



Australian Government

Department of Education, Employment and Workplace Relations

CPPHSA5002A Assess thermal performance and energy efficiency of residential buildings

Release: 1

CPPHSA5002A Assess thermal performance and energy efficiency of residential buildings

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 use the regulatory and non-regulatory functions of a house energy rating software tool to assess the thermal performance and other energy-related features of residential buildings. It includes the competencies required to apply the full functions relating to thermal performance, including free running modes, and non-thermal performance functions that address factors such as hot water, lighting, water use and embodied carbon dioxide.

Application of the Unit

This unit of competency supports the work of Nationwide House Energy Rating Scheme (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 the assessment. | <p>1.1 <i>Need for assessment of residential building</i> is clarified with <i>client</i> in line with organisational procedures and authority to proceed is obtained prior to commencing.</p> <p>1.2 <i>Effective communication strategies</i> are employed to assist in establishing rapport with the <i>client</i> and in responding to client questions and concerns.</p> <p>1.3 <i>Functions of software package</i> to be used in assessment are identified.</p> <p>1.4 Computer equipment required for the assessment is identified and checked for serviceability.</p> <p>1.5 Potential <i>risks</i> are identified and suitably managed.</p> |
| 2 | Gather building and other relevant information. | <p>2.1 Building and appliance information is extracted from building drawings, specifications and other documents; outcomes of site inspections; and discussions with client and other building professionals.</p> <p>2.2 Information required for assessment is gathered, checked for accuracy, and where necessary verified with software developer, regulatory authorities and other building professionals, as required.</p> <p>2.3 Site inspection of existing building, if required, is planned to gather information for assessment.</p> <p>2.4 Potential hazards associated with conducting a site inspection of an existing building are identified to ensure risks are suitably managed.</p> <p>2.5 Tools, equipment and other requirements for site inspection are identified and arrangements are made to</p> |

- ensure their availability on day of inspection.
- 2.6 Information required from client prior to conducting site inspection is obtained in line with organisational requirements.
- 2.7 Details of site inspection are agreed with client prior to inspection being conducted.
- 2.8 Site inspection is conducted and information required for assessment is gathered in line with organisational procedures.
- 3 Enter information into assessment tool.
- 3.1 Information on residential building is entered into the assessment tool.
- 3.2 Methods for entering *information* are used correctly.
- 4 Conduct residential sustainability assessment.
- 4.1 Appropriate functions of assessment tool are used to generate *outputs* in relation to the thermal performance and sustainability of the building.
- 4.2 *Advanced features* of software are used in line with developer instructions and organisational procedures.
- 4.3 Assessment tool outputs are identified and analysed.
- 4.4 Errors in data entry and assessment are identified and corrected.
- 5 Identify options for improving residential sustainability.
- 5.1 *Sources of technical advice* on residential sustainability are identified.
- 5.2 *Assumptions* and limitations inherent in assessment tool are considered when interpreting outputs.
- 5.3 Assessment tool outputs are interpreted to identify strengths and weaknesses in the residential sustainability of building.
- 5.4 Government rebates and other assistance programs for improving residential sustainability are identified, as required.
- 5.5 *Options* for improving thermal performance and residential sustainability are identified by considering

- the outputs of the assessment and other *criteria* in line with organisational procedures.
- 5.6 Impact of options is evaluated by modelling options using the assessment tool.
- 5.7 Costs of options for improving the residential sustainability of residence are estimated in line with organisational procedures.
- 6 Report outcomes of residential sustainability assessment.
- 6.1 Results and recommendations, along with supporting evidence, are collated and documented in line with organisational and client requirements.
- 6.2 Estimated cost of proposed recommendations and potential associated reductions in energy use, costs and greenhouse gas emissions are documented in line with organisational procedures.
- 6.3 ***Results and recommendations*** of the residential sustainability assessment are explained to the client.
- 6.4 Reports and other documentation associated with residential sustainability 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
- decision-making and problem-solving skills to make recommendations based on the outputs of software tools
- literacy skills to read and interpret a variety of texts, including legislation, regulations and conduct and ethical standards
- numeracy and data analysis skills to:
 - calculate and interpret the full range of outputs of house energy rating software tools
 - interpret and extract data from building plans and specifications and other documents, the outcomes of site inspections, and discussions with clients and other building professionals
- planning, organising and scheduling skills to undertake work-related tasks, such as collecting data required for conducting residential sustainability assessments
- research skills to identify and locate documents and information on key matters associated with thermal performance assessments, such as climatic zones, and thermal properties of building materials
- technology skills to:
 - operate computer equipment and peripherals
 - enter data and use the full functions of house energy rating 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 materials:

- constraints on choice of building materials:
 - cost
 - practicality
 - size
 - space
- thermal performance properties of common building materials
- building thermal performance:
 - benefits of thermal performance assessment
 - impact of building design on building thermal performance
 - impact of building materials on building thermal performance
 - 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 standards and ratings
 - ways of improving the thermal performance of residential buildings
- 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
 - energy efficiency
 - energy loads
 - 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:
 - embodied carbon dioxide
 - relationship between building design, space heating and cooling, water heating,

- lighting water use, fuel source, energy consumption and greenhouse gas emissions
- types of greenhouse gases
- ways of reducing greenhouse gas emissions
- life cycle approach in building sustainability assessment
- passive energy design:
 - benefits of passive design
 - principles of passive design
 - relationship between passive design, energy consumption and greenhouse gas emissions
- residential energy use:
 - appliances
 - equipment
 - external installations
 - fittings
 - fixtures
 - fuel sources
 - occupant use of building
 - sources of energy consumption
- residential heating and cooling:
 - appliances
 - carbon dioxide emissions
 - energy consumption
 - energy efficiency measures
 - methods
 - types
- residential lighting:
 - carbon dioxide emissions
 - energy consumption
 - energy efficiency measures
 - types
- residential water use:
 - appliances
 - carbon dioxide emissions
 - energy consumption
 - fittings
 - fixtures
 - types
 - water efficiency labelling and standards (WELS)
 - water efficiency measures and regulations
- software tools:

- assumptions and limitations inherent in software tools
- building and other elements included in an assessment
- correct operation of software
- 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
- scope and function of software tools
- types of software tools
- thermal comfort:
 - definition of thermal comfort
 - physical factors that influence thermal comfort
 - requirement for 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 using the regulatory and non-regulatory functions of a house energy rating software tool to assess the thermal performance and other energy-related features of residential buildings.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	<p>A person should demonstrate the ability to:</p> <ul style="list-style-type: none"> • gather the required building information for assessment • correctly enter this information into a software tool with appropriate functions • conduct assessment of a residential building using a software tool with appropriate functions • identify and analyse the outputs of the assessment • make recommendations to improve the energy performance of residential building.
Context of and specific resources for assessment	<p>Assessment of this unit:</p> <ul style="list-style-type: none"> • 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

	<p>performance, including task skills, task management skills, contingency management skills and job role environment skills</p> <ul style="list-style-type: none"> • must meet relevant compliance requirements. <p>Resource implications for assessment include:</p> <ul style="list-style-type: none"> • access to residential buildings from which building and other relevant information required for conducting an assessment may be obtained • residential energy assessment software tools with appropriate advanced functions • relevant codes, standards and government regulations • building plans and full specifications, including hot water heaters, space heating and cooling appliances, lighting and water using appliances, fixtures and fittings for residential buildings to be assessed • computer equipment suitable for using residential energy assessment software tools and generating printed copies of reports • technical reference library with current publications on building design and materials, house energy rating schemes, residential sustainability, building thermal performance for planned buildings, Australian climatic zones, and manufacturer product information on building products and materials.
<p>Method of assessment</p>	<p>Assessment for this unit must verify the practical application of the required skills and knowledge, using one or more of the following methods:</p> <ul style="list-style-type: none"> • written and/or oral assessment • observed, documented and/or first-hand testimonial evidence of the candidate using the regulatory and non-regulatory functions of a house energy rating software tool to assess the thermal performance and other energy-related features of residential buildings.
<p>Guidance information for assessment</p>	<p>This unit could be assessed on its own or in combination with other units relevant to the job function.</p> <p>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.</p> <p>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.</p>

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 for assessment</i> may include:	<ul style="list-style-type: none"> • assessment for building design advice purposes • assessment for energy conservation purposes • assessment of greenhouse gas emissions • assessment for legislative, regulatory and compliance purposes.
<i>Residential building</i> refers to:	<ul style="list-style-type: none"> • any building categorised as Class 1, 2, 4 and 10a of the National Construction Code or in accordance with jurisdictional requirements.
<i>Effective communication strategies</i> may include:	<ul style="list-style-type: none"> • 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>Client</i> may include:	<ul style="list-style-type: none"> • architect • builder • building designer • construction manager • government agency • property developer • property manager • property owner • tenant.
<i>Functions of software package</i> may include:	<ul style="list-style-type: none"> • building thermal performance: <ul style="list-style-type: none"> • conditioned mode • non-conditioned mode • non-building thermal performance: <ul style="list-style-type: none"> • embodied carbon dioxide

	<ul style="list-style-type: none">• energy consumption• lighting• operational carbon dioxide• plug-in appliances• water heating• water use.
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<p><i>Risks</i> may include:</p>	<ul style="list-style-type: none"> • awareness of current legislative and regulatory requirements • confidentiality • data accuracy • data integrity • data loss • insurance • privacy • professional indemnity • work health and safety.
<p><i>Information</i> may relate to:</p>	<ul style="list-style-type: none"> • appliances • non-standard and complex building materials, designs and other features • occupant usage.
<p><i>Outputs</i> may include:</p>	<ul style="list-style-type: none"> • cooling loads • embodied carbon dioxide • emissions • energy use • heating loads • histograms • latent cooling • rating and non-rating mode.
<p><i>Advanced features</i> may include:</p>	<ul style="list-style-type: none"> • automatic calculations • calculators • libraries • thermal bridging capability.
<p><i>Sources of technical advice</i> may include:</p>	<ul style="list-style-type: none"> • architects • building designers • building thermal performance assessors • colleagues • consultants • government agencies • home sustainability assessors • professional associations • research bodies • supervisors • suppliers of products relating to energy efficiency • utility companies.
<p><i>Assumptions</i> may include:</p>	<ul style="list-style-type: none"> • building use • climate data • comfort • material properties

	<ul style="list-style-type: none"> • occupancy profiles • thermostat settings • uses of windows, doors, curtains and blinds.
<i>Options</i> may include:	<ul style="list-style-type: none"> • behaviour change • construction materials • energy-efficient appliances • glazing • indigenous planting • insulation levels • landscaping and planting • orientation • overshadowing • passive heating and cooling • reuse and recycling of products • size • style • thermal mass • type of glazing • ventilation • water conservation strategies • window • zoning and layout.
<i>Criteria</i> may include:	<ul style="list-style-type: none"> • availability of rebates and other assistance programs • cost • intended use of the building • occupant preferences • ownership of the building • practicality.
<i>Results and recommendations</i> may relate to:	<ul style="list-style-type: none"> • compliance with regulatory requirements • cost implications • practicalities.

Unit Sector(s)

Home sustainability assessment

Custom Content Section

Not applicable.