

PRACTICE NOTE 55-2018

This updates the previous Practice Note-2014-55 issued July 2014.

Reference to the Building Code of Australia (BCA) in this Practice Note means Volumes One and Two of the National Construction Code Series.

PART A GENERAL REQUIREMENTS AND NEW DWELLINGS

Purpose

This practice note applies to Class 1 and 2 buildings and a Class 4 part of a building only. It provides advice about Victoria's 6 Star Standard and options for compliance.

Requirements

For Class 1 buildings, the BCA provides a number of options to demonstrate compliance with performance requirement P2.6.1 and P2.6.2

P2.6.1 Building

A building must have, to the degree necessary, a level of thermal performance to facilitate the efficient use of energy for artificial heating and cooling and a level of water use performance to facilitate the efficient use of water, appropriate to—

- a. the function and use of the building; and
- b. the internal environment; and
- c. the geographic location of the building; and
- d. the effects of nearby permanent features such as topography, structures and buildings; and
- e. solar radiation being—
 - i. utilised for heating; and

- ii. controlled to minimise energy for cooling; and
- f. the sealing of the building envelope against air leakage; and
- g. the utilisation of air movement to assist cooling; and
- h. water resources available; and
- i. pertinent water management measures of the responsible water authority.

P2.6.2 Services

Domestic services, including any associated distribution system and components must, to the degree necessary—

- (a) have features that facilitate the efficient use of energy appropriate to—
 - i. the domestic service and its usage; and
 - ii. the geographic location of the building; and
 - iii. the location of the domestic service; and
 - iv. the energy source; and
- (b) obtain heating energy from—
 - i. a source that has a greenhouse gas intensity that does not exceed 100 g CO₂-e/MJ of thermal energy load; or
 - ii. an on-site renewable energy source; or
 - iii. another process as reclaimed energy.

New Class 1 Building – Compliance Options

Performance requirement P2.6.1 can be achieved by complying with the following:

Deemed-to-Satisfy (DTS) solutions

New Class 1 buildings are required to comply with the acceptable construction practice in Part 3.12.

There are two options for compliance:

- i. 3.12.0 (a) (i) using the Nationwide House Energy Rating Software (NatHERS)¹ and the relevant parts of 3.12: 3.
- ii. using the Elemental DTS Parts 3.12.1 to 3.12.4 and relevant parts of 3.12.5.

Refer to Appendix 2

Performance solution

Using Verification Method V2.6.2.2.

The Verification Method uses a reference building that the proposed building is compared against. For P 2.6.2 Service -the verification method BV2.2 can be found in NCC Volume three the Plumbing Code of Australia or

Any other design method that can satisfy the performance requirement under P2.6.1

¹ NatHERS Software means software accredited under the Nationwide House Energy Rating Scheme and is limited to assessing the potential thermal efficiency of the dwelling envelope.

Rainwater tanks and solar hot water heater systems

All **new** Class 1 buildings require:

- A rainwater tank (minimum capacity of 2000 litres) connected to all toilets in the building for the purpose of sanitary flushing; or
- A solar water heater system installed in accordance with the Plumbing Regulations 2008 (the Plumbing Regulations)

The Plumbing Regulations allows two different options of water heated systems to choose from:

- a gas boosted solar water heater or
- a heat pump water heater (if it is not connected to the mains electricity supply)

Where a solar water heater system is used and it incorporates booster heating and

reticulated gas supply is available for connection to the building, the solar water heater system must be gas boosted.

Where a heat pump water heater is installed, no part of the heater that is capable of heating water is to be connected to mains electricity.

A heat pump water heater system is ideal for dwellings being constructed using a totally renewable energy source (i.e. not connected to a mains gas or electricity supply)

The Plumbing Regulations require the solar collectors to be oriented to face between 30 degrees east and 60 degrees west of magnetic north and the collectors must have an inclination of 35 degrees (plus or minus 20 degrees to the horizontal) to allow for different roof pitches. (Refer to Technical solution sheet 6.06 on the VBA Plumbing website).

Satellite Habitable Buildings

Sleepouts or bungalows which are associated with but not attached to an existing Class 1 dwelling are considered to be part of the existing dwelling. Therefore, there is no requirement to install solar water heater systems or rainwater tanks to the structure.

Class 2 and 4 Parts of Buildings

BCA section J0.2 requires that Sole-Occupancy Units (SOU's) of a Class 2 building must collectively achieve an average energy rating of not less than 6 Stars and each individual SOU is to achieve an energy rating of not less than 5 stars (using NatHERS software).

The SOU must also comply with the BCA construction requirements for thermal breaks, insulation and building sealing. The remainder of the building (common areas passageways, plant rooms etc.) and services provisions must comply with the relevant provisions of Part J. Refer to Appendix 2.

A Class 4 part of a building must achieve a minimum 6 star rating using NatHERS software.

Note: There is no requirement to install a rainwater tank or solar water heater system to a Class 2 building or Class 4 part of a building.

Detailed plans to be provided

Regulation 25 of the Building Regulations 2018 (the Regulations) details the minimum information the applicant needs to provide to the Relevant Building Surveyor (RBS) when applying for a building permit. (Refer to PN 62- Documentation required for applications for Building Permits).

The applicant is required to provide detailed design plans and specifications of energy efficiency construction requirements to be incorporated in the design. For example, window schedules will require specific details including glass type, frame type, U-values, SHGC values, orientation sector, and a copy of the glazing computations. If used, a copy of glazing calculator results must also be included. It is not the responsibility of the RBS to use the glazing calculator. This information must be provided by the building designer in the building permit application documentation.

Note: The applicant should limit the use of general notes. A note such as “The builder is to ensure compliance with BCA Part 3.12” is not appropriate. The design and specifications must clearly demonstrate full compliance.

Complete and appropriate details and information must be provided in the application for a building permit to enable the RBS to ensure compliance is achieved in order to issue the building permit. This also ensures that the builder can construct the building in accordance with the approved building permit documentation.

Relevant Building Surveyor role in assessing application

The RBS has a responsibility to ensure that the building permit application contains sufficient information to determine compliance with the Act and the Regulations.

Where the RBS is not satisfied with the information provided, they must not issue the building permit. A request to provide further information should be actioned as it is not appropriate for the RBS to “mark-up” plans or accept notes on plans that are too general.

The RBS should limit the use of conditions on the building permit. Reliance on general conditions is a failure of the RBS to ensure that compliance with the Act and the Regulations has been achieved prior to issuing the building permit.

Applying the energy standards

Building permit

It is the applicant’s responsibility to provide the RBS with evidence that the proposed building design meets the DTS requirements of Part 3.12 or show compliance with the relevant performance requirements.

When using the Nationwide House Energy Rating Software, a NatHERS Universal Certificate must be provided by an Accredited Residential Thermal Performance Assessor.² (example of a certificate can be found at:

<http://www.nathers.gov.au/resources/new-nathers-universal-certificate>)

²The term “residential thermal performance assessor” (people qualified and accredited by an Assessor Accrediting Organisation (AAO) is accepted nationally and meaning a person assessing the thermal performance of a building.

The proposed design must have manual or electronic stamps on every page of documents related to the assessment (i.e. all drawings, calculations and specifications).

The design must indicate whether downlights or other ceiling penetrations are included.

As a minimum the stamp must contain:

- Certification date
- Assessors accreditation name and number
- Star rating achieved
- Address

For new Class 1 buildings, the applicant must also provide details of any rainwater tank or solar water heater system to assist the RBS in checking compliance. Details should include the size and location of rainwater tank and the type and size of solar water heater system to be installed.

For new Class 2 Buildings the SOU's of a Class 2 building must show that collectively they achieve an average energy rating of not less than 6 Stars and individually achieve an energy rating of not less than 5 Stars.

Individual SOU scores must be shown as part of the certified working drawings detailing each individual star rating and each SOU's combined heating and cooling load total. These results should be displayed on the specifications page or alternatively on a separate page.

Non-accredited assessors

Where an assessment is provided by a non-accredited assessor, the RBS should be satisfied the person has suitable qualifications and experience in the use of the NatHERS software and that the current approved software is being used.

Note: If the current approved software is not being used this should be treated as a Performance Solution.

Ratings of dwelling adjacent to adjoining allotments

NatHERS assessments must include details of existing adjacent building(s) and structure(s) on neighbouring allotments, which overshadow windows of the proposed

building being rated. Trees, shrubs and other landscaping are not required to be considered (unless covered by a preservation order).

Occupancy permit

During the building process, the RBS may choose to carry out additional inspections (particularly worthwhile for insulation of the building envelope) to ensure that the dwelling is constructed in accordance with the requirements of the approved HERS report or BCA Part 3.12 where used.

The RBS may, if necessary, request that the builder provide a statement of compliance regarding sustainability matters. This statement must cover all matters in the HERS report.

Where an application for an occupancy permit has been submitted and the only outstanding non-complying matters relate to energy efficiency, the RBS may:

- Refuse to issue an occupancy permit, or
- Issue an occupancy with conditions, or
- Issue an occupancy permit concurrently with a building notice or order.

Where a rainwater tank or a solar water heater system is installed, the RBS must see a copy of the plumber's compliance certificate issued under section 221ZH of the Act before an occupancy permit can be issued.

The RBS must sight all plumbing compliance Certificates applicable to the building work before an occupancy permit is issued.

SOFTWARE

Approved Software

Under BCA Volume One for Class 2 (SOU), Class 4 part of a building and BCA Volume Two for Class 1 buildings energy rating must be determined using a thermal calculation method that is accredited under the NatHERS.

A thermal calculation method is defined as a calculation method that identifies-

- i. a heating load, or
- ii. a cooling load, or
- iii. a heating and cooling load (annual energy load), based on the sum of hourly loads or an equivalent approach.

For information about the house energy rating software and current versions of the software that are accredited under NATHERS refer to the following websites.

www.nathers.gov.au

www.energyinspection.com.au for Accurate and BERS Pro

www.fr5.com.au for FirstRate5

Note: The use of other software may be accepted by the RBS through a Performance Solution as meeting the relevant Performance Requirements, provided the building permit application can be shown to use less heating and cooling energy per square metre than a 6 star house in the same climate zone using the same occupancy profile as NatHERS accredited software.

Using Rating Tools

The standard input assumptions made when rating the energy performance of a house are defined in the NatHERS technical Notes.

Note: A separate rating must be completed for every new orientation or layout for each building design. This eliminates the use of one design being rated once, and then used in a variety of orientations that reduce the star rating of the dwelling.

Limitations of Energy Rating Software

It is not possible to take into account every feature of dwelling design with the currently approved software. The following design features cannot be rated:

- earth bermed walls
- trombe walls (utilising masonry or water tanks for storing radiant heat gains)
- solar heated rock storage
- insulating shutters on windows.

Note: Where dwellings contain the above features a Performance Solution will need to be provided.

Accreditation of residential thermal performance assessors (TPAs)

It is recommended that NatHERS assessment be prepared by persons accredited in the use of the relevant rating tool. Residential thermal performance assessors require separate accreditation for each rating tool they use.

Currently the Association of Building Sustainability Assessors (ABSA) and Building Designers Association Victoria (BDAV) are authorised under NatHERS to provide the accreditation of TPAs. A list of accredited assessors and energy rating tool accreditation is listed on the following websites:

www.absa.net.au www.bdav.org.au

The assessor will need to provide a report and stamped plans accordingly as per NatHERS Technical Notes.

Where a design does not meet the required minimum standard, the assessor may suggest design options to improve building performance to the required level.

Any alterations or changes made to the design after an initial compliance rating either before or after submission to the RBS, must be reassessed and approved by the assessor and a new submission made to the RBS.

Alternative to rainwater tanks

As an alternative to the installation of rainwater tanks required by Victorian variation to Performance Requirement P2.6.1 and DTS part 3.12.0, the RBS may consider a Performance Solution for the use of grey water treatment systems or dual water reticulation and water recycling systems connected to toilet flushing systems.

To assist in formulating a Performance Solution, refer to Technical Solution 91.02

Grey or recycled water (non-drinking water supply) available on the VBA website.

Dual water reticulation and water recycling systems

Dual water reticulation and water recycling systems provide a source of recycled water, including a recycled water main and drinking water main. This is often referred to as a 'dual supply' system or previously as a 'third pipe' system.

Typically, the water will come from one of Melbourne's major sewerage treatment plants, or from a smaller localised treatment plant. The recycled water must be supplied by the Responsible Water Authority and must only be used for approved purposes, including toilet flushing and garden watering.

The provision of recycled water for clothes washing machine use may be a requirement of a water authorities condition of connection.

Note: The responsible Water Authority should be contacted for confirmation of their approval processes.

Some new Housing estates are currently incorporating this type of system.

Independent analysis confirms that a dual water reticulation system will provide equivalent or better performance than a rainwater tank, in terms of water conservation, when the systems are connected to domestic sanitary flushing systems. Dual water reticulation systems

conserve drinking water more effectively than rainwater tanks, as they are more reliable, regardless of rainfall and are also available for garden use.

Some housing sub-divisions / estates propose rainwater collection from individual dwelling roofs which is piped via a holding basin to a treatment plant operated by the water authority. The treated rainwater is then piped back through the mains drinking water system to each dwelling. A dual pipe stormwater system may be required to separate roofing stormwater from surface water in these instances and may be a condition of connection.

Greywater treatment systems

Grey water is the waste water from the washing machine, laundry trough, shower, hand basin, and bath - excluding the kitchen sink and toilet waste water.

There are two main options for grey water re-use:

Domestic grey water system

A domestic grey water system collects, stores and treats grey water to a quality which allows the water to be used for toilet flushing and washing machines.

Grey water - Direct diversion

This system diverts grey water directly to a garden. Although a cheaper option, the use is restricted and the grey water cannot be stored for more than 24 hours. It must not be connected to sanitary flushing systems and can only be diverted through subsoil absorption systems. This system cannot be used as a Performance Solution.

The design and installation of dual water reticulation, water recycling systems and grey water systems must comply with the Plumbing Regulations.

General information on insulation information

Reflective foil insulation products

Reflective foil only provides an insulating effect when it faces an air space. It works by reducing radiant heat flow across the air space. If the reflective foil does not face an air space, then it cannot be considered in the total R value of the roof or wall system.

Reflective foil must not allow air to leak from one side of the foil to the other side.

Particular care must be taken during construction, to ensure that all penetrations through the foil and joins are effectively sealed by taping joins and penetrations.

Reflective foil product tests often show the R value of the whole building element, whereas bulk insulation tests usually show the R value of the insulation alone.

Bulk insulation products

Loose fill products will typically settle after a few years providing a lower depth than originally installed. Batt and blanket products can suffer significant degradation of their R-value through poor installation.

To maintain the effectiveness of the insulation products builders must ensure that:

- Insulation fits snugly against all framing members with gaps filled with batt off-cuts;
- Bulk insulation is not compressed, the width of insulation provided in a wall frame matches the width of the stud;
- Insulation placed near lamps, luminaires and associated transformers is installed in accordance with AS 3000-2007 Amt 2 (Refer NatHERS Technical Note) or in accordance with manufacturer's instructions where specifically designed low watt and heat generating luminaires are being installed; and

- Insulation must comply with AS/NZS 4859.1.

When determining whether to place part of the required insulation at the roof level, consideration must be given to the condensation that may form within the roof space.

Sealing of gaps and cracks

Gaps and cracks in buildings contribute significantly to the inefficient use of heating and cooling systems, therefore it is important that they are adequately sealed.

In addition to using the NatHERS software to demonstrate compliance with NCC/BCA energy efficiency requirements, the following provisions of BCA Part 3.12.3 must be met.

Seals are to be provided to:

- chimney and flues;
- roof lights;
- around external doors and windows; and
- exhaust fans.

Sealing can also be achieved by providing close fitting internal lining systems at the ceiling, wall and floor junctions or by caulking, skirtings architraves and cornices or the like.

Artificial lightening information

Artificial lighting

The BCA incorporates provisions to address artificial lighting. It provides for the maximum power that will be consumed by the lights in a space, including lamps, ballasts, current regulators and control devices.

BCA Part 3.12.5.5 requires the lamp power density or illumination power density of artificial lighting (excluding heaters that emit light) not to exceed the allowance of -

- i. 5 W/m² in a class 1 building, and
- ii. 4 W/m² on a verandah, balcony or the like attached to the class 1 building; and

- iii. 3 W/m². in a class 10 building associated with a class 1 building

Note: Trading of allowances between (i), (ii) and (iii) are not permitted.

Perimeter lighting must be controlled by daylight sensors or have an average light source efficacy of not less than 40 lumens/W (i.e. efficient lighting).

The design lamp power density is calculated by adding the maximum power ratings of all permanently wired lamps in a space and dividing this sum by the area of the space.

The design illumination power density is calculated by adding the illumination power load for each space and dividing this sum by the area of the space.

The area of the space is measured to the internal wall dimension and should be scaled off if not dimensioned on the plans.

It is important that designers provide the RBS with sufficient details of electrical layout and fittings to ensure that Performance Requirement P2.6.2 is satisfied.

When using a NatHERS rating tool for compliance purposes, the provisions of 3.12.5.5 must still be addressed separately as lighting performance is not assessed by the energy rating software.

Refer to BCA Volume one J6.2 for similar provisions for Class 2 (SOUs) and Class 4 parts of a building

The ABCB has developed a lighting calculator that can be used to determine the artificial lighting requirements. This can be downloaded from www.abcb.gov.au

PART B - APPLYING RESIDENTIAL SUSTAINABILITY MEASURES TO ALTERATIONS AND RELOCATION OF DWELLINGS

Specific requirements for alteration to dwellings

Class 1 buildings constructed to the 5 or 6 Star Standard post 1 July 2004

Alterations to an existing building previously assessed under the 5 or 6 Star Standard must ensure that the energy efficiency requirement of the existing building is maintained.

If using the NatHERS method to assess an alteration or addition then the whole of the dwelling, existing and proposed, must be assessed as one.

It is not appropriate to use NatHERS to determine the rating of the home and then assess an extension using the elemental provisions of DTS or Verification Method.

Regulation 233 and partial compliance alternations to an existing building

Under Regulation 233 building work associated with the alteration to an existing building must comply with the regulations.

The Regulations describe an alteration as either:

- An alteration to an existing building. Sub regulation (2) (e.g. internal alterations, relining of walls. Relocation or removal of internal walls, replacing windows and doors or external cladding) and/or
- An extension to an existing building. (sub regulation (6) (increasing the size, adding on to the existing building).

Alterations to an existing building.

Regulation 233 (2) requires that where the volume of proposed alterations (excluding extensions), combined with any alterations completed within the previous 3 years represents more than fifty per cent (50%) of the volume of the original building, the entire building including the alteration must be brought into compliance with the Regulations.

When calculating the volume for the purpose of Regulation 233, the volume is determined by adding the sum of the building spaces above the sub-floor, 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; and
- any sub-floor area used for rooms, garages etc. that are enclosed by walls, floor and roof/ceiling.

Note: These calculations do not apply when calculating volume for the purpose of a HERS rating.

Example 1. Where only a window or door is being altered in an external wall the volume calculation will only apply to the portion of wall being altered.(i.e. the width of the wall x the height of the wall x the length wall being affected).

Example 2. Where an opening is being incorporated into a wall to form a new room or increase the size of a room, then the volume will be - the total area of the two rooms x the height of the rooms.

Regulation 233 (4) provides the RBS with discretionary power to consent to partial compliance in certain circumstances. When considering partial compliance, the RBS must take the following into account:

- the structural adequacy of the building,
- the requirements necessary to make

reasonable provision for;

- a. the amenity of the building and the safety and health of people using the building; and
- b. 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 (excluding Extensions) and the requirement to bring the remainder of the building into compliance.

This does not mean that the RBS can allow non-compliance.

Extensions /Additions to an existing building

An extension to an existing building must comply with the Regulations.

However, under Regulation 233 (6) the RBS can consider partial compliance to an extension if the floor area of the extension is not greater than the lesser of:

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

The requirement for full compliance only applies to the extension /addition and has no impact on the existing building unless the building work includes an alteration to the existing building and the alteration exceeds 50 per cent of the volume of the original building.

A summary of the requirements of Regulation 233 and where the RBS has discretion to allow partial compliance is included in Appendix 1

Where alterations are constructed using concrete panels, cavity brick, earth wall construction, and ashlar stone or other masonry walls (including any cavity), the applicant must provide the RBS with sufficient information to determine the R-value of the wall system.

What is Reasonable?

When deciding whether to permit partial compliance under regulation 233, the RBS should consider how reasonable full compliance would be in a particular instance, along with the likely cost and benefit.

The RBS should apply professional judgement to the specific matter(s) 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 a specific building element of construction or use.

The energy efficiency provisions have been developed on a basis of saving energy and long-term cost effectiveness for the building owner.

On the same basis, when determining whether a dispensation from the energy efficiency provisions should be granted, it may be reasonable to ask, "Is it cost effective?"

Examples that may not be considered to be cost effective are:

- removing a window which has a significant service life and replacing it with a double glazed window;
- walls which don't need an internal lining or external cladding removed can be insulated with blown in product, but may be 2 to 4 times more expensive. At the lower end this may still be cost effective.;
- Insulating a skillion roof where the roof deck must be removed is about 2-3 times more expensive than installing insulation in a pitched roof space;
- Insulating a timber floor with limited clearance and access can be 2 to 3 times more expensive;
- Poor underfloor ventilation can lead to wet insulation; and

- A slab floor can be up to double the cost of a timber floor depending on site access and soil conditions.

Applying Part 3.12 Deemed to Satisfy Elemental provisions Building fabric

Where a building is being extended, the fabric of the extension should fully comply with the BCA fabric provisions. Refer to regulation 233 for partial compliance requirements.

Where the new work includes replacement of existing elements, such as roof cladding, wall cladding or wall lining, compliance with the BCA fabric provisions should be achieved. However, if these items only require minor repairs, then it may be unreasonable to require this to be removed, solely to install new insulation.

Fully compliant ceiling insulation should be installed wherever there is access to the roof space.

External Glazing

Where an existing building is being extended, the glazing in the extension must comply with the BCA Part 3.12.2- Glazing provisions.

Glazing can be determined by using the DTS requirements or by using the ABCB's Glazing Calculator (Refer to website www.abcb.gov.au). However, this is complicated by the fact that the glazing provisions are determined on the basis of the whole storey.

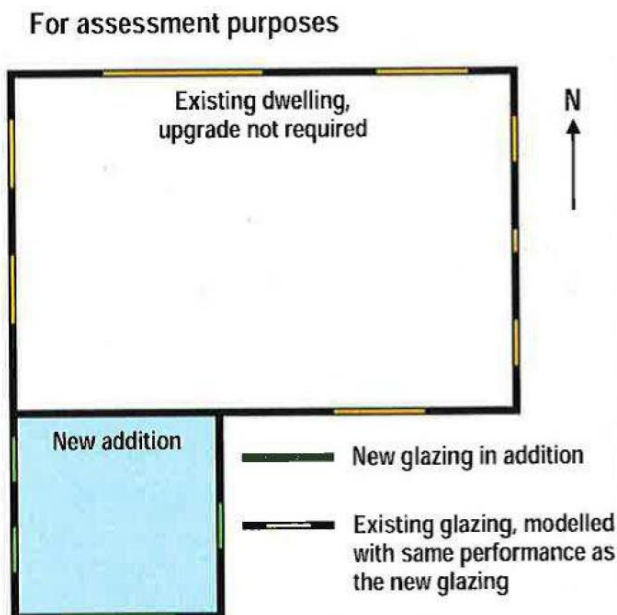
This means for the purpose of determining the conductance and solar heat gain of the glazing to the extension, the glazing to the existing building/storey also needs to be considered in the calculations. (*Refer figure 1 Consideration of Glazing*).

In these instances, it would be reasonable to determine compliance by applying the performance of the new glazing uniformly to the whole storey but only require the complying glazing to the extension or new building work. This principle may also be applied when using HERS

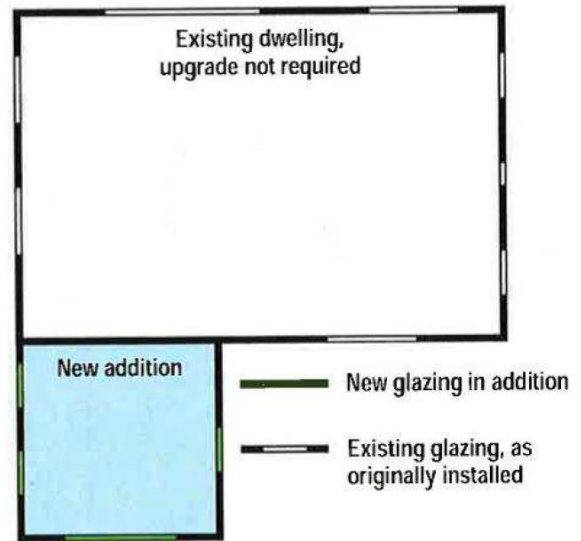
If all the existing glazing to the building is being replaced, then the new glazing must comply with the current BCA glazing provisions

Shading is integral to glazing performance. There may be site constraints or planning requirements that prevent external shading being added to an existing building. In these circumstances, higher performance glazing elements may need to be used however may be more costly. It would therefore be reasonable to allow a reduced level of glazing performance, where such constraints on shading exist. This only applies to the existing building not the proposed extension.

Figure 1.



For installation purposes



Building sealing

An extension should be sealed in accordance with BCA - Part 3.12.3 Sealing provision. If an existing room is being extended, the need for sealing may depend upon its condition. Sealing of an existing room is an all-or-nothing matter. If the existing part is not sealed for example 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 and the extent to which the existing part is unsealed. However, if sealing is practical and achievable it should be undertaken.

Air Movement

The BCA -Part 3.12.4 -Air movement provisions generally require two openings in a room, or a breeze path through to another room. In the case of some extensions, it may not be possible to comply with these requirements – for example, where there is insufficient room for the two openings to be installed in the external wall and the existing building does not have complying breeze paths.

Services

New building work must comply with Performance Requirement Part 2.6.2 for Services. Victoria does not call up BCA - Part 3.12.5.0 in relation to heated water supply systems as these are required to comply with the Plumbing Regulations 2008. (Refer to Technical Solution Sheet 6.06 6: Hot Water Plumbing –VBA website)

BCA -Parts 3.12.5.1 to 3.12.5.3 set out the requirements for insulation of services, central heating water piping and heating and cooling ductwork. Whether using HER software or applying other parts of Part 3.12.5, insulation for service piping and ductwork must be provided.

It is important the designers provide the RBS with sufficient details of piping and ductwork insulation to ensure that Performance Requirement P2.6.2 compliance has been met.

Artificial Lighting

Part 3.12.5.5 sets out the compliance requirements for artificial lighting. The alterations or extension should comply with the BCA artificial lighting provisions. It would be unreasonable to change existing light fittings unless the alterations include the complete re wiring of the building. However, if the existing light fittings are to be replaced then compliance with the provisions is required.

It will be important that designers provided the RBS sufficient details of electrical layout and fittings so that the RBS can ensure that Performance Requirement P2.6.2 is complied with.

Using house energy rating HER software to assess a proposed alteration to an existing dwelling

Where an alteration (including an addition) is being proposed to an existing dwelling and it is intended to use HER software for assessing the alteration, the dwelling must be assessed as a whole. However, the current star rating requirements will only apply to the new building work. (Refer to Regulation233)

In cases where the existing dwelling does not have a house energy rating it may be more practical to use the DTS elemental provisions than the NatHERS software. However, if using NatHERS software to assess an alteration to an existing dwelling that has not previously been assessed using NatHERS software or the NatHERS assessment is over 12 months old it will be necessary to provide two energy ratings to the RBS.

If a house energy rating was completed more than 1 year previous, it is likely the rating software, and/or procedures have changed which means the original rating is no longer applicable. It is not reasonable to use an old version with different procedures in conjunction with a new one. The results are unbalanced.

Two new House energy ratings should be created – equal software, equal procedures, equal assessor.

An initial house energy rating will need to be produced for the existing building as constructed to determine what star rating it currently achieves. The minimum data collection and corresponding data input to the software for the rating of an existing building is set out in Appendix 3.

A second house energy rating for the whole 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 below.

This approach could also be used to support an application to the RBS for partial compliance under Regulation 233, though, if the application relates to a reduction in the overall star rating, further justification would be needed.

Where a 233 application has been approved, it is important that the plans reflect the actual requirements that have been approved to ensure that there is no misunderstanding as to the required star rating of the new work and existing building.

If it is intended to upgrade the existing building along with the alterations or extension to the current requirements only one assessment of the proposed design is necessary.

Formula for required overall star rating.

The following formula may be used to determine that proposed alterations, including additions achieve the required star rating.

The formula set out below is only of use where part of a building is required to have a different star rating to the remainder. In this circumstance, the formula provides a means of calculating an overall star rating for the building that may be accepted (as a Performance Solution) by the relevant building surveyor.

The formula is not a Deemed-to-Satisfy solution under the BCA, as it is not mentioned in the BCA. It may be used as part of an application for partial compliance under regulation 233 of the Building Regulations 2018, but would need to be supported by evidence, argument or justification for a reduction in performance, because it is only a means of calculating (approximately) a star rating for the whole building.

When a proposed addition is greater than 25% of the floor area of the existing building, or 1000 m², the formula cannot be used to determine compliance of the addition because Regulation 233 (6) is not performance based and partial compliance for such an addition is not allowed under Regulation 233. In this case, an application for modification could be made to the Building Appeals Board.

The volumes referred to in this clause relate to the volume of conditioned or rated space affected by the proposed building work not to the calculation of volume for the purposes of regulation 233.

Volume of new internal work is the volume of the spaces where the proposed works are to be undertaken. For example, installing an ensuite to the master bedroom, including re-lining internal walls and new windows throughout - the volume would include the ensuite and master bedroom spaces as described in Appendix 4.

The Formula.

Addition or Extension

$$(V_e \times S_{Re}) + (V_n \times S_{Rn}) = S_{Rr}$$

$$(V_e + V_n)$$

where,

V_e = Existing internal dwelling volume,

V_n = New work internal volume remaining after work completed

S_{Re} = Existing house Star rating

S_{Rn} = New house star rating

S_{Rr} = Overall star rating required.

In the example at Appendix 4, the

$$V_e = 203.7 \text{ m}^3$$

$$V_n = 20.8 \text{ m}^3$$

$$S_{Re} = 3.2 \text{ stars}$$

$$S_{Rn} = 6.0 \text{ stars}$$

The required overall star rating (not incl. any V_{ni}):

$$S_{Rr} = (203.7 \times 3.2) + (20.8 \times 6.0)$$

$$(203.7 + 20.8)$$

$$= 3.5\text{-star requirement}$$

For additions to an existing dwelling including internal alteration works, the formula becomes:

$$[(V_e - V_{ni}) \times S_{Re}] + [(V_n + V_{ni}) \times S_{Rn}] = S_{Rr}$$

$$(V_e + V_n)$$

including the additional factor,

V_{ni} = Volume of new internal work

(example - Case study Appendix 4)

Calculation including internal works in existing building:

$$V_e = 451 \text{ m}^3$$

$$V_n = 55.66 \text{ m}^3$$

$$V_{ni} = 140 \text{ m}^3$$

$$S_{Re} = 2.0 \text{ stars}$$

$$S_{Rn} = 6.0 \text{ stars}$$

The required overall star rating (incl. the V_{ni}):

$$S_{Rr} = ((451 - 140) \times 2.0) + ((56 + 140) \times 6.0)$$

$$(451 + 56)$$

$$= 3.54 \text{ star requirement}$$

Performance solutions for alterations installing rainwater tanks or solar hot water systems

The BCA only requires the installation of a rainwater tank for toilet flushing or a solar hot water system to be installed in a new Class 1 building.

Where an alteration is proposed to an existing building and the RBS is considering compliance under Regulation 233, they may consider the installation of either a rainwater tank and/or a solar hot water system as a Performance Solution to achieve compliance if they are satisfied that the proposal satisfies the requirement of the Performance Requirement P2.6.1 or P2.6.2.

An example: if the cost to adequately seal around all the existing windows and doors outweighs the benefits of the proposed energy savings, the RBS may consider a Performance Solution for the installation of a solar hot water system provided it can be justified that a saving can be achieved and the system meets the requirements of BCA 3.12.5.6.

However, the use of a rainwater tank cannot be used as a Performance Solution to justify an energy efficiency saving requirement.

Relocated and fabricated homes

Relocation homes

The definition of 'Alteration' in the Regulations means "construction in relation to an existing building" and includes building work to an existing building. An existing dwelling 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.

As a minimum, required levels of insulation should be installed in ceilings, walls and floor (if there is access to do so). Sealing of windows and doors should be undertaken and where windows are replaced, then thermally efficient windows should be provided.

This does not prevent the owner of the property using best practice principles. This Practice Note outlines some basic requirements when altering a home. These principles should also be applied to a home that is re-erected

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 means that the design will have been assessed using either NatHERS software or the elemental DTS provisions to achieve a 6 star rating, or sufficient evidence provided that the design will meet the performance requirements of the BCA. (i.e. verification method) These homes will also require the installation of

either a solar hot water system or a rainwater tank.

It's important to note that a separate house energy rating must be completed for every new orientation/site condition. This eliminates the occurrence of a design being rated once, and then used in a variety of orientations that reduce the star rating of the dwelling. This section also applies to transportable/demountable buildings (dongas, on-site cabins etc.).

Non- Regulatory Matters

Designers, builders and to some extent building surveyors are in a position to encourage greater sustainability measures than those required by the Regulations in their capacity to influence consumers.

Although the Regulations do not require the installation of rainwater tanks or solar hot water systems, where alterations are proposed, owners should be encouraged to consider installing these items and potentially take advantage of applicable government rebate systems.

Where major plumbing work is proposed which includes a new hot water service installation, the owner should also be encouraged to consider installing a solar hot water system.

Where new stormwater plumbing work is proposed, such as new spouting and/or downpipes, an owner should again be encouraged to install a rainwater tank at the same time. The rainwater tank should comply with the minimum plumbing requirements for new dwellings and be connected to any new sanitary flushing systems.

Useful contacts and references

For further information on the 6 Star standard, plumbing standards, or energy efficient design, please contact the following organisations:

Websites

Victorian Building Authority

www.vba.vic.gov.au

Sustainability Victoria

www.sustainability.vic.gov.au

Energy Safe Victoria

www.esv.vic.gov.au

Your Home

www.greenhouse.gov.au/yourhome

BDAV

www.bdav.org.au

ABSA

www.absa.net.au

NATHERS

www.nathers.gov.au

Further information

Want to know more?

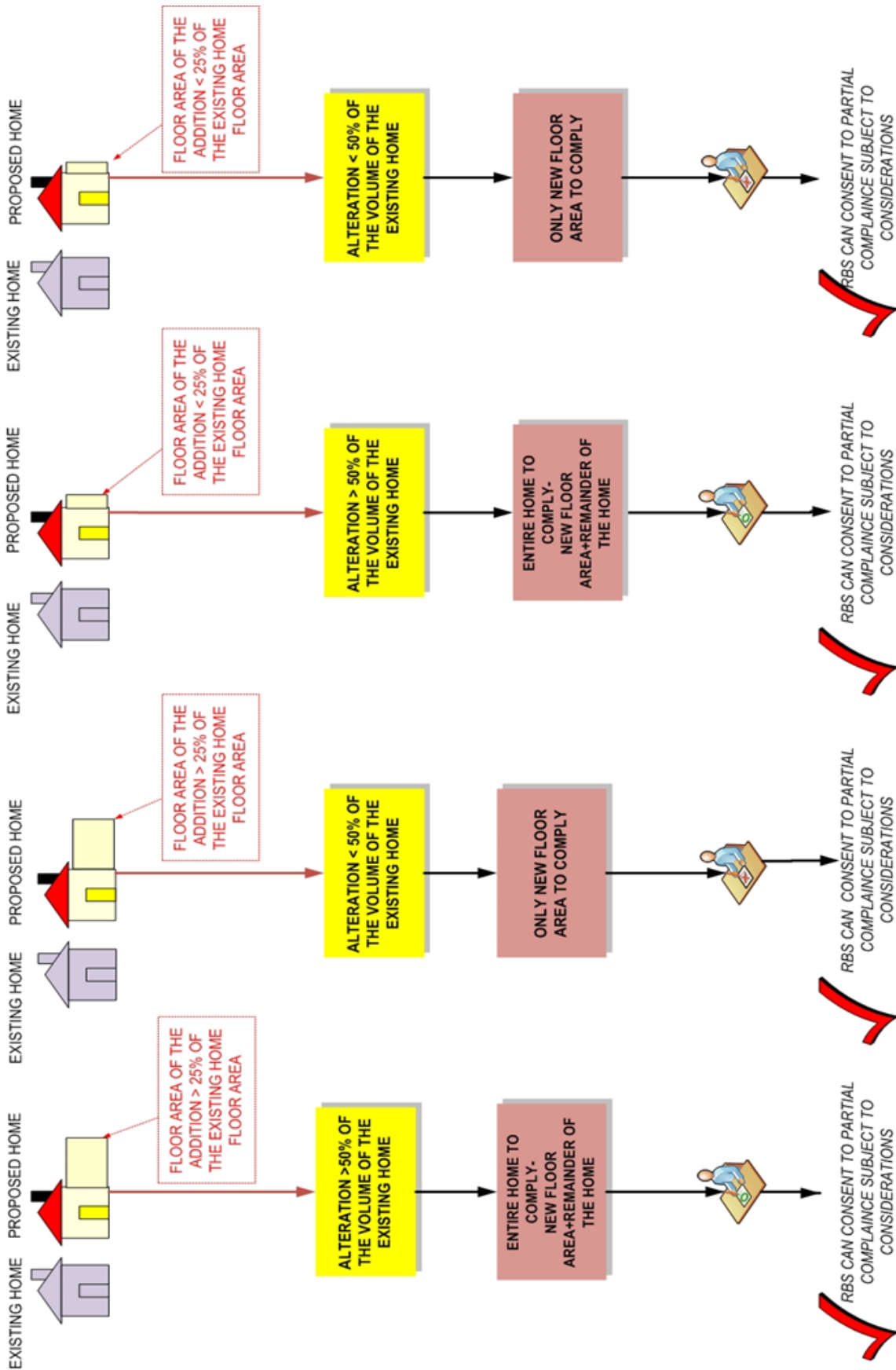
If you have a technical enquiry, please email technicalenquiry@vba.vic.gov.au or call 1300 815 127.

Victorian Building Authority
733 Bourke Street Docklands VIC 3008

www.vba.vic.gov.au

Appendix 1

Consent to partial compliance



IF RBS grants partial compliance then he/she must issue a special dispensation clearly documenting the reasons for partial compliance. Under regulation 319, a copy of the consent must be given to council.



Appendix 2

Energy Efficiency for New Class 1 Dwellings

Victoria Climate Zones 4, 6, 7 and 8



How will you meet JP1, JP2 and JP3?

Within sole occupancy unit, Class 2 or Class 4 using a software rating tool

Remainder of building not within a sole occupancy unit

Comply with:

- Average energy rating for all sole occupancy units within the building of not less than 6 Stars
- Each sole occupancy unit must achieve a minimum energy rating of not less than 5 Stars
- J1.2 Insulation installation requirements
- J1.3(d) Thermal breaks for a steel roof cladding to steel roof framing
- J1.5(c) Thermal breaks for lightweight cladding to steel wall framing
- J1.3(c) Compensating for ceiling insulation loss around exhaust fans, recessed downlights and flues
- J1.6(c) Concrete slab on ground insulation required in climate zone 8 and for in-slab heating or cooling
- J1.6(d) Concrete slab on ground insulation specifications
- J3 Building sealing and penetration sealing.

Comply with Parts:

- J1 Building fabric
- J2 Glazing
- J3 Building sealing
- J5 Air-conditioning and ventilation systems
- J6 Artificial lighting and power
- J7 Hot water supply and swimming pool and spa pool plant
- J8 Access for maintenance and facilities for monitoring.

Achieve compliance with Section J of the BCA

Appendix 3

Minimum Data Rating Required for existing house

Client Details	
<i>Client Name</i>	
<i>Address</i>	
<i>Suburb</i>	
<i>Post code (non-climate related)</i>	
Climate	
<i>Postcode (Climate related)</i>	
General	
<i>Exposure</i>	
Orientation	
<i>Orientation</i>	
ZONING - plans indicating:	
<i>Partitioning of rooms</i>	
Air-infiltration and Ceiling Penetrations	
<i>Chimneys</i>	
<i>Quantity -chimneys</i>	
<i>Sealed - chimneys</i>	
Exhaust Fans	
<i>Quantity -exhaust</i>	
<i>Sealed - exhaust</i>	
Generic Vents	
<i>Quantity - vent</i>	
<i>Sealed - vent</i>	
Downlights	
<i>Quantity - DL</i>	
<i>Size - DL</i>	
Unflued Gas Heater	
<i>Quantity - UGH</i>	
<i>Sealed - UGH</i>	
Heater Flue	
<i>Quantity - HF</i>	

Sealed - HF	
WALLS	
Wall Types	
Construction - ext walls	
Materials - ext walls	
Existing Insulation - walls	
Height - walls	
SHADING & OBSTRUCTIONS - plans showing	
Eaves	
Wing-walls	
Screens/Obstructions	
OPENINGS (vertical)	
Doors	
Weatherstripped (Ext doors)	
Windows - plans showing	
Window Name (ID)	
Style	
Height - Windows	
Width - Windows	
Window system description (e.g. aluminium or timber)	
Single glazing or double glazing or toned	
FLOORS - plans showing	
Floor Area Size	
Floor Types	
Coverings- floor	
Subfloor Ventilation	
Subfloor Perimeter type	
Added Bulk Insulation	
Foil	
Size - Horizontal Openings (stairs and voids)	

CEILING & ROOFS	
Ceiling Area Size	
Roof/Ceil Types	
Roof Level - Added Bulk insulation	
Sarking	
Ceiling Level - Added Bulk insulation	
Foil Type -Main roof	
Number of Layers - Main roof	
Roof windows & Skylights	
Type	
Area	
Complex Elements - (plans showing - if applicable)	
Details of geometry	
Walls - complex:	
Split Walls	
Base Height of Split Walls	
Connecting to walls: added surface areas	
Opening inputs in added walls	
Ceilings - complex:	
Cathedral/Raised Ceilings - complex	
Split Ceiling Areas - complex	
Connecting to ceil: added surface areas	
Floors - complex:	
Split Floor Areas - complex	
Connecting to floors: added surface areas	
Shading - complex:	
Advanced Shading Features	
Other - complex:	

Other features and/or comments:

Ensure all necessary data for rating the existing dwelling is available:

<i>Supplied documentation Standard:</i>	<i>If missing ✓</i>
<i>EE Specifications (if separate to drawings)</i>	
<i>Floorplans</i>	
<i>Elevations</i>	
<i>Section Drawings</i>	
<i>Site Plan/Context Plan(s)</i>	
<i>Electrical (incl fans & downlights)</i>	
<i>Details Drawings</i>	
<i>Window System Description or WERS values</i>	
<i>Window Schedule - existing incl sizes and new</i>	
<i>Insulation Details</i>	

Appendix 4

Example of Volume calculation

