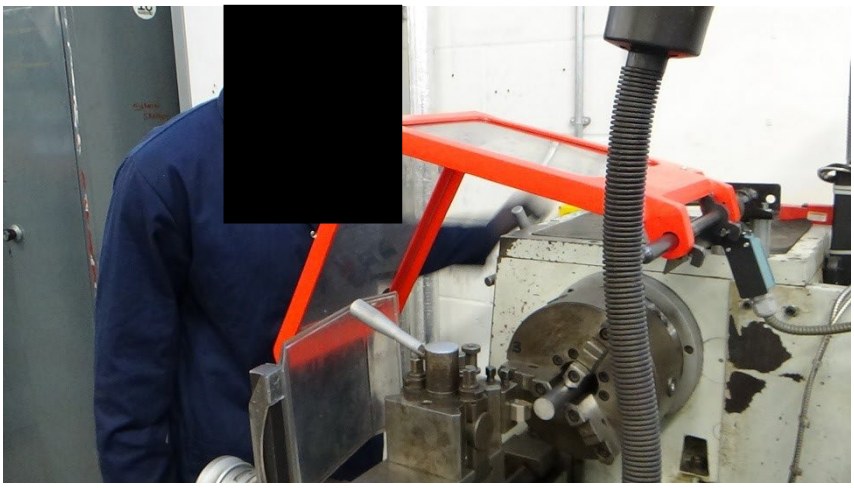
Front panel refitted after maintaining vee belts.



Interlock bracket repaired.

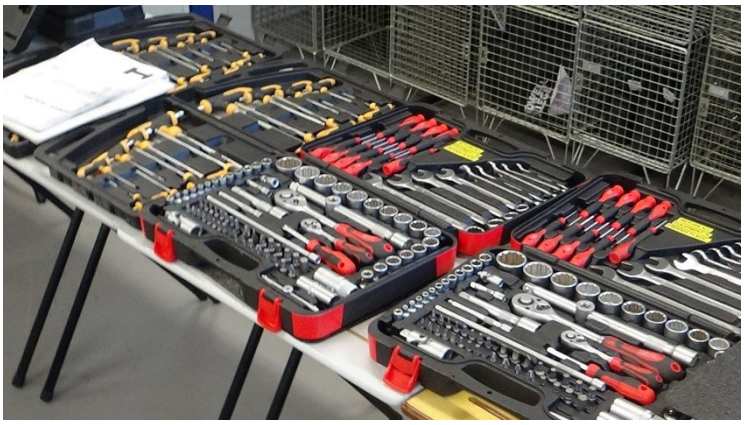
Candidate proving that tailstock was realigned using DTI

Final look after going through checklist.



Candidate taking a trial cut upon completion of tasks.

Centre lathe upon completion of maintenance / Reinstated work area.



Tooling returned and stored correctly.

Candidate was first to finish – back lathe and concluded his checklist.

Area left correctly prior to handover.

Task 2 - Practical observation form

8712-311 Maintenance Engineering Technologies: Mechanical - summer 2024

Candidate Name	Candidate number
xxx	xxx
Provider name	**Date**
xxx	8 5 2024

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

This observation must cover	Assessor observation should include:	Assessment Themes
Work area preparation	• The work area preparation.	• Health and Safety • Planning and Preparation • Systems and Components
Service and maintenance activities	• decommissioning and inspection of the system • disassembly and reassembly of the system • diagnosis and recording of faults within the system, including carrying out appropriate tests • repairing the faults and replacing components and consumables • use of tools and equipment • recommissioning of the system • re-instating the work area.	• Health and Safety • Planning and Preparation • Systems and Components

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.*

Work area preparation:
The work area was prepared to a suitable standard. Any parts were removed to allow full access to the lathe. The tooling for the tasks was all available from college stock. This was positioned on work benches close to hand.
Candidate had a checklist and the lathe manual with him.
The lathe was electrically isolated using correct lock off equipment.
The risk assessment was presented along with his method statement. Both to acceptable standard.
The area was taped off but no signage was utilised.
Candidate wore gloves, boots, overalls and glasses throughout.
The work area caused no concerns with all applicable legislation in place.

Service and maintenance activities:

Decommissioning and inspection of the system.
After a visual inspection of area, Candidate proceeded to electrically isolate the lathe using correct lock off procedure. He then taped off the access to the lathe using red and white tape.
Candidate proceeded to remove the back guard and access plates exposing the vee belts that drive the chuck.
He visually inspected the vee belts checking play and general condition of belts. He decided the belts needed replacing with new. Should have consulted manual.
It was identified the tailstock was misaligned.
He correctly identified the visual alignment marks on rear of tailstock showing it was out of true, later confirmed with DTI.
He identified an Interlock was bent out of shape and position.
No other faults were identified at this time. Candidate made some notes on his checklist.

Disassembly and reassembly of the system.
Candidate firstly removed the faulty bracket from end plate by removing retaining screws.
Candidate then decided to remove the jaws from the 3-jaw chuck, followed by the chuck.
He removed the front cover plate which holds the broken interlock bracket, exposing vee belts and motor. The back plate was now removed for access.
He proceeded to loosen the drive motor to allow removal of Vee belts. He also removed the leadscrew curtain exposing carriage oil level gauge.
All above tasks were completed satisfactorily, as was the reassembly of said items. No issues arising, some good practice observed.

Diagnosis and recording of faults within the system, including carrying out appropriate tests
The interlock was repaired first. Candidate ran the lathe as a check.
Candidate decided to visually inspect and then clean the jaws using cloth and WD40, along with main bearing housing, before replacing jaws in correct 1 2 3 order. This was recorded on inspection sheet at time of completion.
This could have been checked with DTI but was not. Lathe could have been run.
The vee belts were given a visual and manual inspection. Could have consulted manual, he could of used a deflection test. These were deemed to require replacing.
Candidate then removed the 3-jaw chuck and replaced with a dead centre.
He fitted a live centre in tailstock and utilised a ground bar between the centres and a DTI on the saddle to determine the tailstock was misaligned. Candidate realigned tailstock and proved to me it was correct.
Candidate worked through his checklist and recorded his findings.

Repairing the faults and replacing components and consumables

Candidate remade the interlock retaining bracket first. This involved remaking the angle bracket and re- drilling using original as a template. This was replaced using existing holes and bolts.
The jaws had already been replaced after inspection and cleaning utilising WD40 and workshop rags. COSHH regs applied and were adhered to.
The vee belts replacement went very well with no issues. Candidate elected to manually check the free movement of the belts, although there are more accurate methods of setting the belts.
The tailstock stock was realigned in the correct manner until correctly aligned, as checked with DTI and proven to me.
Candidate only used the vee belts from stock and minimal metal for bracket.
No oil was required.

Use of tools and equipment

Tooling was kept on individual workbench at foot of lathe.
All tooling was returned to main storage area. He was required to work in adjacent workshop for drilling bracket on pedestal driller – this was carried out satisfactory.
The DTI was well utilised for tailstock realignment as was the use of an extra cap head as grub screw was causing an issue,
Candidate did tend to attempt too many tasks at once initially. He still kept tooling in check and area safe.
Tooling was generally well managed utilising workbench at foot of lathe.
Tooling was not specially wiped down before returning to boxes. Generally, no issues.

Recommissioning of the system / re-instating the work area.

The lathe was run to identify any residual faults – non-found.
Candidate took a trial cut at this point.
Candidate removed swarf he produced.
When deemed maintenance completed the lathe electrical isolation was removed.
At this point no tools or other equipment was on lathe or immediate area.
Candidate completed checklist and generally wiped down the lathe.
These rags were placed in specific container for recycling.

Internal assessor signature	Date
xxx	10 5 2024

If completing electronically, double-click next to the 'X' to add an electronic signature once the record is **finalised**.

Task 3A Review and report the maintenance activities

Assessment number (eg 1234-033)	8712-311
Assessment title	Mechanical Occupational specialism

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	3A
Evidence title / description	Technical report
Date submitted by candidate	DD/MM/YY

Task 3A

Assessment themes:

- Health and safety
- Systems and components
- Reviewing and reporting

You must:

- produce a technical report for the supervisor. This should typically be 850 words and include:
    - a review of the maintenance activities, including fault diagnosis/detection techniques and suggestions for future improvements
    - the faults found and how they were rectified
    - any outstanding faults, including recommendations that may require attention before the next planned maintenance activity according to the current maintenance schedule
    - reporting of stock levels and waste disposal.
- produce a revised maintenance schedule from your activities and findings, this should include:
    - recommendations for future planned maintenance, including justifications
    - due date of next maintenance activity.

Additional evidence of your performance that must be captured for marking:

none

Candidate evidence

Task 3a – Technical report

Contents

- Maintenance review- fault diagnosis/ detection techniques
- Identifying faults- how they were found
- Outstanding faults- recommendations for the next planned maintenance
- Reporting stock levels and waste disposal

Maintenance review

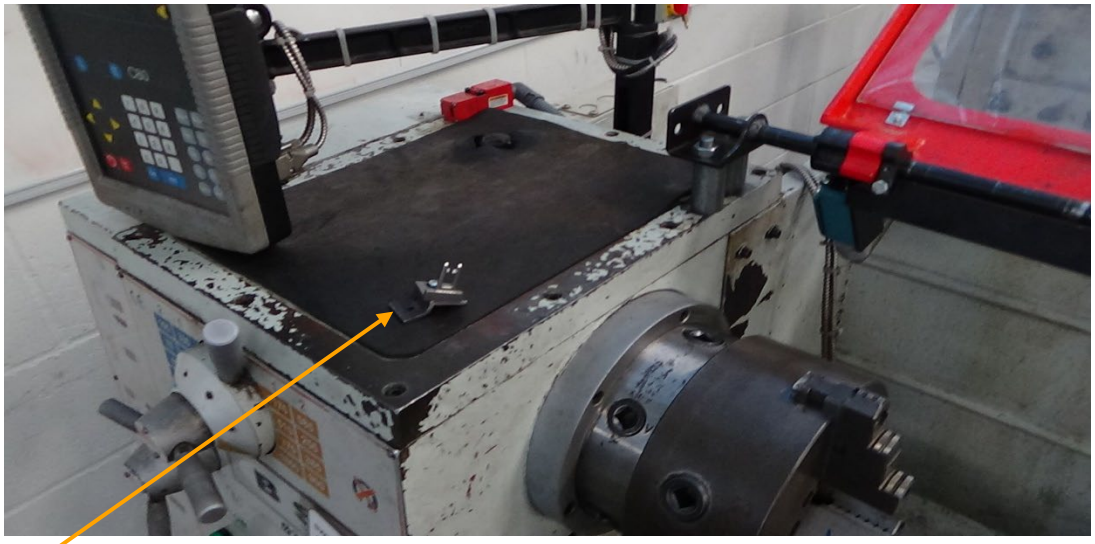
- The maintenance of the machine of the machine was exceptional as the gear box oil was set to the correct level this was easy to see as there was red marker to show that the oil was at the correct level so there were no adjustments required.
- The Apron oil level was also show to be at the correct marking so there was no need to make any adjustments.
- The V-belt was needed to get replaced as there was damage to exterior of the belt so it had to be replaced.
- The chuck had the correct alignment so there was no need to make any changes to the alignment.
- The chuck jaws were found miss aligned so they need to get realigned.
- There were no problems with the spindle it just needed cleaning off.
- The tailstock was found aligned so they were minor adjustments needed to correct the alignment using a DTI (digital test indicator).
- The extension and retraction of the tailstock works correctly so there was nothing to fix.
- The carriage and spindle lock work as intended so there weren't any adjustments required.
- There was free and continuous movement of the X and Y axis so there wasn't any alteration made.
- The compound slide moved as intended to so there was no fixes implemented.
- The condition of the lead screw was decent as it moved the table correctly with no sudden stops whilst operating.
- The feed rod was in good condition as it allowed continuous movement.
- The emergency foot break works allowing the spindle to come to a complete stop.
- The emergency stop also completely stops all function immediately.

- All the gears work properly and they change to the correct ones when changing them.

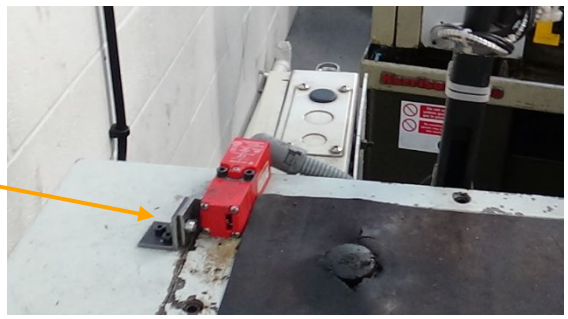
Identifying faults

Interlock

A fault that was found straight away was the broken interlock bracket as shown in the picture below.

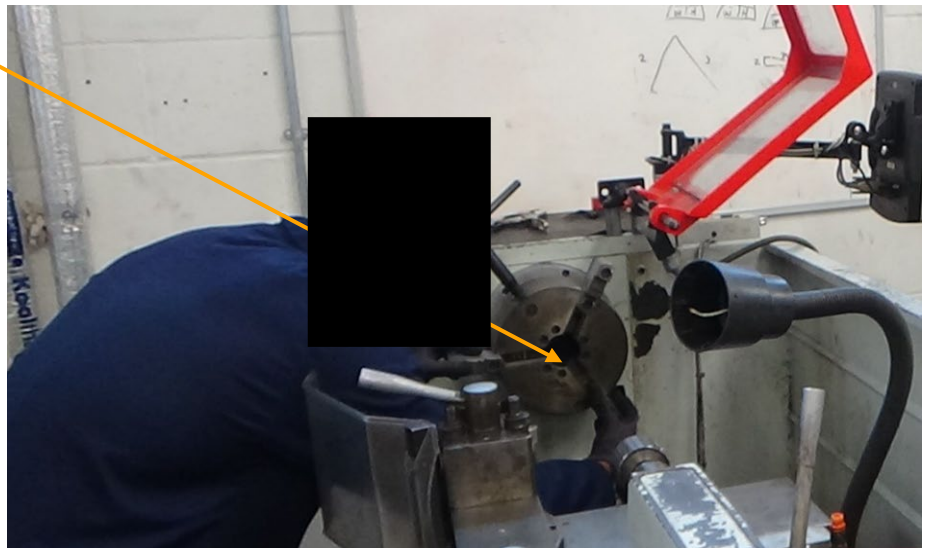


This shows that the bracket was bent and that it needs to be replaced as damage has occurred and it wasn't able to make a stable connection to the interlock so it needed to get fixed or replaced. The chosen method was to replace the bracket as the bracket was quite hard to bend back into place so it ended up getting replaced.



Chuck jaws

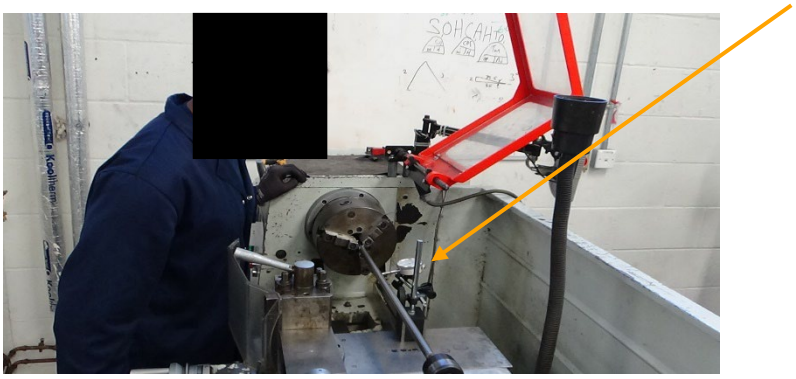
A fault which was shown was the miss alignment of the chuck jaws the image below shows me realigning them.



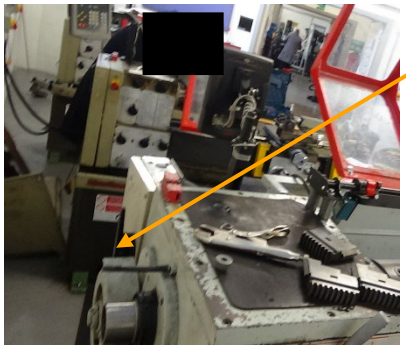
When the maintenance was getting, I had to check the alignment of the chuck and I noticed that the chuck jaws were miss aligned so I chose to clean the area around the chuck before beginning to fix the alignment. To do this the jaws had to be complete taken off and the put separately and some pressure from your hand needed to be applied to push them together so that they all lined up evenly.

Tailstock alignment

The tailstock was shown to be aligned from when I used the DTI to measure and it was different from each end.



This shows that the tailstock is getting realigned using a DTI to measure to see if it has been calibrated correct measure to ensure that it has been centred so there's no problems when using the lathe.



V-belt

The v-belt is shown here:

The V-belt wasn't in the best condition so I had to replace it due to not working at the best efficiency. What I had to do is take out the old v belt and replace it with a brand new one as there was visible damage done to it.

Outstanding faults

The next maintenance will be annual as there's just enough oil for to be used until then so there's no need to for there to be an oil change, also everything else seems to be fine so there's no major reason for the check to be earlier.

Reporting stock levels and waste disposal

The stock that was required was a L-shaped rod of mild steel and a pair of V-belts. For the waste products e.g., the old V-belt and broken bracket and screws they should be put into separate bins. The bracket can be recycled as its metal, however the V-belt should be put into a non-recycling bin.

Task 3B Peer Review

Assessment number (eg 1234-033)	8712-311
Assessment title	Mechanical Occupational specialism

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	3B
Evidence title / description	Peer Review Form Amended Method Statement
Date submitted by candidate	DD/MM/YY

Candidate evidence

Task 3b – Revised Method Statement

~~**Introduction**~~

~~This method statement is going to present the potential causes of the lathe vibrating and what you may need to do to stop this from happening the allocated time frame.~~

~~**Potential fault 1**~~

~~A potential fault with lathe could be that there's a broken gear this could lead to the lathe to vibrate the spindle a way in which can be fixed is by replacing the broken gear with a brand new one this should hopefully resolve the problem as the spindle wasn't spinning correctly as it was chipping away at the gear over time leading to it to break.~~

~~**Potential fault 2**~~

~~Another fault that could be the reason to the spindle vibrating could be that the v-belt could be fared or even lose. If it is loose then all that needs to be done is to tighten in so that there more tension on so that it can spin correctly and hopefully this stops the vibrations.~~

~~**Potential fault 3**~~

~~What could have potentially happened that there has been a problem with the oil leading to it not running smoothly so it is vibrating when it is not supposed to. The easiest way to fix this problem would be to replace the oil and re-run the lathe.~~

Interlock fault

Tools required:

- Posidrive screwdriver
- Hex keys
- Pliers
- Pilar drill
- Hack saw

The interlock bracket was found to be broken so they needed to get replace to do so what I needed to do was:

- First lock off the machine from the mains.
- Then use caution tape to tape off the area.
- Now assess the size of the bracket.
- After that remove the 4 screws that was on the bracket and keep them safe.
- Then cut a piece of mild steal to the correct size.
- Next what was needed to be done is to drill four 4mm holes on the mild steel two at the bottom then two at the side at the side using a pillar drill.
- After that I filled down the sharp edges before installing it back onto the lathe.
- Then I had to screw the bracket onto the interlock key.
- Once that was done screw the bracket back into the machine securely

Once I completed the task, I had to remove the caution tape and to take the lock off of the power switch to see if the interlock was connecting perfectly.

Tailstock

Tools required:

- DTI (digital test indicator)
- Dead centre
- Metal rod
- Rotating centre
- Chuck key
- Hex key

Another fault that was found was that the tailstock was miss aligned on the chuck to resolve this what was need to happen:

- First lock off the machine from the mains.
- Then use caution tape to tape off the area.
- Remove chuck from the spindle.
- Use the chuck to take the off to reveal the spindle.
- Put the dead centre inside the spindle.
- Zero the DTI before use.
- Next place the DTI reader on the sliding table.
- Now put the rotating centre inside the tail stock.
- After that place a metal rod onto both the points.
- Now slide table across to the left towards the spindle to see if the reading changes when it does bring the table back up to the starting point.
- Next loosen the hex screw on either side to make micro adjusts to bring it towards the left or the right.
- Once this has been done bring it back towards the spindle and see if it's zero at the spindle.

Chuck jaws

Tools required:

- Chuck key
- Whiteboard pen

I noticed when I was performing the maintenance task, I notice that chuck jaws were miss aligned the way in which I realigned the chuck jaws was to:

- First lock off the machine from the mains.
- Then use caution tape to tape off the area.
- Next place the chuck into the chuck to extend the jaws completely out and write the numbers on the chuck and place them aside
- Then place the chuck jaws back in in the correct order by try to bring back to the centre
- Once all of them are in apply some pressure when close the jaws so that all meet in the centre

Task 3b – Peer Review Forms

Assessment ID	Qualification number
3b	
Candidate name	**Candidate number**
Provider name	**Provider number**
Date	**Series**
09/05/2024	Summer 2024

Question	Feedback
How well does the method statement enable the maintenance activities to be performed and recorded?	The statement is very vague. It provides almost no instruction on how to diagnose and remedy the potential faults.
How appropriate is the method statement and why?	The statement does list out a couple potential faults and vaguely glosses over the fixes to them. However it is very lacking in instructions.
What are the implications to the business of the proposed method statement?	This statement could make a business more aware of the issues that can arise and render the lathes inoperable.
How could the method statement be optimised/ improved?	The statement needs to expand on the instructions on how to remedy the listed issues.

Task 3b - Peer Review Form

Assessment ID	Qualification number
3b	
Candidate name	**Candidate number**
Provider name	**Provider number**
Date	**Series**
09/05/2024	Summer 2024

Question	Feedback
How well does the method statement enable the maintenance activities to be performed and recorded?	It's simple to understand however it doesn't have information on needed documents i.e. maintenance manual or a handover. It lacks how often the maintenance needs to be performed.
How appropriate is the method statement and why?	There could be a little more detail on how to check the damages or the methods used for finding the faults.
What are the implications to the business of the proposed method statement?	You haven't explained the down time of the machine and there isn't any information on how often maintenance should be performed.
How could the method statement be optimised/ improved?	Some punctuation needs to be added such as commas. Whilst it's simple to understand I had to read it a couple times to know what I read so I recommend changing some of the wording.

Task 4 Handover

Assessment number (eg 1234-033)	8712-311
Assessment title	Mechanical Occupational specialism

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	4
Evidence title / description	Assessor observation of the handover meeting
Date submitted by candidate	DD/MM/YY

Task 4

Assessment themes:

- Health and safety
- Reviewing and reporting

You must now hold a meeting with the supervisor to return to service and complete handover procedures, including:

- demonstration of machine functionality
- confirmation of work completed
- amended method statement and how you addressed peer review feedback, including any suggested changes that were not made and why
- appropriate handover documentation.

Additional evidence of your performance that must be captured for marking:

none

Candidate Evidence

Task 4 - Practical observation form

8712-311 Maintenance Engineering Technologies: Mechanical - summer 2024

Candidate Name	Candidate number
xxx	xxx
Provider name	**Date**
xxx	10 5 2024

Complete the table below referring to the relevant marking grid, found in the assessment pack.

Do not allocate marks at this stage.

This observation must cover	Assessor observation should include:	Assessment Themes
Handover	• the handover of the work completed.	• Health and Safety • Reviewing and Reporting

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.*
Handover Candidate attended on time to deliver handover of lathe. He introduced himself and the task in hand – albeit a bit brief. He described PPE and its relevance. He utilised a checklist he had completed during the maintenance as a prompt sheet. He explained what he had checked / altered and replaced in logical order as appeared on the checklist. He could of utilised the manual better and more specifically the H&S regs.

The terminology showed a degree of knowledge but was bit basic. Never the less this was a suitable handover which covered all the aspects required.

Internal assessor signature	Date
xxx	10 5 2024

If completing electronically, double-click next to the 'X' to add an electronic signature once the record is **finalised**

Get in touch

The City & Guilds Quality team are here to answer any queries you may have regarding your T Level Technical Qualification delivery.

Should you require assistance, please contact us using the details below:

Monday - Friday | 08:30 - 17:00 GMT

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E: **technicals.quality@cityandguilds.com**

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Web chat available **here**.