



Australian Government

Department of Education, Employment and Workplace Relations

CPPHSA5001A Assess thermal performance of complex residential buildings

Release: 1

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Modification History

Version	Comments
1	This version first released with CPP07 Property Services Training Package Version 11.

Unit Descriptor

This unit of competency specifies the outcomes required to assess the thermal performance of complex residential buildings using software tools that are accredited under the Nationwide House Energy Rating Scheme (NatHERS) for regulatory purposes.

Application of the Unit

This unit of competency supports the work of NatHERS assessors engaged in assessing, and making recommendations for improving, the thermal performance of planned and existing residential buildings.

Licensing/Regulatory Information

In some jurisdictions, this unit of competency may form part of the accreditation, licensing, legislative, regulatory or certification requirements for NatHERS assessors.

Pre-Requisites

Not applicable.

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	Plan and organise the thermal performance assessment.	1.1	<i>Need</i> for assessing the thermal performance of a <i>residential building</i> is clarified with the <i>client</i> .
		1.2	Features of design requiring complex modelling techniques are determined and appropriate assessment strategies are identified in line with organisational procedures, software developer recommendations, and regulatory requirements.
		1.3	Cost of assessment is communicated to client in line with organisational procedures.
		1.4	<i>Effective communication strategies</i> are employed to assist in establishing rapport with client and in responding to client questions and concerns.
		1.5	Potential <i>risks</i> are identified and suitably managed.
		1.6	Computer equipment and software required for the assessment are identified and checked for serviceability.
		1.7	<i>Documentation</i> required for the assessment is obtained consistent with organisational practice.
		1.8	Authority to proceed is obtained from client prior to commencement and reconfirmed as appropriate during the assessment.
2	Enter information into thermal performance assessment tool.	2.1	Building <i>information</i> is extracted from the full range of <i>available sources</i> .
		2.2	Building information on <i>complex features of building envelope</i> is gathered, checked for accuracy and where necessary verified with other building professionals.

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| | | 2.3 | Software technical support and advice are identified and sourced as required. |
| | | 2.4 | Limitations of software are identified and considered during assessment. |
| | | 2.5 | Building information is correctly and consistently entered into the thermal performance assessment tool. |
| | | 2.6 | Methods for entering information on non-standard and complex building materials and designs are used correctly. |
| | | 2.7 | Complex constructions are built from standard construction materials library. |
| 3 | Apply thermal performance assessment tool. | 3.1 | Relevant functions of thermal performance assessment tool are used to generate outputs in relation to the thermal performance of the building. |
| | | 3.2 | Thermal performance assessment tool outputs are identified and analysed. |
| | | 3.3 | Impact of external factors on thermal performance of building are identified and assessed. |
| | | 3.4 | Methods for entering information on non-standard building materials and designs are used correctly. |
| | | 3.5 | Errors in data entry and assessment are identified and corrected. |
| | | 3.6 | Software scratch file is read and interpreted. |
| 4 | Identify options for improving thermal performance. | 4.1 | Sources of technical advice on building thermal performance are identified. |
| | | 4.2 | Assumptions and limitations inherent in thermal performance assessment tool are considered when interpreting outputs. |
| | | 4.3 | Thermal performance tool outputs are interpreted to identify strengths and weaknesses in thermal performance of building. |
| | | 4.4 | Organisational options for improving thermal and environmental performance and for meeting regulatory |

- requirements are identified based on **criteria** consistent with organisation, regulatory and client requirements.
- 4.5 Interactions of thermal performance improvements on other aspects of building performance are identified and advice is provided to client in line with organisational procedures.
 - 4.6 Impact of options is evaluated by reassessing the building using the thermal performance assessment tool.
 - 4.7 Cost of options for improving the thermal performance of the residence is estimated in line with organisational procedures.
- 5 Report outcomes of thermal performance assessment.
- 5.1 Results and recommendations, along with supporting evidence, are collated and documented in line with organisation, regulatory and client requirements.
 - 5.2 Estimated cost of proposed recommendations and potential associated reductions in energy use, costs and greenhouse gas emissions are documented in line with organisational procedures.
 - 5.3 **Results and recommendations** of the thermal performance assessment are explained to the client.
 - 5.4 Reports and other documentation associated with thermal performance assessment are securely stored to be readily retrieved in line with organisational requirements.

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

- communication skills to interact with clients from diverse social, economic and cultural backgrounds in an ethical manner
- data analysis skills to interpret and extract data from building plans and specifications
- decision-making and problem-solving skills to make recommendations based on the outputs of NatHERS software tools
- literacy skills to read and interpret a variety of texts, including legislation, regulations, and conduct and ethical standards
- numeracy skills to calculate and interpret the outputs of NatHERS software tools data associated with conducting thermal performance assessments
- planning, organising and scheduling skills to undertake work-related tasks, such as collecting data required for conducting thermal performance assessments
- research skills to identify and locate documents and information on key matters associated with thermal performance assessments, such as climatic zones and the thermal properties of building materials
- technology skills to:
 - operate computer equipment and peripherals
 - enter data and use the functions of NatHERS software tools and other general purpose software packages
- time-management skills to complete the assessment in a timely, cost-efficient manner

Required knowledge

- Australian climatic zones:
 - climate data used in thermal performance assessment:
 - diurnal temperature range
 - humidity
 - irradiance
 - maximum and minimum temperature
 - solar geometry
 - wind speed and direction
 - climatic zones and characteristics
- building thermal performance:
 - benefits of thermal performance assessment
 - constraints on choice of building materials:

- cost
- practicality
- size
- space
- heat flows
- impact of building materials on building thermal performance
- impact of building design on building thermal performance
- properties of building materials:
 - capacitance
 - material thickness
 - resistance heat flow up and down
 - thermal bridging
- relationship between building thermal performance and thermal comfort
- thermal performance principles:
 - glazing, shading and insulation for controlling temperature
 - orientation for heating
 - thermal mass for storing
 - ventilation for cooling
- thermal performance properties of common building materials
- thermal performance ratings:
 - current rating requirements
 - documentation of ratings
 - legal requirements
 - uses
- ways of improving the thermal performance of residential buildings:
 - condition of building
 - construction materials
 - draught proofing
 - floor coverings
 - glazing
 - insulation levels
 - landscaping and planting
 - orientation
 - overshadowing
 - passive heating and cooling
 - shade
 - siting of building
 - structural changes
 - thermal mass

- ventilation
- window coverings
- window size, location and type
- zoning and layout
- commonwealth, state and territory, and local government legislation and regulations impacting on thermal performance assessment relating to:
 - building and construction
 - building thermal performance
 - consumer protection, fair trading and trade practices
 - environment protection
 - occupational licensing
 - work health and safety
- energy and power:
 - terminology:
 - energy loads
 - energy efficiency
 - heating and cooling loads
 - latent heat
 - power
 - primary energy source
 - units of measurement
 - uses, cost and environmental impact of energy use in residential buildings
- greenhouse gas emissions:
 - relationship between building design, energy consumption and greenhouse gas emissions
 - ways of reducing greenhouse gas emissions through building design
- NatHERS software tools:
 - assumptions inherent in software protocol
 - criteria for the selection of particular software tools
 - NatHERS and Australian Building Codes Board Protocol for House Energy Rating software
 - properties of materials, such as heat transfer coefficients and U-value, thermal resistance and R-value, reflectivity, absorptance, solar heat gain coefficient and emissivity
 - scratch file
 - types of software tools
- passive energy design:
 - benefits of passive design
 - passive design standards
 - Passivhaus (Passive) House Standard

- principles of passive design
- relationship between passive design, energy use and operational greenhouse gas emissions
- thermal comfort:
 - definition of thermal comfort
 - models
 - physical factors that influence thermal comfort
 - requirement for and importance of thermal comfort
 - role of thermal comfort in building thermal performance assessments

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	This unit of competency could be assessed by candidates undertaking thermal performance assessments of residential buildings with some of the following complex design features: • buildings designed to fit a site with unique characteristics • buildings with complex levels, shading and void arrangements • buildings with non-conventional building materials and configurations: • earth-filled tyre • mud brick • solar tower • straw bale • underground house construction. Assessment must be undertaken using a NatHERS software tool that is accredited under NatHERS for regulatory purposes in a mode appropriate for the type of assessment.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person should demonstrate the ability to: • gather the required building information from building plans, specifications and other supporting documents required for a thermal performance assessment and correctly enter this information into a NatHERS software tool • conduct a thermal performance assessment of a complex residential building using a NatHERS software tool • identify and analyse the outputs of a thermal performance assessment tool

	• identify interactions of thermal performance with other health, safety, amenity and sustainability aspects of a dwelling • make recommendations to improve the thermal performance of a planned residential building.
Context of and specific resources for assessment	Assessment of this unit: • must be in the context of the work environment • may be conducted in an off-site context, provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills • must meet relevant compliance requirements. Resource implications for assessment include: • NatHERS software tools • relevant codes, standards and government regulations • building plans and specifications for residential buildings to be assessed • computer equipment suitable for using NatHERS software tools and generating printed copies of reports • technical reference library with current publications on building design and materials, building thermal performance for buildings, NatHERS scheme, Australian climatic zones and manufacturer product information on building products and materials.
Method of assessment	Assessment for this unit must verify the practical application of the required skills and knowledge, using one or more of the following methods: • written and/or oral assessment • observed, documented and/or first-hand testimonial evidence of the candidate undertaking thermal performance assessments of residential buildings with complex design features.
Guidance information for assessment	This unit could be assessed on its own or in combination with other units relevant to the job function. Reasonable adjustments for people with disabilities must be made to assessment processes where required. This could include access to modified equipment and other physical resources, and the provision of appropriate assessment support. Assessment processes and techniques should, as far as is practical, take into account the language, literacy and numeracy capacity of the candidate in relation to the competency being assessed.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

<i>Need</i> may include:	• assessment for building design advice purposes • assessment for legislative, regulatory and compliance purposes.
<i>Residential building</i> refers to:	• any building categorised as Class 1, 2, 4 and 10a of the National Construction Code or in accordance with jurisdictional requirements.
<i>Client</i> may include:	• architect • builder • construction manager • government agency • owner • property developer.
<i>Effective communication strategies</i> may include:	• active listening • being non-judgemental • exploring problems • expressing an individual perspective • providing sufficient time for questions and responses • providing summarising and reflective responses in conflict situations • using appropriate words, behaviour and posture • using clarifying and summarising questions • using clear and concise language • using culturally appropriate communication • using plain English • using verbal and non-verbal communication.
<i>Risks</i> may include:	• awareness of current legislative and regulatory requirements • complexity of building design • confidentiality • data accuracy • data integrity • data loss • insurance • privacy • professional indemnity • work health and safety.

Documentation may include:	• building details • building drawings and specifications • checklists • client details • risk assessment • site details.
Information may include:	• air leakage features: • fans • wall vents • attachments to other buildings externally • building sealing • construction materials • dimensions • electrical fittings: • ceiling fans • down lights • exhaust fans • floor coverings • glazing • insulation levels: • ceiling • floors • walls • orientation • overshadowing • shading • thermal mass • ventilation • windows: • coverings • size • style • type of frame • type of glass: • clear • tinted • zoning and layout.
Available sources of information may include:	• building drawings, specifications and other documents • discussions with client and other building professionals • outcomes of site inspections.

Complex features of building envelope may include:	• buildings designed to fit a site with unique characteristics • buildings with complex levels, shading and void arrangements • buildings with non-conventional building materials and configurations: • earth-filled tyre • mud brick • solar tower • straw bale • underground house construction.
Outputs may include:	• cooling loads • heating loads • latent cooling • rating and non-rating mode • temperature histograms.
External factors may include:	• shading: • external shading • within the design • terrain: • sheltering • wind loads.
Sources of technical advice may include:	• architects • building designers • building thermal performance assessors • colleagues • consultants • government agencies • professional associations • research bodies • supervisors • suppliers of products relating to building thermal performance.
Assumptions may include:	• climate data • comfort • material properties • occupancy profiles • thermostat settings • uses of windows, doors, curtains and blinds.
Options may include:	• construction materials • glazing • insulation levels • landscaping and planting

	• orientation • overshadowing • passive heating and cooling • thermal mass • ventilation • window: • adjustment of window areas to gain maximum solar gains without over heating the design • shading • size • style • type of glazing • use of advanced window technologies • zoning and layout.
Criteria may include:	• cost • outputs of thermal performance assessment • practicality • thermal performance properties of building elements • type of building.
Results and recommendations may include:	• compliance with regulatory requirements • cost implications • practicalities.

Unit Sector(s)

Home sustainability assessment

Custom Content Section

Not applicable.