



Australian Government

Department of Education, Employment and Workplace Relations

MEM09211A Produce drawings or models for industrial piping

Release: 1

MEM09211A Produce drawings or models for industrial piping

Modification History

Release 1 - New unit of competency

Unit Descriptor

This unit of competency covers the skills and knowledge required to produce detailed, isometric and assembly drawings or models for the installation of industrial piping. Drawings/models are fully dimensioned and notated.

Application of the Unit

This unit is suitable for those working within a drafting work environment. It includes the use of piping and instrumentation and process flow diagrams to inform work. Piping may be used in commercial or industrial contexts for materials, such as hot and cold water, air, gas, chemicals and oil.

Drawings/models will usually be carried out with the use of computer-aided design (CAD) systems but may also be done manually. Drawings are produced to Australian Standard (AS) 1100.101–1992 Technical drawing – General principles, from predetermined critical dimensions and specifications. If CAD systems are to be used, the unit MEM30031A Operate computer-aided design (CAD) system to produce basic drawing elements, should also be selected.

Licensing/Regulatory Information

No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

Pre-Requisites

MEM09002B Interpret technical drawing

MEM09204A Produce basic engineering detail drawings

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	Determine work requirements	1.1	Check purpose, scope and information requirements for drawing/model
		1.2	Interpret available information relevant to project and work requirements, and identify and address further information needs
		1.3	Identify and prepare equipment required to complete work
		1.4	Identify and apply relevant codes, standards and symbols used for pipe installation drawings/models
		1.5	Identify and access organisational files, templates and symbols as required for work
		1.6	Identify environmental implications of inefficient systems and strategies for minimising impact
2	Analyse piping system components	2.1	Interpret piping and instrumentation diagrams and specifications
		2.2	Identify various pipe fittings and flanges and specify their application
		2.3	Describe the function and application of valves and auxiliary equipment
		2.4	Identify components used in piping project
		2.5	Identify occupational health and safety (OHS) factors applying to piping system

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| 3 | Produce drawings/models for installation of industrial piping systems | 3.1 Apply operating principles and specifications of piping systems and equipment to drawing/model |
| | | 3.2 Detail pipes, valves and auxiliary equipment |
| | | 3.3 Indicate vertical and horizontal offsets and hand wheel orientation |
| | | 3.4 Apply OHS and environmental factors to drawing detail |
| | | 3.5 Ensure drawing/model accurately reflects specifications, is presented according to organisational requirements and contains all relevant information |
| | | 3.6 Produce process flow, piping and instrumentation (P&ID) diagrams and isometric and spool drawings |
| | | 3.7 Produce orthogonal single and double line arrangement drawings of pipe installation systems in accordance with engineer's sketches |
| | | 3.8 Prepare cutting lists from the arrangement and detail drawings |
| 4 | Complete drawing/model task | 4.1 Check and confirm drawing/model accuracy and compliance with industry standard |
| | | 4.2 Ensure drawing/model is presented according to organisational requirements and contains all relevant information |
| | | 4.3 File drawing according to workplace procedure |

Required Skills and Knowledge

Required skills

Required skills include:

- literacy skills sufficient to read and interpret instructions, relevant codes of practice and specifications for drawing work
- using computer technologies and navigating software
- numeracy skills sufficient to interpret technical information and conduct mathematical problem solving as required in the scope of this unit
- using and maintaining drawing equipment
- applying spatial principles to achieve scale and proportion
- interpersonal skills to consult with other disciplines
- using and interpreting process flow and P&ID diagrams
- classifying valves in terms of the duties they perform (i.e. shutoff throttling and non-return)
- compiling cutting lists
- identifying pipe fittings and components
- identifying connections for valves (i.e. screwed, flanged or socket welded)
- applying symbols to identify pipe fittings
- correctly using line thickness material and construction to identify parts and pipe lines
- dimensioning the drawings

Required knowledge

Required knowledge includes:

- general knowledge of different approaches to drawing
- awareness of copyright and intellectual property issues and legislation in relation to drawing
- environmental and OHS issues associated with the tools and materials used for drawing
- quality assurance procedures
- Australian standard specification of pipes, fittings and flanges
- standard valves and auxiliary equipment
- auxiliary equipment used in industrial piping
- principles of producing orthogonal and isometric piping drawings
- types of pipe fittings and components
- different types of industrial pipe systems
- terminology associated with industrial piping systems

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria required skills and knowledge range statement and the Assessment Guidelines for the Training Package.

<p>Overview of assessment</p>	<p>A person who demonstrates competency in this unit must be able to interpret and apply drawing specifications and industry standards in the production of installation drawings for industrial piping systems.</p>
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts.</p> <p>Specifically the candidate must be able to:</p> <ul style="list-style-type: none"> • work within typical site/teamwork structures and methods • apply worksite communication procedures • comply with organisational policies and procedures, including quality requirements • participate in work meetings • comply with quality requirements • use industry terminology • apply appropriate safety procedures • produce fully notated and detailed drawings for commercial or industrial piping systems.
<p>Context of and specific resources for assessment</p>	<p>This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, that is the candidate is not in productive work, then an appropriate simulation must be used where the range of conditions reflects realistic workplace situations. The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team.</p> <p>Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.</p> <p>Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include</p>

	<p>equipment modified for people with disabilities. This unit could be assessed in conjunction with any other units addressing the safety, quality, communication, materials handling, recording and reporting associated with drafting or other units requiring the exercise of the skills and knowledge covered by this unit.</p>
Method of assessment	<p>Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways, including direct observation, supervisor's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency. The candidate must have access to all tools, equipment, materials and documentation required. The candidate must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials.</p>

Range Statement

Available information	<p>Available information may include:</p> <ul style="list-style-type: none"> • construction documents • building and coordination information • work specifications • information for plant services equipment • industry codes, standards and regulations • design brief
Piping systems	<p>Piping systems may include:</p> <ul style="list-style-type: none"> • petro-chemical • gas • water • wine and juice
Piping system fittings and components	<p>Piping system fittings and components may include:</p> <ul style="list-style-type: none"> • ball, stop, gate, angle and cocks • flanges, t-pieces, elbows, plugs, caps, unions, connectors and reducers
Piping drawings	<p>Piping drawings may include:</p> <ul style="list-style-type: none"> • standard shop details for pipe spools and pipe supports • standard shop drawings for layout and vendor equipment • single line and double line orthogonal arrangement drawings • transferring information from vendor equipment drawings to detail drawings • compiling cutting lists from arrangement and detail drawings

Unit Sector(s)

Drawing, drafting and design

Custom Content Section

Not applicable.