



Australian Government

Assessment Requirements for MEM234015

Design hydronic heat exchanger systems

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MEM234015A Design hydronic heat exchanger systems.

Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include:

- interpreting features of plant and equipment
- confirming parameters of the brief or contract and providing initial advice based on discipline knowledge, standards, work health and safety (WHS), regulatory and risk assessment requirements
- researching sustainability implications and current industrial design techniques
- investigating faults in existing designs and proposing solutions
- measuring, modelling and calculating using appropriate techniques, software and validation techniques
- innovating and creating solutions, incorporating systems thinking, continuous improvement, and constraint and contingency management
- evaluating solutions against design criteria ensuring conformity to WHS requirements
- designing hydronic heat exchange systems using current design methods on at least two occasions, selecting all required boilers, pumps, cooling towers and chillers
- applying safe working practices and procedures
- communicating, negotiating and reviewing with stakeholders and client throughout the process to obtain agreement on proposal and sign-off on design
- documenting design by producing graphics, drawings, specifications and instructions.

Note: Where a volume and/or frequency is not specified, demonstration must be provided at least once.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- contemporary engineering design methods
- design brief parameters
- hydronic heat exchange system components including:
 - boilers
 - pumps

- pipes
- pipe fittings
- cooling towers and chillers
- techniques for:
 - continuous improvement
 - problem solving and decision making
 - root cause analysis (RCA) or failure mode and effects analysis (FMEA) or design review based on failure mode (DRBFM), and Pareto analysis
- documenting design with drawings, specifications and instructions required
- WHS, regulatory and environmental requirements for work areas and refrigerated spaces
- standards, codes of practice, risk management and organisational procedures related to heating, ventilation and air conditioning and refrigeration (HVACR) design, installation, operation and maintenance
- concepts of thermodynamics, hydraulics, properties of substances, conservation of mass and energy principles
- heat transfer including conduction, convection and radiation
- heat exchangers
- water chillers
- pumping systems and cavitation
- practical pump installations and operation problems.

Assessment Conditions

- Assessors must:
 - have vocational competency in designing hydronic heat exchanger systems at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015 or its replacement* and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires.
- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions that cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required including relevant workplace procedures, product and manufacturing specifications.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Links

Companion Volume Implementation Guides are available on VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>