

Continuous Insulation Using Rigid Foam Boards

(CI Properties and R values)

Determine the type of building (Commercial vs. Residential), type of framing (steel or wood studs) and where (the Climate Zone) the structure is being built. National energy codes have the country divided into eight climate zones. The California energy code divides the state into 16 different zones and does not correlate with the national zones. Use Technical Bulletins 1.001 or 1.002 to determine the allowed prescriptive U Factor (e.g.098 or .105) your project requires. With R values, the higher the number the more efficient a product is. The lower the U Factor, the more energy efficient the assembly becomes.

Once the U Factor is determined, Systems like EIFS or one coat stucco can be chosen or a three-coat plaster assembly might be preferred. Variables include:

- Spacing of framing members (16" or 24" on center)
- Cavity Insulation
- Continuous Insulation (CI) may be required with cavity insulation to meet U Factor. Examples of combinations can be found on bulletins 1.001 & 1.002
- Determine what type of rigid insulation to use. This bulletin discusses the three most popular types of rigid insulation.

CONTINUOUS INSULATION MATERIALS:

Expanded Polystyrene or EPS foam boards: are typically 24"x48" thick and are from ¾" to 4" thick but can vary in density and performance.(R-value, Compressive and Flexural Strength, etc.). They are the least expensive of the rigid boards but have less R Values per Square Inch.

Foam Classification (per ASTM C578	Density	R- Value
Type I	0.90 lb/ft ³	3.6 per inch
Type VIII	1.15 lb/ft ³	3.8 per inch
Type II	1.35 lb/ft ³	4.0 per inch
Type IX	1.80 lb/ft ³	4.2 per inch
Type XIV	2.40 lb/ft ³	4.2 per inch
Type XV	2.85 lb/ft ³	4.3 per inch

Notes: Types I and VIII are normally used with EIFS. Type II foam is most often used with one coat stucco systems. "Tongue and groove" edges allow for open-stud framing. Type II is recommended when choosing EPS with three-coat plaster.

Additional resources can be found at: <http://www.epsindustry.org/> and <http://www.foamsheathing.org/>

CONTINUOUS INSULATION MATERIALS: continued

Extruded Polystyrene or XPS foam boards: are commonly 24"x96" and are from 1" to 2" thick but can vary in density and performance.(R-value, Compressive and Flexural Strength, etc.).

Foam Classification (per ASTM C578)	Density	R-Value
Type XII	1.20. lb/ft ³	4.6 per inch
Type X	1.35 lb/ft ³	5.0 per inch
Type XIII	1.60 lb/ft ³	3.9 per inch
Type IV	1.55 lb/ft ³	5.0 per inch
Type VI	2.20 lb/ft ³	5.0 per inch
Type XIII	3.00 lb/ft ³	5.0 per inch
Type V	3.00 lb/ft ³	5.0 per inch

Notes:

Types IV and X are often used with Stucco systems/assemblies and with "PM" EIFS

"Tongue and groove" edges allow for open-stud framing. Flat Edge board is used when XPS is installed over sheathing.

More information can be found at: <http://www.xpsa.com/>

Polyisocyanurate (Poly- iso board): rigid boards are typically 48"x96". "Poly-iso board" for walls is not the same rigid foam used in roof construction. Verify the product is suitable for wall assemblies. The R-Value can vary greatly between manufacturers so check before you assume. The following are general R-Values for aged polyisocyanurate.

Thickness	R-Value
1 inch	6.7
1 ½ inches	10.5
2 inches	14.4
2 ½ inches	17.8

Notes:

Many poly- iso manufacturers require a "slip sheet" installed between the foam sheathing and the plaster/stucco.

More information on poly – iso can be found at: <http://www.polyiso.org/>