Australian Government

MEM23141 Complete a building thermal performance survey

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MEM23141A Complete a building thermal performance survey.

Application

This unit of competency defines the skills and knowledge required to carry out a detailed heat load estimate for a multiple zone commercial or industrial building and then analyse building thermal performance and document results.

It applies to technicians in heating, ventilation and air conditioning (HVAC) manufacturing, servicing and maintenance organisations who are required to conduct a building performance survey to inform the design and specification of HVAC equipment and system/s, including consideration of improvements to building design.

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

Pre-requisite Unit

MEM23004 Apply technical mathematics

MEM23006 Apply fluid and thermodynamics principles in engineering

MEM23142 Determine psychrometric processes and system performance

Competency Field

Engineering science

Elements and Performance Criteria

Elements	**Performance Criteria**
Elements describe the essential *outcomes.*	*Performance criteria describe the performance needed to demonstrate achievement of the element.*
1. Estimate heat load for a multiple zone commercial or industrial building	1.1 Obtain and implement work health and safety (WHS) and environmental requirements for the work area 1.2 Determine extent of the performance survey from work sheets, drawings, building specifications or other documentation and discussions with appropriate personnel 1.3 Determine sources of heat gains 1.4 Coordinate work effectively with all team members

Elements	Performance Criteria
Elements describe the essential *outcomes.*	*Performance criteria describe the performance needed to demonstrate achievement of the element.*
	1.5 Obtain and check resources and equipment required for the performance survey
2. Analyse the air conditioning heat and cooling load	2.1 Complete room sensible and latent heat estimates of a multiple zone building 2.2 Identify peak effective room latent and sensible and latent heat loads over time of day and year for each zone 2.3 Determine the thermal performance of the building using simulation software
3. Investigate building design improvement options	3.1 Analyse alternative building design improvement options with respect to the effect on thermal performance using simulation software 3.2 Identify unacceptably high thermal loads on the building using check figures and industry standards 3.3 Prepare recommendations for changes in building design and/or treatment to eliminate unacceptably high thermal loads 3.4 Document and recommend improvements of thermal performance of the building to appropriate personnel 3.5 Consult as required on unexpected situations and take appropriate action
4. Specify system design	4.1 Determine equipment size, including coil and air handling unit capacities for constant and variable volume systems, and central refrigeration and boiler capacities based on the recommendations 4.2 Document the completed survey in accordance with organisational procedures, including all recommendations, building design improvements and/or treatments, and appropriate system design specifications 4.3 Prepare a formal survey report in consultation with appropriate personnel and in accordance with organisational procedures

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.	
WHS requirements include:	• legislation • protective equipment • material safety management systems • hazardous substances and dangerous goods code • local safe operation procedures • awards provisions.
Environmental requirements include:	• relevant legislation, regulations and codes • correct handling and disposal of liquid and solid waste • elimination or minimisation of gas, fume, vapour and smoke emissions, including fugitive emissions • dust elimination, minimisation and control • minimisation of energy and water use • elimination or control of excessive noise • use and recycling of refrigerants.
Appropriate personnel include:	• supervisor, leading hand, foreman or manager • engineer • technician • trainer or mentor • team member • customer.
Heat gains include those related to:	• external factors • internal factors • system • U-values and infiltration rates for various wall and/or roof constructions • measurement of sun azimuth and altitude angles, and overall shade factors for various windows.
Resources and equipment include:	• computer workstation • appropriate simulation and reporting software • reference manuals and charts • appropriate measurement equipment • building codes and codes of conduct • access to legislative and regulatory requirements • technical library

	• stationery • scientific calculator • appropriate tools of trade, equipment and materials.
Industry standards include:	• AS 1668.1 The use of ventilation and air conditioning in buildings, Part 1: Fire and smoke control in buildings • AS 1668.2 The use of ventilation and air conditioning in buildings, Part 2: Mechanical ventilation in buildings • EU Guidelines for Ventilation Requirements in Buildings (European Commission) • ASHRAE 62-89 ventilation standard • National Construction Code (NCC).
Organisational procedures include:	• use of tools and equipment • instructions, including job sheets, plans, drawings and designs • reporting and communication • manufacturer specifications • site operational procedures.
Building performance surveys include:	• minimum five zones • internal and system heat gains • infiltration and fresh air rates • heat flow through windows accounting for internal and external shading • heat flows through building fabric • use of simulation software.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM23141A Complete a building thermal performance survey.

Links

Companion Volume Implementation Guides are available on VETNet - https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2