

| Mass Factors for 6-inch Concrete Walls Insulated Interior or Exterior for Six Locations | | | | | | | |
|---|---------------------|---------|--------|-------|-------------|---------|------------|
| R-value | Insulation Location | Atlanta | Denver | Miami | Minneapolis | Phoenix | Washington |
| R-13-R-17 | interior | 1.3 | 1.4 | 1.1 | 1.3 | 1.4 | 1.3 |
| R-13-R-17 | exterior | 2.1 | 1.8 | 2.3 | 1.5 | 2.5 | 1.8 |
| R-9 | interior | 1.3 | 1.4 | 1.1 | 1.2 | 1.5 | 1.3 |
| R-9 | exterior | 2.0 | 1.8 | 2.1 | 1.4 | 2.6 | 1.7 |
| R-5 | interior | 1.1 | 1.1 | 0.7 | 0.9 | 1.3 | 1.1 |
| R-5 | exterior | 1.5 | 1.4 | 1.5 | 1.1 | 2.1 | 1.3 |

Condensed from research reports by Oak Ridge National Laboratory, Building Technology Center from testing using the guarded hot box apparatus together with computer simulations. Multiply these factors times the R-value determined from a conventional calculation approach to estimate a more accurate R-value, which considers the effects of thermal mass on the wall's seasonal heat transmission.

| Approximate R-Values of Wall Assemblies from Guarded Hot Box Testing | | | |
|---|-------|-------|----------------|
| Wall Type | C-W R | W-W R | W-W R C-W R |
| Standard wood 2x4, R-11 Fiberglass-batt insulated | 10.5 | 9.7 | 92% |
| Standard wood 2x6, R-19 Fiberglass batts, installed perfectly | 15.4 | 12.8 | 83% |
| Standard wood 2x6, R-19 Fiberglass batts, installed typically | 14.1 | 11.7 | 83% |
| Standard wood 2x6, R-19 Fiberglass batts, installed poorly | 13.2 | 11.0 | 83% |
| Steel frame wall C-stud, Fiberglass batts, installed typically | 7.3 | 5.6 | 78% |
| Steel frame wall, Fiberglass batts, 1-inch EPS sheathing | 14.0 | 10.5 | 75% |
| Steel frame wall Fiberglass batts, 0.5 inch EPS sheathing | 10.9 | 8.0 | 73% |
| Steel frame wall with cavity-sprayed polyurethane and fiberglass batts | 11.3 | 8.2 | 73% |
| Structural insulated panel, 6 inches of EPS foam | 24.7 | 21.6 | 87% |
| Concrete block 12-inch, insulated with EPS inserts into cores ^a | 4.2 | 3.9 | 93% |
| Light-weight EPS-bead concrete block, insulated with EPS inserts ^a | 19.2 | 14.7 | 82% |
| Straw insulated panels ^b | 16.5 | 15.7 | 95% |
| Stuccoed 19-inch straw-bale wall ^c | – | 16-28 | – |
| Insulating concrete form ^d | 11.8 | 11.1 | 94% |
| Autoclaved concrete block ^e | 9.4 | 8.6 | 91% |

These values are calculated using data from guarded hot-box tests of 8-foot by 8-foot square wall sections. Tests performed by scientists at Oak Ridge National Laboratory's Building Performance Center. C-W R is an average of R-value of the cavity between the framing members. W-W R is whole-wall R-value, which considers the lower R-value of the framing material. In some cases, test results are averaged from two similar tests by the author.

- Averages two test walls, insulated with slightly different methods. Mass factor not available but may be significant.
- Effective R-value, including thermal mass, is 16.8 to 23.5 depending on climate.
- Test results vary widely according to spaces within the wall. Mass factor not available but may be significant.
- Effective R-value of ICF, including thermal mass and airtightness, is between 26 and 44 depending on climate.
- Effective R-value of the concrete block is 12.1 to 16.8 depending on climate.