Supplement C

Thermal Performance of Common Insulation Materials

Below are listed nominal R-values for typical insulation materials. In some cases a range of R-values is listed to indicate variation in the materials. This will get you started. Specific insulation R-values should be obtained from the product manufacturer.

Use only nominal steady state R-values obtained using test methods approved by the Federal Trade Commission. Nominal R-value labeling is required for all insulation materials. At a minimum this is required to be on the packaging.[1]

Batt, board and blanket insulation is labeled with the R-value. Washington State Energy Code (WSEC) requires that these labels be visible for inspection.

Loose or spray applied insulation must be applied at the manufacturers specified thickness and density to provide the tested R-value. This is documented by providing calculations of the volume of insulation installed per square foot of component area. For example, a count of the number of bags of cellulose insulation installed in a 1200 square foot attic can be used to determine the density of the product. An inspection of the depth of the insulation is also required.

The following list has been compiled from a number of sources. This includes the latest edition of the *ASHRAE Handbook of Fundamentals*.[2] Data obtained by other sources is referenced in the footnotes. For some assemblies we have developed tables that provide insulation values for a filled cavity as they would apply to the prescriptive application of the energy code.

[1] *Title 16 – Commercial Practices Chapter I – Federal Trade Commission Part 460 – Labeling and Advertising of Home Insulation*

[2] *2005 ASHRAE Handbook Fundamentals, American Society of Heating, Refrigeration and Air-Conditioning Engineers, Inc.*

Table C-1

Thermal Performance of Common Insulation Materials

Fiberglass

Type	Density	R /inch	2X4	2X6	2X10	2X12/Flat Ceiling
Batts LD	0.4-2.0	3.0-3.2	11	19		30 (10.0″)
Batts MD	0.4-2.0	3.3-3.6	13			
Batts HD	1.2-1.6	3.6	15	21	30	38 (10.25″)
BIBs HD	2.0	4.2	15	23	40	38 (9.0″)
Loose fill	0.5-1.0	2.2-2.7				38 (17.0″)

Cellulose *R-values obtained from the Cellulose Insulation Manufacturers Association*

Type	Density	R /inch	2X4	2X6	2X10	2X12/Flat Ceiling
Loose fill	1.5 – 2.0	3.2 – 3.8				38 (12″)
Wet Spray	3.5 - 4.0	2.94 – 3.0	10	17	28	36(12″)
Dense Pack	5.5 – 6.0	3.3-3.45	12	19	33	41(12″)

Rigid Board

Type	Density	R /inch
Extruded Polystyrene (XPS)	1.8 – 3.5	5.0
Expanded Polystyrene (EPS)	1.0 – 2.0	3.85 – 4.36
Polyisocyanurate	1.5 – 2.0	5.56 – 7.04
Fiberglass, cellular glass	8.0	3.03

Spray Applied Foam

Type	Density	R /inch
Polyurethane, closed cell	1.5 – 2.5	5.6 – 7.3
Polyurethane, open cell	.5	3.7

Duct Board & Duct liner

Type	Density	R /inch
Glass Duct Board	4.0 – 9.0	4.0
Duct liner	1.75 – 3.0	3.7 - 4.2