1991

NF91-40 Insulation Information for Nebraska Homeowners

Ann Ziebarth

Nebraska Cooperative Extension NF91-40

NebFact

Published by Cooperative Extension, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln

Insulation Information for Nebraska Homeowners

Ann Ziebarth, Extension Housing Specialist

The U.S. now consumes 76 quadrillion Btu of energy per year. This is enough energy to light one home for 20 billion years![1] Over half of the energy used in the average American home is for heating and cooling. Another 20 percent goes for heating water. Sufficient insulation can help limit the total household energy use. Investing in insulation can make a substantial difference in energy use —and the energy bills.

How Much Insulation Is Needed?

Insulation is usually measured in inches of thickness. R value, however, is a better indicator of effectiveness. R stand for resistance and indicates the capacity of insulation to resist heat flow. The higher the R value, the better insulation.

The Nebraska State Department of Energy recommends that for homes with electric heat the attic insulation should be an R-49. For those homes heated with gas and oil the attic insulation recommendation is R-38. Floors and basements should have an R-19 level of insulation. The Model Energy Code recommends an R-22-R-25 for floors and an R-22 for wall insulation.

Insulation Materials

Any product with a relatively high resistance to heat flow can be considered an insulator. A list of common materials with their respective R-values and brief comments is provided in Table 1.

New homes frequently have a combination of insulating materials. Rigid foam boards are often placed over the exterior plywood and at the foundation, vapor barriers and fiberglass batts are used on exterior walls and attic roofs. Cellulose fiber and mineral wool are less often used as the other materials are easier to handle and are often more energy efficient.

In retrofitting older homes, a layer of fiberglass batts can be used over existing insulation in unfinished

attics. Cellulose fibers or urea formaldehyde can be blown into exterior walls through holes drilled between studs. If major interior remodeling is planned, walls can be removed, fiberglass batt insulation and a vapor barrier installed, and the interior wall then finished with new plasterboard. In some cases, such as when finishing basement areas, an "add-on" method is used. This involves furring out or studding the existing interior walls and placing insulation between the strips or studs. Rigid insulation such as styrofoam, polystyrene, or foil-coated urethane can be used. The new wall must then be covered with paneling or sheetrock for fire safety.

Vapor Barriers and Ventilation

Good vapor barriers are a necessity with well insulated homes. Vapor barriers restrict the passage of moisture through walls and ceilings protecting them from condensation which can cause peeling paint, damage the building structure, and lower the effectiveness of the insulation material.

Aluminum foil and 4-mil plastic sheeting make effective vapor barriers; kraft paper is less effective. A vapor barrier is always placed next to the living areas or against the warm side of a wall, ceiling, or floor.

To be effective, a vapor barrier must be continuous. Do not install a vapor barrier between layers of insulation or moisture can be trapped in between.

Ventilation is the changing of air in any space and is useful to remove moisture, odors, smoke, heat, and airborne bacteria. An attic should be vented to remove summer heat and winter moisture. Vent openings should equal 1 square foot for each 300 square feet of attic floor area. Never block vents with insulation.

Poorly insulated houses without proper ventilation lose enough heat to melt snow on the roof in the winter. The water flows down the roof and refreezes on the cold overhang forming an ice dam that backs up water and can damage the roof. Adequate attic insulation with gable and eave vents will keep the attic cold enough to eliminate most ice dam problems.

Avoiding Insulation Fraud

Properly installed insulation can result in up to a 50 percent savings in both heating and cooling costs. If you plan to hire a contractor to install insulation, here are some useful suggestions to avoid possible fraud:

1. Be Informed. Learn the different types, costs, benefits, and other comparisons among insulation materials available.

2. Obtain names of reputable insulation contractors from local building suppliers, utility and power companies, bank and loan agencies, or Better Business Bureaus.

3. Write down a rough set of specifications for the job you have in mind. List work to be done, kinds of materials to be used, expected time frame, and clean-up details that you want the contractor to meet.

4. Call at least three contractors. Let them inspect the job to be done, get their opinions, and a cost estimate. Ask the contractor for references. Do not obligate yourself until you can compare the estimates.

5. Contact the references supplied by the contractor. Ask the customers about their satisfaction, hidden costs, results of the insulation job.

6. Put it in writing. A contract may be handwritten but it should include: your name as the property owner, the contractor's name, a listing of the job to be done, total cost (including materials, labor, taxes, and any fees). Note any guarantee or warranty supplied by the contractor, and estimated date of completion. Finally, get signatures of the owner, contractor, and two unbiased witnesses and date the agreement.

7. Inspect the work and make sure you are satisfied with the job **before** the last payment is made.

Information Sources

- How To Determine Your Insulation Needs. USDA Fact Sheet (AFS-2-3-8). December 1978.

- Including Energy Efficiency on the National Agenda by Rhonda Snider. Texas Energy and Natural Resources. June-July 1989.

- Model Energy Code. Congress of American Building Officials. 1988.

- Save Energy Save Dollars. Information Bulletin 125. New York State Cooperative Extension. 1977.

- Tips on Avoiding Insulation Fraud. Mississippi Energy Extension Center, Cooperative Extension Service, Mississippi State University. 1979.

Insulation Products Summary

PRODUCT	R VALUE PER INCH	COMMENTS
Cellulose fiber	3.6	Usually made from wood and vegetable fibers and treated with flame retardant chemical. Readily absorbs moisture which may affect flame retardant chemicals. Usually has boric acid or borax to resist rodent and varmint attraction caused by starch.
Mineral wool fiber glass	2.0-3.7	Made from rock slag or glass. It will not burn. Moisture can collect on fibers but when dry, R value is regained. Is available in loose fill, batts and blankets.
High density fiber glass	3.36-5.0	Available to contractors only.
Urea formaldehyde	4-4.5	Resists spread of flames in case of fire. May absorb moisture but dries to original condition. Is formed in place. Not a do-it-yourself job as improper installation may result in indoor air quality problems.
Expanded polystyrene, molded beads	3.57	Rigid insulating board. Should be covered because toxic fumes may be released in case of fire.

Soil	0.1-1.0	Insulation value of soil is extremely variable. For example, in very dry soil heat transfer is 0.1 btu/hour/foot/°F; thus, one foot on a roof would have an R value of R-10. However wet soil may have an R value of only R = 0.5.
Extended polystyrene	5.4	Rigid insulating board. Should not be left exposed (such as in a basement) due to possible toxic fumes in case of fire. Blowing agents which are used in manufacturing may contain chlorofluorocarbons (CFCs) resulting in this type of insulation being banned in Connecticut, Iowa, Indiana, Maine and Rhode Island. Manufacturers are now developing new processes which have less negative impact on the environment.

*** Sources:** Peterson, Roger (1983) Insulation, R = value + fuel savings. University of Minnesota Extension Folder No. 591. Alvaraz, Mark (1991) 'Energy Barriers' Practical Homeowner, (January) 42-50.

File NF40 under HOUSING AND EQUIPMENT: HOUSE PLANS
C-1, Building, Remodeling
Issued July 1991

Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Elbert C. Dickey, Director of Cooperative Extension, University of Nebraska, Institute of Agriculture and Natural Resources.