



People Helping People Build a Safer World™

Governor's Energy Office

Education & Outreach Initiative

International Energy Conservation Code (IECC®)
2006 Edition



Governor's
Energy Office



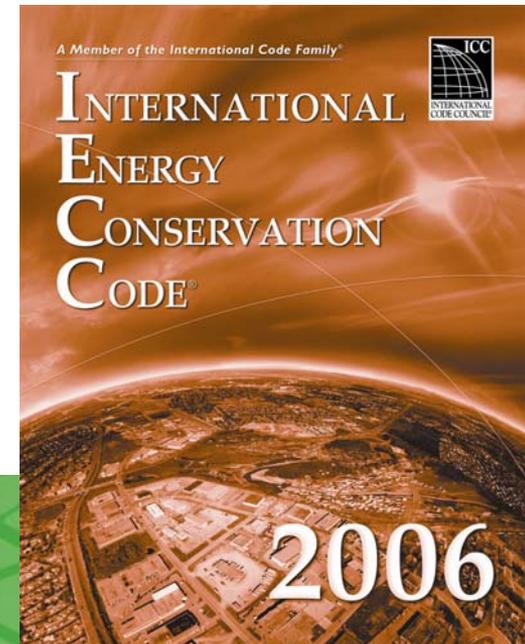


INTERNATIONAL
CODE COUNCIL®

People Helping People Build a Safer World™

2006 IECC® *Short Form Summary*

Based on the
2006 *International Energy Conservation Code*



HB 1146

Concerning Energy Efficiency

- **Effective July 1, 2008**
- Raises baseline for building codes to 2003 IECC or 2006 IECC.
- ENERGY CODE means at a minimum, 2003 IECC
- Counties and Municipalities w/ building codes are required to adopt/apply the Energy Code.
- Establishes a dedicated training and education program for jurisdictions w/ building codes.

An Energy Efficient Building Code Why?

- Energy consumption creates effects beyond the boundaries of local government where power production is centralized
- Emissions from consumption affect the health of our citizens
- Strain on the grid from peak electric power is not confined to jurisdictional boundaries
- There is statewide interest in the reliability of the grid and adequate supplies of heating oil and natural gas
- Lessening the impact of the increasing cost of energy for residents and businesses furthers statewide interest in a strong economy and reducing cost of housing in Colorado

Applicability

Colorado Energy Conservation Code

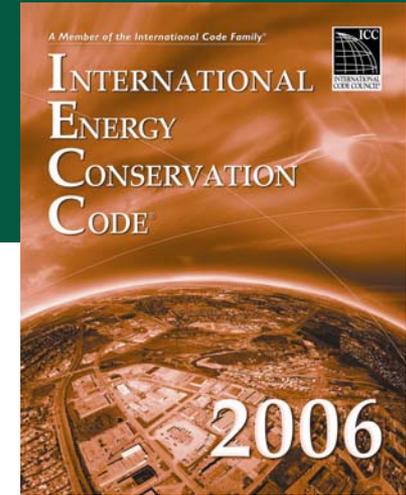
- Any commercial building or structure in Colorado for which a building permit application is received by a municipality or county enforcing building codes
- Additions, alterations, renovations and repairs thereto to the extent the building code applies
- Compliance can be demonstrated by submitting
 - Approved, Prescriptive Worksheets
 - COMcheck™ / REScheck™ Compliance Reports
 - ASHRAE 90.1 Compliance Forms
 - Approved, Third-party, performance-based assessments

Technical Support is Available **NOW!**

- **FREE Email Interpretations**
 - For Colorado professionals
 - 2003 and 2006 IECC
 - <http://www.iccsafe.org/cs/cct/colorado.html>
- **Verbal Interpretations**
 - **Must be an ICC Member**
 - Access ICC's Professional Staff
 - Talk to a person LIVE!
- **Web-Based Clearing House**
 - Available 24-hrs (since 15 APR 08)
 - Links to CO GEO and GEO Programs
 - <http://www.colorado.gov/energy/>



Structure of 2006 IECC



- **Chapter 1 Administration & Enforcement**
- **Chapter 2 Definitions**
- **Chapter 3 Climate Zones**
- **Chapter 4 Residential Energy Efficiency**
 - 2003 IECC Chapter 5 consolidated into Ch.4
 - 2003 IECC Chapter 6 consolidated into Ch.4
 - 2003 IECC Chapter 7 deleted
- **Chapter 5 is old Ch. 8 Commercial Energy Efficiency**
 - ASHRAE 90.1-**2004** Standard Reference
- **Chapter 6 is old Ch. 9 Referenced Standards**

Chapter 1 – Administration

Scope & General Requirements

- Applies to several different project types:
 - New construction
 - Newly conditioned spaces in existing
 - Additions, alterations and repairs to existing
 - Change in occupancy increasing energy use
- Exempt Buildings
 - Historic buildings
 - Unconditioned buildings and portions thereof
 - Low energy use buildings
 - $IF < 3.4 \text{ Btu/h-ft}^2$ (1.0 Watt/ft^2)
 - THEN building envelope need not comply
 - Regardless, MECH, LTG and SWH must still comply as applicable





Chapter 2 – Definitions

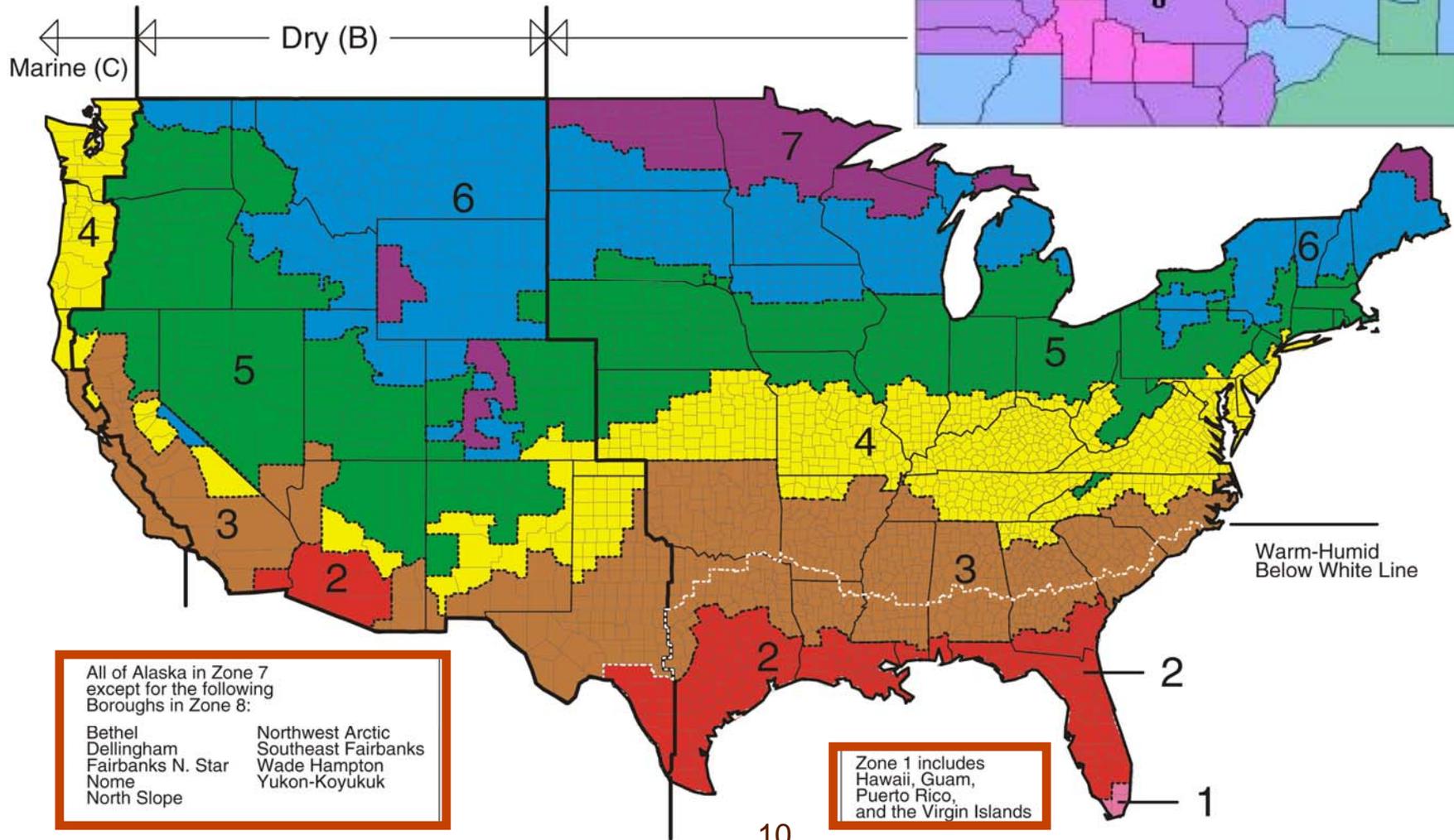
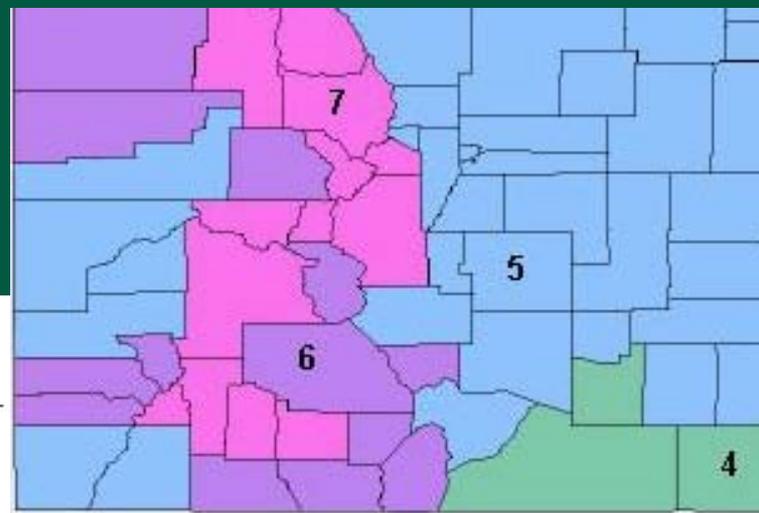
Key Definitions to Know

- **CONDITIONED SPACE**
 - *Spaces maintained directly or indirectly at or above 50F in the heating season, or at or below 85F in the cooling season*

- **COMMERCIAL BUILDING**
 - *Buildings other than Residential Buildings, and*
 - *Group R-2, R-3, and R-4 four stories or greater in height*

- **RESIDENTIAL BUILDING**
 - *One- and two-family dwellings and townhouses*
 - *Group R-2 Apartments/condominiums ≤ 3 stories in height*
 - *Group R-3 Adult/child care (≤ 5 occ.), Congregate care (≤ 16 occ.)*
 - *Group R-4 Residential care assisted living ($5 > x \leq 16$ occ.)*

Chapter 3 – Climate Zones

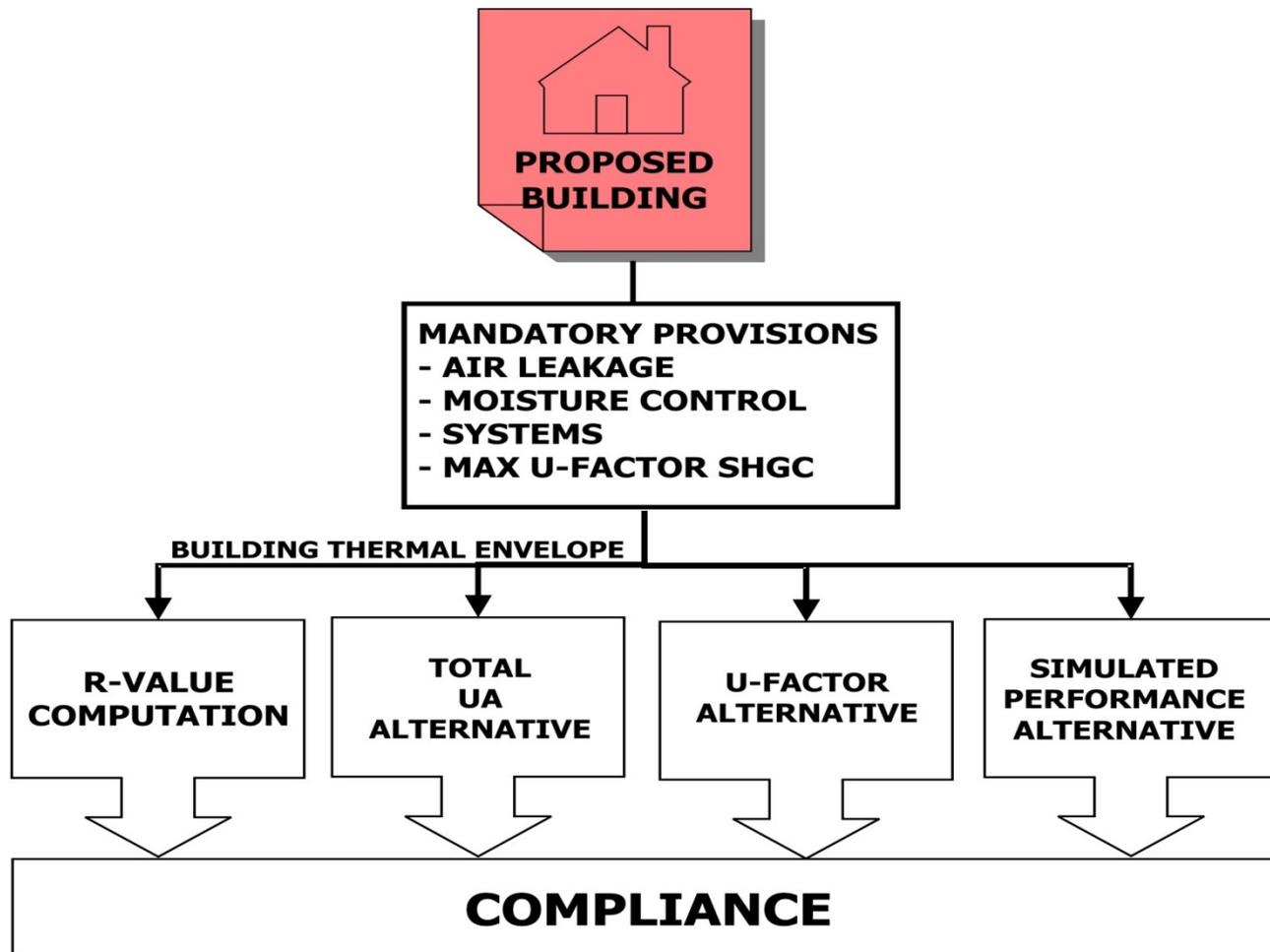


All of Alaska in Zone 7
except for the following
Boroughs in Zone 8:

Bethel	Northwest Arctic
Dellingham	Southeast Fairbanks
Fairbanks N. Star	Wade Hampton
Nome	Yukon-Koyukuk
North Slope	

Zone 1 includes
Hawaii, Guam,
Puerto Rico,
and the Virgin Islands

Chapter 4 – Residential Compliance Paths



Compliance by *R*-value Computation

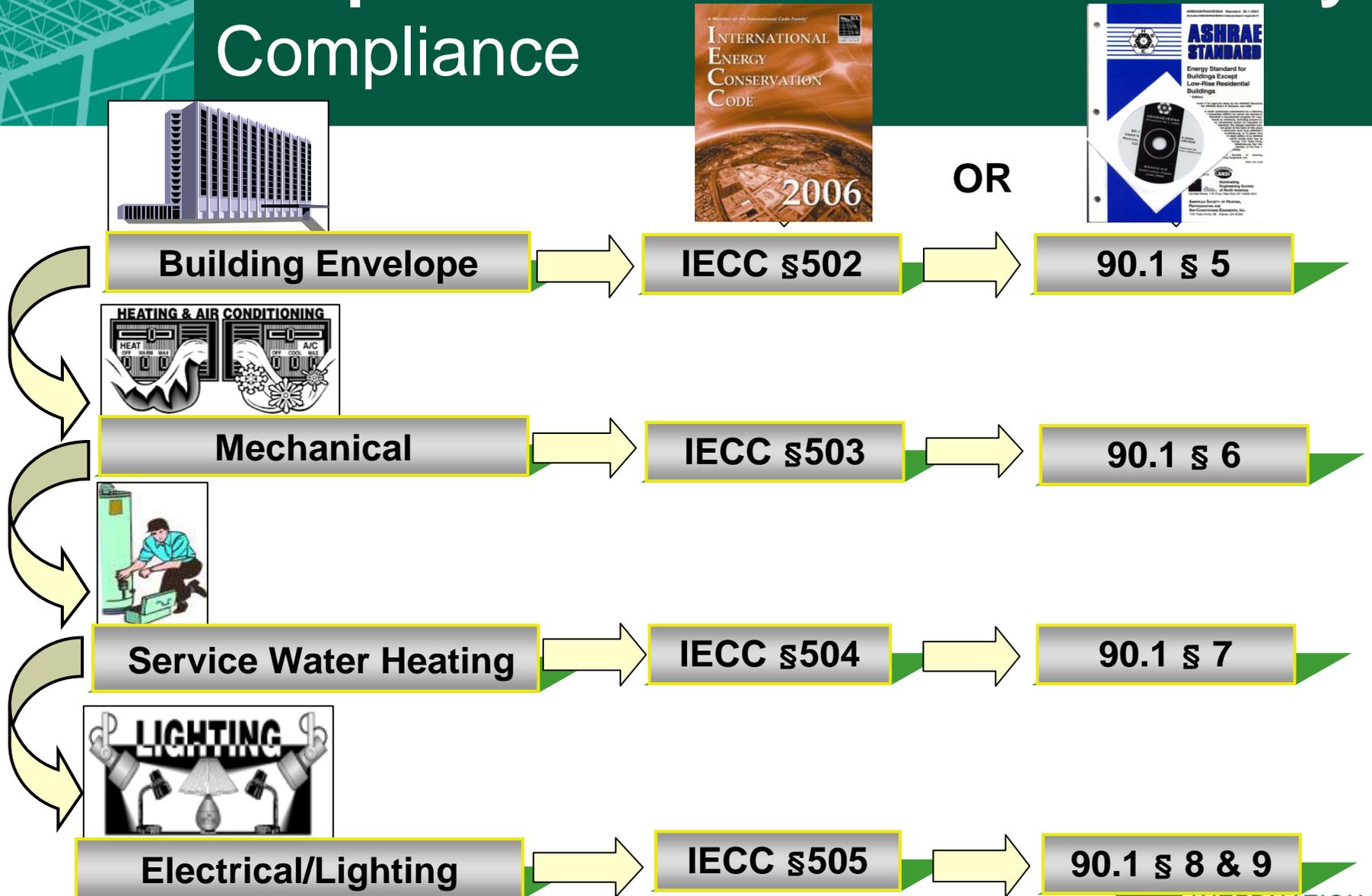
**TABLE 402.1.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a**

CLIMATE ZONE	FENESTRATION <i>U</i> -FACTOR	SKYLIGHT ^b <i>U</i> -FACTOR	GLAZED FENESTRATION SHGC	CEILING <i>R</i> -VALUE	WOOD FRAME WALL <i>R</i> -VALUE	MASS WALL <i>R</i> -VALUE	FLOOR <i>R</i> -VALUE	BASEMENT ^c WALL <i>R</i> -VALUE	SLAB ^d <i>R</i> -VALUE & DEPTH	CRAWL SPACE ^e WALL <i>R</i> -VALUE
1	1.20	0.75	0.40	30	13	3	13	0	0	0
2	0.75	0.75	0.40	30	13	4	13	0	0	0
3	0.65	0.65	0.40 ^e	30	13	5	19	0	0	5/13
4 except Marine	0.40	0.60	NR	38	13	5	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.35	0.60	NR	38	19 or 13+5 ^g	13	30 ^f	10/13	10, 2 ft	10/13
6	0.35	0.60	NR	49	19 or 13+5 ^g	15	30 ^f	10/13	10, 4 ft	10/13
7 and 8	0.35	0.60	NR	49	21	19	30 ^f	10/13	10, 4 ft	10/13

For SI: 1 foot = 304.8 mm

- R*-values are minimums. *U*-factors and SHGC are maximums. R-19 shall be permitted to be compressed into a 2 × 6 cavity.
- The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
- The first *R*-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.
- R-5 shall be added to the required slab edge *R*-values for heated slabs.
- There are no SHGC requirements in the Marine zone.
- Or insulation sufficient to fill the framing cavity, R-19 minimum.
- "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.

Chapter 5 – Commercial Efficiency Compliance



IECC Denver, CO – Zone 5B

Commercial Insulation Provisions

BUILDING ENVELOPE REQUIREMENTS – OPAQUE ASSEMBLIES

CLIMATE ZONE	1	2	3	4	5	6	7	8
Roofs								
Insulation entirely above deck	R-15 c _i	R-15 c _i	R-15 c _i	R-15 c _i	R-20 c _i	R-20 c _i	R-25 c _i	R-25 c _i
Metal buildings (with R-5 thermal blocks ¹) ²	R-19 + R-10	R-19	R-19	R-19	R-19	R-19	R-19 + R-10	R-19 + R-10
Attic and other	R-30	R-30	R-30	R-30	R-30	R-30	R-38	R-38
Walls, Above Grade								
Mass	NR	NR	R-5.7 c _i ^{3,5}	R-5.7 c _i ³	R-7.6 c _i	R-9.5 c _i	R-11.4 c _i	R-13.3 c _i
Metal building ²	R-13	R-13	R-13	R-13	R-13 + R-13	R-13 + R-13	R-13 + R-13	R-13 + R-13
Metal framed	R-13	R-13	R-13	R-13	R-13 + R-3.8 c _i	R-13 + R-3.8 c _i	R-13 + R-7.5 c _i	R-13 + R-7.5 c _i
Wood framed and other	R-13	R-13	R-13	R-13	R-13	R-13	R-13	R-13 + R-7.5 c _i
Walls, Below Grade								
Below grade wall ⁴	NR	NR	NR	NR	NR	NR	R-7.5 c _i	R-7.5 c _i
Floors								
Mass	NR	R-5 c _i	R-5 c _i	R-10 c _i	R-10 c _i	R-10 c _i	R-15 c _i	R-15 c _i
Joist/Framing	NR	R-19	R-19	R-19	R-19	R-30	R-30	R-30
Slab-on-Grade Floors								
Unheated Slabs	NR	NR	NR	NR	NR	NR	NR	R-10 for 24 in. below
Heated Slabs	R-7.5 for 12 in. below	R-7.5 for 12 in. below	R-7.5 for 12 in. below	R-7.5 for 12 in. below	R-7.5 for 24 in. below	R-10 for 36 in. below	R-10 for 36 in. below	R-10 for 48 in. below
Opaque Doors								
Swinging	U – 0.70	U – 0.70	U – 0.70	U – 0.70	U – 0.70	U – 0.70	U – 0.70	U – 0.50
Roll-up or sliding	U – 1.45	U – 1.45	U – 1.45	U – 1.45	U – 1.45	U – 0.50	U – 0.50	U – 0.50

IECC Denver, CO – Zone 5B Commercial Fenestration Provisions

BUILDING ENVELOPE REQUIREMENTS: FENESTRATION

Climate Zone	1	2	3	4	5	6	7	8
Vertical Fenestration (40% maximum)								
SHGC – All Frame Types								
SHGC: PF < 0.25	0.25	0.25	0.25	0.40	0.40	0.40	NR	NR
SHGC: 0.25 < PF < 0.5	0.33	0.33	0.33	NR	NR	NR	NR	NR
SHGC: PF ≥ 0.5	0.40	0.40	0.40	NR	NR	NR	NR	NR
U-factor								
Framing materials other than metal with or without metal reinforcement or cladding								
U-Factor	1.20	0.75	0.65	0.40	0.35	0.35	0.35	0.35
Metal framing with or without thermal break								
Curtain Wall/Storefront U-factor	1.20	0.75	0.65	0.50	0.45	0.45	0.45	0.45
Entrance Door U-factor	1.20	1.10	0.90	0.85	0.80	0.80	0.80	0.80
All Other U-factor	1.20	0.75	0.65	0.55	0.55	0.55	0.50	0.50
Skylights (3% maximum)								
Glass								
U-Factor	1.00	1.05	0.90	0.80	0.60	0.60	0.60	0.60
SHGC	0.40	0.40	0.40	0.40	0.40	0.40	NR	NR
Plastic								
U-Factor	1.90	1.90	1.30	1.30	1.30	0.90	0.90	0.60
SHGC	0.35	0.35	0.35	0.62	0.62	0.62	NR	NR



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Thank You!



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