

HIGH PERFORMANCE BUILDINGS HOW INSULATION ADDS UP

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HIGH PERFORMANCE BUILDINGS

HOW INSULATION ADDS UP

- **Overview**
- How Insulation Works
- How Insulation Is Measured
- Where Insulation Fits In Buildings
- The Benefits Of Insulation
- Building Codes and Insulation Requirements
- Insulation In High Performance Buildings

HIGH PERFORMANCE BUILDINGS

HOW INSULATION ADDS UP

- Heat energy flows from hot to cold

- Conduction – physical contact



- Convection – air currents



- Radiation – heat rays



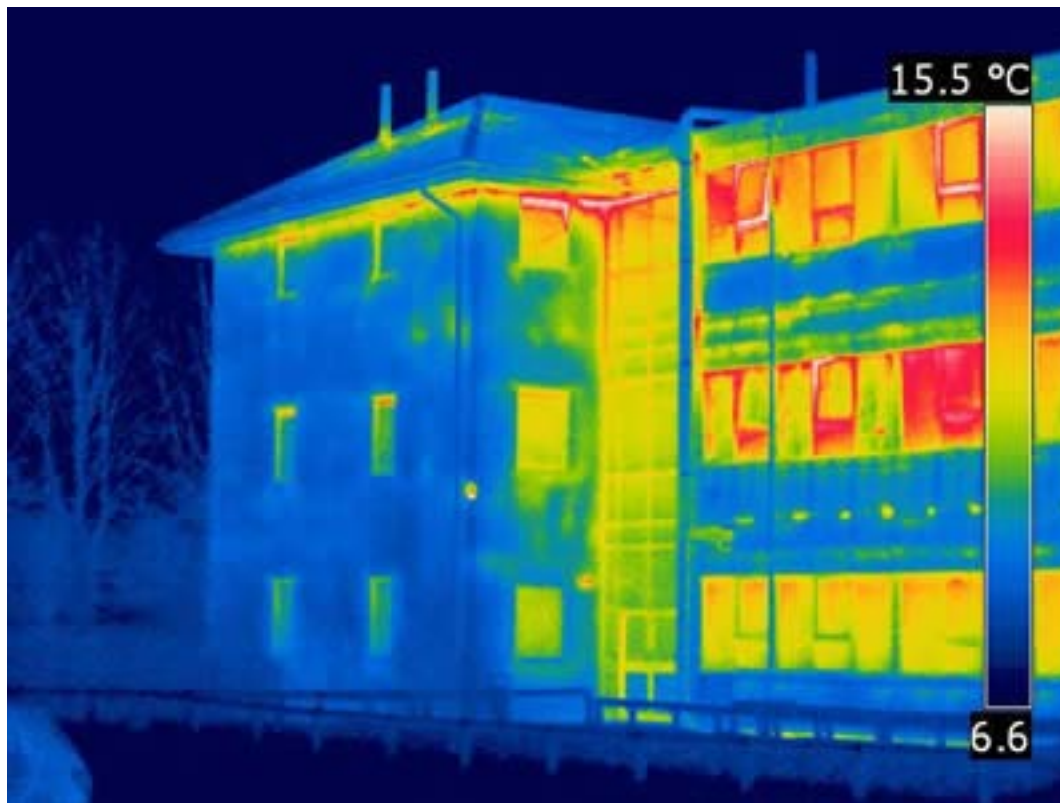
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Insulation is made in many forms

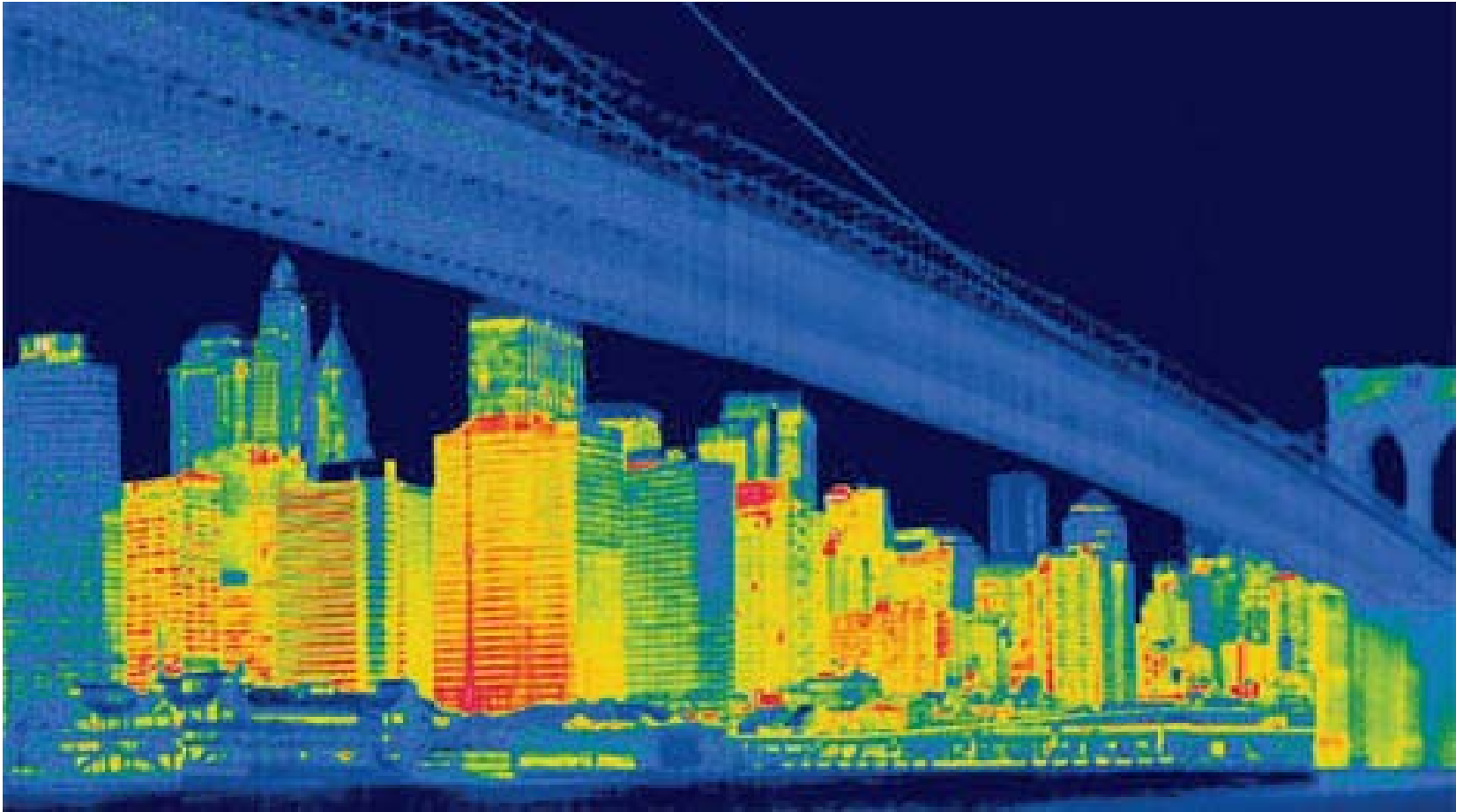


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- Insulation slows heat flow



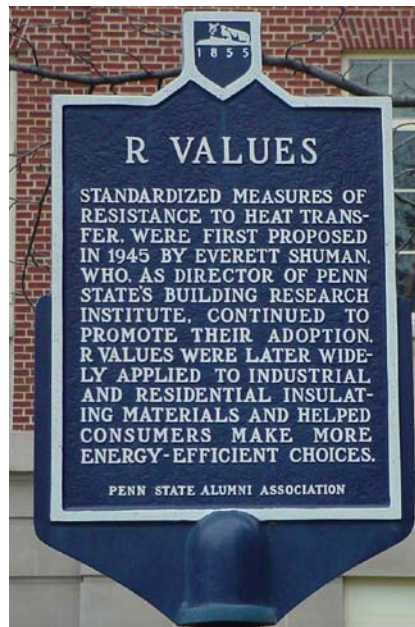
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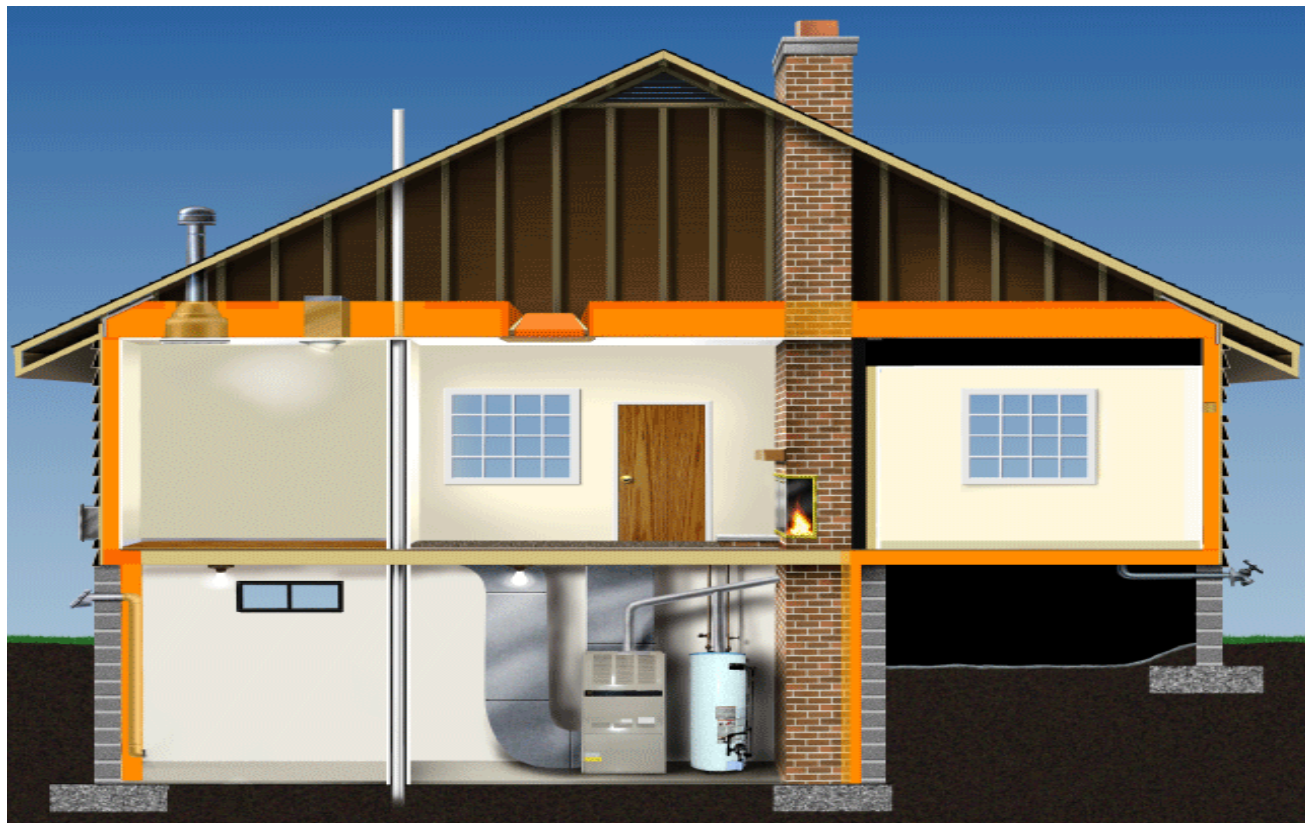
- R-value is a measure of thermal resistance
- The greater the R-value, the greater the resistance to heat flow



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HOW INSULATION ADDS UP

Insulation goes in floors, ceilings walls and roofs



HIGH PERFORMANCE BUILDINGS HOW INSULATION ADDS UP

It's easier to add insulation to a new building



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Insulated Buildings Improve the Environment:

- Insulation currently in place in U.S. buildings reduces the amount of carbon dioxide by 780 million tons each year.
 - This is the equivalent of over 150 coal-fired power plants.
 - This is the equivalent to the electricity use of over 90 million homes for one year.

- An additional 146.75 million tons of carbon dioxide could be avoided each year if insulation levels in buildings were increased to code.
 - This is the equivalent of an additional 29 coal-fired power plants or the additional electricity use of over 17 million homes for one year.

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Well Insulated Buildings Improve National Security:

- America uses about 101 quadrillion Btus of energy per year. This equates to the energy equivalent of 56 barrels of oil per person per year. 12 quadrillion Btus are saved each year by insulation in homes. (1 quadrillion = 1000 x 1 trillion)
 - This is the equivalent of 40 million Btus or the energy equivalent of 7 barrels of oil per person per year.
- Reducing dependence on foreign energy imports can stabilize energy prices and provide predictable costs for businesses and homeowners

HIGH PERFORMANCE BUILDINGS

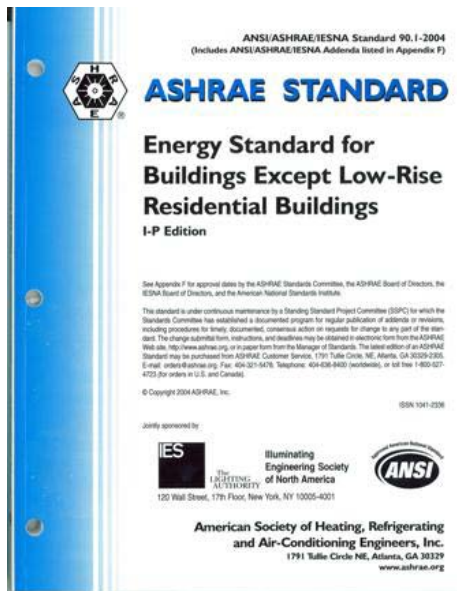
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Well Insulated Buildings Are More Affordable:

- Insulation helps reduce the burden of increasing energy prices.
- Increasing the insulation in an under-insulated building results in a decrease in monthly utility bills
- Well-insulated homes have reduced the size (capacity) of heating and cooling equipment.
- Properly insulated buildings improve property values and have been shown to increase the return on rented and leased properties
- Insulation is a one-time cost that lasts for the life of the building (typically 50-70+ years) and requires no further maintenance

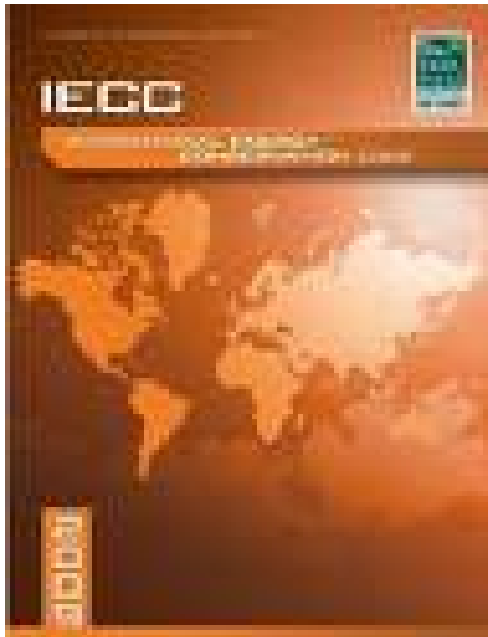
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- Commercial Energy Code - ASHRAE 90.1 Energy Standards for Buildings



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- Residential Energy Code – International Energy Conservation Code (IECC)



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How does building insulation contribute to high-performance buildings?

High-performance building means a building that integrates and optimizes on a life cycle basis all major high performance attributes, including energy conservation, environment, safety, security, durability, accessibility, cost-benefit, productivity, sustainability, functionality, and operational considerations.

Energy Independence and Security Act of 2007 §401(PL 110-140)