

Energy Efficiency EE-04| Alterations to existing Class 1 buildings

Audience

The audience/s for this Practice Note include/s:

- | | |
|---|---|
| <input checked="" type="checkbox"/> Architects/ Designers | <input checked="" type="checkbox"/> Owner Builders |
| <input checked="" type="checkbox"/> Builders | <input type="checkbox"/> Plumbers |
| <input checked="" type="checkbox"/> Building Surveyors/ Inspectors | <input type="checkbox"/> Real estate management agents |
| <input type="checkbox"/> Engineers | <input type="checkbox"/> Trades and Maintenance (inc. Electricians) |
| <input checked="" type="checkbox"/> Home Owners / Residential Tenants | |

Purpose

This Practice Note provides guidance on the energy efficiency requirements for alterations to an existing Class 1 building and compliance with the Building Act 1993, the Building Regulations 2018 and the National Construction Code 2019.



Note: This Practice Note applies only to the NCC 2022 performance requirements. For Practitioners following the performance requirements of NCC 2019, please refer to Practice Note EE-04-2019.

For further information about transitional requirements please refer PN EE-05 Transitional Energy Efficiency Arrangements.

The content below provides guidance on:

- Compliance requirements for alterations to existing buildings,
- Alterations and extensions to existing buildings,
- Using NatHERS software to assess a proposed alteration to an existing dwelling,
- Applying Elemental Provisions to a proposed alteration to an existing building, and
- Relocated and prefabricated homes.



For guidance on the energy efficiency requirements for new residential buildings, refer to Building Practice Note EE-03-2022: Energy Efficiency requirements for new residential buildings.



Abbreviations & Definitions

The abbreviations and definitions set out below are for guidance only. They are not intended to vary those set out in the Building Act 1993, Building Regulations 2018, Plumbing Regulations 2018 or the National Construction Code.

- **ABCB** – Australian Building Codes Board
- **Act** – Building Act 1993
- **BAB** – Building Appeals Board
- **DtS** – Deemed-to-Satisfy
- **NatHERS** – Nationwide House Energy Rating Scheme
- **NCC** – National Construction Code 2019, Amendment 1
- **RBS** – Relevant Building Surveyor
- **Regulations** – Building Regulations 2018

Transition from NCC 2019 to NCC 2022

NCC 2022 introduces quantified performance requirements for energy efficiency under Part H6 and specify a value for what buildings must achieve under the performance requirement. This quantification differs to NCC 2019, with former performance requirements P2.6.1 and P2.6.2 utilising the qualitative phrase 'to the degree necessary'. Practitioners are strongly encouraged to take note of this when determining how to comply with requirements, particularly in relation to performance solutions.

NCC 2022 also introduces a new 'whole of home' energy usage requirement (H6P2) that replaces the previous services requirement (P2.6.2). This practice note provides initial guidance on applying these new requirements to renovations. Additional guidance regarding the application of H6P2 to renovations will be made available to support compliance when requirements become mandatory at the conclusion of the NCC transition period on 1 October 2023. During the transition period for energy efficiency requirements in NCC 2022 it may be practical to apply energy efficiency requirements in NCC 2019 for alterations and extensions.

Practitioners are encouraged to refer to explanatory materials issued by the Australian Building Codes Board and engage in training opportunities during the NCC transition period to gain an understanding of changes to energy efficiency requirements for NCC 2022.

Compliance requirements for alterations to existing buildings

Alterations and extensions to Class 1 and Class 10a buildings must comply with the Regulations, which incorporate the NCC. The Regulations modify the NCC in some situations, and regulation 233 has specific provisions relative to alterations and extensions. Therefore, subject to the extent of the work, there are two options to consider for compliance:

- compliance with the provisions of the NCC, and
- partial compliance as permitted within the Regulations.

Compliance with the NCC means satisfying performance requirements H6P1 and H6P2 for the alteration or extension, and for the existing building, where triggered.

Regulation 233 of the Regulations gives the RBS discretionary powers to consider partial compliance. This allows for alteration work, which may not reasonably be able to satisfy performance requirements H6P1 and H6P2, to achieve an acceptable compliance outcome.



Alterations and extensions to existing building

Alterations to an existing building

Regulation 233 has specific provisions regarding the NCC compliance including situations where consent to partial compliance may be considered. These requirements are based on volume for alterations and floor area for additions. Requirements for the application of partial compliance is summarised in Table 1 and Table 2 below.

Volume alteration	Application & Limitations	Consent to partial compliance
Less than 50% of existing building, including work done in the past 3 years	<ul style="list-style-type: none"> New building work only must comply with the Regulations - reg 233(1) & (2) 	Available
50% of existing building or greater, including work done in the past 3 years	<ul style="list-style-type: none"> New building work and existing building must comply with the Regulations - reg 233(1) & (2) Existing building may be considered in partial compliance determination - reg 233(3) Limitations on partial compliance remain present for extensions - see Table 2 	Available

Table 1: Application of Regulations and availability of partial compliance for **alterations** to existing buildings

Floor area of extension	Application & Limitations	Consent to partial compliance
Less than 25% of existing building	<ul style="list-style-type: none"> New building work only must comply with the Regulations - reg 233(6) New building work and existing building may be considered in partial compliance determination 	Available
Extension greater than 25% of the existing building (or the lesser of 25% or 1000m ²)	<ul style="list-style-type: none"> New building work only must comply with the Regulations - reg 233(3) & (6) Applies to the extension component of building work only Existing parts of the building may still be subject to partial compliance determination - see Table 1 	Not available

Table 2: Application of Regulations and availability of partial compliance for extensions to existing buildings



Calculation of volume

There is no specific requirement for calculating the volume for the purpose of regulation 233. The RBS can use their professional judgement and discretion to apply the most appropriate method for the particular circumstances.

By way of guidance, the volume of alterations may be determined by the sum of the building spaces above the sub-floor. The building spaces are defined by:

- the enclosing external walls; and
- the roof space and roof structure; and
- the area covered by verandahs and other roofed structures forming part of the building.

Areas below the sub-floor framing may not need to be included except where these areas contain rooms, garages, etc. that are enclosed by walls, floor and roof/ceiling.

Example 1: Calculation of volume for an alteration that includes an extension

An opening is being incorporated into a wall to form a new room or increase the size of a room. The roof structure remains unaltered and this change is the only work completed or granted a building permit in the past three years. Figure 1 shows the building used in this example.

The volume of the alteration equals the area of the two rooms x the height of the rooms:

$$3.3 (W) \times 5.7 (L) \times 3 (H) = 56.43\text{m}^3$$

The volume of the extension is: the area of the extension x the height of the room:

$$3.3 (W) \times 2.1 (L) \times 3 (H) = 20.79 \text{ m}^3$$

The existing home's volume is:

$$7.3 (W) \times 9.3 (L) \times 3 (H) = 203.67 \text{ m}^3$$

The alteration as a percentage can now be determined as: $100 \times 56.43/203.67 = 28\%$

Only the new works must comply with the current energy efficiency requirements of the NCC, because the altered volume is less than 50% of the volume of the existing home (reg 233(1) & (2)).

In addition, the floor area of the extension can be calculated as:

$$3.3 (W) \times 2.1 (L) = 6.93 \text{ m}^2$$

The existing home floor area is:

$$7.3 (W) \times 9.3 (L) = 67.89 \text{ m}^2$$

The floor area of the extension is 10%, which is less than 25% of the floor area of the existing home (reg 233 (6)).

Example 2: Calculation of volume for a minor alteration

A window or door is being altered in an external wall. The volume calculation will only apply to the portion of wall being altered:

Volume = the width of the wall x the height of the wall x the length of the wall affected.

Note: practitioners must not apply this method of calculating volume for the purpose of a NatHERS rating using the formula in this Practice Note, which relates solely to the volume to be rated in the NatHERS software. See the section 'Using NatHERS software to assess a proposed alteration to an existing dwelling' for further information.

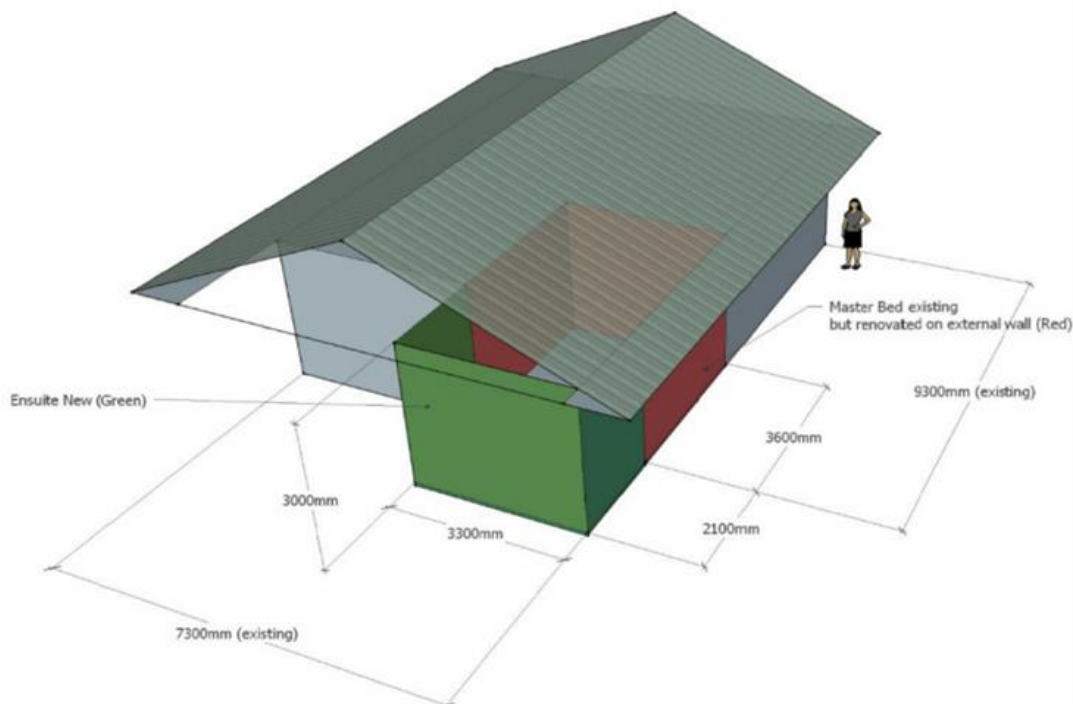


Figure 1: Building dimensions used in Example 1 volume calculations

Extensions to an existing building

An extension to an existing building must comply with the Regulations. The RBS can consider partial compliance to an extension under regulation 233(6), if the floor area of the extension is not greater than the lesser of:

- 25% of the floor area of the existing building, and
- 1000m².

The requirement for full compliance, when the extension exceeds the thresholds in regulation 233(6), only applies to the extension. Partial compliance determinations may still be used for the existing building, where appropriate.



For further information on exemptions from compliance with the Regulations, refer to Building Practice Note BP-12: Exemptions from compliance with Regulations.

Consent to partial compliance of building work

Regulation 233(3) provides the RBS with discretionary power to consent to partial compliance with sub-regulations (1) or (2). When determining whether to consent to partial compliance under regulation 233(3), the RBS must take the following into account:

- the structural adequacy of the building, and
- the requirements necessary to make reasonable provision for:
 - the amenity of the building and the safety and health of people using the building, and
 - avoiding the spread of fire to or from any adjoining building.



The discretion to allow partial compliance applies to both the building work associated with the alteration (except any extensions for which partial compliance is excluded under regulation 233(6)), and the requirement to bring the remainder of the building into compliance. In granting partial compliance, the RBS should require the highest level of compliance, unless it can't be reasonably achieved.

The RBS must ensure that any consent to partial compliance under 233(3) is in the form of Form 18 and is recorded on the building permit.

An application to the BAB can also be made under section 160 of the Act to allow for partial compliance with the Regulations.

What is reasonable?

When deciding whether to consent to partial compliance under regulation 233, the RBS should consider whether full compliance would be reasonable in a particular instance. Consideration should be given to:

- the objectives under section 4 of the Act, in particular -
 - safety and health
 - amenity
 - cost effective construction and maintenance
 - facilitating environmentally sustainable and energy efficient buildings,
- the energy efficiency objectives and functional statements of the NCC,
- the overall energy efficiency performance, including whether improved outcomes are achieved for the existing building (i.e. the existing building will not have a reduced energy efficiency performance based on the consent to partial compliance).

The RBS should apply professional judgement to the specific matter being assessed. In some instances, the RBS will need to seek the advice of other suitably qualified practitioners or industry experts in determining the acceptability or otherwise of partial compliance.

Structured assessments such as the Residential Efficiency Scorecard, which provide a rating of energy performance for existing homes and can help to identify cost-effective upgrades, may assist with determining a reasonable level of compliance.

The energy efficiency provisions have been developed on the basis of efficient use of energy and long-term cost effectiveness for the building owner. Provisions in the NCC are intended to be the minimum level necessary and do not preclude voluntary measures that achieve higher levels of energy performance. Therefore, it would be reasonable to consider those factors when determining whether to consent to partial compliance with the energy efficiency provisions.

Example 3: Consideration for partial compliance

Alteration of an existing dwelling triggers full compliance with the NCC as it exceeds 50% volume limitation. Full compliance cannot be achieved despite additional measures being implemented, such as insulating the ceiling space, installing dampeners for building sealing, shading western facing glazing, etc. A proposal for partial compliance is put forward based on the cost associated with dismantling and rebuilding the external wall to add insulation.



Using NatHERS software to assess a proposed alteration to an existing dwelling

The use of NatHERS software to assess alterations and extensions to existing dwellings is considered a DtS solution under the NCC 2022, where the whole building (i.e. existing and alteration) is brought into compliance with the 7 star rating (under DtS clause H6D2(1)(a)) and whole-of-home rating (under DtS clause H6D2(2)(a)). For information about this solution refer to Practice Note EE-03-2022 Energy efficiency requirements for new residential buildings.

NatHERS software can only assess a building as a whole, meaning it is not possible to use NatHERS to satisfy requirements for the extension or alteration of a building in isolation from the remainder of the building.

In cases where the existing dwelling does not have a NatHERS star rating it may be more practical to use the DtS elemental provisions including ABCB Housing Provisions Part 13.6 rather than NatHERS software.

Where the NatHERS software is used when only part of the building needs to achieve NCC compliance, it must be in the form of a performance solution demonstrating compliance as required under clause A2G2. It may also be considered under a consent to partial compliance.



NatHERS-accredited whole-of-home tools suitable for demonstrating compliance with H6P2 will be released in 2023. Prior to release, practitioners are encouraged to familiarise themselves with new requirements by testing NatHERS endorsed tools. - For more information go to Software updates in 2022 | Nationwide House Energy Rating Scheme (NatHERS).

Performance Solution

When considering the use of NatHERS software for developing a performance solution for alterations, careful consideration must be given to how the part of the building will comply with the NCC.

Any performance solution must clearly document and demonstrate how it complies with the quantified value of the performance requirements or is at least equivalent to the DtS provisions. The new quantified nature of performance solutions present challenges when applying to the whole building, but compliance can still be achieved through this pathway. For example, a performance solution for an extension greater than 25% of the floor area of the existing building could demonstrate that the extended area has an equivalent performance to a form of construction under the DtS elemental provisions.



Obtaining consent to partial compliance is not the same as approval for a performance solution, however each must be appropriately documented

Consent to partial compliance

If NatHERS software is used to assess thermal performance for an alteration to an existing dwelling that has not previously been assessed using NatHERS software or if a previous assessment was done using superseded NatHERS software, then it would be necessary to provide two energy ratings to the RBS to demonstrate the net improvement to thermal performance of the building. The ratings should be conducted using the same version of the software and by the same assessor to ensure consistency in assessment.



The ratings required are:

- **An initial house energy rating for thermal performance of the existing building** as constructed (if it is not going to be altered) to determine what star rating it currently achieves. Table 3 provides a checklist of documentation required to conduct the rating. Further details and information may be requested by the assessor conducting the rating.
- **A second house energy rating for thermal performance of the new building design** incorporating the proposed building work is necessary to show that the proposed design would meet the minimum required overall star rating calculated using the approach set out in Table 4.
- **An energy usage assessment of the new building design** using either NatHERS Whole of Home tools or conducted in accordance with the ABCB Housing Provisions Part 13.6

If the application for partial compliance relates to a reduction in the required overall star rating or the whole- of-home rating, further justification would be needed to demonstrate to the RBS that the reduction is reasonable in the proposed circumstances.

Where partial compliance under regulation 233 is approved, it is important that the plans reflect the approved conditions. This is to ensure that the construction requirements, which need to be implemented to achieve the required star rating of the new work and existing building, are clearly defined.



It is not appropriate to require an additional assessment of a theoretical version of the building design that would achieve a rating of 6 Stars if the actual design would not achieve that rating, as this risks contravening the NatHERS Technical Note.

NatHERS assessors cannot provide an assessment of a home or house features that have not been designed.

If the application for partial compliance relates to a reduction in the required overall star rating, further justification would be needed to demonstrate to the RBS that the reduction is reasonable in the proposed circumstances.

Where partial compliance under regulation 233 is approved, it is important that the plans reflect the approved conditions. This is to ensure that the construction requirements, which need to be implemented to achieve the required star rating of the new work and existing building, are clearly defined.

Type of Documentation	Supplied (Yes / No)
• Energy Efficiency specifications (if separate to drawings)	
• Floorplans	
• Elevations	
• Section drawings	
• Site plan / context plan(s)	
• Electrical (incl. fans and downlights)	
• List of hot water, lighting, heating and cooling, spa and pool pump appliances including energy efficiency star ratings	
• Details of on-site renewable	
• Drawing details	
• Window system descriptions	
• Window schedule – existing including sizes and new	
• Insulation details	

Table 3: Standard documentation required for rating an existing dwelling



Consent to partial compliance - application of overall star rating formula

The formula in Table 4 can be used to determine the overall star rating for thermal performance of a dwelling where there is consent to partial compliance.

The formula may be used where a new extension of less than 25% floor area is required meet a 7-star thermal performance rating and the existing building is not proposed to be altered. The formula allows for a reduced star rating for the whole building but demonstrates a net improvement in the dwelling's thermal performance. Table 4 shows examples of the application of the formula.

The formula is not a DtS or performance solution under the NCC 2022. However, it may be incorporated into part of a performance solution if justified and documented correctly to address the performance requirement H6P1 or be shown to be at least equivalent to DtS requirement.



For further information on performance solutions, refer to Building Practice Note PS-01: Documentation and Assessment – Performance Solution.

Considering their role in determining the star rating of a home, it would be appropriate to consider NatHERS Accredited Assessors' expertise when developing performance solutions for alterations and additions in order to comply with residential energy efficiency requirements in the NCC.

The volumes referred to in the formula relate to the volume of conditioned or rated space in the NatHERS software, including those volumes affected by the proposed building work, not the volume of building calculation for the purposes of regulation 233.

The volume of new work is the volume of the spaces where the proposed works are to be undertaken. For example, if installing an ensuite to a master bedroom, including re-lining internal walls and new windows throughout, the volume of the work would include the ensuite and master bedroom spaces.



Example 1- Extension to an existing dwelling (existing dwelling has lesser rating)	Example 2 - Extension to an existing dwelling including compliant internal alteration work
$SRr = \frac{(Ve \times SRe) + (Vn \times SRn)}{(Ve + Vn)}$	$SRr = \frac{[(Ve - Vni) \times SRe] + [(Vn + Vni) \times SRn]}{(Ve + Vn)}$
<p>Where</p> <p>SRr = Overall star rating required SRe = Existing dwelling star rating SRn = New work dwelling star rating Ve = Existing unaltered volume Vn = New work volume for extension</p>	<p>Where</p> <p>SRr = Overall star rating required SRe = Existing unaltered dwelling star rating SRn = New work dwelling star rating Ve = Existing unaltered volume Vn = New work volume for extension Vni = New work volume for internal alteration</p>
<p>An example of application of the formula is as follows:</p> <p>Ve = 203.7 m³ Vn = 20.8 m³ SRe = 3.2 stars SRn = 7.0 stars</p>	<p>An example of application of formula is as follows:</p> <p>Ve = 203.7 m³ Vn = 20.8 m³ SRe = 2.0 stars SRn = 7.0 stars Vni = 35.6m³</p>
<p>The required overall star rating,</p> $SRr = \frac{(203.7 \times 3.2) + (20.8 \times 7.0)}{(203.7 + 20.8)}$ <p>SRr = 3.6 Star requirement</p>	<p>The required overall star rating,</p> $SRr = \frac{((203.7 - 35.6) \times 2.0) + ((20.8 + 35.6) \times 7.0)}{(203.7 + 20.8)}$ <p>SRr = 3.3 Star requirement</p>

Table 4 - Using the formula to calculate the required overall star rating for consent to partial compliance

Consent to partial compliance – Whole-of-home compliance

When using NatHERS for a whole-of-home consent to partial compliance there may be assumptions that need to be made through the calculation in order to show enough consistency to reasonably show a net improvement. Any assumptions would be subject to the functionality of the NatHERS software and should be appropriately documented.

In many cases the installation of on-site photovoltaics may be sufficient to demonstrate partial compliance (refer to DTS clause H6D2(2) and 13.6 of the ABCB housing provisions), particularly when there is minimal change to the existing main space conditioning and main water heater as part of the alteration or addition.

Example 4: Partial compliance for whole-of-home requirements

Alteration of an existing dwelling triggers full compliance with the NCC as the volume of the work exceeds the threshold of 50% of the existing volume. There are no planned changes to the existing dwelling's appliances, which includes an in-slab electric main space heating system.

Full compliance cannot reasonably be achieved due to the cost of replacing the existing heating system. A proposal for partial compliance is put forward based on the provision of on-site photovoltaics to offset the energy usage of regulated appliances.



Applying Elemental DtS Provisions to a proposed alteration to an existing building

Building fabric

Where a building is extended, the building fabric of the new extension should fully comply with the NCC 2022. Partial compliance for the extension may be considered under regulation 233, subject to the restriction under regulation 233(6) (refer to Table 1 and Table 2), however there would need to be strong justification for partial compliance as the construction process of the extension allows ample opportunity to ensure compliance.

Where the new work includes replacement of existing elements, such as roof cladding, wall cladding or wall lining, compliance with the NCC 2022 fabric provisions should be achieved. However, if these items only require minor repair work, then it may be unreasonable to require their removal, solely to install new insulation. For example, where access to the roof space is available, fully compliant ceiling insulation should be installed.

External glazing

Where an existing building is extended, the glazing in the extension needs to comply with the NCC, subject to consent to partial compliance. Glazing compliance can be determined using the ABCB's Glazing Calculator (refer to the ABCB website, www.abcb.gov.au).

The glazing provisions are determined on the basis of the whole storey. This means that the glazing to the existing part of the storey also needs to be considered in the calculations.

In these instances, where compliance is required for part of a storey, it may be reasonable to determine compliance as part of a consent to partial compliance or a performance solution by applying the performance of the new glazing uniformly to the whole storey but only requiring the installation of glazing to the extension or new building work.

If all the existing glazing or other elements are being replaced, then those elements must comply with the current NCC 2022 provisions, subject to acceptance of partial compliance.

Shading

Shading is integral to glazing performance. There may be site constraints or planning requirements that prevent external shading from being added to an existing building. In these circumstances, higher performance glazing elements may need to be used. However, this may be more costly.

It may therefore be reasonable to allow a reduced level of glazing performance, where such constraints on shading exist. This should only apply to the existing parts of the building and not a proposed extension, where the extension exceeds the floor area limit set out in regulation 233(6).

Building sealing

An extension to an existing building should be sealed in accordance with the ABCB Housing Provisions Part 13.4. If an existing room is extended, then the need for sealing may depend upon its condition. If the existing part is not sealed, for example having large areas of unsealed louvred glazing, there may be little benefit in sealing the new part of the building.

Where a new extension is proposed to an existing unsealed building, a practical approach may be to accommodate the different amounts of sealing in the new and existing parts of the building by installing sealed doors between the two parts. The final decision should be based on the relative size of the extension, the extent to which the existing part is unsealed and the extent to which sealing is practical and beneficial.



Services

New building work must comply with H6P2 for Services.

The ABCB Housing Provisions Part 13.7 set out the requirements for insulation of services, central heating water piping and heating and cooling ductwork. In all cases, insulation for service piping and ductwork must be provided.

It is important that the designer provides the RBS with sufficient details of piping and ductwork insulation to ensure that H6P2 compliance has been met.

The services must also meet the requirements of part 13.6 Whole-of-home usage or partially compliance as outlined above.

Artificial Lighting

The ABCB Housing Provisions set out the compliance requirements for artificial lighting. The alterations or extension should comply with the ABCB Housing Provisions artificial lighting requirements as set out in 13.7.6. It may be unreasonable to change existing light fittings unless the alterations include the complete re wiring of the building or it is needed to address a safety hazard.

However, if the existing light fittings are to be replaced then compliance with the provisions is required. It is important that the designer provides the RBS sufficient details of electrical layout and fittings so that the RBS can ensure that H6P2 is complied with.

Hot water systems

Where an alteration is proposed to an existing building, the RBS may consider the installation of an efficient hot water system. The hot water system may act as part of compliance with performance requirement H6P2 but cannot be used to offset against performance requirement H6P1.

Relocated and prefabricated homes

Relocated homes

An alteration is building work that relates to an existing building. An existing dwelling that is re-erected, moved from one allotment to another or relocated on the same allotment is considered an alteration to the dwelling exceeding the 50% volume trigger. This means that the RBS has discretion to allow partial compliance under regulation 233.

It is recognised that there are sometimes limited opportunities to improve the thermal performance of an existing building where it is being relocated in its original condition. However, wherever possible, compliance with the DtS provisions should be achieved.

This does not prevent the owner of the property using best practice principles. As a minimum, required levels of insulation should be installed to ceilings, walls and floor if there is access to do so. Sealing of windows and doors should be undertaken and where windows are replaced, thermally efficient windows should be installed.

Prefabricated kit homes

Homes that are prefabricated in a factory, whether they are fully assembled or delivered to site as “flat pack” kits, are required to comply with the Regulations as they are a new dwelling. This also applies to transportable/demountable buildings (e.g. dongas, on-site cabins etc.).

The design for this type of home must be assessed using either NatHERS software to achieve a 7 star rating or above and a whole-of home assessment as set out in 13.6 of the ABCB



Housing Provisions, or the elemental DtS provisions, or sufficient evidence provided that the design will meet the performance requirements of the NCC. It is important to note that a separate house energy rating must be completed for every new orientation and other site conditions. This avoids incorrect use of a design in other orientations, which may reduce the star rating of the dwelling.

Related Documentation

- Building Act 1993
- Building Regulations 2018
- Plumbing Regulations 2018
- National Construction Code 2019
- Building Practice Note BP-12: Exemptions from compliance with regulations
- Building Practice Note EE-02: Applying BCA energy efficiency measures to existing Class 2-9 buildings
- Building Practice Note EE-03: New Residential Buildings
- AS/NZS4859.1: Thermal insulation materials for buildings

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