

## Energy Efficiency EE 02 – 2022 | Applying NCC energy efficiency measures to existing Class 2 to 9 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 application of the NCC part J1 energy efficiency measures for alterations to existing Class 2 to 9 buildings, excluding Class 2 SOUs and Class 4 parts of a building.



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-02-2019.

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

The content below provides guidance on:

- Requirements for Class 2 to 9 buildings
- Partial compliance
- Energy Efficiency: Deemed-to-Satisfy provisions
- Air-conditioning and ventilation systems
- Artificial light and power
- Access for maintenance



## 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, the Building Regulations 2018 or the National Construction Code.

- **ABCB** – Australian Building Codes Board
- **Act** – Building Act 1993
- **DtS** – Deemed-to-Satisfy
- **NCC** – National Construction Code 2022
- **Regulations** – Building Regulations 2018
- **RBS** – Relevant Building Surveyor
- **SOU** – Sole-Occupancy Unit

## Requirements for Class 2 to 9 buildings

Section J of the NCC contains energy efficiency requirements for Class 2 to 9 buildings, which apply to new building work and alterations to existing buildings.

Alterations and extensions to Class 2 to 9 buildings must comply with the Regulations and the relevant provisions of the NCC. The Regulations may modify the NCC, and regulation 233 has specific provisions in relation to alterations and extensions.

Subject to the extent of the work, there are generally two options to consider for compliance:

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

Compliance with the NCC for class 3, 5, 6, 7, 8, 9 and the common areas of class 2 buildings means satisfying performance requirements J1P1 and J1P4 for the alteration or extension, and for the existing building, where triggered. The RBS may consent to partial compliance in certain circumstances, where it may not be reasonable to satisfy the performance requirements but where an acceptable compliance outcome can be achieved.

## Partial compliance

Regulation 233 requires that all new building work, including work to alter an existing building, must comply with the Regulations.

There is a threshold measure which determines if the remainder of an existing building needs to be improved to comply with the Regulations. If the proposed alterations, together with any other alterations completed or permitted within the previous 3 years, represent more than half the original volume of the building, the remainder of the existing building must be improved.

This regulation also provides the RBS with discretionary power to consent to partial compliance with the Regulations. The RBS may only consent to partial compliance in respect of the 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
- 1000m<sup>2</sup>.



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"> <li><b>New building work</b> only must comply with the Regulations - reg 233(1) &amp; (2)</li> </ul>	Available
50% of existing building or greater, including work done in the past 3 years	<ul style="list-style-type: none"> <li><b>New building work</b> and <b>existing building</b> must comply with the Regulations - reg 233(1) &amp; (2)</li> <li><b>Existing building</b> may be considered in partial compliance determination - reg 233(3)</li> <li>Limitations on partial compliance remain present for <b>new additions</b> - see Table 2</li> </ul>	Available

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

Floor area extension	Application & Limitations	Consent to partial compliance
Less than 25% of existing building	<ul style="list-style-type: none"> <li><b>New building work</b> only must comply with the Regulations - reg 233(1)</li> <li><b>New building work</b> and <b>existing building</b> may be considered in partial compliance determination</li> </ul>	Available
Extension greater than 25% of the existing building (or the lesser of 25% or 1000m <sup>2</sup> )	<ul style="list-style-type: none"> <li><b>New building work</b> only must comply with the Regulations - reg 233(3) &amp; (4)</li> <li>Applies to the extension component of building work only</li> <li><b>Existing parts of the building</b> may still be subject to partial compliance determination - see Table 1</li> </ul>	Not available

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



For further information regarding the use of discretionary power by the RBS refer to Practice Note BP-12: Exemptions from Compliance with Regulations.

When applying regulation 233, the RBS must also consider other requirements relative to Class 2 to 9 buildings that may affect the decision-making process for compliance. These include:

- Section 28 of the Act – Historic buildings and special buildings
- Regulation 229 – Change of use
- Regulation 231 – Subdivision of existing building
- Regulation 234 – Alterations affecting exits and paths to exits.
- Regulation 236 – Application of requirements in the BCA Volume One relating to access to buildings for persons with disabilities
- Other sections of the NCC, including fire resistance, access and egress, and services and equipment



## 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 judgment 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.

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.

## Energy Efficiency: Deemed-to-satisfy provisions

The ABCB has produced several handbooks that provide guidance about energy efficiency requirements for Class 2 to 9 Buildings and applying Section J. These are available from the ABCB website at [ncc.abcb.gov.au](http://ncc.abcb.gov.au).

### Building fabric

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.

Partial compliance may be considered for the extension under regulation 233 subject to the restriction under regulation 233(6). The discretion to allow partial compliance applies to both the building work associated with the alteration and the requirement to bring the remainder of the building into compliance. In granting partial compliance, the RBS should require the level of compliance to be as close to full compliance as is reasonable.

#### Example 1: Building Fabric – Partial Compliance

An existing office building between a main street and a lane is being extended to the adjoining allotment and, for aesthetic reasons, the existing facade is being replaced. The fabric of the extension must comply with the NCC fabric provisions. As the facade is being replaced, it is reasonable to expect insulation to be added to the external wall of the existing building. However, as work is not carried out on the rear wall of the existing building (other than painting) it may not be reasonable to require the rear wall to be insulated.



## External walls and glazing

The glazing and external walls in building extensions must comply with the NCC 2022. This requirement also applies to existing external walls and glazing if all the existing wall-glazing construction in a building is replaced.

The NCC 2022 relies on two key indicators for the performance of windows:

- **The U-value**, which is an expression of the window's thermal performance and is the inverse of the R-value of the insulation. Therefore, the higher the U value the poorer the performance of the window.
- **The solar admittance or Solar Heat Gain Coefficient (SHGC)**, which is the fraction of incident irradiance on glazing that adds heat to a building's space. Therefore, the higher the SHGC, the more light enters the building and contributes to greater heat gain.

DtS calculation methods for the total system U-Value and solar admittance of wall-glazing construction are set out in Specification 37.

Both U-Value and solar admittance are required to be calculated for the walls and glazing facing each aspect (northern, southern, eastern and western) separately (Method 1), or facing multiple aspects (Method 2).

When using Method 1 each aspect is required to meet the applicable total system U-Value and solar admittance.

When using Method 2 multiple aspects are assessed together, allowing trading of thermal performance values between different aspects.

Both Method 1 and 2 require existing wall-glazing construction to be considered.

In some cases, it may be unreasonable for new wall-glazing construction in an extension to compensate for the poor performance of the existing wall-glazing construction. In such instances it may be reasonable to determine compliance by applying the performance of the new wall-glazing construction uniformly to a single façade for Method 1, or to the whole storey for Method 2, but only require the complying glazing to be installed in the extension.

## Shading

Shading to a building and the windows has a significant impact on the building's energy efficiency performance.

Changes to shading may affect the energy efficiency rating of an existing building. They may also have a negative impact on the performance of the building's mechanical services and their ability to maintain comfortable temperatures within the building.

Site constraints or planning requirements may reduce options to provide external shading to an existing building. In such circumstances the required performance level may be achieved by installing more energy efficient windows instead of external shading devices.

Partial compliance is an option the RBS may consider. However, in making a decision, the RBS needs to have regard for:

- the occupant comfort
- the cost of maintaining comfortable temperatures in the building,
- risks of overheating
- the cost of upgrading the windows borne by the owner.



## Building sealing

An extension to an existing building should be sealed in accordance with part J5 building sealing of NCC 2022. If an existing room is being extended, the need for sealing may depend upon its condition. If the existing part is not sealed, for example by having large areas of unsealed louvred glazing, there may be little benefit in sealing the new part.

Where a new extension is proposed to an existing unsealed building, a practical approach may be to accommodate different levels of sealing in the new and existing parts of the building and 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 extent to which sealing of the new part is practical and beneficial.

## Air-conditioning and ventilation systems

Where a new extension is proposed to an existing building, the extension may include installation of air-conditioning and ventilation systems. This could mean new air-conditioning throughout the existing building and the new extension. Alternatively, it could consist of a combination of a new system and the existing system which was already installed in the existing part of the building.

The NCC 2022 provisions may also apply where the air-conditioning system in an existing building is being replaced with a new and upgraded system.

New systems and elements in new parts of a building, and new elements and systems in existing parts of a building, should all comply with the NCC 2022 services provisions.

Some NCC 2022 air-conditioning provisions relate to the system, while others relate to equipment. System-related aspects include outside air cycles, controls, zoning, time switches and fan motor power, which may affect the operation of the new part of the system. If they only affect existing elements and are not part of the new building work, they need not be upgraded to comply with the current NCC 2022 provisions. New items such as a boiler, chiller, package air-conditioner, piping insulation (for new piping) and the like, would be required to comply with the NCC 2022.

New piping and ductwork, whether within a new or existing part of a building, should comply with the NCC 2022 provisions. It would be unreasonable to expect that the existing ductwork concealed behind ceilings and risers be upgraded.

If ductwork and piping is replaced as part of a refurbishment, it is reasonable to expect that the new ductwork and piping, including terminal flexible ductwork, will comply with the NCC 2022 provisions.

### Example 2: Air-conditioning, Partial Compliance

The air distribution elements of an existing air-conditioning system are being modified as part of a general refurbishment. The work includes repositioning some existing uninsulated ductwork and replacing some of the ductwork altogether. Ideally, all ductwork in the area being refurbished would be insulated to the current NCC 2022 requirements. However, an assessment made on the cost-effectiveness of installing new insulated ductwork, including the cost of lowering ceilings and obtaining access to tight locations, may demonstrate that full compliance is not reasonable.

A typical example is when new rooms are added to an existing building, or when an existing building is being refurbished. The new or refurbished space may be served by a totally new air-conditioning system, or by extending the existing system. If a new air-conditioning system is installed, then it will need to comply in all respects with the NCC 2022 provisions. If an existing system is extended, then only the new components need to comply.





Lighting is similar to air-conditioning and ventilation systems, in that new elements and new systems in new parts of a building need to comply with the NCC 2022 provisions, as do new elements and new systems in existing parts of the building.

**Example 3: Air-conditioning, Partial Compliance**

Another floor is being added to an existing building. The work includes extending the existing air-conditioning and increasing its capacity to serve the extension. The new floor will have ductwork that complies with the current NCC 2022 provisions, but the central air-conditioning unit in the basement is simply being modified to provide more capacity. The main ductwork runs are not being replaced, because of limited riser space. It may be unreasonable in this case to require the main ductwork to comply with the current NCC 2022 provisions for insulation because of the limited space and access.

**Artificial light and power**

Artificial lighting requirements for a building class 2 - 9 are provided in NCC 2022 Volume One Part J7. Most lighting components are in, or adjacent to, the space being served, which means that they are generally easily accessible and therefore more easily upgraded.

Where work is undertaken in a section of the building, only the artificial lighting in that area needs to be considered when assessing the artificial lighting against the NCC 2022 requirements. Electrical safety is not regulated through the NCC which may mean the scope of work will extend to further electrical work to satisfy the legislative framework within Victoria (e.g. requirements under the Electricity Safety Act 1998).

**Example 4: Artificial Lighting**

A shop is being refurbished for a new tenant. It is proposed that some lights are replaced, and others are relocated. The existing wiring is being reused. The NCC 2022 lighting provisions are based on an aggregate design illumination power load for the whole shop, so that aggregate cannot be exceeded by the existing and new lighting combined. Even if no new lights are to be installed and all the existing lights are being reused, compliance should still be achieved.

**Access for maintenance**

Access should be provided for maintenance of new building services. It may be difficult to provide an ideal level of access to new building services located in existing parts of a building. Provision of a reasonable level of access in such cases should be guided by cost effectiveness.

**Example 5: Plant Room Maintenance Access**

A building is being extended, but the air-conditioning plant for the extension will be located in the rooftop plantroom of the existing building. Restrictions on the height of the extension prevent a rooftop plant room from being located on top of the extension. As the new air-conditioning plant is being placed in the existing plantroom, only limited access is available for maintenance purposes. It may be considered unreasonable to require that additional access and egress is provided within the existing plantroom, subject to reasonable provision for safety and health of people using the plantroom.



## Related Documentation

- Building Act 1993
- Building Regulations 2018
- National Construction Code 2022
- Building Code of Australia 2022 Volume One
- Building Practice Note BP-12 | Exemptions from compliance with regulations
- Building Practice Note EE-03 | Energy efficiency requirements for new residential buildings
- Building Practice Note EE-04: | Alterations to existing Class 1 buildings

## Document history

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