

Energy Code Requirements for Buildings

Effective January 1, 2019, the National Energy Code for Buildings 2017 (NECB 2017) and Section 9.36 of the National Building Code 2015 come into effect in the province of Saskatchewan. The new energy requirements will apply to building permit applications received on or after January 1, 2019.

As per Article 9.36.1.3 of NBC 2015, the code applies to the design and construction of all buildings and additions including:

- Section 9.36 of the NBC 2015 applies to:
 - Part 9 buildings of Group C occupancy
 - Part 9 buildings of Group C, D, E, or F3 occupancies where the combined floor area of non-residential occupancies does not exceed 300 m²
 - **Note:** Section 9.36 does NOT apply to all Part 9 buildings. Therefore Part 9 buildings that do not fall within the scope of Section 9.36 are required to adhere to the NECB
 - Section 9.36 will be applied to new buildings and additions. Consideration will continue to be made regarding the application to alterations and renovations.
- NECB 2017 applies to:
 - Part 3 buildings
 - Part 9 buildings that are beyond the scope of Section 9.36
 - Any building to which Section 9.36 applies, but the owner/applicant chooses to conform to the NECB
 - The NECB specifically applies to new buildings and additions

The energy codes provide various compliance pathways including:

- Prescriptive
 - Prescriptive provides a set of minimum build requirements which can be used to obtain direct compliance. Plans must be drafted and include standardized notes.
- Prescriptive with Trade-Off
 - Trade-off applies to construction options to above ground building envelope components and assemblies. Plans that incorporate a simple trade-off option must show applicable calculations.
- Performance (Energy Modeling)
 - Performance requires that the structure in question has all aspects calculated to meet a minimum energy load. This design must be completed by an engineer or architect.

Definitions:

Competent person - is defined as a person who is familiar and fluent with building design under Section 9.36 of the NBC and acceptable to the Authority Having Jurisdiction.

NECB: A design professional (an engineer or architect licensed to practice in Saskatchewan) will be required to complete the design, review and inspections for conformance to NECB

Addition - means any conditioned space that is added to an existing building that increases the building footprint and / or the above grade floor area.

Energy Efficiency includes requirements affecting building envelope, heating, ventilation and air conditioning (HVAC), and service water heating.

These are intended to address:

- Air leakage
- Uncontrolled thermal transfer
- Unnecessary energy demand or consumption for heating and cooling, service water heating, and electrical equipment and devices
- Inefficiency of equipment and systems
- Unnecessary rejection of reusable waste energy

There are three possible paths to achieve the energy efficiency requirements:

Prescriptive Path

The prescriptive path offers distinct actions to directly move a building project toward an end goal of higher efficiency. Prescriptive path includes minimum R-values for insulation of wall and roof assemblies, acceptable infiltration rates, and efficiency requirements for mechanical systems such as water heaters and HVAC equipment. This path is considered easy to follow because it clearly lays out what is acceptable and requires little, if any, analysis on the part of the project designer.

Depending on the complexity of the project you are building, if you are incorporating a tall wall or a feature window, the calculations must be provided with Code references of how you will meet the minimum requirements from above.

Trade-Off Path

If you need some flexibility in your design, a trade-off path applies to above ground building envelope assemblies and components within a single building. This path has some limitations such as:

- Cannot trade-off airtightness measures, doors, and access hatches;
- Walls and attic roofs cannot be reduced below 55% of required RSI-value;
- Other opaque assemblies cannot be reduced below 60% of required RSI-values;
- Cannot be applied to heated assemblies (i.e. embedded heating cables);
- Cannot be applied to components and assemblies already exempted (i.e. site-built windows, glass block and storm doors).

Performance Path

The performance path offers the designer or builder the most flexibility for demonstrating compliance. It is often the only alternative when the design is non-compliant due to innovative construction methods or materials, and large amount of fenestration. This path you must simply demonstrate that the proposed design will not consume more energy than an equivalent building built to a prescriptive requirement. This compliance path requires an hourly building energy simulation specialized software. This will require a professional stamped design from an engineer or architect.

The National Energy Code of Canada for Buildings

This sets out technical requirements for the energy efficient design and construction of new buildings. This path requires a professional stamped design from an engineer or architect inclusive of all disciplines. **Plans submitted under the NECB must specify compliance with the NECB and that the project has been designed specific to our Zone.**

These requirements will vary across the province (zones) and are based on Appendix C Table C-2 Climatic Design Data from the NBC for the number of degree days below 18° C.

For **Zone 7A** (5000 – 5999), section 9.36 requires assembly to reach the following Effective Values:

	Effective R value (<u>With an HRV</u>)	Effective R value (<u>Without an HRV</u>)
Ceilings Below attic (attic space)	R49.2 <> RSI 8.67	R49.2 <> RSI 10.43
Cathedral ceiling/flat roof	R28.5 <> RSI 5.02	R28.5 <> RSI 5.02
Walls	R16.9 <> RSI 2.97	R16.9 <> RSI 3.08
Floors over unheated space	R28.5 <> RSI 5.02	R28.5 <> RSI 5.02
Basement walls	R16.9 <> RSI 2.98	R16.9 <> RSI 3.46

For **Zone 7B** (6000 – 6999), section 9.36 requires assembly to reach the following Effective Values:

	Effective R value (<u>With an HRV</u>)	Effective R value (<u>Without an HRV</u>)
Ceilings Below attic (attic space)	R49.2 <> RSI 10.43	R49.2 <> RSI 10.43
Cathedral ceiling/flat roof	R28.5 <> RSI 5.02	R28.5 <> RSI 5.02
Walls	R16.9 <> RSI 3.08	R16.9 <> RSI 3.85
Floors over unheated space	R28.5 <> RSI 5.02	R28.5 <> RSI 5.02
Basement walls	R16.9 <> RSI 2.98	R16.9 <> RSI 3.46

Effective R values are the insulating value of an assembly as a unit. In the past, if an R20 insulation batt was in a wall, it was considered to be insulated to R20. Now batt insulation is just a factor in considering the whole assembly and the Nominal R-value is the design value for the entire assembly as a whole.

The following are the minimum calculated requirements with an HRV. **Without an HRV, all requirements increase.** Other designs will be acceptable **if calculations and all required information** have been submitted for review.

Walls, Ceilings & Floors (actual insulation values with an HRV installed):

- For a 2x6 wall system 16" on center, the minimum will be R24 Batts in the wall cavity.
- For a 2x6 wall system 24" on center, the minimum will be R22 Batts in the wall cavity.
- A 2x6 wall with R20 batts will require exterior side insulation (R2).
- A tall wall (a wall that exceeds 11' 6" in height) must be calculated separately from other walls.
- For basement perimeter walls, 2x6, 24" on center, 6 mil poly, R20 batts and 1 1/2 gyproc, rim joist spaces require the same insulation as in the above grade walls, with the air space behind the frame wall.
- Pressure treated wood foundations will require R22 in the cavity.
- Below attic (attic space) will require R60.
- Cathedral ceiling/flat roof require R28. Cathedral ceilings must have a continuous air space cavity above the insulation.
- Shallow foundations will require R10 under the floor slab.

- Floor with in-floor heating will require R15 below the slab.
- The floor below a living space above an attached garage will need R24 batts.
- A foundation below frost will not need floor insulation.
- Truss heels need to be designed so that a minimum R20 cover can be provided at the wall junction and so the design standard of R60 is achieved 4 feet from the juncture. (See illustration below)

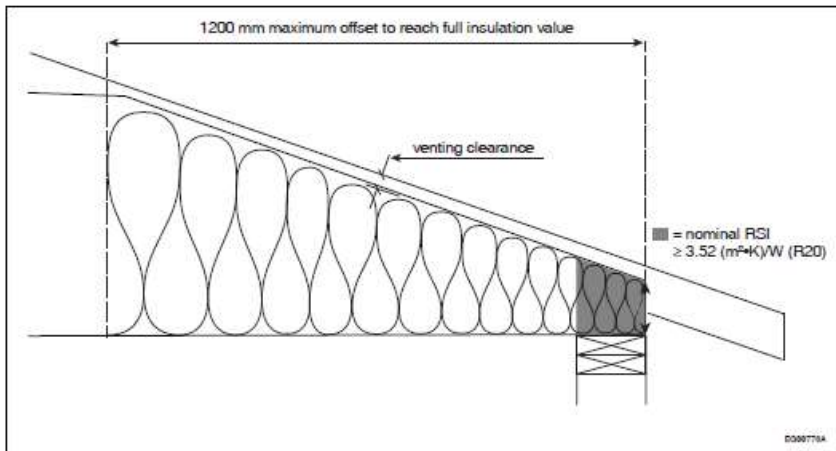


Figure A-9.36.2.6.(3)

HVAC Systems

There are specific requirements for HVAC systems, air conditioners and fuel-fired appliances, such as furnaces, hot water heaters and gas fireplaces, as well as the controls installed for these appliances.

It is important to note the following:

- Thermostatic controls are to be activated by +/- 0.5 degree temperature changes;
- HVAC equipment must meet minimum performance requirements;
- Gas fired appliances must be direct vent and have pilot on demand;
- Humidification on HVAC requires controls;
- Heating and cooling systems must be prevented from operating at the same time;
- Ducts that discharge to the outside must have a motorized, gravity operated or spring-operated damper;
- All intake ducts must have a motorized damper unless specifically defined otherwise by regulation;
- All outside ducts and piping must be insulated and sealed to meet the same standard as the wall assembly.

Windows & Doors

Required U-value for Zone 7A is 1.60 with a minimum Energy rating of 25

Required U-value for Zone 7B is 1.40 with a minimum Energy rating of 29

Regarding the U-value the lower the number the better and the Energy rating the higher the number the better.

This will be a minimum triple pane window with 2 panes having Low E coatings. Metal frames are not allowed.

Skylights need a U-value for Zone 7A is 2.70 and for Zone 7B is 2.40.