



Australian Government

Department of Education, Employment and Workplace Relations

CPPHSA4015A Assess impact of building elements on thermal performance of 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 impact of construction materials, design elements and building condition on thermal performance of residential buildings. It includes selecting appropriate building materials for improving thermal performance, identifying the impact of the construction of key elements of the building envelope on thermal performance, and identifying the correct use and installation of building materials to improve thermal performance.

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	Assess influence of common construction materials on thermal performance of residential buildings.	1.1	<i>Properties of construction materials</i> that may influence thermal performance of buildings are identified.
		1.2	<i>Properties of glazing units</i> that may influence the thermal performance of buildings are identified.
		1.3	<i>Ways in which the use of building materials may influence the thermal performance of buildings</i> are identified.
		1.4	Impact of climate on the choice of construction materials that improve the thermal performance of buildings is identified.
		1.5	Ways in which <i>physical constraints</i> may influence the choice of building materials when improving the thermal performance of buildings are identified.
		1.6	Construction materials are identified that meet requirements for improving the thermal performance of residential buildings.
		1.7	<i>Correct use and installation of materials</i> to improve thermal performance are identified.
		1.8	Condition of materials and the effect of condition on degrading thermal performance are identified.
2	Assess impact of building design features on thermal performance of residential buildings.	2.1	<i>Building design features</i> that influence the thermal performance of residential buildings are identified using correct industry and regulatory terminology.
		2.2	Potential impact of building design features on thermal performance is identified.

- 2.3 Ways in which building design features may be altered to improve thermal performance of residential buildings are identified.
- 3 Assess impact of residential construction methods on thermal performance.
 - 3.1 **Residential construction methods** are identified using correct industry terminology.
 - 3.2 Potential impact of construction methods on thermal performance of buildings is identified.
 - 3.3 **Key components of the building envelope** are identified using correct industry terminology.
 - 3.4 Impact of the construction of the key features of the building envelope on thermal performance is identified.
- 4 Assess impact of common building defects on thermal performance.
 - 4.1 **Common building defects and poor construction techniques**, as well as condition of building elements that may influence thermal performance of the building, are researched.
 - 4.2 Sources of professional advice on ways of responding to common building defects that may influence the thermal performance of the building are identified.
 - 4.3 Potential impact of poorly designed or installed **measures for improving thermal performance** on other aspects of residential buildings is researched.

Required Skills and Knowledge

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

Required skills

- literacy skills to:
 - apply correct building industry terminology for construction materials and methods
 - read and interpret written sources of information on the thermal performance of construction materials
- numeracy and data analysis skills to calculate and interpret statistical information on the thermal performance of different construction materials and methods
- research skills to identify and locate documents and information required to assess the impact of construction materials, methods and condition on the thermal performance of residential buildings
- technology skills to:
 - operate computer equipment and peripherals
 - access online catalogues and references to source information on the thermal performance of construction materials
- time-management skills to provide advice on the impact of construction materials and design elements on thermal performance to clients in a time-efficient manner

Required knowledge

- building regulations, including National Construction Code requirements
- building construction materials, including types, correct industry terms, and sources of information on their thermal performance
- building construction methods: types, materials, benefits and limitations, and implication for thermal performance of structure
- building defects that impact on thermal performance
- building design features that may influence the thermal performance of a building:
 - common walls
 - convection
 - eaves
 - floor type
 - glazing
 - insulation
 - landscaping
 - mass
 - materials

- orientation
- shading
- siting
- thermal mass
- ventilation
- windows
- zoning and layout
- building envelope components:
 - flooring
 - roof
 - wall
 - windows
- building life cycle, and impact on energy use, costs and sustainability
- building materials:
 - constraints on choice of building materials:
 - cost
 - practicality
 - size
 - space
 - correct terminology for building materials
- causes of and remedies for condensation
- passive building design principles
- properties of building materials that can influence thermal performance:
 - emissivity
 - R-value
 - reflectivity
 - solar absorptance
 - U-value
- properties of glazing units that can influence thermal performance:
 - solar heat gain coefficient (SHGC)
 - U-value
 - visible light transmission (VLT)

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 evaluating the impact of construction materials, design elements, key features of the building envelope, and construction condition on thermal performance of residential buildings.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person should demonstrate the ability to: • assess the impact of: • construction materials on thermal performance of residential buildings • building design and external elements on thermal performance of residential buildings • residential construction methods on thermal performance • common building defects on thermal performance • explain the impact of the construction of key elements of the building envelope on thermal performance • research non-standard building materials and techniques • identify potential impacts of thermal performance improvements on other health, safety, amenity and sustainability aspects of building performance.
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: • access to existing buildings and building materials • relevant codes, standards and government regulations • computer equipment suitable for accessing online catalogues and references to source information on the thermal performance of construction materials • technical reference library with current publications on passive building design, thermal performance of building materials and construction methods, building thermal performance, house energy rating schemes, and common building defects.
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 evaluating the impact of the following on thermal performance of residential buildings: • construction materials • design elements • key features of the building envelope • construction condition.
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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.
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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>Properties of construction materials</i> may include:	• emissivity • R-value • reflectivity • solar absorptance • U-value.
<i>Properties of glazing units</i> may include:	• SHGC • U-value • VLT.
<i>Ways in which the use of building materials may influence the thermal performance of buildings</i> may include:	• heat loss • heat transfer • thermal insulation.
<i>Physical constraints</i> may include:	• cost • practicality • size • space.
<i>Correct use and installation of materials</i> may include:	• draught proofing • glazing • insulation • mass.
<i>Building design features</i> may include:	• convection • glazing

	• insulation • landscaping • mass • orientation • shading • ventilation • zoning and layout.
Residential construction methods may include:	• brick veneer (BV) • cavity brick (CB) • light weight (LW) • reverse brick veneer (RBV).
Key components of the building envelope may include:	• flooring • roof • walls • windows.
Common building defects and poor construction techniques may include:	• air leakage • draughts • inadequate or missing insulation • inadequate ventilation.
Measures for improving thermal performance may include:	• airtightness measures • insulation.

Unit Sector(s)

Home sustainability assessment

Custom Content Section

Not applicable.