Insulation for Residential Additions

OVERVIEW

The following information pertains to the energy efficiency requirements for additions to existing dwellings and heated residential accessory buildings where an Energy Advisor is not involved. The City of Nanaimo is in Climate Zone 4.

NEW RESIDENTIAL UNITS

Insulation requirements for new dwelling units, including carriage houses, are not covered under this handout. The energy efficiency requirements for new residential buildings are regulated under the City of Nanaimo Building Bylaw and the current Building Code which requires compliance with the Energy Step Code described in Section 9.36.6. of the BC Building Code. Compliance to this "performance" based energy efficiency approach includes submission of documentation required under the BC Energy & Zero Carbon Step Code and prepared by an Energy Advisor. See Energy Step Code and Zero Carbon Step Code for more information.

QUESTIONS & ANSWERS

The insulation requirements have increased in successive BC Building Code versions. Does this mean I will need to change my existing walls to accommodate additional insulation as part of my home renovation?

No, repairs and renovations to existing construction (additions not included) may use materials with the same insulation value or better than the materials originally approved when the dwelling was built.

Can I use the same type of materials in my new addition as exist in my existing dwelling (e.g. 2x4 exterior walls with R-12 insulation)?

No, all new construction for additions must strive to meet the current requirement of the BC Building Code.

Will I need an Energy Advisor to supply an energy report?

Although the Energy Step Code applies to additions and renovations of Part 9 buildings, these codes were developed for new buildings. Requiring an Energy Advisor and report in these situations may not be practical or beneficial. Large additions and extensive renovations will be treated with discretion and judged on a case by case basis. Keep in mind an Energy Advisor can help find the best performance balance for your home and proposed addition, possibly saving you money in energy savings and providing information about energy grants which may be available to you. If you are relying on the expertise of an Energy Advisor, the reports must be submitted as part of your Building Permit application.

DETERMINING THE EFFECTIVE THERMAL RESISTANCE OF THE ASSEMBLY

Thermal insulation requirements are defined in terms of effective thermal resistance. This means looking at the entire assembly to determine the insulation value, as opposed to looking solely at the insulation material used in the assembly. This takes into consideration thermal bridging.

Effective thermal resistance is expressed in either the metric RSI values or the imperial R-values.

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DETERMINING THE EFFECTIVE THERMAL RESISTANCE OF THE ASSEMBLY (cont'd)

Calculations are necessary to determine if your wall, ceiling, and floor assemblies provide the required effective thermal resistance. However, in this guide we have provided a list of the nominal insulation values by assembly to achieve the effective thermal resistance requirements of common construction assemblies.

There are also websites set up to help with the calculation if your construction assemblies are different than those identified below.

Owens Corning – Owens Corning Effective Thermal Resistance Calculator
Canadian Wood Council –
Canadian Wood Council's Instructions for Effective R Calculator & Effective R Wall Calculator

NOMINAL INSULATION VALUES BY TYPE OF ASSEMBLY TO ACHIEVE EFFECTIVE THERMAL RESISTANCE REQUIREMENTS FOR ADDITIONS TO EXISTING DWELLINGS

The following insulation nominal R-values (as labeled on insulation packaging) are provided for convenience only. The construction assemblies for each construction type are assumed to be common construction assemblies or as identified below.

Type of Assembly	Installed Insulation - Nominal R-value
Cathedral Ceilings & Flat Roofs (2x4 purlins on top of joists for venting)	R31
Attic Ceilings (2x4 bottom truss cord, batt, or blown-in)	R42
Attic Ceilings (2x6 bottom truss cord, batt, or blown-in)	R44
Exterior Walls (2x6 @ 16" o.c. with batt insulation)	R20
Floors over Unheated Space (2x10 @ 16" o.c. with batt insulation)	R30
Foundation Walls (8" thick, with 2x4 @ 16" o.c. with batt insulation)	R14
Foundation Walls (8" thick, with continuous rigid insulation)	R12
Heated Floors (slabs)	R12
Unheated Floors (slabs) Above Frost Line	R10
Garage Doors (when heated)	R6.25
Attic Hatch	R15

Note that the R-values identified above are nominal values and do not represent an assemblies' effective thermal resistance value.

MAXIMUM U-VALUE OF WINDOWS, DOORS, AND SKYLIGHTS

Doors between the exterior and interior (conditioned space) are permitted to have a U-value not greater than 2.10 where there are three doors or less. Additional doors between the exterior and interior (conditioned space) must have a maximum U-value of 1.84.
Windows must have a maximum U-value of 1.22.
Skylights must have a maximum U-value of 2.92.

If you have any questions or require clarification, please contact Building Inspections at 250-755-4429.
This guide should not be used as a substitute for existing building codes and other regulations.
The building owner is responsible for compliance with all codes, bylaws, and other regulations.