



Australian Government

Department of Education, Employment and Workplace Relations

MEM09212A Produce detailed drawings of steel to non-steel connections

Release: 1

MEM09212A Produce detailed drawings of steel to non-steel connections

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 connections of non-steel to steel components. Drawings are completed to relevant Australian Standards (AS).

Application of the Unit

This unit is suitable for those working within a drafting work environment. 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 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.

This unit applies to detail drafting work for drawings where steel components are connected to non-steel components that may include items made from wood, concrete, glass, and so on.

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

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| 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 features of components and connections | 2.1 | Identify type and features of components to be detailed and determine detailing requirements |
| | | 2.2 | Identify impact of component material on detailing work and determine appropriate standards and drawing symbols |
| | | 2.3 | Identify type and features of connections to be detailed from design information and determine detailing requirements |
| | | 2.4 | Identify any non-standard connections and determine detailing requirements |
| | | 2.5 | Determine method of general dimensioning of the connection, including datum points and geometric shapes from engineer, sketches or specifications |
| | | 2.5 | Determine edge and other clearances for concrete and other non-steel members or components from designer |
| | | 2.6 | Determine if surface finish or other information is required to be detailed |
| | | 2.7 | Identify materials to prevent electrolysis of dissimilar |

metals

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|---|---------------------------------------|-----|---|
| 3 | Detail steel to non-steel connections | 3.1 | Identify connection types from design information |
| | | 3.2 | Identify reinforcement locations and avoid clashes with other connections |
| | | 3.3 | Avoid interference with post-tensioning cables and holding down bolts for upper floor connections |
| | | 3.5 | Detail steel to non-steel connections according to design information |
| | | 3.6 | Identify and apply relevant codes, standards and symbols used for installation drawings |
| | | 3.7 | Apply workplace occupational health and safety (OHS) and environmental procedures |
| | | 3.8 | Provide measures to counter electrolytic action from dissimilar materials |
| 4 | Complete drawing | 4.1 | Check final drawing to ensure all required specifications, symbols, dimensions, and components are included according to standards and the design specification |
| | | 4.2 | Present and store drawing according to organisational procedures |

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
- 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
- determining drawing implications of materials used and applying industry standard codes, symbols and notation
- using engineering and manufacturer catalogues, tables, standards and specifications
- applying surface texture symbols to comply to engineer's requirements
- applying toleranced dimensions to a detail drawing
- identifying material clashes
- applying spatial principles to achieve scale and proportion
- interpersonal skills to consult with others, as required, to gain information required
- applying symbols, schedules and legends to the drawing using appropriate standards, codes and conventions
- applying surface texture symbols to comply with engineer's requirements
- applying dimension to a detail drawing using appropriate standards, codes and conventions
- 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

Required knowledge

Required knowledge includes:

- effects of electrolytic action from dissimilar materials
- 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
- features of components and connections
- geometric tolerances with regard to the roundness, straightness, flatness and concentricity of an engineering component
- company checking procedures for drawings
- layout and presentation of drawings
- the relevant statutory and authority requirements

- terminology associated with drawings
- the process of checking the completed drawing
- the process of storing paper drawings and electronic drawing files
- Australian standard bolting category identification system

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 installation of steel to non-steel components.
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 detail drawings that meet industry standards and client requirements.
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
Connection types	Connection types may include: • flexible connections: • angle seats • bearing pads • flexible end plates • angle cleats • web side plates • rigid connections: • fully welded end plates • bolted moment end plates • stainless steel, aluminium, timber, glass and concrete connections
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.