

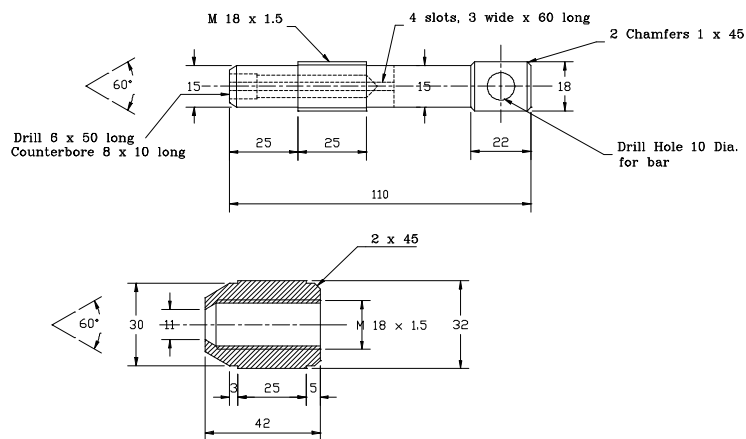


## BEAUDESERT STATE HIGH SCHOOL

### ENGINEERING WORK BOOK

#### TAP WRENCH

Time allowed – 6 weeks



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#### Procedure for making the Tap Wrench

##### Body

1. Cut a piece of 18 diameter bright mild steel 113 long using the cold saw.
2. Face both ends in the centre lathe to 110 long.
3. Turn the two 15 mm diameters as per the drawing.
4. Turn the chamfers as shown in the drawing.
5. Centre drill, then drill 6 diameter x 50 long.
6. Counter bore 8 diameter x 10 long.

7. Using the centre lathe to ensure squareness of thread, cut the M18 x 1.5 thread.
8. Mark out, centre punch and drill the 10 diameter hole for the cross bar.
9. Set up the work piece in the horizontal miller, held by 15 diameter so that the thread is above the level of the machine vice jaw top. Clamp a piece of split PVC tube around the 15 diameter, to ensure good grip and protection of the turned surface.
10. Using a slitting saw, cut the slots down to the level of the bottom of the thread.
11. Rotate the machine vice for the 2<sup>nd</sup> cut at 90 degrees to the initial cut.

## Cap

1. Cut a piece of 28 diameter bright mild steel to a length of 45 mm on the cold saw.
2. Face both ends in the centre lathe to the required finished length.
3. Centre drill one end and drill 11 diameter right through.
4. Drill at 16.5 diameter to leave a sufficiently strong angled internal face at the rear end of the hole to act as the clamping mechanism for the body as it is screwed into the cap (see the drawing).
5. Counter sink the hole for starting the thread.
6. Start the M18 x 1.5 thread in the lathe and finish using a plug tap, either in the lathe or in the hand vice once the thread is started square.
7. Turn the 5 x 26 diameter spigot and the 45 degrees x 2 chamfer.
8. Reverse in the lathe, hold by the 28 diameter and turn the 6 x 26 diameter spigot and the 6 x 60 degree chamfer.
9. Screw the cap onto the body until it is tight (put a short piece of round metal bar into the mouth of the body to prevent the 4 fingers of the mouth from collapsing in).
10. Mount the body in the lathe, held by the 18 diameter end and supported by a live centre at the other end.
11. Knurl the 28 OD.
12. Cut a piece of 10 round bright mild steel bar for the top of the body, chamfer the ends in the lathe, and either flatten out both ends slightly while in position in the body to prevent the bar from being able to

slip out or drill and tap a M6 x 1.0 thread in the end of the body top for a grub screw (dimple the corresponding position on the 10 bar).

### Competencies covered

#### **Unit 1.1F.1 Undertake interactive workplace communication.**

**Element – 1.1F.1 Communicate information about tasks, processes, events, or skills.**

Criteria		Met
1.1F 1.1	An appropriate choice of communication techniques are used.	
1.1F 1.2	Multiple operations involving several topics are communicated.	
1.1F 1.3	Listening is done without continuous interruptions of the speaker.	
1.1F 1.4	Questions are asked to gain extra information	
1.1F 1.5	Correct sources of information are identified	
1.1F 1.6	Information is selected and sequenced appropriately	
1.1F 1.7	Verbal reporting and written reporting done where required	
1.1F 1.8	Communication is demonstrated in unfamiliar situations	

**Element - 1.1F.2 Take part in group discussion to achieve appropriate work outcomes.**

1.1F 2.1	Responses sought and provided from others in the group	
1.1F 2.2	Constructive contributions are made towards the production processes involved.	
1.1F 2.3	Goals and aims are communicated.	

**Element - 1.1F 3 Represent the views of the group to others.**

1.1F 3.1	Views and opinions of others are understood and reflected accurately.	
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#### **Unit 1.2F Apply principles of occupational health and safety (OH&S) in work.**

**Element – 1.2F.1 Follow safe work practices**

1.2F 1.1	Work is carried out safely to school standards and legislative requirements.	
1.2F 1.2	Housekeeping is undertaken to school standards.	
1.2F 1.3	Responsibilities and duties of students are understood and demonstrated.	
1.2F 1.4	Personal protective equipment is worn and stored to school standards.	
1.2F 1.5	All equipment and safety devices are used to legislative requirements and school standards.	
1.2F 1.6	Safety signs are identified and followed as per instruction.	
1.2F 1.7	All manual handling is carried out to legal requirements and school standards.	
1.2F 1.8	Emergency equipment identified and used as appropriate.	

### **Element – 1.2F.2 Report workplace hazards**

1.2F 2.1	Workplace hazards identified and reported to teacher.	
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### **Element – 1.2F.3 Follow emergency procedures**

1.2F 3.1	Identifies the means of contacting appropriate personnel in the event of an accident	
1.2F 3.2	Emergency and evacuation procedure understood and carried out.	
1.2F 3.3	School evacuation procedures followed	

## **Unit 1.3F Apply quality procedures**

### **Element - 1.3F.1 Take responsibility for own quality**

1.3F 1.1	Concept of supplying product or service to meet customer needs or requirements understood and applied.	
1.3F 1.2	Accepts the “right first time” concept as a personal responsibility	

### **Element – 1.3F.2 Apply standard procedures of workplace quality to own job**

1.3F 2.1	Quality system procedures followed.	
1.3F 2.2	Conformance to specifications ensured.	

## **Unit 1.4F Plan to undertake a routine task**

### **Element – 1.4F.1 Identify task requirements**

1.4F 1.1	Instructions for procedures are obtained, understood and if necessary, clarified.	
1.4F 1.2	Relevant specifications for task outcomes are obtained, understood, and if necessary, clarified.	
1.4F 1.3	Task outcomes are identified	
1.4F 1.4	Task requirements, such as completion time and quality measures are identified.	

### **Element – 1.4F.2 Plan steps required to complete task**

1.4F 2.1	Based on specifications and instructions provided, the individual steps or activities required to undertake the task are understood, and if necessary, clarified.	
1.4F 2.2	Sequence of activities required to be completed are identified in plan.	
1.4F 2.3	Planned steps and outcome are checked to ensure conformity with instructions and relevant specifications.	

### **Element – 1.4F.3 Review plan**

1.4F 3.1	Outcomes are identified and compared with (planned) objectives, task	
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		instructions, specifications, and task requirements.	
1.4F	3.2	If necessary, plan is revised, to better meet objectives and task requirements.	

## Unit 2.5C11 Measure with graduated devices

### Element – 2.5C11.1 Use graduated devices to check dimensions or variables

2.5C11	1.1	Selects appropriate device or equipment to achieve required outcome.	
2.5C11	1.2	The correct and appropriate measurement technique used.	
2.5C11	1.3	Measures accurately to the finest graduation of the instrument.	

### Element – 2.5C11.2 Maintain graduated devices

2.5C11	2.1	Routine care and storage of devices undertaken to manufacturers specification or standard operating procedure.	
2.5C11	2.2	Checks and maintains routine adjustments to devices e.g. zeroing.	

## Unit 7.32A Use workshop machines for basic operations

### Element – 7.32A.1 Determine job requirements

7.32A	1.1	Job requirements interpreted.	
7.32A	1.2	Appropriate machine selected to meet requirements.	

### Element – 7.32A.2 Set up machine

7.32A	2.1	Tools are selected where appropriate.	
7.32A	2.2	Cutting tools are sharpened as required.	
7.32A	2.3	Tools are correctly installed using standard operating procedures.	
7.32A	2.4	Appropriate guards are set and adjusted as required.	

### Element – 7.32A.3 Operate machine

7.32A	3.1	Material to be machined is positioned and secured.	
7.32A	3.2	Machine is operated appropriately to suit job and material requirements.	

### Element – 7.32A.4 Check finished component

7.32A	4.1	Machined component checked against requirements and predetermined finish.	
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## **Machinery and equipment used**

Cold cutting saw, centre lathe, pedestal grinder, HSS tool bit and straight or right hand tool holder, centre drill, live centre, stock and die, metal work vice, pedestal drill, centre punch, scribe, rule.

## **Record keeping**

All criteria which have been successfully met by each student, must be recorded on the students **Engineering Competencies Student Booklet** as soon as possible, but no less often than at the end of each semester.