# Skills assessment: Machine a pin/Tool sharpening

# Trainer & Assessor Marking Guide

**Event 2 of 3**

## Criteria

### Unit code, name and release number

MEM07032 - Use workshop machines for basic operations (1)

### Qualification/Course code, name and release number

MEM10119 – Certificate 1 in Engineering (1)

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This assessment can be found in the: [Learning Bank](https://share.tafensw.edu.au/share/access/searching.do?doc=%3Cxml%2F%3E&in=P7ac4831b-430a-4b8d-8b56-f7b32ed5b9cf&q=&type=standard&sort=rank&dr=AFTER)

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## Assessment instructions

Table 1 Assessment instructions

| Assessment details | Instructions |
| --- | --- |
| **Instructions for the trainer and assessor** | This is a skill based assessment and will be assessing the student on their ability to demonstrate skills required in the unit.  This assessment is in 2 parts:   1. Practical 2. Observation Checklist   Pre Assessment  The student must have successfully completed the knowledge assessment for MEM07032 prior to attempting the practical skills assessment tasks.  Assessor is to ensure the workshop is set up with all the necessary hand tools and measurement equipment and material available for the completion of the tasks in the skills assessment.  The assessor is to provide the student with the appropriate TAKE 5 risk assessment template. The student is to complete the TAKE 5 prior to commencing the task. This requirement is not an assessable task within this assessment.  Practical Task  The purpose of this task is to interpret a drawing of a Stepped/Headed pin and manufacture the pin on a lathe as per the dimensions on the drawing. Assessor will demonstrate how to sharpen a HSS lathe tool prior to commencing the task. Students will then sharpen a HSS lathe tool to complete the task. |
|  | Model answers, sample responses or a criteria for each task or activity is provided below.  Use these to support your judgement when determining a satisfactory result.  The student’s response to each question must contain the information indicated in this marking guide in order for their response to be correct. However, if a student provides information other than indicated below, and in the professional opinion of the assessor it is appropriate and meets the intent of the question, it may be considered correct.  Complete the Observation Checklist for each task and activity and the Assessment Feedback to the student. Ensure you have taken a copy of the assessment prior to it being returned to the student.  The Assessment Feedback page must be signed by both the student and the assessor so the student displays that they have received, understood and accepted the feedback.  Ensure the students name appears on the bottom of each page of the submitted assessment. |
| **About this marking guide** | The student’s response to each task or activity must contain the criteria indicated in this marking guide in order for their response to be correct.  All tasks and activities must be completed correctly in order to satisfactorily complete this assessment event.  Assessors will need to make a judgement call as to whether each response meets the criteria based upon the:   * Rules of Evidence:   + Validity – does the answer address the skill required and does the evidence reflect the four dimensions of competency?   + Sufficiency – is the task or activity sufficient in terms of length and depth?   + Currency – has the work been done so recently as to be current?   + Authenticity – is this work the student’s own authentic work? * Principles of Assessment   + Fairness – individual student’s needs are considered in the assessment process   + Flexibility – assessment is flexible to the individual student   + Validity – any assessment decision is justified, based on the evidence of performance of the student   + Reliability – evidence presented for assessment is consistently interpreted and assessment results are comparable irrespective of the assessor conducting the assessment * Dimensions of competency   + Task skills   + Task Management Skills   + Contingency Planning Skills   + Job Role Environment Skills |
| **Student must provide** | Calculator, pen, pencil, eraser |
| **Assessor must provide** | A workshop fitted with suitable workbenches and workspace.  Material - 130mm x 40mm Mild Steel round bar  All necessary machines, tools and measurement equipment to complete the skills task   * Lathe * Pedestal/bench grinder * RH HSS lathe tool * Vernier callipers * 0 -25mm and 25-50mm micrometres * Brass Tool Gauge * Honing Stone * Letter stamps   Assessment documents, Data sheets, reference text, organisational policy etc. that is referenced in the assessment. These may be hard copy or made available online. |
| **Due date/time allowed** | Time allowed 4 Hours |

Simulated Environment Conditions

***Note: The assessor may direct the student to use different equipment in different spaces to ensure competency is applied in new and different situations.***

The assessment is to be carried out in the workshop complying with all WHS requirements and compliance with Standard Operating Procedures.

The assessment should take approximately 4 Hours.

## Part 1: Practical

To complete this part of the assessment, the student is required to participate in a practical demonstration of how to complete a task or activity.

These practicals will be observed by you, or the student can digitally record them and submit them as evidence.

The student’s responses will be used as part of the overall evidence requirements of the unit.

You should refer to the list of criteria provided in the Observation Checklist to understand what skills the student is required to demonstrate in this section of the assessment. This Checklist outlines the Performance Criteria, Performance Evidence and Assessment Conditions you will be marking the student on.

Once completed the student is required to submit this assessment and the tasks and activities required to be completed to you for marking.

**Contingency Management:**

While undertaking this task a number of unforeseen circumstances may arise. The assessor will have the opportunity to question each learner to gather an understanding of how the student will respond to these events. Below is a table with examples of possible questions and acceptable responses.

The assessor has the opportunity in the Observation Checklist to record additional relevant questions and responses in the table ***“Part 2 Table 3 Additional Questions”***

Table 1 Unforeseen Circumstances

|  |  |  |
| --- | --- | --- |
| Scenario | Assessors question | Acceptable students response |
| Power failure in workshop | What is the correct action in the case of power failure? | *Determine the cause of the failure and rectify if possible. If not call in the appropriately qualified to rectify the problem* |
| Emergency evacuation | What do you do if an emergency evacuation drill happens during the assessment? | *Turn of any equipment and make the workplace safe. Exit in an orderly manner to the nearest Emergency Assembly Area*  *Do not leave TAFE site.* |
| Measurement tool defective | What do you do if you find a measurement tool defective | *Try to repair tool, if not tag it out of service*  *Arrange for replacement tool* |

**Task 1: Sharpen Lathe tool**

In this task, the student is to attend a demonstration on sharpening a HSS lathe tool and sharpen a tool to complete the task. Student is to complete the table on following the SOP for the grinder. The student is to follow the steps in the sharpening process by referring to the supplied diagram and use a brass tool gauge as a guide. The student will then use the sharpened tool to machine a pin which will be Task 2.

**Step 1:**

Refer to the SOP document for the equipment being used. Complete both tables A and B with the relevant information

**Table A and B: Follow SOP**

Refer to the SOP for the equipment to be used and complete the following tables

Table A: Equipment information

|  |  |  |
| --- | --- | --- |
| Item/Description | Manufacturer | Location  Eg. (TAFE Campus: Mechanical Workshop #) |
| *Example response*  *Pedestal Grinder* | *Example response*  *Hafco* | *Example response*  *E.g. Ultimo TAFE : Mechanical Workshop* |

Table B: Follow SOP

|  |  |
| --- | --- |
| PPE Requirements  (list the PPE requirements) | *Benchmark responses may include, but limited to:*  *Cotton drill clothing, Safety glasses, Safety boots* |
| **Procedure prior**  (list a minimum of two (2) main points) | *Student response must include:*  *Check condition machine prior to use for damage*   * *Grinding wheel condition – chips and grooves in wheel to be dressed. If wheel is cracked remove and replace wheel* * *Correct gap obtained between tool rest and grinding wheel*   *Check operation of E stop*  *Eye shields must be in place* |
| **Procedure during**  (list a minimum of two (2) main points) | *Benchmark responses may include, but limited to:*   * *Check all safety guards are in position* * *Never leave machine while running* * *Do not stand behind the machine* * *Do not use gloves, pliers etc to hold work piece* * *Do not grind on the side of wheel* * *Slowly move the work piece across the face of the wheel* |
| **Procedure after**  (list a minimum of two (2) main points) | *Benchmark responses may include, but limited to:*   * *Switch of with E stop when complete* * Clean work area of abrasive dust * Coolant spills on the floor absorbed up * *Damaged equipment tagged and placed out of service* |

**Step 2:**

Attend a teacher demonstration on how to safely operate a bench/pedestal grinder and to sharpen HSS lathe tools on the bench/pedestal grinder

**Step 3:**

Follow the steps provided in the SOP

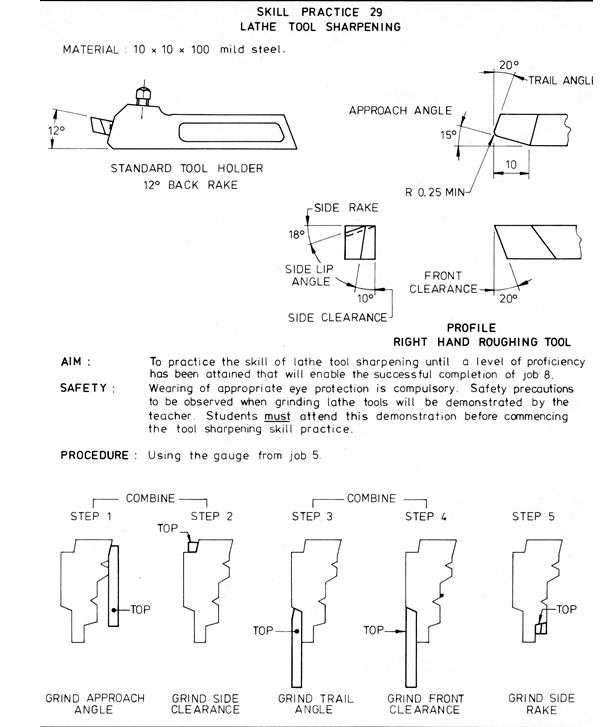
Prior to use of the grinder

* Check condition machine prior to use for damage. Tag out damaged equipment and place out of service*.*
* Check grinding wheel condition – chips and grooves on the grinding wheel are to be dressed. If wheel is cracked remove and replace wheel. Tag cracked wheel for disposal.
* Correct gap to be obtained between tool rest and grinding wheel (approximately 2mm)

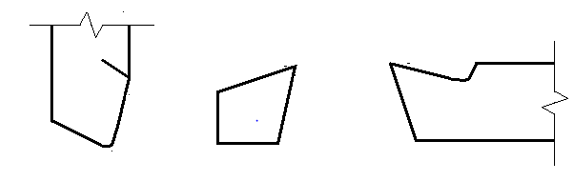
**Step 4:**

Sharpen a HSS lathe tool

* A tool gauge is to be used to measure correct angles
* Cutting edges on the lathe tool must be sharp without signs of overheating
* A honing stone is used to finish the sharpening process and produce a nose radius on the cutting tip



**The lathe tool should have angles similar to those displayed the following diagram**



**Step 5:**

After use of the grinder

* Present the ground tool to the assessor for marking.
* Check grinding wheels for damage after use. Damaged components are to be tagged and placed out of service
* Clean and clear machine and immediate area of grinding dust
* Dust to be placed in appropriate waste bins

**Task 2: Machine pin**

## In this task, the student is to use a lathe to manufacture a pin to specification. Student is to complete the table on following the SOP for operation of the lathe. The student is is to follow the work instructions for the lathe operation.

**Step 1:**

Refer to the SOP document for the equipment being used. Complete both tables A and B with the relevant information

**Table A and B: Follow SOP**

Refer to the SOP for the equipment to be used and complete the following tables

Table A: Equipment information

|  |  |  |
| --- | --- | --- |
| Item/Description | Manufacturer | Location  Eg. (TAFE Campus: Mechanical Workshop #) |
| *Example response*  *Lathe* | *Example response*  *Colchester* | *Example response*  *E.g. Ultimo TAFE : Machine shop – Lathe No. 6* |

Table B: Follow SOP

|  |  |
| --- | --- |
| PPE Requirements  (list the PPE requirements) | *Benchmark responses may include, but limited to:*  *Cotton drill clothing, Safety glasses, Safety boots* |
| **Procedure prior**  (list a minimum of two (2) main points) | *Student response must include:*  *Check condition of machine prior to use for damage*   * *‘E’ stops functioning* * *Chuck guard functioning* * *Feed screw cover in place*   *Damaged machine is tagged and placed out of service.*   * *Chuck is tight in headstock* |
| **Procedure during**  (list a minimum of two (2) main points) | *Benchmark responses may include, but limited to:*  *Use Correct speeds and feeds*  *Control of swarf*  *Be aware of hot metal* |
| **Procedure after**  (list a minimum of two (2) main points) | *Student response must include:*  *Shut down machine*  *Do not leave chuck key in chuck*  *Check lathe for damage after use*   * *Damaged equipment tagged and placed out of service*   *Clean lathe and immediate work area*   * *Swept area clear of swarf* * *Swarf placed in appropriate waste bins*   *Lubricate lathe after use* |

**Step 2:**

Follow work instructions and steps provided in the SOP

**Work Instructions:**

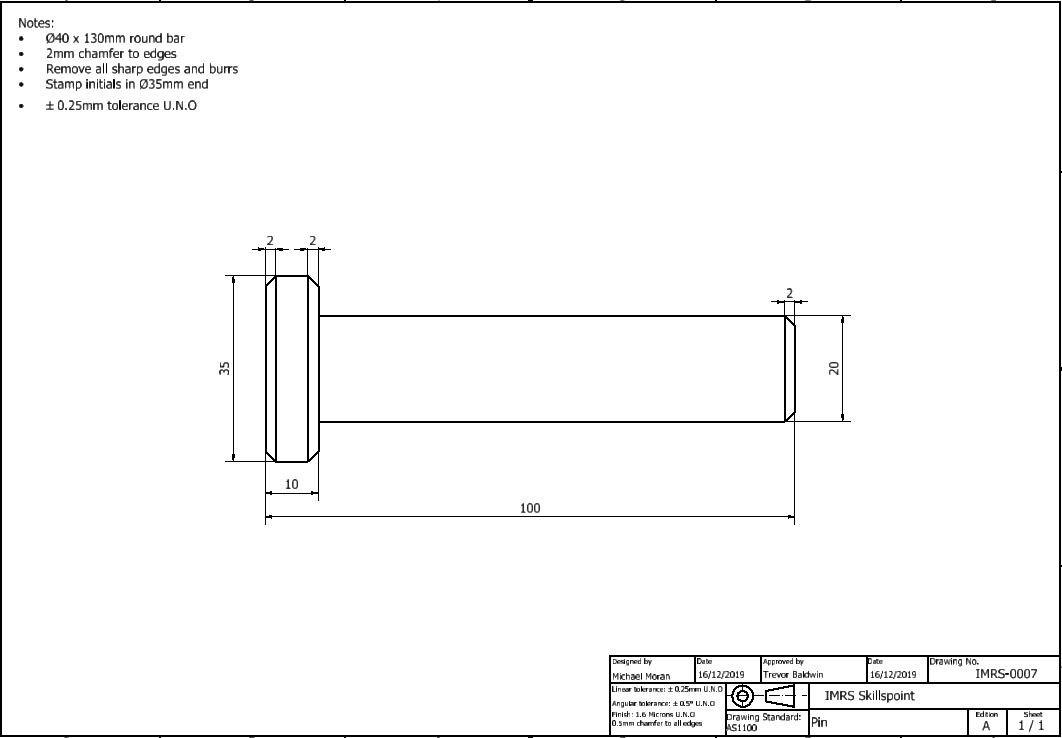
1. Identify specifications from Drawing Number IMRS-0007
2. Check material for correct size - 130mm x 40mm Mild Steel round bar
3. Make any adjustments to the lathe before use

* Speed = = 450 RPM
* Feed 0.2mm/rev

1. Set up lathe tool to correct centre height
2. Set up material in 4 jaw chuck using a scribing block. Note: Leave enough material out of chuck to machine Ø20mm
3. Face job to length
4. Machine Ø20mm using RH HSS lathe tool
5. Machine 2mm Chamfer at end of pin
6. Check machined component to ensure dimensions meet the specifications of the drawing
7. Turn pin around and setup job in the 4 Jaw chuck (holding the job on the Ø20mm end)
8. Machine head end of pin to Ø35mm
9. Face head of pin to length machine 2mm chamfers
10. Check machined component to ensure dimensions meet the specifications of the drawing and make adjustments as required.

**Step 3:**

1. Remove job from lathe and stamp initial on the head end. Remove all burrs
2. Turn power off and isolate machine
3. Follow any further instructions given by the assessor.
4. Use the observation checklist to confirm the tasks have been completed
5. Ensure all tools are cleaned, packed away, and returned to store at the completion of the tasks.
6. Ensure machines are cleaned and lubricated after use.
7. Submit job to assessor for marking



## Part 2: Observation Checklist

The Observation Checklist will be used by you to mark the students’ performance in any of the previous three event types. Use this Checklist to understand what skills the student is required to demonstrate in this section of the assessment. This Checklist outlines the Performance Criteria, Performance Evidence and Assessment Conditions you will be marking the student on. All the criteria must be met. The student’s demonstration will be used as part of the overall evidence requirements of the unit. You may ask questions while the demonstration is taking place or if appropriate directly after the task/activity has been completed.

Table 1 Observation Checklist

| Item# | Task 1: Sharpen Lathe Tool | S | U/S | Assessor Comments (Describe the student’s ability in demonstrating the required skills and knowledge) |
| --- | --- | --- | --- | --- |
| 1 | Attend demonstration on safe use of bench/pedestal grinders |  |  | (PE1) (PC1.1,1.2.1.3) Student attends demonstration and follows verbal instructions  *(a list of verbal questions and responses can be noted in Table 3 additional questions following the observation checklist)*  *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student’s performance against the criteria required.* |
| 2 | Follow Standard Operating Procedure (SOP) for the use of a pedestal or bench grinder, use correct PPE and follow safe work practices |  |  | (PE1) (PC1.1,1.2.1.3, PC2.4) Student referred to and followed SOP for the use of pedestal/bench grinder  Student completed Equipment information and Follow SOP tables  *Correct PPE worn when using pedestal/bench grinder*   * *Safety glasses* * *Cotton drill shirt and trousers* * *Safety boots*   *Student checked condition of machine prior to use for damage*   * *Student checked for the correct gap between tool rest and grinding wheel and adjustments made if required* * *Student checked eye shields were in place*   *Student took appropriate action for damaged machine, tagged and placed out of service*  Follow safe practices   * *Check all safety guards are in position* * *Never leave machine while running* * *Do not stand behind the machine* * *Do not use gloves, pliers etc to hold work piece* * *Do not grind on the side of wheel* * *Slowly move the work piece across the face of the wheel*   Housekeeping   * *Switch of with E stop when complete* * Clean work area of abrasive dust * Coolant spills on the floor absorbed up * *Damaged equipment tagged and placed out of service*   *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student’s performance against the criteria required.* |
| 2.1 Complete Equipment information and Follow SOP tables |  |  |
| 2.2 Wear correct PPE suitable for task |  |  |
| 2.3 Carry out before use checks   * check for the correct gap between tool rest and grinding wheel and adjust if required (2mm) * check eye shields are in place and not damaged * Damaged equipment tagged and placed out of service |  |  |
| 2.4 Follow safe practices and housekeeping   * Follow steps provided in the SOP |  |  |
| 3 | Sharpen lathe tool |  |  | (PE3) (PC2.2) *Student displayed appropriate techniques when sharpening lathe tool*   * *Student followed tool geometry guide* * *Student kept lathe tool cool using water* * *Correct angles were obtained using tool gauge* * *Tool finished on honing stone all over with small nose radius*   *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student’s performance against the criteria required.* |
| 3.1 Sharpen tool using tool geometry guide |  |  |
| 3.2 Check tool angles using tool gauge |  |  |
| 4 | Carry out after use checks   * Follow steps provided in the SOP |  |  | (PE1) (PC1.1,1.2) Student carries out after use checks  *Student checks machine after use for damage*   * *Damaged components tagged and placed out of service*   *Student kept work area clean and clear of grinding dust*  *Student followed sound housekeeping practices. Student cleaned up immediate area on completion of task*   * *Swept area clear of grinding dust* * *Dust placed in appropriate waste bins*   *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student’s performance against the criteria required.* |
| 4.1 Check grinder for damage after use   * damaged components tagged and placed out of service |  |  |
| 4.2 Clean around grinder and immediate area   * Dust placed in appropriate waste bins |  |  |
| 4.3 Present ground tool to assessor for marking |  |  |

Table 2 Observation Checklist

| Item # | Task 2: Machine Pin | S | U/S | Assessor Comments (Describe the student’s ability in demonstrating the required skills and knowledge) |
| --- | --- | --- | --- | --- |
| 1 | Follow Standard Operating Procedure (SOP) for the use of a lathe use correct PPE and follow safe work practices |  |  | (PE1) (PC1.1,1.2.1.3, PC2.4) Student referred to and followed SOP for the use of a lathe  Student completed Equipment information and Follow SOP tables  *Correct PPE worn when using a lathe*   * *Safety glasses* * *Cotton drill shirt and trousers* * *Safety boots*   *Student checked condition of machine prior to use for damage*   * *‘E’ stops functioning* * *Chuck guard functioning* * *Feed screw cover in place* * *Chuck is tight in headstock*   *Student took appropriate action for damaged machine, tagged and placed out of service.*   * *Student did not use damaged equipment* * *Damaged equipment tagged and placed out of service*   *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student’s performance against the criteria required.* |
| 1.1 Complete Equipment information and Follow SOP tables |  |  |
| 1.2 Wear correct PPE suitable for task |  |  |
| 1.3 Carry out before use checks   * ‘E’ stops functioning * Chuck guard functioning * Feed screw cover in place * Chuck is tight in headstock * Damaged equipment tagged and placed out of service |  |  |
| 1.4 Follow safe practices and housekeeping   * Follow steps provided in the SOP |  |  |
| 2 | Interpret drawing |  |  | (PE2) (PC1.4) Student interprets drawing  *Student selects material*   * *size and material type is checked as per the drawing (No.IMRS-0007)*   *Student selects measurement tools appropriate to complete the task*  *• Scribing block*  *• 0-25mm micrometre*  *• 25-50mm micrometre*  *• Vernier callipers*  *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student’s performance against the criteria required.* |
|  | 2.1 Select correct material |  |  |
|  | 2.2 Select measurement and set up tools |  |  |
| 3 | Set up machine |  |  | (PE3) (PC2.1,PC2.3)Student employs appropriate machine settings   * *Student selects 450 RPM or speed on assessors advice* * *Student selects 0.2mm/rev*   *Student sets the cutting tool on centre height*   * *Tool is clamped appropriately and tightened*   *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student’s performance against the criteria required.* |
| 3.1 Select speed and feed for the lathe |  |  |
| 3.2 Set up lathe tool on centre height |  |  |
| 4 | Mount material in chuck |  |  | (PE4) (PE2.4,PE3.1) Student mounts the material to be machined in a 4 Jaw chuck   * *Student grips the material by 30mm* * *Student sets up job to run true using a scribing block* * *Student tightens jaws of chuck uniformly and checks tension* * *Student close chuck guard ready for machining*   *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student’s performance against the criteria required.* |
| 4.1 Set up material to run true in the 4 Jaw chuck using a scribing block. (Grip material by 30mm of its length) |  |  |
| 4.2 Tighten the jaws uniformly and check tension |  |  |
| 4.3 Close chuck guard |  |  |
| 5 | Machine pin |  |  | (PE5) (PC3.2,PC3.3,PC3.4) Student machines pin to specification as per Drawing No IMRS-0008   * *Student machines dimension Ø20mm x 90mm long* * *Student checks dimension and makes any adjustments if required* * *Student machines 2mm chamfer to end of pin*   *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student’s performance against the criteria required.* |
| 5.1 Face end of pin and machine Ø20mm x 90mm long |  |  |
| 5.2 Check dimension with a micrometre and adjust if required |  |  |
| 5.3 Turn tool to 45⁰ and machine 2mm chamfers |  |  |
| 6 | Machine Pin head |  |  | (PE4,PE5) (PC3.1,PC3.2,PC3.3,PC3.4) Student removes and reverses job to machine head end of pin   * *Job is gripped by 40-50mm* * *Student sets up Job to run true and chuck jaws tightened uniformly* * *Pin is faced to 10mm wide and turned to Ø35mm* * *Student checks dimension and makes any adjustments if required*   *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student’s performance against the criteria required.* |
| 6.1 Remove and reverse job and set up in chuck with a scribing block (Grip material by 40-50mm) |  |  |
| 6.2 Tighten the jaws uniformly and check tension |  |  |
| 6.3 Face head of pin to 10mm wide and machine Ø35mm |  |  |
| 6.4 Check dimension with a micrometre and adjust if required |  |  |
| 7 | Machine chamfers |  |  | (PE3,PE5) (PC2.1,PC3.2,PC3.3,PC3.4) Student selects a chamfer tool to complete task   * *Student fits 45⁰ chamfer tool to tool post and sets centre height* * *Student machines 2mm chamfers*   *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student’s performance against the criteria required.* |
| 7.1 Select and fit a 45⁰ chamfer tool to tool post and set centre height and tightened |  |  |
| 7.2 Machine 2mm chamfers to each side of the head and check dimension. Adjust if required |  |  |
| 8 | Remove all burrs and sharp edges |  |  | *(PE2) (PC1.4) Student removes all burrs and sharp edges*   * *Student stamps initials on the head end of the pin*   *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student’s performance against the criteria required.* |
| 8.1 Stamp your initials on head end of the pin |  |  |
| 9 | Carry out after use checks   * Follow steps provided in the SOP |  |  | (PE1) (PC1.1,1.2) Student carries out after use checks  *Student follows steps in the SOP for after use checks*  *Student checks machine after use for damage*   * *Damaged components tagged and placed out of service*   *Student kept work area clean and clear of swarf*  *Student followed sound housekeeping practices. Student Cleaned up lathe and immediate area on completion of task*   * *Swept area clear of swarf* * *Swarf to appropriate waste bins*   *Student lubricated and cleaned lathe*  *Student returns tools to the correct storage and hands job in for marking*  *Assessors are to record their observations in sufficient detail to demonstrate their judgement of the student’s performance against the criteria required.* |
| 9.1 Check lathe for damage after use   * damaged equipment tagged and placed out of service |  |  |
| 9.2 Clean lathe and immediate area   * Swarf placed in appropriate waste bins |  |  |
| 9.3 Return lathe tools and equipment to correct storage |  |  |
|  | 9.4 Lubricate machine after use. |  |  |
| 9.5 Submit job in for marking |  |  |

Table 3: Additional Questions

|  |
| --- |
|  |
| Assessors may ask additional questions to clarify student understanding. List here any additional questions that were asked during this assessment event.  *Record all additional questions that were asked of the student during the assessment event.* |
| **Student Reponses to Additional Questions** |
| List here the student responses to any additional questions that were asked during this assessment event.  *Record the student responses to any additional questions that were asked during this assessment event.* |