Australian Government

Department of Education, Employment and Workplace Relations

MEM09207A Produce drawings for reticulated services

Release: 1

INDUSTRY SKILLS COUNCILS

Creating Australia's Future

MEM09207A Produce drawings for reticulated services

Modification History

Release 1 - New unit of competency

Unit Descriptor

This unit of competency covers the skills and knowledge required to produce detailed engineering drawings for the installation of reticulated services such as water, gas, refrigeration, steam, compressed air and other services requiring reticulated pipework, flues or ducts in commercial and industrial buildings. Drawings are completed to relevant Australian Standards.

Application of the Unit

This unit is suitable for those working within a drafting work environment in the air conditioning and mechanical services industry.
Drawings 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 drawing requirements	1.1	Check purpose, scope and information requirements for drawing
		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 access organisational files, templates and symbols as required for work
2	Identify working principles for reticulated systems	2.1	Identify principles of reticulation and application in service system
		2.2	Identify the operational features of hot and cold water systems and suitability for specific applications
		2.3	Distinguish between the operation of a condenser, chilled, heating, compressed air systems and water systems, and confirm suitability for specific applications
		2.4	Identify operational features and ventilation requirements for different gas systems
		2.5	Identify safety and environmental implications of reticulated system
3	Produce drawings for reticulated systems	3.1	Lay out drawing in accordance with the sketches and supplied specifications
		3.2	Identify different parts of services on drawings

3.3 Size the system in accordance with relevant standards, regulations and workplace requirements

3.4 Apply knowledge of working principles of reticulated system to drawing

3.5 Ensure drawing accurately reflects specifications, is presented according to organisational requirements and contains all relevant information, including full notation and dimensioning

3.6 Apply workplace occupational health and safety (OHS) and environmental procedures

3.7 Identify and apply relevant codes, standards and symbols used for reticulated services installation drawings

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 others, as required, to gain information required
- drafting skills
- applying the correct line thicknesses and construction types to distinguish between building's elements and systems
- applying symbols, schedules and legends used in the mechanical services industry to the drawing
- confirming selection of components with design specifications
- applying operational principles of reticulated services to drawing work
- arranging the views in a logical manner and in accordance with AS 1100.101–1992 Technical drawing – General principles
- correctly using line thickness and construction to identify parts
- using engineering and manufacturer catalogues, tables, standards and specifications
- filing drawings according to workplace procedures

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
- company standards for CAD
- order of drawing process
- company checking procedures for drawings
- layout and presentation
- the relevant statutory and authority requirements related to reticulation systems
- terminology associated with drawings
- the process of checking the completed drawing
- the process of storing paper drawings and electronic drawing files

- principles of steam reticulation
- principles of reticulation
- features and operating principles of a reticulation systems and components
- flue requirements in an liquefied petroleum gas (LPG) system
- issues and hazards of fuel storage
- expansion and contraction factors
- support systems/anchors used in reticulated 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.

Overview of assessment	A person who demonstrates competency in this unit must be able to interpret and apply drawing specifications and industry standards in the production of drawings for the installation of reticulated services.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	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. Specifically the candidate must be able to: • 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 drawings for reticulated services to industry standard.
Context of and specific resources for assessment	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. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability. Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include

	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.
Method of assessment	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.

Range Statement

Available information	Available information may include: • construction documents • building and coordination information • work specifications • information for plant services equipment • industry codes, standards and regulations • design brief
Reticulated systems	Reticulated systems may include: • hot and cold water systems • steam and condensate systems • heating/chilled and condenser water systems • compressed air systems • natural and LPG systems • pipe work insulation • flues and insulation

Operational features and working principles of reticulated system components	Operational features and working principles of reticulated system components include:
	• variable refrigerant volume (VRV) systems
	• refrigeration systems
	• slab heating/cooling
	• hydronic heating
	• chilled beams
	• medical gases
	• fittings/valve types:
	  • strainer
	  • balancing
	  • isolating
	  • non-return
	  • pumps
	• air side:
	  • fans
	  • dampers
	  • registers
	  • filters
	  • air handling units
	  • vav units
	• domestic hot and cold water systems
	• steam and condensate systems

	• heating/chilled and condenser water systems • compressed air systems • gas systems • insulation
Codes, standards and industry regulations	Safety standards include: • AS/NZS 1668 Set:2005 The use of ventilation and air conditioning in building Set • AS 1682.1–1990 Fire dampers – Specification • AS 4254–2002 Ductwork for air-handling systems in buildings • building codes • OHS codes of practice • Gas Regulations overview
Industry standards	Industry standards may include, but are not limited to: • Building Codes of Australia (BSA) • Australian Standards (AS) • legislation requirements from Building Practitioner's Board (RBP) • Australian Gas Codes (AGC) • Sheet Metal and Air Conditioning Contractors National Association (SMACNA) • third-party manufacturing and installation standards • company standards • guidelines • general practices

Unit Sector(s)

Drawing, drafting and design

Custom Content Section

Not applicable.