


MEM - Metal and Engineering

MEM10119 - Certificate I in Engineering



Unit Resources and User Guide



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Passing Lane Pty Ltd
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INTRODUCTION

Passing Lane Pty Ltd is pleased to introduce your school/institution to our vocational education and training unit resource packages.

MEM10119 - Certificate I in Engineering

This document outlines the licensing terms and conditions of the unit resource packages.

It also provides basic information on how to use the materials.

Should you have any further questions or require any additional information do not hesitate to contact Passing Lane.

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INTRODUCTION-CONT'D

The Student/Trainee and the Teacher/Trainer manuals are developed to provide training content that addresses the specific 'Unit of Competency' as outlined on the following pages.

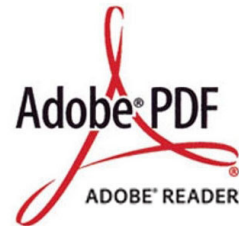
This unit manuals can be packaged with various manuals addressing other 'Units of Competency' in order to meet the 'Packaging Rules' of a particular Australian Training Package Qualification.

This resource has been designed to be delivered in a form that is conducive to the learning environment including:

- ☆ Online delivery
- ☆ Classroom delivery
- ☆ On the job training

The documents are designed in a 'landscape' format in order to make reading on a computer screen easier as well as reduces the need to scroll down pages. Documents can be easily printed if the learning environment requires the student or trainee to have hard copies of the learning materials.

The Student/Trainee and the Teacher/Trainer manuals are Portable Document Files (PDF) and are opened using Adobe Reader.



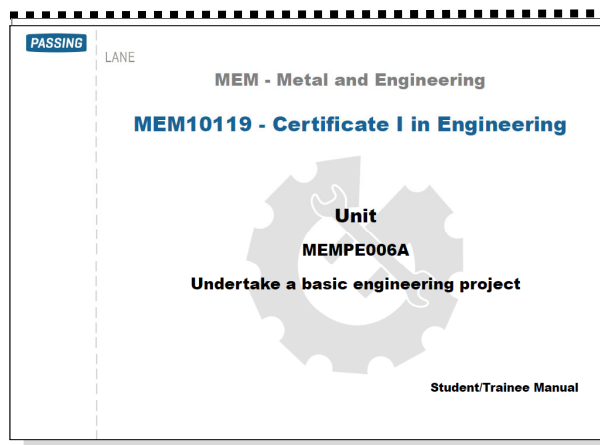
The latest Acrobat Reader software is available at no charge from the website <http://get.adobe.com/reader/>

INTRODUCTION—CONT'D

The Student/Trainee and the Teacher/Trainer manuals can be used on both PC and MAC platforms.

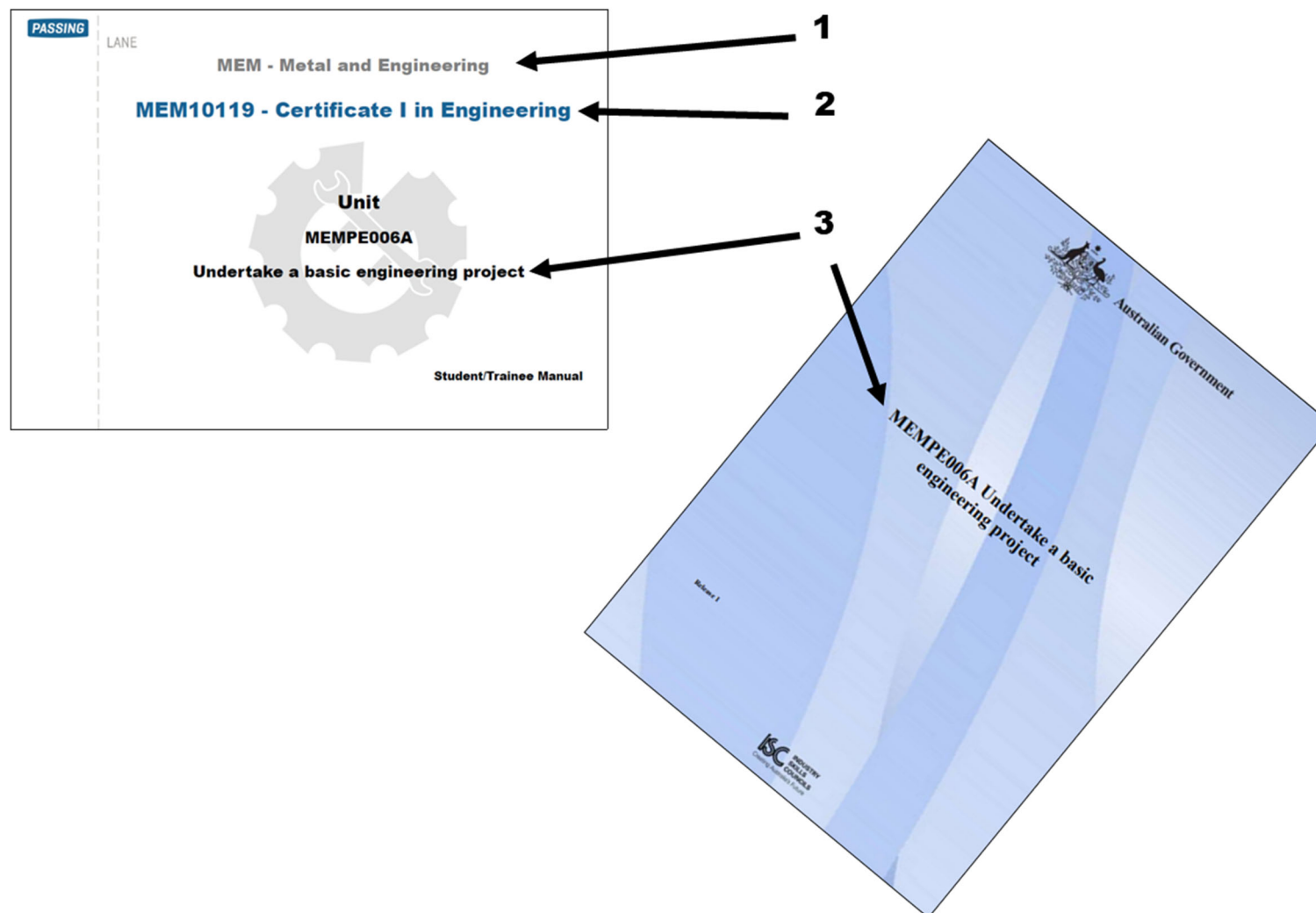
Generally, the materials are easily exported to most learning platforms.

The materials can also be printed and bound and handed out as hardcopies to each student or trainee.



MATERIALS CONTENT

The title page of both the Student/Trainee and the Teacher/Trainer manuals specify 1) the training package it has been developed for, 2) the qualifications which the content in each manual has been written for and 3) the specific unit the content is addressing.



MATERIALS CONTENT—CONT'D

The beginning of both manuals is the 1) 'Unit of Competency Overview' page, which aligns directly with the endorsed 'Unit of Competency' in the training package.

This page is to let the readers know what the materials in the manuals are addressing.

PASSING

MEMPE006A - Undertake a basic engineering project

UNIT OF COMPETENCY OVERVIEW

The following pages are extracts from Training.gov.au website and outlines this specific 'Unit of Competency' including the 'Elements' and the 'Performance Criteria'. The content within this manual has been developed to address this unit.

MEMPE006A - UNDERTAKE A BASIC ENGINEERING PROJECT

ELEMENT	PERFORMANCE CRITERIA
1. Research engineering materials and components	1.1. Determine the uses of engineering materials , such as types and forms of metals, polymers (thermo setting and thermo plastic) and fibres 1.2. Describe the advantages of the engineering materials when compared to each other 1.3. Determine commonly available shapes of metal materials , such as sheet, plate, bar, angle iron and other common shapes 1.4. Determine methods used to join metal pieces, such as, threads, pins, circlips, rivets, welding, folded joints and adhesives 1.5. Describe the advantages of the different metal joining methods 1.6. Determine the types of plain and anti-friction bearings, including type of materials, used in machines 1.7. Describe the advantages and disadvantages of the different types of bearings
2. Develop a metals-based project	2.1. Research and decide on a realistic project that can be completed in the institution in the available time 2.2. Determine the types of material required for the project 2.3. Determine the amount of material and components required 2.4. Gain approval for the project
3. Determine drawing requirements	3.1. Research engineering drawing practices 3.2. Decide how drawings will be produced, e.g. using a CAD systems and/or hand drawing equipment, and/or freehand sketches 3.3. Decide on appropriate dimensioning methods for the drawings produced 3.4. Decide on methods and conventions for naming and saving new or modified drawings

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Date this document was generated: 15 December 2013

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1 Research engineering materials and components	1.1 Determine the uses of engineering materials , such as types and forms of metals, polymers (thermo setting and thermo plastic) and fibres 1.2 Describe the advantages of the engineering materials when compared to each other 1.3 Determine commonly available shapes of metal materials , such as sheet, plate, bar, angle iron and other common shapes 1.4 Determine methods used to join metal pieces, such as, threads, pins, circlips, rivets, welding, folded joints and adhesives 1.5 Describe the advantages of the different metal joining methods 1.6 Determine the types of plain and anti-friction bearings, including type of materials, used in machines 1.7 Describe the advantages and disadvantages of the different types of bearings
2 Develop a metals-based project	2.1 Research and decide on a realistic project that can be completed in the institution in the available time 2.2 Determine the types of material required for the project

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Page 3 of 10
ManufacturingSkills Australia

f material and components

ject

rawing practices

ill be produced, e.g. using a
d drawing equipment, and/or

imensioning methods for the

conventions for naming and
drawings

completed project using either
wing equipment or freehand

individual project components
a, hand drawing equipment or

acher/instructor and peers

ared

aterials list using the either the
nputer software

tools and equipment required

of individual component
es needed to protect
is from damage

sembly of the project

for the project and plan

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ManufacturingSkills Australia

MATERIALS CONTENT—CONT'D

The manuals contain detailed information aligned specifically to the 'Unit of Competency' and the unit's 'Elements' and 'Performance Criteria'.

The 1) Table of Contents for both manuals show that each section title is the 2) 'Unit of Competency' 'Element'.

1 → **TABLE OF CONTENTS**

2 → **Section One**

Section One → **Research Engineering Materials and Components**

1 → **Employability Skills Information**

1 → **Elements and Performance Criteria Pre-Content**

1 → **Elements and Performance Criteria**

2 → **1 Research engineering materials and components**

2 → **2 Develop a metals-based project**

1.1 Determine the uses of *engineering materials*, such as types and forms of metals, polymers (thermo setting and thermo plastic) and fibres

1.2 Describe the advantages of the engineering materials when compared to each other

1.3 Determine commonly available *shapes of metal materials*, such as sheet, plate, bar, angle iron and other common shapes

1.4 Determine *methods used to join metal* pieces, such as, threads, pins, circlips, rivets, welding, folded joints and adhesives

1.5 Describe the advantages of the different metal joining methods

1.6 Determine the types of plain and anti-friction bearings, including type of materials, used in machines

1.7 Describe the advantages and disadvantages of the different types of bearings

2.1 Research and decide on a realistic project that can be completed in the institution in the available time

2.2 Determine the types of material required for the project

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MATERIALS CONTENT—CONT'D

In each section the content is broken down into sub-sections and the titles for each sub-section is the same as the 1) 'Element's' 'Performance Criteria'.

MEMPE006A - Undertake a basic engineering project Page 10

Section One

Research Engineering Materials and Components

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MEMPE006A - Undertake a basic engineering project Page 12

DETERMINE THE USES OF ENGINEERING MATERIALS, SUCH AS TYPES AND FORMS OF METALS, POLYMERS (THERMO SETTING AND THERMO PLASTIC) AND FIBRES


The most common metal used in the engineering industry sectors is steel. The two basic types of steel are:

- ✦ Hot rolled
- ✦ Cold rolled


Hot rolled - semi-finished products called blooms, billets and slabs are transported from the steelmaking plant to the rolling mills.

Steel products can be classified into two basic types according to their shape: flat products and long products. Slabs are used to roll flat products, while blooms and billets are mostly used to roll long products. Billets are smaller than blooms and therefore are used for the smaller types of long product.

Semi-finished products are first heated in a re-heat furnace until they are red hot (around 12000 C). The reheated steel is passed through a collection of steel rolls (or drums) on which pressure can be applied to squeeze the hot steel passing through them, and arranged so as to form the steel into the required shape.



Steel billets



Steel slabs


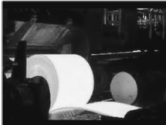



Plate mill



Strip mill



Long product mill

MEMPE006A Undertake a basic engineering project Date this document was generated: 15 December 2013

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency. Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

1	Research engineering materials and components	1.1	Determine the uses of engineering materials , such as types and forms of metals, polymers (thermo setting and thermo plastic) and fibres
		1.2	Describe the advantages of the engineering materials when compared to each other
		1.3	Determine commonly available ste materials , such as sheet, plate, common shapes
		1.4	Determine

1

The manual's information is supported with graphics, charts, tables, photos and drawings.

MATERIALS CONTENT-CONT'D

As earlier mentioned, the materials are vocational education and training unit resources in the form of Student/Trainee and the Teacher/Trainer manuals.

We will go through each in more detail.

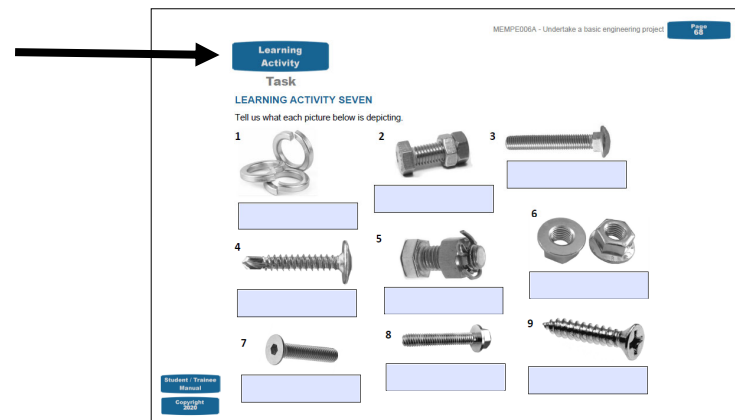
STUDENT/TRAINEE MANUAL

The 'Student/Trainee Manual' could be likened to a textbook.

The manuals contain detailed information aligned specifically the 'Unit of Competency' and the unit's 'Elements' and 'Performance Criteria' and are supported with graphics, charts, tables, photos and drawings.

The manuals contain a series of 'Learning Activities'.

Each learning activity is identified with the following icon.



**Learning
Activity**

MATERIALS CONTENT-CONT'D

Learning activities come in the following forms.

- ☆ Questions
- ☆ Research
- ☆ Tasks
- ☆ Interviews

Questions

Questions would relate to the information presented on previous pages.

Research

This type of learning activity would require the student or trainee to locate information by using research methods. The information they would be required to locate would be in line and/or support the information that the manual had outlined in previous pages.

**Learning
Activity**

Tasks

Research

This learning activity type would require the student/trainee to actually do or undertake something and would be reinforcing the knowledge they have gained from reading the manual's previous pages.

Interviews

This learning activity type would require the student/trainee to interview person(s) in an actual workplace environment or a person(s) who are experienced in the industry sector which the student/trainee is currently undergoing training.

The student/trainee is made aware of the type of learning activity by noting the learning activity type displayed under the learning activity icon.

MATERIALS CONTENT—CONTID

The learning activities in the Student/Trainee manuals are 'Form Enabled' so that if the resources delivered are online, the activities can be filled in using the computer keyboard.

The student or trainee would simply place the cursor in the field and click once with the mouse.

Seconds later the blue colour disappears and the student enters his/her answers into the field .

The screenshot shows a digital form titled 'Learning Activity One' under the heading 'TASK'. It instructs the user to 'Have a look at them and tell us what the problems with each are:'. Three numbered images are displayed: 1. A warehouse with boxes on the floor, 2. A narrow aisle in a warehouse, and 3. A desk cluttered with papers and boxes. Below each image is a text input field. The first field is active, showing a blue border and the placeholder text 'Type in the answers in the field...'. The second and third fields are currently blue. A black arrow points to the first input field. In the bottom left corner, there are small buttons for 'Student / Trainee Manual' and 'Copyright 2018'. A 'Page 13' label is in the top right corner of the form area.

When the student or trainee leaves the filled in field to move on to the next field, the previous field returns to a blue colour.

IT IS VERY IMPORTANT THAT THE MANUAL IS SAVED REGULARLY.

It is recommended that the student or trainee set up a 'Student/Trainee' folder on their computer and saves their manuals to that folder.

The '**first**' SAVE will have the software will ask if you wish to replace the file and the student/trainee would click YES.

Saving does not prevent the student or trainee from going back to previous fields to make changes.

After the 'first' SAVE, the student or trainee would need to use the '**SAVE AS**' function.

MATERIALS CONTENT—CONT'D

Self Assessment

At the end of each manual is a series of questions that the student or trainee should review and answer.

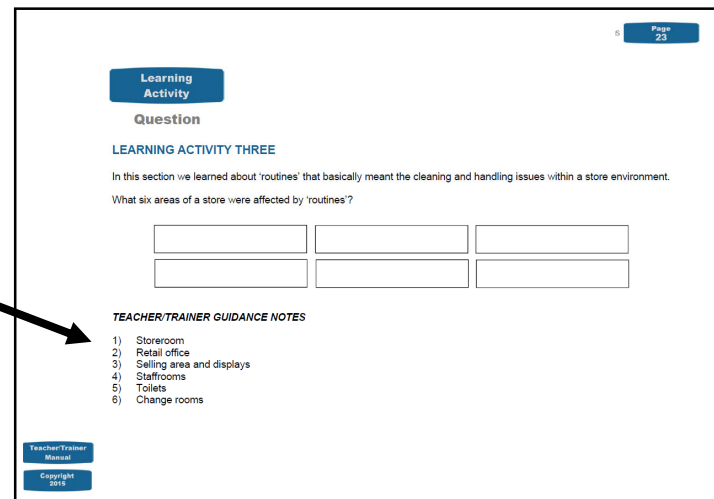
This self assessment is to ensure in the student's or trainee's mind that they have reviewed and understood the information that was presented in the manual.

If they are unsure of their understanding in any of the topics reviewed, they are encouraged to go back and review the information again and/or seek the assistance of their teacher or trainer.

TEACHER/TRAINER MANUAL

The Teacher/Trainer manuals have exactly the same content as the Student/Trainee manuals.

The only differences are the explanatory introduction pages and after each learning activity there are 'Teacher/Trainer Guidance Notes'. These provide the answers to the 'Learning Activities' as well as some notes on how to assess the student/trainee's submission to each learning activity.



Page 23

Learning Activity

Question

LEARNING ACTIVITY THREE

In this section we learned about 'routines' that basically meant the cleaning and handling issues within a store environment.

What six areas of a store were affected by 'routines'?

TEACHER/TRAINER GUIDANCE NOTES

- 1) Storeroom
- 2) Retail office
- 3) Selling area and displays
- 4) Staffrooms
- 5) Toilets
- 6) Change rooms

Teacher/Trainer Manual

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Graphics, pictures or illustrations in the original materials can be removed ,but not used elsewhere or modified.

The PDFs can be converted to WORD files using PDF conversion tools that are readily available on the market.



UPDATES AND UPGRADES

On occasions the training packages will be updated and if the updates are minor, Passing Lane updates the materials and the updated materials are provided free to those holding a current user licence.

If the training package changes are substantial, Passing Lane will update the materials.

However, there would be a small upgrading fee charged to those schools or institutions wanting to upgrade their materials.