



# H1 COMPLIANCE FOR RENOVATIONS

**For alterations and extensions, the requirements of Building Code Clause H1 Energy efficiency still seem to be a very grey area. We have some advice on how to achieve compliance for alterations and extensions.**

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**T**he Department of Building and Housing *Codewords 32* provides some good guidance on how to apply Building Code Clause H1 requirements to alterations and additions.

Basically, an alteration that doesn't change the thermal envelope doesn't trigger H1 requirements to upgrade insulation or glazing. This allows an existing window to be moved and reused within the existing dwelling or a large window to be replaced with new doors as long as the glazed area is not increased and the R-value is the same or better.

If the glazed area is increased, the thermal performance of the structure would be reduced and H1 requirements triggered.

## Leeway for small reductions

*Codewords 32* proposes a leeway for small performance drops where either:

- no more than 2% of the thermal envelope is affected
- the thermal performance is no more than 20% below the original building element (when replacing doors and windows).

Therefore, increasing the glazed area by more than 2% of the thermal envelope or making the thermal performance more than 20% worse than the original triggers the need to comply with H1.

## If upgrading, make it worthwhile

Where new glazed areas lower the thermal performance, one option is to increase the thermal performance of a wall, ceiling or floor to at least cover the increased heat loss the proposed glazing has caused.

However, there is no point just insulating a small part of a wall, floor or ceiling. If upgrading one of these elements, upgrade at least the whole floor, wall or ceiling in the room affected – insulating part of a wall may satisfy the H1 requirement, but in reality, whole walls, ceilings or floors in a room need to be insulated to make a worthwhile difference.

## Demonstrating compliance

Proposed additions (i.e. new work) need to be assessed for H1 compliance. Compliance with the H1 Acceptable Solution can be demonstrated using the NZS 4218 schedule method or calculation method. *Codewords 32* and NZS 4218:2009 appendix D say only the addition needs to be considered – the existing building is only considered in glazing totals.

## Schedule method

The proposal must comply with NZS 4218 schedule method glazing rules:

- No more than 30% glazing – this is the combined total of the existing building plus the addition.

- The sum of the glazing on the east, south and west walls is no greater than 30% of the total area of these walls.

- Skylight areas and decorative glazing are within requirements.

For compliance, the required construction R-values for the zone need to be demonstrated for the walls, floor, ceiling and glazing of the addition, and the glazed area must be within the limits above.

If the glazed area exceeds the area requirements or single glazing is proposed in the addition, the calculation method must be used. The schedule method requires a minimum glazing R-value of R0.26, but single glazing in aluminium only achieves R0.15 and R0.19 in timber windows, both below the schedule method requirements.

## NZS 4218:2004 and 2009 calculation methods

Rules in the NZS 4218 standards differ, so you must decide which standard you are going to use – you cannot mix them. The key differences are:

- NZS 4218:2004 calculation method allows up to 50% glazed area
- NZS 4218:2009 calculation method allows up to 40% glazed area.

### OPTION 1 – CONSIDER THE WHOLE HOUSE

If the proposed addition is to have some single glazing or other elements that are below the schedule values, it may be better to consider the whole house (existing and addition) as if it were a new house. This gives more options to upgrade the existing part of the house to compensate for deficient areas in the proposed addition.

Glazing area rules again apply to the existing building and proposed addition combined. Calculate a reference building by combining the existing building and proposed addition to set up a reference point of compliance, i.e. an acceptable heat loss. If the glazed area is no more than 30%, the reference building glazing is set at 30% glazing and 70% walls. If the glazing is over 30%, the glazing areas and wall areas are set at the actual percentage areas of glazing and walls.

Apply the glazing rules from the selected standard – NZS 4218:2004 or 2009 – to the total glazed area. The reference building's glazing is rated at R0.26 for the first 30% of the glazing, with glazing over 30% treated according to the chosen version of NZS 4218.

Use the R-values in the schedule method tables for the chosen version of NZS 4218 to calculate the heat loss for the walls, ceilings, floor and glazing. Add these together to get the acceptable heat loss.

For the proposed addition, consider the proposed insulation levels for the areas of the addition, i.e. divide the respective areas by the construction R-values for the walls, ceilings, floor and glazing, and add these together to calculate the heat loss of the addition.

Calculate the heat loss for the existing building – initially use the heat loss values of the reference building that apply to the existing building. These totals calculate what the heat loss would be if the existing building was already compliant. Add the heat loss of the addition and the existing building together.

If the total heat loss exceeds the reference building heat loss, upgrade some of the values in the proposed addition until the heat loss for the proposed addition and existing building match or better the reference building heat loss.

If the heat loss of the reference building cannot be equalled by upgrades in the proposed addition, upgrades to the existing building are required.

#### OPTION 2 – CONSIDER THE ADDITION ONLY

Glazing area rules again apply to the existing building and the proposed addition combined.

Using the calculation method, calculate the acceptable heat loss for the reference building for the proposed work. Use the schedule method values and apply them to the proposed new addition. This means that the reference building's glazing is rated at R0.26 for the first 30% of the glazing and the area over 30% is treated according to the chosen version of NZS 4218.

Next calculate the heat loss for the proposed addition:

- Use the same element areas (walls, ceilings) as the reference building.
- Take the areas of the individual elements, for example, walls, and divide by the construction R-value intended for the element to get the actual heat loss for that element.
- Use the actual areas for the walls, ceilings, floor and glazing and individually divide them by their respective construction R-value to get a total for each element.
- Add each of the element's heat losses together to calculate the total heat loss for the proposal.

To meet H1 compliance, the proposed addition's heat loss must be no greater than the reference building.

#### OPTION 3 – CELL APPROACH

There is an alternative method for a proposed small predominantly glazed extension where the glazed area for the whole house complies using the schedule or calculation method rules, for example, extending a bedroom to become a new living area with some windows and doors to a deck.

It may be possible to satisfy H1 requirements by considering this room as a 'cell'. Treat the cell as all new work and upgrade walls to the current requirements by removing interior linings from the interior frames of the old bedroom. The floor and ceiling of the bedroom would also need upgrading to the values required in the schedule method for the given zone.

Use the schedule method of the chosen version of NZS 4218 to show compliance for the total cell. If some single glazing or areas of the cell were unable to be insulated to the schedule method values, the calculation method could be applied to the cell.

This upgrade would create at least one energy-efficient comfortable living space in the house that complies with H1 requirements.

*For further information, see the BRANZ website ([www.branz.co.nz](http://www.branz.co.nz)), then H1 support page. This has links to calculation sheets, tools and articles on clause H1 and NZS 4218:2009. Codewords 32 is available on the DBH website, [www.dbh.govt.nz](http://www.dbh.govt.nz). ♦*