

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.

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