What are Building Energy Codes?

Worksheet

Building energy codes are mandatory regulations (e.g., IECC, national building codes) that set maximum U-values, minimum insulation levels and system efficiency requirements a new or renovated building must meet before it can get a permit.

Questions

1. A wall has R = 2.0 mK/W. What is its U-value?

A) 0.50 W/mK
B) 2.0 W/mK
C) 0.20 W/mK
D) 5.0 W/mK

2. What does a LOWER U-value mean?

A) Worse insulation
B) Better insulation
C) Higher energy use
D) No effect on energy use

3. Building energy codes typically set limits on

A) Only paint color
B) U-values and system efficiency
C) Furniture layout
D) Parking spaces

4. Why do energy codes vary by climate zone?

A) Random regional preference
B) Colder/hotter zones need different insulation levels to save energy
C) They don't vary
D) Only cost differences

5. A wall assembly has a total thermal resistance R = 2.5 mK/W. Find its U-value and check it against a code limit of 0.35 W/mK.

6. Adding insulation raises R from 2.5 to 4.0 mK/W. Does the wall now pass the 0.35 W/mK limit?

7. A code requires roof U-value 0.20 W/mK. What minimum R-value is needed?

8. Define: What is a building energy code?

9. Define: What does U-value measure?

10. Define: How are R-value and U-value related?

Answer Key

1. A) 0.50 W/mK - U = 1/R = 1/2.0 = 0.50 W/mK.

2. B) Better insulation - A lower U-value means less heat transfer, i.e. better insulation.

3. B) U-values and system efficiency - They regulate thermal performance and system (HVAC/lighting) efficiency.

4. B) Colder/hotter zones need different insulation levels to save energy - Requirements are calibrated to each zone's heating/cooling demand.

5. U = 1/R = 1/2.5 = 0.40 W/mK 0.40 > 0.35, so the wall FAILS the code limit - more insulation is needed.

6. U = 1/R = 1/4.0 = 0.25 W/mK 0.25 < 0.35, so the wall now PASSES the code limit.

7. U = 1/R R = 1/U R = 1/0.20 = 5.0 mK/W minimum roof resistance required.

8. A mandatory regulation setting minimum energy-performance requirements (insulation, U-values, HVAC efficiency) that buildings must meet.

9. Thermal transmittance - how much heat passes through a building element per m per degree of temperature difference (W/mK). Lower is better.

10. U-value is the inverse of total thermal resistance: U = 1/R.