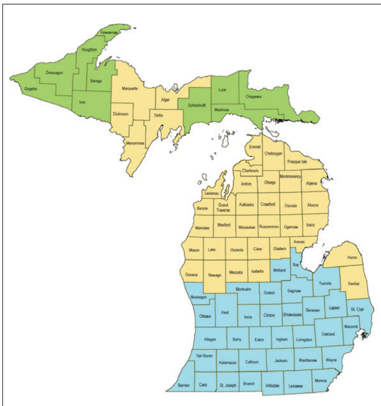
Reference Guide

Michigan Uniform Energy Code (MUEC 2009)

The Michigan Uniform Energy Code uses the climate zones defined in the IECC 2009 code on which it was based. There are three climate zones within the state of Michigan. Prescriptive requirements vary by zone.



Zone 5A

Allegan	Clinton	Jackson	Midland	Shiawassee
Barry	Eaton	Kalamazoo	Monroe	St. Clair
Bay	Genesee	Kent	Montcalm	St. Joseph
Berrien	Gratiot	Lapeer	Muskegon	Tuscola
Branch	Hillsdale	Lenawee	Oakland	Van Buren
Calhoun	Ingham	Livingston	Ottawa	Washtenaw
Cass	Ionia	Macomb	Saginaw	Wayne

Zone 6A

Alcona	Clare	Iosco	Mecosta	Oscoda
Alger	Crawford	Isabella	Menominee	Otsego
Alpena	Delta	Kalkaska	Missaukee	Presque Isle
Antrim	Dickinson	Lake	Montmorency	Roscommon
Arenac	Emmet	Leelanau	Newaygo	Sanilac
Benzie	Gladwin	Manistee	Oceana	Wexford
Charlevoix	Grand Traverse	Marquette	Ogemaw	
Cheboygan	Huron	Mason	Osceola	

Zone 7

Baraga	Houghton	Luce	Schoolcraft
Chippewa	Iron	Mackinac	
Gogebic	Keweenaw	Ontonagon	

Prescriptive Minimum Requirements

Note: Upon final inspection, a builder must provide a certificate of predominant R-values for insulation, U-factors for fenestration, and types and efficiencies of heating, cooling, and water service equipment.

Climate Zone	Fenestration U-Factor	Skylight[a] U-Factor	Ceiling R-Value	Wood Frame Wall R-Value	Mass Wall R-Value[b]	Floor R-Value	Basement[c] Wall R-Value & Depth	Slab[d] R-Value	Crawlspace[d] Wall R-Value
5A	0.35	0.6	38	20 or 13+5[e]	13/17	30[f]	10/13	10, 2 ft	10/13
6A	0.35	0.6	49	21 or 13+5[e]	15/19	30[f]	15/19	10, 4 ft	10/13
7	0.35	0.6	49	21	19/21	38[f]	15/19	10, 4 ft	10/13

For SI: 1 foot = 304.8 mm.

a. The fenestration U-factor column excludes skylights.
b. The second R-value applies when more than half the insulation is on the interior.
c. The first R-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.
d. R-5 shall be added to the required slab edge R-values for heated slabs.
e. "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25% or less of the exterior, R-5 sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25% of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.
f. Or insulation sufficient to fill the framing cavity, R-19 minimum.

SOURCE: 2009 Michigan Uniform Energy Code, International Code Council, Inc., Country Club Hills, IL. 2010.

Estimated R-Values for Common Insulation Materials

	R-Value
Board and Slabs	
Cellular glass	3.03 per in.
Glass fiber, organic bonded	4.00 per in.
Expanded polystyrene, extruded	5.00 per in.
Expanded polystyrene, molded beads	3.85 per in.
Expanded polystyrene, molded beads (high density)	4.00–4.35 per in.
Cellular Polyurethane/polyisocyanurate (depending on facers)	5.56–7.04 per in.
Cellular phenolic (closed cell)	8.20 per in.
Cellular phenolic (open cell)	4.40 per in.
Loose Fill	
Cellulosic insulation (milled paper or wood pulp)	3.13–3.70 per in.
Perilite, expanded (depending on density)	2.4–3.7 per in.
Mineral fiber (rock, slag, or glass)	
Approx. 3.75–5 in.	11.0
Approx. 6.5–8.75 in.	19.0
Approx. 7.5–10 in.	22.0
Approx. 10.3–13.7 in.	30.0
Approx. 3.5 in. (closed sidewall application)	12.0–14.0
Vermiculite, exfoliated (depending on density)	2.13–2.27 per in.
Spray Applied	
Polyurethane foam	5.56–6.25 per in.
Urea-formaldehyde foam	3.57–4.55 per in.
Cellulosic fiber	2.94–3.45 per in.
Glass fiber	3.70–3.85 per in.

SOURCE: Walter T. Grondzik, et al., *Mechanical and Electrical Equipment for Buildings*, 11th ed. (Hoboken, N.J.: John Wiley & Sons, 2010).

Estimated U-factor[a] for Common Glass Types

	Frame		
Glass	Metal	Metal w/ Thermal Break	Non-metal
Single	≥1.00		0.71–0.99
Double, clear	0.71–0.99	0.56–0.70	0.41–0.55
Double, low-E	0.56–0.70	0.41–0.55	0.31–0.40
Double, low-E (thermally improved)			0.26–0.30
Triple, low-E (thermally improved)			≤0.20

a. The U-factor ranges shown are typical for these generic glass and frame combinations. The U-factor of specific products may differ from these ranges. Actual values for window and frame should be obtained from the manufacturer.

SOURCE: The Efficient Windows Collaborative Multiple Benefits Fact Sheet, Regents of the University of Minnesota, Twin Cities Campus, Center or Sustainable Building Research, January, 2010.

Note: This tool is intended as a reference only. R-values and U-factors may vary by manufacturer. Be sure to check the product label for precise value calculations.

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