

Prescriptive U-Factor Minimum Requirements by Climate Zone for Framed Construction in California

TABLE 1 – ALL NON-RESIDENTIAL CONSTRUCTION EXCEPT HIGH-RISE RESIDENTIAL AND HOTELS OVER THREE STORIES

	Metal Frame				Wood Frame				
CA ZONE	1,6,7	2,4,5,8-16	3		1	5,8	2,4,9,10,12-14, 16	3,6,7	11,15
U-Factor	.069	.062	.082		.095	.102	.059	.110	.042
Insulation Example	R19+10	R21+11	R19+7		R15+0	R13+0	R19+4	R13+0	R19+9

TABLE 2 –HIGH-RISE RESIDENTIAL AND HOTELS OVER THREE STORIES

	Metal Frame			Wood Frame	
CA ZONE	1-6,8-14,16	7	15	1-10,12,13	11,14-16
U-Factor	.069	.105	.048	.059	.042
Insulation Example	R19+10	R19+4	R21+15	R19+4	R19+9

TABLE 3 – LOW-RISE RESIDENTIAL; OCCUPANCY GROUP R, DIVISION 1&2

	Wood Frame Only	
CA ZONE	1,3-5,8-16	2,6,7
U-Factor	.051	.065
Insulation Example	R21+4	R19+0
Wood Stud Size	2 x 6	2 x 8

The U-Factors in the tables are from the 2016 *California Energy Code (CEC)*. (Formally, the *2016 Building Energy Efficiency Standards, Title 24, Part 6*.) U-factors shown are code minimum requirements.

To use the table, determine a project type, framing type, and climate zone (CA Zone 1-16). Information on climate zones by city is contained in Appendix JA2 of the *2016 Reference Appendices for the 2016 Energy Efficiency Standards*.ⁱⁱ Additional information on the type and R-value of insulation required to comply with energy code requirements is contained in Appendix JA4 of the same document. The CEC does not mandate information on Type “I” occupancies such as hospitals, prisons, and nursing homes.

The insulation examples are suggested combinations of cavity insulation (first figure) and continuous insulation (second figure) that will achieve the U-Factor shown. Both figures shown are R-values; for example, R19+10 is a combination of R19 cavity insulation and R10 continuous insulation.

Other combinations of cavity and continuous insulation can be used to achieve compliance with CEC requirements. Insulation combinations should be verified for code compliance prior to installation.

Metal (steel) framing shown is based on is nominal 6-in., 18-gauge studs spaced 16 in. on center. Note that the 2016 CEC requires an air barrier in all commercial construction in climate zones 10 through 16.

ⁱ 2016 *Building Efficiency Energy Standards for Residential and Nonresidential Buildings (California Code of Regulations; Title 24, Part 6)*, California Energy Commission, Sacramento, CA, 2015, <https://ww2.energy.ca.gov/title24/2016standards/>. U-factors shown in Table 1 are from Table 140.3-B of the CEC; U-factors in Table 2 are from Table 140.3-C; and U-factors in Table 3 are from Table 150.1-A.

ⁱⁱ 2016 *Reference Appendices for the 2016 Energy Efficiency Standards*, California Energy Commission, Sacramento, CA, 2015, <http://www.energy.ca.gov/2015publications/CEC-400-2015-038/CEC-400-2015-038-CMF.pdf>