

Ventilation, Insulation

# Key Features of IDEAL Home Secure Quality, Value

Energy efficient construction requires attention to detail, which will lead to a well-built home. This will not only make the home affordable to own because of its energy efficiency, but it will also survive the test of time.

There are three key design elements that insure quality and energy savings. They are airtight construction, controlled ventilation, and high levels of insulation. A home that combines all of these features is often called a super-insulated home. We, at the Iowa Energy Policy Council, call it an IDEAL home, which stands for Innovative Designs for Energy Affordable Living.

## Airtight Construction

Why airtight construction? Energy savings is an obvious reason.

The air within the average new home is replaced by outside air approximately once every one to two hours. This accounts for 30 to 40 percent of the home's heating requirement. You can't expect to eliminate all of it, but by using certain construction techniques, you can greatly reduce it.

Another reason to build as airtight as possible is not as obvious, but it is much more important. Air leaking from the home carries moisture with it. Moisture will condense when it hits a cold surface. This condensation can get your insulation wet, lowering its insulating ability.

It can also cause your wood structural members to rot if not given the opportunity to dry out. Air leakage in a new home can result in a house rotting before its time.

Measuring natural air leakage is done with a blower door. The blow-

er door uses a large fan to pressurize or depressurize a home. Measuring the difference in pressure between the inside and outside of the home and the air flowing through the fan, yields an induced air change per hour (acph) rate. A properly built airtight home will yield an air change rate between one and three air changes per hour.

Blower doors are also used to locate leaks so they can be sealed. When a house is being pressurized, a technician uses a smoke stick to locate the leaks and then properly seals them.

There are companies today that specialize in this type of service. Search one out to be sure your home is built with airtight quality.

## Controlled Ventilation

Controlled ventilation is essential to an IDEAL home. It may seem illogical to bring in outside air after

going to great lengths to build an airtight house, but a controlled ventilation system has significant advantages over natural air leakage. These advantages include energy savings, a healthier environment, and a home free of moisture problems.

In a conventional home, air leakage can average one air change per hour. But, there are times when no air is moving through a home. A controlled ventilation system, however, provides a constant flow of fresh air and increases ventilation when it is needed most. It also ensures that common indoor air pollutants, such as tobacco smoke, are kept at a harmless level.

A home should be built as tight as possible, with air exchange provided by a controlled ventilation system. Such a system can be integrated with the heating, cooling and water heating systems. But, that information is another article by itself.

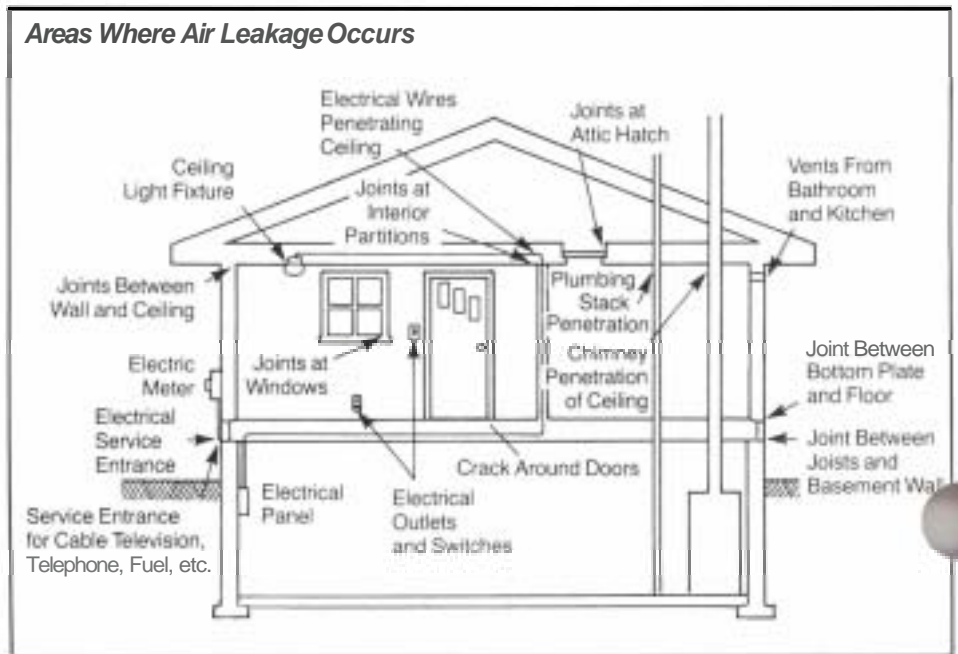
## Insulation

The IDEAL concept demands that the entire envelope of the home — foundation, walls, ceiling, windows, and doors — has appropriate insulation to minimize heat loss.

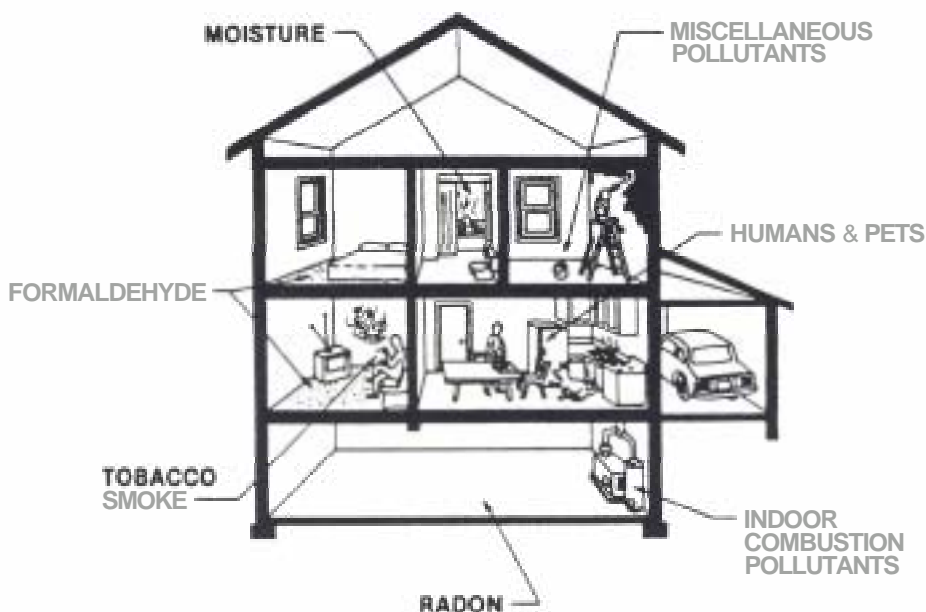
The recommended R-values for various building components are:

Ceiling - R-40

Walls - R-25



## Common Indoor Air Pollutants



Band Joist - R-25

Foundation Walls - R-12

Floors over unheated spaces - R-30

Windows - R-3

Doors - R-15

R-value refers to the material's ability to stop heat from passing through it. The higher the R-value, the greater the resistance to heat loss.

Attention should also be paid to reducing thermal defects, especially in places where cold can penetrate through building materials. Places often overlooked are where the garage, outside patio, porch or stoop slabs meet the foundation of a house, or where a concrete retaining wall connects to the foundation. These thermal defects can make a home, which appears to be well insulated, a poor conservation investment.

## Home Heating Index

To measure the energy efficiency of a house as a whole, extension specialists at Iowa State University developed the Home Heating Index (HHI). It is a number, usually between 1 and 15, that describes the

energy efficiency of a home. The lower the number, the more efficient the home.

Its units are BTUs (British Thermal Units) per square foot of heated floor space per heating degree day (a measure of the severity of the winter). It can be calculated before the house is built, using the R-values of the components. Or, it can be obtained after the house is built, using the heating and electric bills.

An older home without efficiency improvements can have an HHI as high as 15. The average older home in Iowa has an HHI of around eight. The average new home built in Iowa in 1984 has an HHI of around five. A home built to the IDEAL specifications should have an HHI of between one and three.

In the next issue, we'll highlight three energy-saving construction methods.

For answers to questions on the information printed here or on other energy issues, call the Iowa Energy Hotline at 1-800-532-1114; in Des Moines call 281-7017.

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