Nebraska Residential Energy Code Fact Sheet: 2018 IECC

Legal

The unamended 2018 IECC was adopted in Nebraska statewide on July 1, 2020. The residential provisions of the code apply to any new building, addition, or renovation of either a detached one- or two-family dwelling and townhouses as well as Group R-2, R-3, and R-4 buildings three stories or less above grade. A renovation means alterations which will cost 50% or more of the replacement cost or if it was not previously heated or cooled.

Local Codes

State statute 81-1618 allows for local jurisdictions to adopt their own energy code, given that it does not result in any greater energy consumption. A specific requirement may be waived if the requirement is not economically justifiable and reviewed by the NDEE.

Insulation & Fenestration

The below table is a quick reference guide to the insulation R-Values and U-Factors for various building envelope components.

Component Type	R-Value	U-Factor
Windows & Doors	N/A	0.30
Skylights	N/A	0.55
Ceiling	49	0.026
Wood Frame Wall	Cavity: 20 or 13+5	0.060
Mass Wall	Cavity: 17 Cont.: 13	0.082
Floor	30	0.033
Basement Wall	Cavity: 19 Cont.: 15	0.050
Slab On-Grade	10, 2ft	N/A
Crawl Space	Cavity: 19 Cont.: 15	0.055

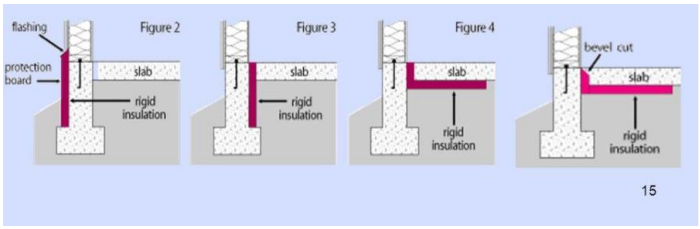
The R-Values in the tables represent only the value of the installed insulation product itself, not the rest of the assembly. The U-Factors in the table are calculated from the entire assembly. Non-fenestration U-Factors must be measured or calculated, so the R-Value column is typically easier to use.

UA Tradeoff Alternative

Different elements of the residential building envelope can be traded off using a total UA alternative method. The intent of this method is to allow designers and builders flexibility in designing homes, while still ensuring that the intended energy conservation of the code is being maintained. If one assembly's U-Factor falls short of the requirements from the table and there isn't a way to easily keep the design and reach the value, another assembly's U-Factor can be improved to compensate. The key is that the overall performance of the home still meets the maximum heat loss requirements of the code. The most common tool used to comply via this method is *REScheck*. If *REScheck* or computer simulation software is not used to show compliance with the code, then each component of the building envelope will need to meet the table (either the R-Value or U-Factor column) with no tradeoffs.

Slab On-Grade

Slab on-grade edge insulation needs to be installed all the way up to the top of the slab edge. This is done to create a continuous thermal barrier from the bottom of the wall assembly down a minimum of 2 feet. Slab edge insulation that stops at the bottom of the slab edge has almost no effect on preventing heat loss through the slab, since the top of the slab is exposed to the largest temperature difference.



HVAC Sizing

Load calculations for heating and cooling equipment must be calculated using an ACCA Manual J approved software. "Rule-of-thumb" methods are commonly outdated, unreliable, and commonly lead to oversized equipment, particularly cooling equipment. Oversized cooling equipment will short cycle, which will negatively impact the efficiency of the system and the humidity levels in the

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home. This leads to increased energy costs, increased up-front costs, decreased equipment life, decreased comfort levels, and potential mold growth. Because of these issues, heat pumps must be sized according to the cooling load and not the heating load. The difference is to be made up with supplemental heating.

Air Leakage

The whole home air leakage needs to be tested via a blower door test. The total leakage needs to be less than 3 air changers per hour at 50 pascals of pressure difference. If the home does not pass, further air sealing measures will need to be employed until it is brought into compliance.

Duct Leakage & Insulation

A duct leakage test needs to be performed on duct systems with ductwork located outside of the building thermal envelope. The portions located in the attic need to be insulated to R-8 for 3" wide ducts on up, and R-6 for smaller. In other portions outside the thermal envelope, the requirements decrease to R-6 and R-4.2, respectively. Ductwork being buried in attic insulation does not exempt them from these provisions. The duct system needs to be tested and measured of having no more than 4 CFM per 100 square feet of conditioned floor area. If the air handler is not installed yet, the testing maximum is 3 CFM instead of 4 CFM. If all the ductwork is located within the building thermal envelope, this testing is not required. All ducts must be sealed with UL-181A or UL-181B tapes or mastic regardless of duct location.

Building Cavities

Building framing cavities are not to be used as ducts or plenums whatsoever, even for return air paths. Panning of cavities is not allowed either. Fully enclosed and sealed ductwork can be placed inside of building cavities, but no portion of a wall, floor, or ceiling assembly itself can be part of the duct system. This is to ensure that the ductwork is sealed properly and that the conditioned air gets delivered to its intended location. Door undercuts are also not allowed, as there needs to be a low resistance return air path.

Mechanical Ventilation

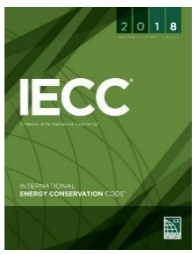
A whole-house mechanical ventilation system needs to be installed in every home. This can be done with an exhaust only, a supply only, a balanced system, or with a heat or energy recover ventilator (HRV or ERV). These systems can be designed to operate continuously or at least for 1 hour every 4 hours. Equation 15.-1 or Table M1505.4.3(1) in the 2018 IRC are to be used to calculate the required ventilation CFM. If the system is designed to operate less than continuously, then the calculated CFM must be increased proportionally. There are minimum efficacy requirements outlined in table R403.6.1 of the 2018 IECC. An economical option is to use a bathroom exhaust fan that, in addition to its normal function, has the ability to quietly operate continuously at a selectable low CFM. Another potentially economical option is to install a motorized damper in a fresh air duct on the return side of the system that operates in conjunction with the air handler to provide the proper amount of fresh air to the home.

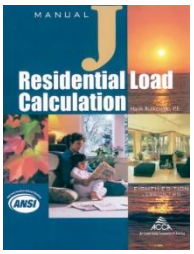
Floor Area (ft^2)	0-1 Bedrooms	2-3 Bedrooms	4-5 Bedrooms
<1,500	30 CFM	45 CFM	60 CFM
1,501-3,000	45 CFM	60 CFM	75 CFM
3,001-4,500	60 CFM	75 CFM	90 CFM
4,501-6,000	75 CFM	90 CFM	105 CFM

Hot Water Piping

Generally, all hot water piping must be insulated to at least R-3. There are additional requirements for recirculation systems.

Note: This document only lists common questions and compliance issues pertaining to the Nebraska Energy Code. For the full code requirements, please see the 2018 edition of the International Energy Conservation Code.





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