

TITLE 14 HOUSING AND CONSTRUCTION
CHAPTER 7 BUILDING CODES GENERAL
PART 6 [2006] 2009 NEW MEXICO ENERGY CONSERVATION CODE

14.7.6.1 ISSUING AGENCY: Construction Industries Division (CID) of the Regulation and Licensing Department.
[14.7.6.1 NMAC - Rp, 14.7.6.1, NMAC, 1-1-08]

14.7.6.2 SCOPE: This rule applies to all contracting work performed in New Mexico on or after [January 1, 2008,] July 1, 2010 that is subject to the jurisdiction of CID, unless performed pursuant to a permit for which an application was received by CID before that date. [except that commercial buildings, which comply with the requirements of the 2004 edition of ASHRAE/IESNA 90.1, are excepted from the requirements of this rule.]
[14.7.6.2 NMAC - Rp, 14.7.6.2, NMAC, 7-1-10]

14.7.6.3 STATUTORY AUTHORITY: NMSA 1978 sections 60-13-9 and 60-13-44.
[14.7.6.3 NMAC - Rp, 14.7.6.3, NMAC, 1-1-08]

14.7.6.4 DURATION: Permanent.
[14.7.6.4 NMAC - Rp, 14.7.6.4, NMAC, 1-1-08]

14.7.6.5 EFFECTIVE DATE: [January 1, 2008,] July 1, 2010 unless a later date is cited at the end of a section.
[14.7.6.5 NMAC - Rp, 14.7.6.5, NMAC, 7-1-10]

14.7.6.6 OBJECTIVE: The purpose of this rule is to establish minimum standards for energy conservation in construction in New Mexico.
[14.7.6.6 NMAC - Rp, 14.7.6.6, NMAC, 1-1-08]

14.7.6.7 DEFINITIONS:
[See 14.5.1 NMAC, General Provisions and chapter 2 of the IECC as amended in 14.7.6.10 NMAC.]
[14.7.6.7 NMAC - Rp, 14.7.6.7, NMAC 1-1-08]

14.7.6.8 ADOPTION OF THE [2006] 2009 NEW MEXICO ENERGY CONSERVATION CODE:
A. This rule adopts by reference the [2006] 2009 international energy conservation code (IECC), as amended by this rule.
B. In this rule, each provision is numbered to correspond with the numbering of the [2006] 2009 international energy conservation code.
C. This rule is to be applied in conjunction with each of the other [2006] 2009 New Mexico building codes, including the NMCBC, NMRBC, NMPC, NMMC and the NMEC.
[14.7.6.8 NMAC - Rp, 14.7.6.8, NMAC, 7-1-04; A, 2-24-08; NMAC, 7-1-10]

14.7.6.9 CHAPTER 1 ADMINISTRATION:

- A. Section 101 - General.**
- (1) **101.1 Title.** Delete this section of the IECC and substitute: this rule shall be known as the [2006] 2009 New Mexico energy conservation code (NMECC).
 - (2) **101.2 Scope.** Delete this section of the IECC and see 14.7.6.2 NMAC, Scope.
 - (3) **101.3 Intent.** Delete this section of the IECC and see 14.7.6.6 NMAC, Objective.
 - (4) **101.4 Applicability.** See this section of the IECC.
 - (5) **101.5.1 Compliance Materials.** Delete this section of the IECC and substitute the following: the code official shall be permitted to approve specific computer software, worksheets, compliance manuals and other similar materials that meet the intent of this code, such as ComCheck, ResCheck, and worksheet or trade-off sheets from the *New Mexico energy conservation code residential applications manual*.
- B. Section 102 Alternate Materials-Method of Construction, Design for Insulating Systems.** [Materials, systems and equipment. 102.3 Maintenance information. Delete this section of the IECC.] See this section of the IECC except: **102.1.1 Above Code Programs**-Delete this section with no substitution.
- C. Section 103 –Construction Documents.** [Alternate materials – method of construction, design

~~or insulating systems.] Delete this section of the IECC and see [14.5.1.11 NMAC, General Provisions.] 14.5.2 NMAC, Permits.~~

D. Section 104 Inspections. ~~[Construction documents. See] Delete~~ this section of the IECC and see [14.5.2 NMAC, Permits.] 14.5.3 NMAC, Inspections.

E. Section 105 Validity. ~~[Inspections.] Delete this section of the IECC and see [14.5.3 NMAC, Inspections].~~ 14.5.1 NMAC, General Provisions

F. Section 106 Reference Standards. ~~[Validity. Delete this section of the IECC and see 14.5.1 NMAC, General Provisions.] All references in the IECC to the international building code shall be deemed references to 14.7.2 NMAC, the [2006] 2009 New Mexico commercial building code (NMCBC). All references to the international residential code shall be deemed references to 14.7.3 NMAC, the [2006] 2009 New Mexico residential building code (NMRBC). All references to the international plumbing code shall be deemed references to 14.8.2 NMAC, the [2006] 2009 New Mexico plumbing code (NMPC). All references to the international mechanical code shall be deemed references to 14.9.2, the [2006] 2009 New Mexico mechanical code (NMMC). All references to the ICC or international electrical code shall be deemed references to 14.10.4 NMAC, the [2005] 2008 New Mexico electrical code (NMEC). All references to the international energy conservation code shall be deemed references to 14.7.6 NMAC, the [2006] 2009 New Mexico energy conservation code (NMECC). All references to the international fuel gas code are deemed references to the NMMC or the LP gas standards found at 19.15.40 NMAC, and NMSA 1978 70-5-1 et seq.~~

G. Section 107 Fees. ~~[Referenced standards.]~~

(1) **107.1 Fees.** ~~[General. See this section of the IECC.] Delete this section of the IECC and see 14.5.5 NMAC Fees.~~

(2) **107.2 Schedule of Permit Fees.** ~~[Conflicting requirements.] Delete this section of the IECC and see [14.5.1.9 NMAC, General Provisions] 14.5.5.10 NMAC Permit Fees.~~

(3) **107.3 Work Commencing Before a Permit Issuance.** ~~[Referenced codes.] Delete this section of the IECC and see 14.5.2.16 NMAC Failure to Obtain Permit. [All references in the IECC to the international building code shall be deemed references to 14.7.2 NMAC, the 2006 New Mexico commercial building code (NMCBC). All references to the international residential code shall be deemed references to 14.7.3 NMAC, the 2006 New Mexico residential building code (NMRBC). All references to the international plumbing code shall be deemed references to 14.8.2 NMAC, the 2006 New Mexico plumbing code (NMPC). All references to the international mechanical code shall be deemed references to 14.9.2, the 2006 New Mexico mechanical code (NMMC). All references to the ICC or international electrical code shall be deemed references to 14.10.4 NMAC, the 2005 New Mexico electrical code (NMEC). All references to the international energy conservation code shall be deemed references to 14.7.6 NMAC, the 2006 New Mexico energy conservation code (NMECC). All references to the international fuel gas code are deemed references to the NMMC or the LP gas standards found at 19.15.40 NMAC, and NMSA 1978 70-5-1 et seq.]~~

(4) **107.4 Related Fees.** Delete this section of the IECC and see 14.5.5 NMAC Fees.

(5) **107.5 Refunds.** Delete this section of the IECC and See 14.5.5 NMAC Fees.

H. 108 Stop Work Order. Delete this section of the IECC and see 14.5.3 Inspections.

I. 109 Board of Appeals. Delete this section of the IECC and See 14.5.1 General Provisions. [14.7.6.9 NMAC - Rp, 14.7.6.9, NMAC, 7-1-10]

14.7.6.10 CHAPTER 2 DEFINITIONS: See this chapter of the IECC except as provided below.

A. Section 201.1 Scope. See this section of the IECC and add the following: If the same term is defined in the New Mexico construction codes and in the IECC, the term shall have the meaning given it in the New Mexico construction codes.

B. Section 201.2 Interchangeability. See this chapter of the IECC.

C. Section 201.3 Terms defined in other codes. Delete this section of the IECC and substitute: if a term is not defined in this code but is defined in a New Mexico construction code, the term shall have the meaning given it in the New Mexico construction code.

D. Section 201.4 Terms not defined. See this chapter of the IECC.

E. Section 202 General Definitions. See this section of the IECC except as provided below:

(1) **Conditioned Space.** Delete the text of this definition and replace with the following: An area, room or space within a building that is provided with heating and/or cooling by equipment or systems capable of maintaining, through design or heat loss/gain, 50F (10C) during the heating season and 85F (29C) during the cooling season, or an area, room or space that communicates directly with a conditioned space.

(2) **Indirectly Conditioned Space.** Add the following definition. Enclosed space within a building thermal envelope that is not mechanically heated or cooled space.

(3) **Multi Scene Controls.** Systems for controlling power to multiple groups of lights requiring only a few controls.

(4) **Residential Building.** Delete the text of this definition and replace with the following: For this code, includes detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress and their accessory structures and R-3 buildings, as well as R-2 and R-4 buildings three stories or less in height above grade.

(5) **Unconditioned Space** Add the following definition: Space within a building that is not mechanically heated or cooled and is outside the thermal envelope.

(6) **Vapor Retarder Class.** Add the following definition: A measure of a material or assembly's ability to limit the amount of moisture that passes through that material or assembly. Vapor retarder class shall be defined using the desiccant method of ASTM E96 as follows:

- (a) **Class I:** 0.1 perm or less.
- (b) **Class II:** > 0.1 perm <1.0 perm.
- (c) **Class III:** > 1.0 perm <10 perm.

[14.7.6.10 NMAC - Rp, 14.7.6.10, NMAC, 7-1-10]

14.7.6.11 CHAPTER 3 CLIMATE ZONES: See this section of the IECC except as provided below.

A. Section 301.1 General. [See this section of the IECC and add the following sentence at the end of the section: "the building official may adjust the climate zones within a particular jurisdiction when site specific climate conditions exist."] Table 301.2 based on the information in Table 301.3(2) shall be used to determine the climate zones for the listed locations and the corresponding requirements for Chapters 4 & 5. Locations with unknown Heating Degree Days (HDD) and Cooling Degree Days (CDD) shall use Table 301.1 to determine the climate zone.

**TABLE 301.2
NEW MEXICO CLIMATE ZONES BASED ON HEATING AND COOLING DEGREE DAYS**

City	County	Elev. (feet)	Heating Degree Days (HDD) 65°F	Cooling Degree Days (CDD) 50°F day	Climate Zone
Abiquiu Dam	Rio Arriba	6380	5872		5B
Alamogordo	Otero	4350	3053	5309	3B
Albuquerque	Bernalillo	5312	4332	4462	4B
Artesia	Eddy	3380	3366	5374	3B
Aztec Ruins	San Juan	5644	5757		5B
Belen	Valencia	4800	4432	5012	3B
Bernalillo	Sandoval	5052	4782	4138	4B
Bloomfield	San Juan	5456	5490		5B
Bosque del Apache	Socorro	4520	3916	5012	3B
Carlsbad	Eddy	3295	2813	5997	3B
Carrizozo	Lincoln	5438	4234	3631	4B
Cedar Crest	Bernalillo	6581	5703		5B
Chaco Canyon	San Juan	6200	6137		5B
Chama	Rio Arriba	7871	8254		6B
Clayton	Union	5056	5150	3170	4B
Cloudcroft	Otero	8801	7205		6B
Clovis	Curry	4268	4033	4252	4B
Corona	Valencia	6690	5389	3631	4B
Cuba	Sandoval	7035	7122		5B
Deming	Luna	4305	3347	5292	3B

<u>Dulce</u>	<u>Rio Arriba</u>	<u>6793</u>	<u>7979</u>		<u>6B</u>
<u>Eagle Nest</u>	<u>Colfax</u>	<u>8262</u>	<u>9254</u>		<u>7B</u>
<u>Edgewood</u>	<u>Santa Fe</u>	<u>6649</u>	<u>6146</u>		<u>5B</u>
<u>Espanola</u>	<u>Rio Arriba</u>	<u>5643</u>	<u>5641</u>		<u>5B</u>
<u>Farmington</u>	<u>San Juan</u>	<u>5395</u>	<u>5747</u>		<u>5B</u>
<u>Fence Lake</u>	<u>Cibola</u>	<u>7055</u>	<u>6396</u>		<u>5B</u>
<u>Fort Sumner</u>	<u>De Baca</u>	<u>4032</u>	<u>3799</u>	<u>4616</u>	<u>3B</u>
<u>Gallup</u>	<u>McKinley</u>	<u>6465</u>	<u>6207</u>		<u>5B</u>
<u>Glenwood</u>	<u>Catron</u>	<u>4725</u>	<u>3632</u>	<u>4427</u>	<u>4B</u>
<u>Grants</u>	<u>Cibola</u>	<u>6460</u>	<u>6143</u>		<u>5B</u>
<u>Hatch</u>	<u>Dona Ana</u>	<u>4052</u>	<u>3270</u>	<u>5904</u>	<u>3B</u>
<u>Hobbs</u>	<u>Lea</u>	<u>3622</u>	<u>2954</u>	<u>5181</u>	<u>3B</u>
<u>Jemez Springs</u>	<u>Sandoval</u>	<u>6198</u>	<u>5260</u>	<u>2059</u>	<u>4B</u>
<u>Las Cruces</u>	<u>Dona Ana</u>	<u>4000</u>	<u>3223</u>	<u>5904</u>	<u>3B</u>
<u>Las Vegas</u>	<u>San Miguel</u>	<u>6424</u>	<u>5738</u>		<u>5B</u>
<u>Lordsburg</u>	<u>Hidalgo</u>	<u>4250</u>	<u>3213</u>	<u>5210</u>	<u>3B</u>
<u>Los Alamos</u>	<u>Los Alamos</u>	<u>7320</u>	<u>6381</u>		<u>5B</u>
<u>Los Lunas</u>	<u>Valencia</u>	<u>4856</u>	<u>4725</u>	<u>4462</u>	<u>4B</u>
<u>Magdalena</u>	<u>Socorro</u>	<u>6572</u>	<u>5074</u>	<u>2093</u>	<u>4B</u>
<u>Mescalero</u>	<u>Otero</u>	<u>6611</u>	<u>5540</u>		<u>5B</u>
<u>Moriarty</u>	<u>Torrance</u>	<u>6220</u>	<u>4735</u>	<u>3786</u>	<u>4B</u>
<u>Mosquero</u>	<u>Harding</u>	<u>5485</u>	<u>5209</u>	<u>3631</u>	<u>4B</u>
<u>Mountainair</u>	<u>Torrance</u>	<u>6520</u>	<u>5558</u>		<u>5B</u>
<u>Organ</u>	<u>Dona Ana</u>	<u>5245</u>	<u>3215</u>	<u>4919</u>	<u>3B</u>
<u>Placitas</u>	<u>Sandoval</u>	<u>5955</u>	<u>4917</u>	<u>3701</u>	<u>4B</u>
<u>Portales</u>	<u>Roosevelt</u>	<u>4006</u>	<u>3845</u>	<u>4347</u>	<u>4B</u>
<u>Raton</u>	<u>Colfax</u>	<u>6680</u>	<u>6001</u>		<u>5B</u>
<u>Reserve</u>	<u>Catron</u>	<u>5847</u>	<u>5483</u>		<u>5B</u>
<u>Rio Rancho</u>	<u>Sandoval</u>	<u>5282</u>	<u>4880</u>	<u>3949</u>	<u>4B</u>
<u>Roswell</u>	<u>Chaves</u>	<u>3573</u>	<u>3565</u>	<u>5505</u>	<u>3B</u>
<u>Ruidoso</u>	<u>Lincoln</u>	<u>6920</u>	<u>6309</u>		<u>5B</u>
<u>Sandia Crest</u>	<u>Bernalillo</u>	<u>10680</u>	<u>10034</u>		<u>7B</u>
<u>Sandia Park</u>	<u>Bernalillo</u>	<u>7077</u>	<u>7510</u>		<u>6B</u>
<u>Santa Fe</u>	<u>Santa Fe</u>	<u>7260</u>	<u>6001</u>		<u>5B</u>
<u>Santa Rosa</u>	<u>Guadalupe</u>	<u>4620</u>	<u>3749</u>	<u>4714</u>	<u>3B</u>
<u>Shiprock</u>	<u>San Juan</u>	<u>4892</u>	<u>5475</u>		<u>5B</u>
<u>Silver City</u>	<u>Grant</u>	<u>5895</u>	<u>4438</u>	<u>3975</u>	<u>4B</u>
<u>Socorro</u>	<u>Socorro</u>	<u>4603</u>	<u>3984</u>	<u>5147</u>	<u>3B</u>
<u>Springer</u>	<u>Colfax</u>	<u>5797</u>	<u>5653</u>		<u>5B</u>
<u>Taos</u>	<u>Taos</u>	<u>6967</u>	<u>6827</u>		<u>5B</u>
<u>Taos Ski Valley</u>	<u>Taos</u>	<u>9321</u>	<u>9769</u>		<u>7B</u>
<u>Tatum</u>	<u>Lea</u>	<u>3999</u>	<u>3680</u>	<u>4721</u>	<u>3B</u>
<u>Thoreau</u>	<u>McKinley</u>	<u>7200</u>	<u>5789</u>		<u>5B</u>
<u>Tierra Amarilla</u>	<u>Rio Arriba</u>	<u>7425</u>	<u>7901</u>		<u>6B</u>
<u>Tijeras</u>	<u>Bernalillo</u>	<u>6322</u>	<u>6338</u>		<u>5B</u>
<u>Tohatchi</u>	<u>McKinley</u>	<u>6447</u>	<u>5418</u>		<u>5B</u>

Truth or Consequences	Sierra	4245	3394	5103	3B
Tucumcari	Quay	4096	3767	4429	4B
Tularosa	Otero	4508	3056	5130	3B
Zuni	McKinley	6293	5742		5B

B. Section 301.2. through 301.3.3. See these sections of the IECC. [14.7.6.11 NMAC - Rp, 14.7.6.11, NMAC, 7-1-10]

14.7.6.12 CHAPTER 4 RESIDENTIAL ENERGY EFFICIENCY.

A. 401 General. See this section of the IECC except as provided below:

(1) 401.1 Scope. See this section of the IECC.

(2) 401.2 Compliance. Delete the text in this section and replace with the following; Projects shall comply with one of the following:

(a) Sections 401, 402.4-1 through 402.5, and 403.1, 403.2.1, 403.2.2, 403.2.3, and 403.3 through 403.9, and 404.1 (mandatory prescriptive provisions);

(b) Specific computer software, worksheets, compliance manuals and other similar materials that meet the intent of this code, such as REScheck, REM/Rate, and worksheet or trade-off sheets from the New Mexico energy conservation code residential applications manual;

(c) (Performance path to compliance.) A REScheck Compliance Certificate, a New Mexico 2009 IECC Annual Energy Cost Report provided by a CID-approved HERS rater, or comparable process that shows a project performs 20% better than the 2006 IECC. Only the following mandatory provisions are required: 403.8, 403.9, and 404.1. Compliance may be demonstrated by use of the RESNET accreditation standard for sampling providers; or

(d) The project is deemed to be in compliance where the *building official* or other authority having *jurisdiction* shall be required to demonstrate to the state that a national, state or local energy efficiency program meets or exceeds the energy efficiency required by this code.

(3) 401.3 Certificate. Delete the text in this section and replace with the following; A permanent certificate shall be posted on, in, or near the electrical distribution panel, or near the mechanical equipment. The certificate shall not cover or obstruct the visibility of the circuit directory label, service disconnect label or other required labels. The certificate shall be completed by the builder or registered design professional. The certificate shall list the predominant R-values of insulation installed in or on ceiling/roof, walls, foundation (slab, basement wall, crawlspace all and/or floor) and ducts outside conditioned spaces; U-factors for fenestration and the solar heat gain coefficient (SHGC) of fenestration. Where there is more than one value for each component, the certificate shall list the value covering the largest area. The certificate shall list the types and efficiencies of heating, cooling and service water heating equipment. Where a gas-fired unvented room heater, electric furnace, or baseboard electric heater is installed in the residence, the certificate shall list "gas-fired unvented room heater", "electric furnace" or "baseboard electric heater" as appropriate. An efficiency shall not be listed for gas-fired unvented room heaters, electric furnaces or electric baseboard heaters.

B. 402 Building thermal envelope. See this section of the IECC except as provided below.

(1) 402.1 General (prescriptive). See this section of the IECC except delete the text of table 402.1.1 and replace with the following:

TABLE 402.1.1

INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a

CLIMATE ZONE	FENESTRATION U-FACTOR ^{b,d}	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION SHGC ^{b, e, k}	CEILING R-VALUE ^{m, n, o}	WOOD FRAME WALL R-VALUE
1	1.2	0.75	0.30	30	13
2	0.65 ^l	[0.75] 0.65	0.30	[30] 38	13
3	[0.50] 0.35 ^l	[0.65] 0.55	[0.30] 0.35	[30] 38	[+3] 20 or 13+5 ^h
4 except Marine	0.35	[0.60] 0.55	[NR] 0.35	38	[+3] 20 or 13+5 ^h
5 and Marine 4	0.35	[0.60] 0.55	[NR] 0.40	[38] 49 ^o	20 or 13+5 ^h

6	[0.35] 0.32	[0.60] 0.55	NR	[49] 60	20 or 13+5 ^h
7 and 8	[0.35] 0.32	[0.60] 0.55	NR	[49] -60	21

Table 402.1 - CONTINUED

INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a

CLIMATE ZONE	MASS WALL R-VALUE ⁱ	FLOOR R-VALUE	BASEMENT ^c WALL R-VALUE	SLAB ^d R-VALUE & DEPTH	CRAWL SPACE ^c WALL R-VALUE
1	3/4	13	0	0	0
2	4/6	13	0	0	0
3	5/8	19	5/13 ^f	0	5/13
4 except Marine	[5/10] 8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	13/17	30 ^g	10/13	10, 2 ft	10/13
6	15/ [19] 20	30 ^g	15/19	10, 4 ft	10/13
7 and 8	[0.35] 0.32	[0.60] 0.55	NR	[49] 60	21

For SI: 1 foot = 304.8 mm.

- a. R-values are minimums. U-factors and SHGC are maximums. R-19 batts compressed into a nominal 2 x 6 framing cavity such that the R-value is reduced by R-1 or more shall be marked with the compressed batt R-value in addition to the full thickness R-value.
- b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
- c. "15/19" means R-15 continuous ~~[insulated sheathing]~~ insulation on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous ~~[insulated sheathing]~~ insulation on the interior or exterior of the home. "10/13" means R-10 continuous ~~[insulated sheathing]~~ insulation on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.
- d. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 ft, whichever is less, in zones 1 through 3 for heated slabs.
- e. There are no SHGC requirements in the Marine zone.
- f. Basement wall insulation is not required in warm-humid locations as defined by Figure 301.1 and Table 301.1.
- g. Or insulation sufficient to fill the framing cavity, R-19 minimum.
- h. First value is cavity insulation, second is continuous insulation, so "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 in the locations 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.
- i. The second R-value applies when more than half the insulation is on the interior of the mass wall.
- j. For impact rated fenestration in wind-borne debris regions ~~[complying with Section R301.2.1.2 of the IRC or Section 1608.1.2 of the IBC]~~, the maximum U-factor shall be 0.75 in Zone 2 and 0.65 in Zone 3.
- k. The SHGC may be waived when the glazing orientation is part of a passive solar glazing application.
- l. A fenestration U-factor of 0.37 shall be equivalent to the 0.35 requirement for glazing in all climate zones above 5,000 ft. elevation.
- m. When air impermeable insulation is used to create an un-vented attic assembly in accordance with Sec. R806.4, at least R-23 cavity insulation and R-10 continuous insulation surrounding all framing members shall be deemed to satisfy the requirement for R-38 ceilings.
- n. In all locations with heating degree days (HDD) exceeding 6000: When air impermeable insulation is used to create an un-vented attic assembly in accordance with Sec. R806.4, at least R-30 cavity insulation and R-17 continuous insulation surrounding all framing members shall be deemed to satisfy the requirement for R-49 ceilings.
- o. In locations with HDD less than 6000, R-38 shall be deemed to satisfy this requirement.

(2) **402.2. Specific insulation requirements (prescriptive).** See this section of the IECC except as provided below.

(a) 402.2.3 Access hatches and doors. See this section of the IECC and add the following exception: Exception: Access need not be provided where only ductwork is present in the attic, unless otherwise required.

([a] b) 402.2.[5] 6 Floors. Delete the text of this section and substitute the following: The following requirements apply to new floors and to existing un-insulated floors, including above-garage and cantilevered floors.

(i) **402.2.[5] 6.1** Floor insulation shall be installed to maintain permanent contact with the underside of the subfloor decking.

(ii) **402.2.[5] 6.2** Batt and blown insulation shall be held in place by mechanical attachments.

(iii) **402.2.[5] 6.3** The manufacturer's published installation instructions for in-floor heating shall be followed.

([b] c) 402.2.[7] 8 Slab-on-grade floors. See this section of the IECC and add the following provisions: Add the following sentence to the end of the first paragraph; Monolithic foundations shall be formed in place or insulation used as a forming material shall be adequately supported to resist movement.

(i) **[402.2.7.1] 402.2.8.1 Exception.** For slab-on-grade installations, the placement of vertical perimeter insulation shall not be required to penetrate the top four (4) inches of the slab at door thresholds or between unheated garages, storage or mechanical areas, and heated living spaces. The required depth and placement of perimeter insulation shall not be required to a depth that exceeds that of the top of the spread footing or the bottom of the monolithically-poured footing as determined for frost protection.

(ii) **402.2.8.2 Slab-on-grade sill plate sealer.** The space between the foundation and the bottom plate shall be sealed to limit infiltration by one of the following methods: application of a sill sealer that will expand and contract, or other equivalent material, between the foundation and the bottom plate; or application of caulk, or other equivalent material, to seal the bottom plate of exterior walls.

([e] d) 402.2.[1.1] 9 Band joist/rim joists and corners. Band /rim joists and corners shall be insulated to the same level as exterior walls as required for wood frame wall R-values in Table 402.1.1 and must include an air barrier.

([d] e) 402.2.[1.2] 10 Skylight Shafts and Knee Walls. Skylight shafts and knee walls shall be insulated to the same level as the exterior walls as required for wood frame wall R-values in Table 402.1.1.

([e] f) 402.2.[1.3] 11 Architectural Features. Code required building envelope insulation and air sealing for exterior architectural features such as stairs and decks shall be continuous.

([f] g) 402.2.[1.4] 12 Insulation Installation Requirements. Insulation shall be installed as follows:

(i) Insulation shall be installed according to manufacturer's published installation instructions.

(ii) Wall insulation shall be enclosed on all six sides, and shall be in substantial contact with the sheathing material on at least one side (interior or exterior) of the cavity.

(iii) Insulation shall uniformly fill each cavity side-to-side and top-to-bottom, without substantial gaps or voids around obstructions (such as blocking or bridging).

(iv) Exterior rigid insulation shall be in firm contact with the structural sheathing materials, and shall be tightly fitted at joints.

(v) Cavity insulation shall be split, installed, and/or fitted tightly around wiring and other services.

(vi) Exterior sheathing shall not be visible from the interior through gaps in the cavity insulation.

([g] h) 402.3 Fenestration. (Prescriptive.) See this section of the IECC except add the following new section: **Section 402.3.7. Glazing-to-opaque wall area ratio.** The ratio of glazing to opaque wall area shall not exceed eighteen percent (18%). Exception: when the ratio of glazing to opaque wall area exceeds eighteen percent (18%), compliance shall be demonstrated by using the calculation methods in the residential applications manual trade-off worksheet, dated June 2004, as prepared by the state of New Mexico energy, minerals and natural resources department.

([h] i) 402.4.1 Building Thermal Envelope. Delete the text of this section of the IECC and substitute the following:

(i) **402.4.1.1 Infiltration.** The building thermal envelope on all new construction shall

be durably sealed to limit infiltration. The sealing methods between dissimilar materials shall allow for differential expansion and contraction. The following shall be caulked, gasketed, weather stripped or otherwise sealed with an air barrier material, suitable film or solid material: all joints, seams and penetrations; site-built windows, doors and skylights; openings between windows and door assemblies and curb mounted skylights and their respective jambs and framing; utility penetrations; dropped ceilings separating a garage from conditioned spaces; behind tubs and showers on exterior walls; and other sources of infiltration.

(ii) **402.4.1.2 Existing building openings in level III alterations.** The existing building openings between conditioned and un-conditioned space must be fully sealed and insulated, and any remaining gaps must be sealed with caulk or foam. Where required, fire rated material shall be used.

(iii) **402.4.1.3 Existing building doors and windows.** Existing building openings between door and window assemblies and their respective jambs and framing shall be caulked, gasketed, weather stripped or otherwise sealed with an approved material.

(iv) **402.4.1.4 Existing building skylight shaft insulation.** Where access is available, all skylights **and knee walls** shall be caulked, gasketed or weather stripped. **and** Knee walls shall be insulated **[with an approved material]** in compliance with Table 402.1.1.

(v) **402.4.2.2 Visual inspection option.** See this section of the IECC and add the following sentence at the end of the paragraph: Compliance with the 2009 Energy Star Thermal Bypass Checklist shall be required.

**State of New Mexico
Thermal Bypass Inspection Checklist**

Home Address: _____ City: _____ State: NM

Thermal Bypass	Inspection Guidelines	Corrections Needed	Builder Verified	Rater Verified	N/A
1. Overall Air Barrier and Thermal Barrier Alignment	Requirements: Insulation shall be installed in full contact with sealed interior and exterior air barrier except for alternate to interior air barrier under item no. 2 (<i>Walls Adjoining Exterior Walls or Unconditioned Spaces</i>)				
	All Climate Zones:				
	1.1 Overall Alignment Throughout Home	Y/N	Y/N	Y/N	Y/N
	1.2 Garage Band Joist Air Barrier (at bays adjoining conditioned space)	Y/N	Y/N	Y/N	Y/N
	1.3 Attic Eave Baffles Where Vents/Leakage Exist	Y/N	Y/N	Y/N	Y/N
	Only at Climate Zones 4 and Higher:				
	1.4 Slab-edge Insulation (A maximum of 25% of the slab edge may be uninsulated in Climate Zones 4 and 5.)	Y/N	Y/N	Y/N	Y/N
	Best Practices Encouraged, Not Req'd.:				
	1.5 Air Barrier At All Band Joists (Climate Zones 4 and higher)	Y/N	Y/N	Y/N	Y/N
	1.6 Minimize Thermal Bridging (e.g., OVE framing, SIPs, ICFs)	Y/N	Y/N	Y/N	Y/N
2. Walls Adjoining Exterior Walls or Unconditioned Spaces	Requirements: • Fully insulated wall aligned with air barrier at both interior and exterior, OR • Alternate for Climate Zones 1 thru 3, sealed exterior air barrier aligned with RESNET Grade 1 insulation fully supported • Continuous top and bottom plates or sealed blocking				
	2.1 Wall Behind Shower/Tub	Y/N	Y/N	Y/N	Y/N
	2.2 Wall Behind Fireplace	Y/N	Y/N	Y/N	Y/N
	2.3 Insulated Attic Slopes/Walls	Y/N	Y/N	Y/N	Y/N
	2.4 Attic Knee Walls	Y/N	Y/N	Y/N	Y/N
	2.5 Skylight Shaft Walls	Y/N	Y/N	Y/N	Y/N
	2.6 Wall Adjoining Porch Roof	Y/N	Y/N	Y/N	Y/N
	2.7 Staircase Walls	Y/N	Y/N	Y/N	Y/N

	2.8 Double Walls	Y/N	Y/N	Y/N	Y/N
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State of New Mexico
Thermal Bypass Inspection Checklist Continued

Home Address: _____ City: _____ State: NM

Thermal Bypass	Inspection Guidelines	Corrections Needed	Builder Verified	Rater Verified	N/A
3. Floors between Conditioned and Exterior Spaces	Requirements: <ul style="list-style-type: none"> Air barrier is installed at any exposed fibrous insulation edges Insulation is installed to maintain permanent contact with sub-floor above including necessary supports (e.g., staves for blankets, netting for blown-in) Blanket insulation is verified to have no gaps, voids or compression. Blown-in insulation is verified to have proper density with firm packing 				
	3.1 Insulated Floor Above Garage	Y/N	Y/N	Y/N	Y/N
	3.2 Cantilevered Floor	Y/N	Y/N	Y/N	Y/N
4. Shafts	Requirements: Openings to unconditioned space are fully sealed with solid blocking or flashing and any remaining gaps are sealed with caulk or foam (provide fire-rated collars and caulking where required)				
	4.1 Duct Shaft	Y/N	Y/N	Y/N	Y/N
	4.2 Piping Shaft/Penetrations	Y/N	Y/N	Y/N	Y/N
	4.3 Flue Shaft	Y/N	Y/N	Y/N	Y/N
5. Attic / Ceiling Interface	Requirements: <ul style="list-style-type: none"> All attic penetrations and dropped ceilings include a full interior air barrier aligned with insulation with any gaps fully sealed with caulk, foam or tape Movable insulation fits snugly in opening and air barrier is fully gasketed 				
	5.1 Attic Access Panel (fully gasketed and insulated)	Y/N	Y/N	Y/N	Y/N
	5.2 Attic Drop-down Stair (fully gasketed and insulated)	Y/N	Y/N	Y/N	Y/N
	5.3 Dropped Ceiling/Soffit (full air barrier aligned with insulation)	Y/N	Y/N	Y/N	Y/N
	5.4 Recessed Lighting Fixtures (ICAT labeled and sealed to drywall)	Y/N	Y/N	Y/N	Y/N
	5.5 Whole-house Fan (insulated cover gasketed to the opening)	Y/N	Y/N	Y/N	Y/N
6. Common Walls Between Dwelling Units	Requirements: Gap between drywall shaft wall (i.e., common wall) and the structural framing between units is fully sealed at all exterior boundary conditions				
	6.1 Common Wall Between Dwelling Units	Y/N	Y/N	Y/N	Y/N

Home Energy Rating Provider: _____ Rater Inspection Date: _____

Home Energy Rater Company Name: _____

Home Energy Rater Signature: _____

Builder Company Name: _____ Builder Inspection Date: _____

Builder Employee Signature: _____

(j) 402.4.3 Fireplaces. See this section of the IECC and add the following exception:

(i) Exception: Wood burning masonry fireplaces without a gas log igniter are allowed without gasketed doors providing:

1) The residence being constructed exceeds compliance of the energy code by 20% or better, and

2) The fireplaces have outdoor combustion air supplied directly to the fireboxes.

(C). 403 Systems. See this section of the IECC except as provided below:

(1) 403.1.1 Programmable thermostat. See this section of the IECC and add the following exceptions:

(a) Exceptions:

(i) Where the home is registered in a performance-based certification program the requirement for a programmable thermostat shall be waived:

(ii) Where approved alternative methods of construction and/or materials are being used, programmable thermostats may be omitted.

(2) 403.2.1 Insulation Delete the text of this section and replace with the following: Ducts shall be insulated to the following levels:

(a) Heating only ducts:

(i) exterior: R-8

(ii) ventilated Attic: R-6

(iii) unvented attic w/ backloaded ceiling: R-6

(iv) unvented attic w/ roof insulation: R-6

(v) unconditioned space: R-6

(vi) indirectly conditioned space: R3.5

(vii) buried: none.

(b) Cooling only ducts :

(i) exterior: R-8 or the R-factor of insulation in the exterior wall on which the duct is located.

(ii) ventilated Attic: R-6

(iii) unvented attic w/ backloaded ceiling: R-6

(iv) unvented attic w/ roof insulation: R-6

(v) unconditioned space: R-6

(vi) indirectly conditioned space: R3.5

(vii) buried: none

(c) Combined heating and cooling ducts:

(i) exterior: R-6

(ii) ventilated Attic: R-6

(iii) unvented attic w/ backloaded ceiling: R-6

(iv) unvented attic w/ roof insulation: R-6

(v) unconditioned space: R-6

(vi) indirectly conditioned space: none

(vii) buried: R-3.5

(3) 403.2.2 Sealing (Mandatory). Delete the text of this section and replace with the following: All ducts, air handlers, filter boxes and building cavities used as ducts shall be sealed. Joints, seams and penetrations of duct systems shall be made air-tight by means of mastics, gasketing, or other means in accordance with the mechanical code. Register penetrations shall be sealed to the wall or floor assemblies. Where HVAC duct penetrates a conditioned space, the duct penetration shall be sealed to the wall or floor assembly to prevent leakage into an unconditioned space.

(4) 403.2.3 Building Cavities. (Mandatory). See this section of the IECC.

(5) 403.2.4 Installation of Ducts Add the following new section: All HVAC ducts or duct systems shall be installed in accordance with the New Mexico Mechanical Code Chapter 6 and 17.

(6) 403.2.5 Materials Add the following new section: Materials for HVAC ducts or duct systems shall comply with the provisions set forth in Chapter 6 of the New Mexico Mechanical Code. Factory made ducts shall be installed in accordance with Chapter 6 of the New Mexico Mechanical Code and UMC Standard 6-5. The use of flexible duct shall be limited to supply- and return-air run-outs of not more than 12 feet in length. Flexible

duct shall not be used for the principle supply- and return-air plenum.

(7) 403.3. [Mechanical System] Piping Insulation (Mandatory). Delete the text of this section of the IECC and replace with the following: All plumbing and mechanical hot water piping systems shall be insulated to a minimum R-2. A means of manual disconnect must be installed on all circulating pumps.

(8) 403.4 Circulating hot water systems (Mandatory). Delete this section of the IECC with no replacement.

(9) 403.5 Mechanical Ventilation (Mandatory) See this section of the IECC.

(10) 403.6 Equipment Sizing (Mandatory). Delete the text of this section and replace with the following: Heating and cooling equipment shall be sized in accordance with Chapter 9 of the New Mexico Mechanical Code, Section 902.0, and Chapter 17 of the New Mexico Mechanical Code, Standards Table 17-1, Standards for Equipment and Materials. The calculations used to determine the equipment size for the residence must be included with the submittal documents and approved by the Authority Having Jurisdiction.

(11) 403.7 Systems serving multiple dwelling units (Mandatory) Delete the text of this section and replace with the following: In lieu of Section 403 systems serving multiple dwelling units as defined in the New Mexico residential building code shall comply with Sections 503 and 504 of this code, Chapter 6 Duct Systems, and Chapter 17 Mandatory Referenced Standards of the 2009 New Mexico Mechanical Code. The calculations used to determine the equipment size for the residence must be included with the submittal documents and approved by the Authority Having Jurisdiction.

(12) 403.8 Snow Melt System Controls and 403.9 Pools (Mandatory). See these sections of the IECC.

(13) 403.10 Fans. Add this new section as follows: Ventilating fans shall meet ENERGY STAR requirements.

(a) Exception: Ventilating fans in half bathrooms that do not contain a bathtub, shower, spa, or similar source of moisture are exempt from the ENERGY STAR requirement.

(D). 404 Electrical Power and Lighting Systems. Delete the text of this section and replace with the following:

(1) 404.1 Lighting equipment (Mandatory). A minimum of 75 percent of the lamps in permanently installed lighting fixtures shall be high- efficacy lamps or 50 percent of the permanently installed luminaires (lighting fixtures) shall be ENERGY STAR qualified.

(2) 404.2 Lighting equipment (Mandatory). On one and two family dwelling units, in addition to a wall switch, motion sensors, daylight sensors, and/or timers shall be installed on at least 33% of the outdoor luminaries (light fixtures).

(3) 404.3 Photovoltaic raceway. On new construction in one and two family dwelling units a listed non-flexible 3/4 inch minimum metallic electrical raceway shall be installed during rough-in from an accessible point in the garage or indoor designated solar photovoltaic equipment location to: (A) the roof for roof mounted photovoltaic equipment, or (B) an outside wall for remote mounted photovoltaic equipment. The conduit shall be sealed with a listed fitting or box at each end.

(E). 405 SIMULATED PERFORMANCE ALTERNATIVE. Delete this section of the IECC with no substitution.

(F) 406 Existing Residential Buildings. Add this new chapter as prescribed below: The following shall apply in residences where *additions* or alterations are made and any of the following are encountered: 1. The reconfiguration of space; 2. The addition or elimination of any door or window; or 3. The work area in the existing building exceeds 50% of the original aggregate floor space.

(1) 406.1 Thermal Envelope. Exposed openings to conditioned space in the existing building shall be fully sealed and insulated and any remaining gaps sealed with caulk or foam. Where required, fire rated material shall be used.

(a) 406.1.1 Openings. Exposed openings in the existing building between conditioned and unconditioned spaces, including those in cabinets or closets, shall be fully sealed and insulated, and any remaining gaps shall be sealed with approved materials. Where required, fire rated material shall be used.

(b) 406.1.2 Doors and Windows. Openings between all exterior door and window assemblies and their respective jambs and framing shall be caulked, gasketed, weather-stripped or otherwise sealed with an approved material.

(c) 406.1.3 Skylight Shaft Insulation. Where access exists, all skylights shall be caulked, gasketed, or weather-stripped with an approved material. Knee walls shall be insulated to comply with Table 402.1.1.

(2) 406.2 Under Floor Insulation. Where access exists, insulate existing un-insulated floors

(including floors above garages and cantilevered floors) in accordance with the following:

(a) Insulation shall be installed to maintain permanent contact with the underside of the sub-floor decking:

(b) Batt and blown insulation shall be held in place by mechanical attachment;

(c) Batt insulation shall be installed in accordance with manufacturers' specifications;

(d) Manufacturers' published installation instructions for in-floor heating shall be followed.

(3) **406.4 Duct Sealing and Insulation.** Where access exists, compliance with applicable sections of 403.2 through 403.4 is required.

(4) **406.5 Programmable thermostat.** Reasonable measures shall be taken for retrofitting all existing non-programmable thermostats. Where the primary heating system is a forced-air furnace, at least one thermostat per dwelling unit shall be capable of controlling the heating and cooling system on a daily schedule to maintain different temperature set points at different times of the day. This thermostat shall include the capability to set back or temporarily operate the system to maintain zone temperatures down to 55°F (13°C) or up to 85°F (29°C). The thermostat shall initially be programmed with a heating temperature set point no higher than 70°F (21°C) and a cooling temperature set point no lower than 78°F (26°C).

(a) **Exceptions:**

(i) Where the home is registered in a performance-based certification program the requirement for a programmable thermostat shall be waived;

(ii) Where approved alternative methods of construction and/or materials are being used, programmable thermostats may be omitted.

[14.7.6.12 NMAC - Rp, 14.7.6.12, NMAC, 7-1-04; A, 2-24-08; NMAC, 7-1-10]

14.7.6.13 CHAPTER 5 COMMERCIAL ENERGY EFFICIENCY: See this section of the IECC except as provided below.

A. 501 General. See this section of the IECC except as provided below:

(1) **501.1 Scope.** See this section of the IECC except delete the second sentence of this section.

(2) **501.2 Application.** Delete this section of the IECC and replace with the following: The *commercial building* project shall comply with the requirements in Sections 502 (Building envelope requirements), 503 (Building mechanical systems), 504 (Service water heating) and 505 (Electrical power and lighting systems) in its entirety.

(a) Exception: Building conforming to Section 507, provided Sections 502.4, 503.2, 504, 505.2, 505.3, 505.4, 505.6, 505.7 and 506 are each satisfied.

B. 502 Building Envelope Requirements. See this section of the IECC except as provided below:

(1) **TABLE 502.1.2 Building Envelope Requirements Opaque Element, Maximum U-Factors.** Amend the table as follows:

TABLE 502.1.2 Building Envelope Requirements Opaque Element, Maximum U-Factors								
CLIMATE ZONE	1		2		3		4 EXCEPT MARINE	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Roofs								
Insulation entirely above deck	U-0.063	U-0.048	U-0.048	U-0.048	U-0.048	U-0.048	[U-0.048] U-0.039	[U-0.048] U-0.039
Metal buildings	U-0.065	U-0.065	U-0.055	U-0.055	[U-0.055] U-0.035	[U-0.055] U-0.035	[U-0.055] U-0.035	[U-0.055] U-0.035
Attic and other	U-0.034	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027	U-0.027
Walls, Above Grade								
Mass	U-0.58	U-0.151	U-0.151	U-0.123	[U-0.123] U-0.110	U-0.104	U-0.104	U-0.090
Metal building	U-0.093	U-0.093	U-0.093	U-0.093	[U-0.084] U-0.079	[U-0.084] U-0.052	[U-0.084] U-0.052	[U-0.084] U-0.052
Metal framed	U-0.124	U-0.124	U-0.124	U-0.064	[U-0.084] U-0.077	U-0.064	U-0.064	U-0.064
Wood framed and other	U-0.089	U-0.089	U-0.089	U-0.089	[U-0.089] U-0.064	[U-0.089] U-0.064	[U-0.089] U-0.064	U-0.064
Walls, Below Grade								
Below-grade wall ^a	C-1.140	C-1.140	C-1.140	C-1.140	C-1.140	C-1.140	[C-1.140] C-0.119	C-0.119
Floors								
Mass	U-0.322	U-0.322	U-0.107	U-0.087	[U-0.107] U-0.076	[U-0.087] U-0.076	[U-0.087] U-0.076	U-0.074
Joist/Framing	U-0.282	U-0.282	U-0.052	U-0.052	U-0.033	U-0.033	U-0.033	U-0.033
Slab-on-Grade Floors								
Unheated slabs	F-0.730	F-0.730	F-0.730	F-0.730	F-0.730	F-0.730	[F-0.730] F-0.54	F-0.540
Heated slabs	F-1.020	F-1.020	F-1.020	F-1.020	[F-0.900] F-0.700	[F-0.900] F-0.700	[F-0.650] F-0.650	[F-0.860] F-0.650

Continue - TABLE 502.1.2								
Building Envelope Requirements Opaque Element, Maximum U-Factors								
CLIMATE ZONE	5 AND MARINE 4		6		7		8	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Roofs								
Insulation entirely above deck	[U-0.048] U-0.039	[U-0.048] U-0.039	U-0.048	U-0.048	U-0.039	U-0.039	U-0.039	U-0.039
Metal buildings	[U-0.055] U-0.035	[U-0.055] U-0.035	U-0.049	U-0.049	U-0.049	U-0.049	U-0.035	U-0.035
Attic and other	U-0.027	[U-0.027] U-0.021	U-0.027	[U-0.027] U-0.021	[U-0.027] U-0.021	[U-0.027] U-0.021	[U-0.027] U-0.021	[U-0.027] U-0.021
Walls, Above Grade								
Mass	[U-0.090] U-0.078	[U-0.090] U-0.078	U-0.080	U-0.071	U-0.071	U-0.071	U-0.071	U-0.052
Metal building	[U-0.069] U-0.052	[U-0.069] U-0.052	U-0.069	U-0.069	U-0.057	U-0.057	U-0.057	U-0.057
Metal framed	U-0.064	U-0.064	U-0.064	U-0.057	U-0.064	U-0.052	U-0.064	U-0.037
Wood framed and other	U-0.064	U-0.051	U-0.051	U-0.051	U-0.051	U-0.051	U-0.036	U-0.036
Walls, Below Grade								
Below-grade wall ^a	C-0.119	C-0.119	C-0.119	C-0.119	C-0.119	C-0.092	C-0.119	C-0.075
Floors								
Mass	U-0.074	U-0.064	U-0.064	U-0.057	U-0.064	U-0.051	U-0.057	U-0.051
Joist/Framing	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033	U-0.033
Slab-on-Grade Floors								
Unheated slabs	[F-0.730] F-0.54	F-0.540	F-0.540	F-0.520	F-0.520	F-0.520	F-0.520	F-0.510
Heated slabs	[F-0.860] F-0.580	[F-0.860] F-0.580	F-0.860	F-0.688	F-0.830	F-0.688	F-0.688	F-0.688

(2) TABLE 502.2.1 Building Envelope Requirements Opaque Assemblies. Amend the table as follows:

Table 502.2(1) BUILDING ENVELOPE REQUIREMENTS - OPAQUE ASSEMBLIES								
CLIMATE ZONE	1		2		3		4 EXCEPT MARINE	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Roofs								
Insulation entirely above deck	R-15	R-20ci	R-20ci	R-20ci	R-20ci	R-20ci	[R-20] R-25ci	[R-20] R-25ci
Metal buildings (with [R-5] R-3.5 thermal blocks ^{a,b})	R-19	R-19	R-13 + R-13	R-13 + R-13	[R-13 + R-13] R-19 + R11ci	[R-19] R-19 + R11ci	[R-13 + R-13] R-19 + R11ci	[R-19] R-19 + R11ci
Attic and other	R-30	R-38	R-38	R-38	R-38	R-38	R-38	R-38
Walls, Above Grade								
Mass	NR	R-5.7ci	R-5.7ci	R-7.6ci	R-7.6ci	R-9.5ci	R-9.5ci	R-11.4ci
Metal building ^b	R-16	R-16	R-16	R-16	[R-19] R-13 + R-6.5c.i	[R-16] R-13 + R-13c.i	[R-16] R-13 + R-13c.i	[R-16] R-13 + R-13c.i
Metal framed	R-13	R-13	R-13	R-13 + R-7.5ci	R-13 + [R-3.8ei] R-5 ci	R-13 + R-7.5ci	R-13 + R-7.5	R-13 + R-7.5ci
Wood framed and other	R-13	R-13	R-13	R-13	R-13 + 3.8c.i. or R-20	R-13 + 3.8c.i. or R-20	R-13 + 3.8c.i. or R-20	R-13 + R-3.8ci or R-20
Walls, Below Grade								
Below-grade wall ^d	NR	NR	NR	NR	NR	NR	[NR] R-7.5ci	R-7.5ci
Floors								
Mass	NR	NR	R-6.3ci	R-8.3ci	[R-6.3ei] R-10ci	[R-8.3ei] R-10ci	R-10ci	R-10.4ci
Joist/Framing	NR	NR	R-19	R-30	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	R-10 for [42] 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-10 for 24 in. below	R-10 for 24 in. below	R-15 for 24 in. below	R-15 for 24 in. below
Opaque Doors								
Swinging	U-0.70	U-0.70	U-0.70	U-0.70	[U-0.70] U-0.61	[U-0.70] U-0.61	[U-0.70] U-0.61	[U-0.70] U-0.61
Roll-up or sliding	U-1.45	U-1.45	U-1.45	U-1.45	[U-1.45] R-4.75	[U-1.45] R-4.75	[U-0.50] R-4.75	[U-0.50] R-4.75

For SI: 1 inch = 25.4 mm.

ci = Continuous insulation. NR = No requirement.

a. When using R-value compliance method, a thermal spacer block is required, otherwise use the U-factor compliance method. [see Tables 502.1.2 and 502.2(2)].

b. Assembly descriptions can be found in Table 502.2(2).

c. R-5.7 ci is allowed to be substituted with concrete block walls complying with ASTM C 90, ungrouted or partially grouted at 32 inches or less on center vertically and 48 inches or less on center horizontally, with ungrouted cores filled with material having a maximum thermal conductivity of 0.44 Btu-in./h-ft F.

d. When heated slabs are placed below grade, below-grade walls must meet the exterior insulation requirements for perimeter insulation according to the heated slab-on-grade construction.

e. Steel floor joist systems shall to be R-38.

Continue - Table 502.2(1)								
BUILDING ENVELOPE REQUIREMENTS - OPAQUE ASSEMBLIES								
CLIMATE ZONE	5 AND MARINE 4		6		7		8	
	All other	Group R	All other	Group R	All other	Group R	All other	Group R
Roofs								
Insulation entirely above deck	[R-20] R-25ci	[R-20] R-25ci	R-20	R-20	R-25	R-25	R-25	R-25ci
Metal buildings (with [R-5] R-3.5 thermal blocks ^{a,b})	[R-13+] R-13 [R-19+] R-19 R-11ci	[R-19+] R-19 [R-19+] R-19 R-11ci	R-13 + R-19	R-19	R-13 + R-19	R-19 + R-10xx	R-11xx + R-19	R-19 + R-10xx
Attic and other	R-38	R-38	R-38	R-38	R-38	R-38	R-49	R-49
Walls, Above Grade								
Mass	R-11.4ci	R-13.3ci	R-13.3ci	R-15.2ci	R-15.2ci	R-15.2ci	R-25ci	R-25ci
Metal building ^b	[R-13+] R-5.6ci [R-13+] R-13 [R-13c.i]	[R-13+] R-5.6ci [R-13+] R-13 [R-13c.i]	R-13 + R-5.6ci	R-13 + R-5.6ci	R-19 + R-5.6ci	R-19 + R-5.6ci	R-19 + R-5.6ci	R-19 + R-5.6ci
Metal framed	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-15.6ci	R-13 + R-7.5ci	R-13 + R-18.8ci
Wood framed and other	R-13 + R-3.8ci or R-20	R-13 + [R-3.8] 7.5 c.i.	R-13 + R-7.5	R-13 + R-7.5	R-13 + R-7.5ci	R-13 + R-7.5ci	R-13 + R-15.6ci	R-13 + R-15.6ci
Walls, Below Grade								
Below-grade wall ^d	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-7.5ci	R-10ci	R-7.5ci	R-12.5ci
Floors								
Mass	R-10ci	R-12.5ci	R-12.5ci	R-14.6ci	R-15ci	R-16.7ci	R-15ci	R-16.7ci
Joist/Framing	R-30	R-30	R-30	R-30 ^e	R-30	R-30 ^e	R-30 ^e	R-30 ^e
Slab-on-Grade Floors								
Unheated slabs	[NR] [R-10 for 24 in. below]	R-10 for 24 in. below	R-10 for 24 in. below	R-15 for 24 in. below	R-15 for 24 in. below	R-15 for 24 in. below	R-15 for 24 in. below	R-20 for 24 in. below
Heated slabs	R-15 for [24] 36 in. below	R-15 for [24] 36 in. below	R-15 for in. below	R-20 for 48 in. below	R-20 for 24 in. below	R-20 for 48 in. below	R-20 for 48 in. below	R-20 for 48 in. below
Opaque Doors								
Swinging	[U-0.70] U-0.37	[U-0.70] U-0.37	U-0.70	U-0.70	U-0.50	U-0.50	U-0.50	U-0.50
Roll-up or sliding	[U-0.50] R-4.75	[U-0.50] R-4.75	U-0.50	U-0.50	U-0.50	U-0.50	U-0.50	U-0.50

(3) TABLE 502.2(2) BUILDING ENVELOPE REQUIREMENTS-OPAQUE ASSEMBLIES.
Delete the text in this table and replace with the following:

TABLE 502.2(2)
BUILDING ENVELOPE REQUIREMENTS-OPAQUE ASSEMBLIES
Table 502.2(2) METAL BUILDING ASSEMBLY DESCRIPTIONS

ROOFS	DESCRIPTION	REFERENCE
R-19+R-11 ci R-25+R-11 ci R-30+R-11 ci	Continuous insulation with thermal spacer block. A continuous membrane is installed below the purlins and uninterrupted by framing members. Uncompressed, un-faced insulation rests on top of the membrane between the purlins.	ASHRAE/IESNA 90.1 A2.3.2.4 and Table A2.3 including proposed 90.1- 2007 Addendum "bb"
WALLS		
R-19	Single layer fiberglass insulation. The layer of R-19 fiberglass insulation is installed continuously perpendicular to the girts and is compressed when the metal skin is attached to the girts.	ASHRAE/IESNA 90.1 A2.3.2.4 and Table A2.3 including proposed 90.1- 2007 Addendum "bb"
R-13+R-6.5 ci R-13+ R-13 ci R-13+ R-19.5 ci R-13+ R-26 ci	Single layer fiberglass insulation with continuous insulation. The first R-value is for faced insulation batts installed perpendicular and compressed between the metal wall panels and the steel framing. The second rated R-value is for continuous rigid insulation installed between the metal panel and steel framing, or on the interior of the steel framing.	ASHRAE/IESNA 90.1 A2.3.2.4 and Table A2.3 including proposed 90.1- 2007 Addendum "bb"

(4) TABLE 502.3 BUILDING ENVELOPE REQUIREMENTS: FENESTRATION. Amend the table as follows:

**TABLE 502.3
BUILDING ENVELOPE REQUIREMENTS: FENESTRATION**

CLIMATE ZONE	1	2	3	4, except Marine	5 and Marine 4	6	7	8
Vertical Fenestration ([40] 30% maximum of above-grade wall)								
Framing materials other than metal with or without metal reinforcement or cladding								
U-Factor ^a	1.20	0.75	[0.65] 0.40	[0.40] 0.35	0.35	0.35	0.35	0.35
Metal framing with or without thermal break								
Curtain Wall/Storefront U-Factor ^a	1.0	0.70	[0.60] 0.50	[0.50] 0.42	[0.45] 0.42	0.45	0.40	0.40
Entrance Door U- Factor	1.20	1.10	0.90	0.85	0.80	0.80	0.80	0.80
All Other U- Factor ^{a,b}	1.20	0.75	[0.65] 0.60	[0.55] 0.50	[0.55] 0.50	0.55	0.45	0.45
SHGC- All Frame Types								
SHGC: PF < 0.25	0.25	0.25	0.25	0.40	0.40	0.40	0.45	0.45
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
Skylights (3% maximum, 5% maximum with automatic day lighting controls^c)								
U-Factor	0.75	0.75	[0.65] 0.55	[0.60] 0.50	[0.60] 0.50	0.60	0.60	0.60
SHGC ^d	0.35	0.35	0.35	0.40	0.40	0.40	NR	NR

NR = No requirement.

PF = Projection factor (see Section 502.3.2).

- a. The first U-factor applies when impact rated glazing is installed.
- b. "All others" includes operable windows, fixed windows, and [nonentrance] doors other than entrance doors.
- c. Automatic day lighting controls shall meet the requirements of Section 505.2.2.3.3.
- d. The SHGC for Climate Zones 1 – 6 can be increased to SHGC no greater than 0.60 if the Visible

Transmittance (VT) is not less than 0.60 and automatic day lighting controls are installed that meet the requirements of Section 505.2.2.3.3.

(4) 502.4.5 Outdoor air intakes and exhaust openings. Delete the text of this section and replace with the following: Stair and elevator shaft vents and other exhaust openings shall be provided with dampers in accordance with Sections 502.4.5.1 and 502.4.5.2.

Dampers shall be installed with controls so that they are capable of automatically opening upon:

- (a) The activation of any fire alarm initiating device of the building's fire alarm system.
- (b) The interruption of power to the damper.

(5) 502.4.5.1 Stair and shaft vents. Stair and shaft vents shall be provided with Class IA motorized dampers with a maximum leakage rate of 3 cfm per square foot (5.1 L/s · C m²) at 1.0 inch water gauge (w.g.) (1250 Pa) when tested in accordance with AMCA 500D.

(6) 502.4.5.2 Outdoor air intakes and exhausts. Outdoor air supply and exhaust openings shall be provided with Class IA motorized dampers with a maximum leakage rate of 3 cfm per square foot (5.1 L/s · C m²) at 1.0 inch water gauge (w.g.) (1250 Pa) when tested in accordance with AMCA 500D.

(a) **Exception:** Delete the text of the exception and replace with the following: Gravity (non-motorized) dampers having a maximum leakage rate of 20 cfm per square foot (34 L/s · C m²) at 1.0 inch water gauge (w.g.) (1250 Pa) when tested in accordance with AMCA 500D are permitted to be used where the design exhaust capacity does not exceed 300 cfm or barometric relief dampers integral with manufacturer's equipment or by engineer designed systems.

(C). 503 See this section of the IECC except as provided below:

(1) 503.2.1 Calculation of heating and cooling loads. See this section of the IECC and add the following sentence after the first sentence: The design loads shall account for the building envelope, lighting, ventilation and occupancy loads based on the project design.

(2) 503.2.2 Equipment and system sizing. Delete the text of this section and replace with the following: The output capacity of the heating and cooling equipment and systems shall not exceed the loads calculated in accordance with Section 503.2.1. A single piece of equipment providing both heating and cooling must satisfy this provision for one function with the capacity for the other function and be as small as possible within available equipment options. Standby equipment and systems shall be provided with controls and devices that allow such systems or equipment to operate automatically only when the primary equipment is not operating.

(a) Exception: Multiple units of the same equipment type with combined capacities exceeding the design load and provided with controls that have the capability to sequence the operation of each unit based on load.

(3) 503.2.3 HVAC equipment Performance requirements. See this section of the IECC.

(4) 503.2.4 Controls. Delete the text this section of the IECC and replace with the following:

(a) 503.2.4.1 Zone Thermostatic Controls.

(i) 503.2.4.1.1 General. The supply of heating and cooling energy to each zone shall be individually controlled by thermostatic controls responding to temperature within the zone. For the purposes of Section 503.2.4.1, a dwelling unit shall be permitted to be considered a single zone. (ASHRAE 90.1: 6.4.3.1.1)

1) Exceptions: Independent perimeter systems that are designed to offset only building envelope loads shall be permitted to serve one or more zones also served by an interior system provided:

a) The perimeter system includes at least one thermostatic control zone for each building exposure having exterior walls facing only one orientation for 50 contiguous feet or more.

b) The perimeter system heating and cooling supply is controlled by a thermostatic control(s) located within the zones(s) served by the system.

Exterior walls are considered to have different orientations if the directions they face differ by more than 45 degrees.

(ii) 503.2.4.1.2 Dead Band. Where used to control both heating and cooling, zone thermostatic controls shall be capable of providing a temperature range or dead band of at least 5°F within which the supply of heating and cooling energy to the zone is shut off or reduced to a minimum. (ASHRAE 90.1: 6.4.3.1.2)

1) Exceptions:

a) Thermostats that require manual changeover between heating and cooling modes:

b) Special occupancy or special applications where wide temperature ranges are not acceptable (such as retirement homes, process applications, museums, some areas of hospitals) and are approved by the authority having jurisdiction.

(b) 503.2.4.2 Setpoint Overlap Restriction. Where heating and cooling to a zone are controlled by separate zone thermostatic controls located within the zone, means (such as limit switches, mechanical stops, or, for DDC systems, software programming) shall be provided to prevent the heating setpoint from exceeding the cooling set point minus any applicable proportional band. (ASHRAE 90.1: 6.4.3.2)

(c) 503.2.4.3 Off-Hour Controls. HVAC systems shall have the off-hour controls required by Sections 503.2.4.3.1 through 503.2.4.3.4. (ASHRAE 90.1: 6.4.3.3)

(i) Exceptions:

1) HVAC systems intended to operate continuously.

2) HVAC systems having a design heating capacity and cooling capacity less than 15,000 Btu/h that are equipped with readily accessible manual ON/ OFF controls.

(ii) 503.2.4.3.1 Automatic Shutdown. HVAC systems shall be equipped with at least one of the following:

1) Controls that can start and stop the system under different time schedules for seven different day-types per week, are capable of retaining programming and time setting during loss of power for a period of at least ten hours, and include an accessible manual override, or equivalent function, that allows temporary operation of the system for up to two hours.

2) An occupant sensor that is capable of shutting the system off when no occupant is sensed for a period of up to 30 minutes.

3) A manually operated timer capable of being adjusted to operate the system for up to two hours.

4) An interlock to a security system that shuts the system off when the security

system is activated. (ASHRAE 90.1: 6.3.3.1)

a) Exception: Residential occupancies may use controls that can start and stop the system under two different time schedules per week.

(ii) 503.2.4.3.2 Setback Controls. Heating systems located in climate zones 2–8 shall be equipped with controls that have the capability to automatically restart and temporarily operate the system as required to maintain zone temperatures above a heating setpoint adjustable down to 55°F or lower. Cooling systems located in climate zones 1b, 2b, 3b, 4b, and 5b shall be equipped with controls that have the capability to automatically restart and temporarily operate the system as required to maintain zone temperatures below a cooling setpoint adjustable up to 90°F or higher or to prevent high space humidity levels. (ASHRAE 90.1: 6.4.3.3.2)

1) Exception: Radiant floor and ceiling heating systems.

(iii) 503.2.4.3.3 Optimum Start Controls. Individual heating and cooling air distribution systems with a total design supply air capacity exceeding 10,000 cfm, served by one or more supply fans, shall have optimum start controls. The control algorithm shall, as a minimum, be a function of the difference between space temperature and occupied setpoint and the amount of time prior to scheduled occupancy. (ASHRAE 90.1: 6.4.3.3.3)

(iv) 503.2.4.3.4 Zone Isolation. HVAC systems serving zones that are intended to operate or be occupied nonsimultaneously shall be divided into isolation areas. Zones may be grouped into a single isolation area provided it does not exceed 25,000 ft² of conditioned floor area nor include more than one floor. Each isolation area shall be equipped with isolation devices capable of automatically shutting off the supply of conditioned air and outdoor air to and exhaust air from the area. Each isolation area shall be controlled independently by a device meeting the requirements of Section 503.2.4.3.1, Automatic Shutdown. For central systems and plants, controls and devices shall be provided to allow stable system and equipment operation for any length of time while serving only the smallest isolation area served by the system or plant. (ASHRAE 90.1: 6.4.3.3.4)

1) Exceptions: Isolation devices and controls are not required for the following:

a) Exhaust air and outdoor air connections to isolation zones when the fan system to which they connect is 5000 cfm and smaller.

b) Exhaust airflow from a single isolation zone of less than 10% of the design airflow of the exhaust system to which it connects.

c) Zones intended to operate continuously or intended to be inoperative only when all other zones are inoperative

(v) 503.2.4.3.5 Automatic Start Capabilities. Controls designed to automatically adjust the start time of an HVAC system each day to allow for automatically bringing the space to desired occupied temperature levels before scheduled occupancy shall be provided on each system.

(d) 503.2.4.4 Off-Hour Controls. HVAC systems shall have the off-hour controls required by Sections 503.2.4.3.1 through 503.2.4.3.4. (ASHRAE 90.1: 6.4.3.3)

(i) Exceptions:

1) HVAC systems intended to operate continuously.

2) HVAC systems having a design heating capacity and cooling capacity less than 15,000 Btu/h that are equipped with readily accessible manual ON/ OFF controls.

(e) 503.2.4.4 Shutoff damper controls. See this section of the IECC except delete the three exceptions and replace with the following exception: Exception: Gravity (nonmotorized) dampers having a maximum leakage rate of 20 cfm per square foot (34 L/s • C m²) at 1.0 inch water gauge (w.g.) (1250 Pa) when tested in accordance with AMCA 500D are permitted to be used where the design exhaust capacity does not exceed 300 cfm or barometric relief dampers integral with manufacturer's equipment or by engineered systems.

(f) 503.2.4.5 Snow Melt system controls. See this section of the IECC.

(g) 503.2.4.6 Freeze Protection. Freeze protection systems shall include automatic controls capable of shutting off the systems when outdoor air temperatures are above 40°F or when the conditions of the protected fluid will prevent freezing. Freeze protection systems shall be installed as allowed under alternate materials and methods of installation and in accordance with currently recognized engineering practices.

(5) 503.2.5 Ventilation. See this section of the IECC except as provided below:

(a) 503.2.5.1 Demand or CO₂ Controlled Ventilation. Demand control ventilation (DCV) or CO₂ controlled ventilation is required for spaces larger than 500 ft² (50m²) and with an average occupant load of 25 people per 1000 ft² (93 m²) of floor area and served by systems with one or more of the following: 1. An air-side economizer; 2. Automatic modulating control of the outdoor air damper; or 3. A design outdoor airflow greater than 3,000 cfm (1400 L/s).

(i) Exceptions:

- 1) Systems with energy recovery complying with Section 503.2.6.
- 2) Multiple-zone systems without direct digital control of individual zones communicating with a central control panel.
- 3) System with a design outdoor airflow less than 1,200 cfm (600 L/s).
- 4) Spaces where the supply airflow rate minus any makeup or outgoing transfer air requirement is less than 1,200 cfm (600 L/s).
- 5) Building spaces where the primary ventilation needs are for process loads.

(b) 503.2.5.2 Kitchen Hoods. Individual commercial kitchen exhaust hoods shall be provided with makeup air sized for at least 50% of exhaust air volume that is unheated or heated to no more than 60°F and uncooled or cooled without the use of mechanical cooling.

(i) Exceptions:

- 1) Where hoods are used to exhaust ventilation air that would otherwise exfiltrate or be exhausted by other fan systems.
- 2) Certified grease extractor hoods that require a face velocity no greater than 60 fpm.

(6) 503.2.6 Energy recovery ventilation systems. Delete the text of this section and replace with the following: Individual fan systems that have both a design supply air capacity of 3,000 cfm (1.42 m³/s) or greater and a minimum outside air supply of 50 percent or greater of the design supply air quantity shall have an energy recovery system that provides a change in the enthalpy of the outdoor air supply of 50 percent or more of the difference between the outdoor air and return air at design conditions. Provision shall be made to bypass or control the energy recovery system to permit cooling with outdoor air where cooling with outdoor air is required.

(i) Exceptions:

- 1) Laboratory systems.
- 2) Systems serving spaces that are not cooled and that are heated to less than 60°F.
- 3) Systems exhausting toxic, flammable, paint, or corrosive fumes or dust.
- 4) Commercial kitchen hoods used for collecting and removing grease vapors and smoke.
- 5) Where more than 60% of the outdoor air heating energy is provided from site recovered or site-solar energy.
- 6) Where the largest exhaust source is less than 75% of the design outdoor airflow.
- 7) Systems requiring dehumidification that employ energy recovery in series with the cooling coil.

(7) 503.2.7 and 503.2.8 See this section of the IECC.

(8) 503.2.9 Mechanical systems test and balancing requirements. Mechanical systems test and balancing shall be in accordance with the provisions of Section 503.2.9.1 through 503.2.9.3.4.

(i) Exception: Buildings less than 4,000 sq. ft

(a) 503.2.9.1 System test and balancing. The construction documents shall require test and balancing in accordance with this section. In addition to test and balancing prerequisites, construction documents shall be permitted to refer to equipment specifications for further requirements. The building official shall be provided test and balancing documentation for review purposes.

(i) 503.2.9.1.1 Test and balance plan. A test and balancing plan shall be prepared for all systems as described in Section 503.2.1 and shall include as a minimum the following items:

- 1) A detailed explanation of the building's project requirements for mechanical design.
- 2) A narrative describing the activities that will be accomplished during each phase of test and balancing, including guidance on who accomplishes the activities and how they are completed.
- 3) Equipment and systems to be tested, including the extent of tests.
- 4) Functions to be tested (for example calibration, economizer control, etc.).
- 5) Conditions under which the test shall be performed (for example winter and summer design conditions, full outside air, etc.), and
- 6) Measurable criteria for acceptable performance.
- 7) A two-week building purge of volatile organic compounds and other toxins, or a purge timed in accordance with a recognized green building program.
- 8) A final system test and balance within 90 days of occupancy and subsequent to building purge.

(9) A line-item completion schedule for inspection review.

(10) An engineer's certificate of acceptance.

Test and balancing shall be performed for all HVAC systems in accordance with Level 1, Basic Commissioning of the SMACNA HVAC Systems Commissioning Manual. Note: See Appendix C of the uniform mechanical code for additional information on HVAC system testing.

(ii) **503.2.9.1.2 Systems adjusting and balancing.** All HVAC systems shall be balanced in accordance with generally accepted engineering standards. Air and water flow rates shall be measured and adjusted to deliver final flow rates within 10% of design rates. Test and balance activities shall include as a minimum the following items:

1) Air systems balancing: Each supply air outlet and zone terminal device shall be equipped with means for air balancing. Discharge dampers are prohibited on constant volume fans and variable volume fans with motors 5 hp (9.3 kW) and larger. Air systems shall be balanced in a manner to first minimize throttling losses, then for fans with system power of greater than 1 hp. Fan speed shall be adjusted to meet design flow conditions.

2) Exception: Fans with fan motors of 1 hp or less.

a) Hydronic systems balancing: Individual hydronic heating and cooling coils shall be equipped with means for balancing and pressure test connections. Hydronic systems shall be proportionately balanced in a manner to first minimize throttling losses, then the pump impeller shall be trimmed or pump speed shall be adjusted to meet design flow conditions. Each hydronic system shall have either the ability to measure pressure across the pump, or test ports at each side of each pump.

3) Exceptions: Pumps with pump motors of 2 hp or less.

a) When throttling results in no greater than 5% of the nameplate horsepower draw above that required if the impeller were trimmed.

(iii) **503.2.9.1.3 Functional performance testing.** Equipment functional performance testing shall be in accordance with Section 503.2.9.1.3.1. Functional testing of HVAC controls shall be in accordance with Section 503.2.9.1.3.2.

1) **503.2.9.1.3.1 Equipment functional performance testing.** Equipment functional performance testing shall demonstrate the correct installation and operation of components, systems, and system-to-system interfacing relationships in accordance with approved plans and specifications. This demonstration is to prove the operation, function, and maintenance serviceability for each of the systems. Testing shall include all modes of operation, including:

a) All modes as described in the Sequence of Operation.

b) Redundant or automatic back-up mode.

c) Performance of alarms, and

d) Mode of operation upon a loss of power and restored power.

2) **503.2.9.1.3.2 Controls functional performance testing.** HVAC control systems shall be tested to document that control devices, components, equipment, and systems are calibrated, adjusted and operate in accordance with approved plans and specifications. Sequences of operation shall be functionally tested to document they operate in accordance with approved plans and specifications.

3) **503.2.9.1.3.3 Economizer Functional Testing.** All air economizers shall be tested to document that the installation and operation are in accordance with manufacturer's specifications.

(iii) **503.2.9.1.4 Test and balance report.** A report of test and balancing procedures and results shall be completed and provided to the building owner. The report shall be identified as "Test and Balance Report" and shall identify:

1) Itemization of deficiencies found during testing required by this section which have not been corrected at the time of report preparation and the anticipated date of correction.

2) Deferred tests which cannot be performed at the time of report preparation due to climatic conditions.

3) Climatic conditions required for performance of the deferred tests, and the anticipated date of each deferred test.

(b) **503.2.9.2 Hydronic system balancing.** Delete the text of this section and replace with the following: **Acceptance.** Buildings, or portions thereof, required to comply with this section shall not be issued a final certificate of occupancy until such time that the code official has received a certificate of acceptance per Section 503.2.9.1.1 item 10 from the engineer of record that states they have received the Preliminary Test and Balance Report as required by Section 503.2.9.1.4. At the request of the code official, a copy of the Preliminary Test and Balance Report shall be made available for review.

(i) Exception: In cases where a third party is contracted to complete the Testing and Balancing, a certificate of occupancy may be issued prior to receipt of Testing and Balancing Report.

(c) **503.2.9.3 [Manuals.]** Delete the text of this section and replace with the following:
Completion requirements.

(i) **503.2.9.3.1 Drawings.** Construction documents shall include as a minimum the location and performance data on each piece of equipment.

(ii) **503.2.9.3.2 Manuals.** An operating manual and a maintenance manual shall be in accordance with industry-accepted standards and shall include, at a minimum, the following:

1) Capacity (input and output) and required maintenance actions for each piece of equipment.

2) Operation and maintenance manuals for each piece of equipment.

3) Manufacturer's operation manuals and maintenance manuals for each piece of equipment requiring maintenance, except equipment not furnished as part of the project. Required routine maintenance actions shall be clearly identified.

4) Names and addresses of at least one service agency.

5) HVAC controls system maintenance and calibration information, including wiring diagrams, schematics, and control sequence descriptions. Desired or field-determined setpoints shall be permanently recorded on control drawings at control devices or, for digital control systems, in programming comments.

6) A complete narrative of how each system is intended to operate, including suggested recommended setpoints.

(iii) **503.2.9.3.3 System balancing report.** A written report describing the activities and measurements completed in accordance with Section 503.2.9.1.2

(iv) **503.2.9.3.4 Final Report.** A complete report of test procedures and results identified as "Final Report" shall include:

1) Results of all Functional Performance Tests.

2) Disposition of all deficiencies found during testing, including details of corrective measures used or proposed.

3) All Functional Performance Test procedures used during the test and balancing process including measurable criteria for test acceptance, provided herein for repeatability.

4) Engineer's sealed certificate of acceptance.

a) **Exception:** Deferred tests which cannot be performed at the time of report preparation due to climatic conditions.

(9) **503.3 [Simple] HVAC systems and equipment (Prescriptive).** See this section of the IECC except as provided below: Delete the second paragraph of this section with no replacement.

(a) **503.3.1 Economizers.** Delete the text of this section and replace with the following: Each cooling system that has a fan shall include either an air or water economizer meeting the requirements of Sections 503.3.1.1 through 503.3.3.

(ii) **Exceptions:** Economizers are not required for the systems listed below.

1) Packaged rooftop equipment with less than 60,000 btu cooling.

2) Individual fan-cooling units with a supply capacity less than the minimum listed in Table 503.3.1(1).

3) Systems that require filtration equipment in order to meet the minimum ventilation requirements of Chapter 4 of the *New Mexico Mechanical Code*.

4) Where more than 25% of the air designed to be supplied by the system is to spaces that are designed to be humidified above 35°F dew-point temperature to satisfy process needs.

5) Systems that include a condenser heat recovery system required by Section 503.4.6.

6) Systems that serve *residential* spaces where the system capacity is less than five times the requirement listed in Table 503.3.1(1).

7) Systems that serve spaces whose sensible cooling load at design conditions, excluding transmission and infiltration loads, is less than or equal to transmission and infiltration losses at an outdoor temperature of 60°F.

8) Systems expected to operate less than 20 hours per week.

9) Where the use of *outdoor air* for cooling will affect supermarket open refrigerated casework systems.

10) Where the cooling efficiency meets or exceeds the efficiency requirements in Table 503.3.1(2).

(b) **503.3.1.1 Air Economizers** Air economizers shall be designed in accordance with Sections 503.3.1.1.1 through 503.3.1.1.4.

(i) **503.3.1.1.1 Design Capacity.** Air economizer systems shall be capable of modulating outdoor air and return air dampers to provide up to 100% of the design supply air quantity as outdoor air for cooling.

1) **503.3.1.1.1.1 System Control.** Air economizer control systems shall be wired to ensure economizer will operate when mechanical cooling is enabled. The cooling unit shall utilize a staged control system that also allows for the economizer to operate when the unit compressor is not under operation.

(ii) **503.3.1.1.2 Control Signal.** Economizer dampers shall be capable of being sequenced with the mechanical cooling equipment and shall not be controlled by only mixed air temperature.

1) **Exception:** The use of mixed air temperature limit control shall be permitted for systems controlled from space temperature (such as single-zone systems).

(iii) **503.3.1.1.3 High-Limit Shutoff.** All air economizers shall be capable of automatically reducing outdoor air intake to the design minimum outdoor air quantity when outdoor air intake will no longer reduce cooling energy usage. High-limit shutoff control types for specific climates shall be chosen from Table 503.3.1.1.3(1). High-limit shutoff control settings for these control types shall be those listed in Table 503.3.1.1.3(2).

TABLE 503.3.1.1.3(1) HIGH-LIMIT SHUTOFF CONTROL OPTIONS FOR AIR ECONOMIZERS

CLIMATE ZONES	ALLOWED CONTROL TYPES	PROHIBITED CONTROL TYPES
1b, 2b, 3b, 3c, 4b, 4c, 5b, 5c, 6b, 7, 8	Fixed dry bulb Differential dry bulb Electronic enthalpy ^a Differential enthalpy Dew-point and dry-bulb temperatures	Fixed enthalpy
1a, 2a, 3a, 4a	Fixed dry bulb Fixed enthalpy Electronic enthalpy ^a Differential enthalpy Dew-point and dry-bulb temperatures	Differential dry bulb
All other climates	Fixed dry bulb Differential dry bulb Fixed enthalpy Electronic enthalpy ^a Differential enthalpy Dew-point and dry-bulb temperatures	!

^a Electronic enthalpy controllers are devices that use a combination of humidity and dry-bulb temperature in their switching algorithm.

Table 503.3.1.1.3(2) HIGH-LIMIT SHUTOFF CONTROL SETTING FOR AIR ECONOMIZERS

DEVICE TYPE	CLIMATE	REQUIRED HIGH LIMIT (ECONOMIZER OFF WHEN):	
		EQUATION	DESCRIPTION
Fixed dry bulb	1b, 2b, 3b, 3c, 4b, 4c, 5b, 5c, 6b, 7, 8.	$T_{OA} > 75^{\circ}\text{F}$	Outdoor air temperature exceeds 75°F
	5a, 6a, 7a	$T_{OA} > 70^{\circ}\text{F}$	Outdoor air temperature exceeds 70°F
	All other zones	$T_{OA} > 65^{\circ}\text{F}$	Outdoor air temperature exceeds 65°F
Differential dry bulb	1b, 2b, 3b, 3c, 4b, 4c, 5a, 5b, 5c, 6a, 6b, 7, 8	$T_{OA} > T_{RA}$	Outdoor air temperature exceeds return air temperature
Fixed enthalpy	All	$h_{OA} > 28 \text{ Btu/lb}^a$	Outdoor air enthalpy exceeds 28 Btu/lb of dry air ^a
Electronic Enthalpy	All	$(T_{OA}, RH_{OA}) > A$	Outdoor air temperature/RH exceeds the "A" setpoint curve ^b
Differential enthalpy	All	$h_{OA} > h_{RA}$	Outdoor air enthalpy exceeds return air enthalpy
Dew-point and dry bulb temperatures	All	$DP_{OA} > 55^{\circ}\text{F}$ or $T_{OA} > 75^{\circ}\text{F}$	Outdoor air dry bulb exceeds 75°F or outside dew point exceeds 55°F (65 gr/lb)

^a At altitudes substantially different than sea level, the Fixed Enthalpy limit shall be set to the enthalpy value at 75°F and 50% relative humidity. As an example, at approximately 6000 ft elevation the fixed enthalpy limit is approximately 30.7 Btu/lb.

^b Setpoint "A" corresponds to a curve on the psychrometric chart that goes through a point at approximately 75°F and 40% relative humidity and is nearly parallel to dry-bulb lines at low humidity levels and nearly parallel to enthalpy lines at high humidity levels.

(iv) **503.3.1.1.4 Relief of Excess Outdoor Air.** Systems shall provide a means to relieve excess outdoor air during air economizer operation to prevent over-pressurizing the building. The relief air outlet shall be located to avoid recirculation into the building.

(c) **503.3.1.2 Water Economizers.** Water Economizer systems for complex HVAC Equipment shall be designed in accordance with Sections 503.3.2.1.1 through 503.3.2.2.

(i) **503.3.1.2.1 Design Capacity.** Water economizer systems shall be capable of cooling supply air by indirect evaporation and providing up to 100% of the expected system cooling load at outdoor air temperatures of 50°F dry bulb/45° wet bulb and below.

1) **Exception:** Systems in which a water economizer is used and where dehumidification requirements cannot be met using outdoor air temperatures of 50°F dry bulb/ 45°F wet bulb must satisfy 100% of the expected system cooling load at 45°F dry bulb/40°F wet bulb.

(ii) **503.3.1.2.2 Maximum Pressure Drop.** Pre-cooling coils and water-to-water heat exchangers used as part of a water economizer system shall either have a water-side pressure drop of less than 15 ft of water or a secondary loop shall be created so that the coil or heat exchanger pressure drop is not seen by the circulating pumps when the system is in the normal cooling (non-economizer) mode.

(d) **503.3.2 Integrated Economizer Control.** Economizer systems shall be integrated with the mechanical cooling system and be capable of providing partial cooling even when additional mechanical cooling is required to meet the remainder of the cooling load.

(i) **Exceptions:**

1) Direct expansion systems that include controls that reduce the quantity of outdoor air required to prevent coil frosting at the lowest step of compressor unloading, provided this lowest step is no greater than 25% of the total system capacity.

2) Individual direct expansion units that have a rated cooling capacity less than 54,000 Btu/h and use non-integrated economizer controls that preclude simultaneous operation of the economizer and mechanical cooling.

3) Systems in climate zones 1A, 1B, 2A, 7, 8.

(e) 503.3.3 Economizer Heating System Impact. HVAC system design and economizer controls shall be such that economizer operation does not increase the building heating energy use during normal operation.

(i) Exception: Economizers on VAV systems that cause zone level heating to increase due to a reduction in supply air temperature.

(5) 503.4 Complex HVAC systems and equipment (Prescriptive). See this section of the IECC except as provided below:

(a) 503.4.2 Variable air volume (VAV) fan control. Delete the text of this section and replace with the following: Individual VAV fans with motors of 5 horsepower (3.7 kW) or greater shall be:

(i) Driven by a mechanical or electrical variable speed drive;

(ii) Driven by a vane-axial fan with variable-pitch blades; or

(iii) The fan shall have controls or devices that will result in fan motor demand of no more than 30 percent of their design wattage at 50 percent of design airflow when static pressure set point equals one-third of the total design static pressure, based on manufacturer's certified fan data.

Static pressure sensors used to control VAV fans shall be placed in a position such that the controller setpoint is no greater than one-third the total design fan static pressure, except for systems with direct digital control. If this results in the sensor being located downstream of major duct splits, multiple sensors shall be installed in each major branch to ensure the static pressure can be maintained in each branch.

For systems with direct digital control of individual zone boxes reporting to the central control panel, the static pressure set point shall be reset based on the zone requiring the most pressure, i.e., the set point is reset lower until one zone damper is nearly wide open.

(6) 504 Service Water Heating (Mandatory). See this section of the IECC.

(7) 505 Electrical Power and Lighting Systems. See this section of the IECC except as provided below:

(a) 505.1 General (Mandatory). See this section of the IECC and add the following paragraph: Lighting within dwelling units shall have 75 percent or more of the permanently installed interior light fixtures fitted with high-efficacy lamps or a minimum of 75 percent of the permanently installed lighting fixtures shall contain only high efficacy lamps.

(i) Exception: Delete the text of the exception and replace with the following: Low-voltage lighting.

(b) 505.2.2.1 Light reduction controls. See this section of the IECC except on Exception #4 remove the text in parenthesis without replacement and add exception #6 Daylight spaces complying with Section 505.2.2.2.3 Automatic Daylighting Controls.

(c) 505.2.2.2 and 505.2.2.3. Delete these sections and replace with the following:

(i) 505.2.2.3 Automatic lighting controls. All commercial buildings shall be equipped with automatic control devices to shut off lighting in compliance with one of the following automatic control technologies: 1. Section 505.2.2.3.1 Occupancy Sensors: 2. Section 505.2.2.3.2 Time Clock Controls: 3. Section 505.2.2.3.3. Automatic Daylighting Controls.

1) 505.2.2.3.1 Occupancy sensors. Occupancy sensors shall be installed in all classrooms, conference/meeting rooms, employee lunch and break rooms, private offices, restrooms, storage rooms and janitorial closets, and other spaces 300 sf. or less enclosed by ceiling height partitions. These automatic control devices shall be installed to automatically turn off lights within 30 minutes of all occupants leaving the space, except spaces with multi-scene control.

2) 505.2.2.3.2 Time Clock Controls In areas not controlled by occupancy sensors, automatic time switch control devices shall be used. It shall incorporate an override switching device that:

a) Is readily accessible.

b) Is located so that a person using the device can see the lights or the area controlled by that switch, or so that the area being lit is annunciated.

c) Is manually operated.

d) Allows the lighting to remain on for no more than 2 hours when an override is initiated.

e) Controls an area not exceeding 5,000 square feet (465 m²).

f) **Exceptions:**

i) In malls and arcades, auditoriums, single-tenant retail spaces, industrial facilities and arenas, where captive-key override is utilized, override time may exceed 2 hours.

ii) In malls and arcades, auditoriums, single-tenant retail spaces, industrial facilities and arenas, the area controlled may not exceed 20,000 square feet (1860 m²).

3) **505.2.2.3.3 Automatic daylighting controls.** Automatic controls installed in daylight zones shall control lights in the daylit areas separately from the non-day-lit areas. Controls for calibration adjustments to the lighting control device shall be readily accessible to authorized personnel. Each daylight control zone shall not exceed 2,500 square feet. Automatic daylighting controls must incorporate an automatic shut-off ability based on time or occupancy in addition to lighting power reduction controls.

Controls will automatically reduce lighting power in response to available daylight by either one of the following methods:

a) **Continuous dimming** using dimming ballasts and daylight-sensing automatic controls that are capable of reducing the power of general lighting in the daylit zone continuously to less than 35% of rated power at maximum light output.

b) **Stepped Dimming** using multi-level switching and daylight-sensing controls that are capable of reducing lighting power automatically. The system should provide a minimum of two control channels per zone and be installed in a manner such that at least one control step shall reduce power of general lighting in the daylit zone by 30% to 50% of rated power and another control step that reduces lighting power by 65% to 100%. Stepped dimming control is not allowed in continuously occupied areas with ceiling heights of 14 feet or lower.

c) **Exception:** Daylight spaces enclosed by walls or ceiling height partitions and containing 2 or fewer luminaire are not required to have a separate switch for general area lighting.

(d) **505.2.3 Specific Application Controls** **505.2.4 Specific Application Controls** Delete these sections of the IECC and replace with the following: Specific application controls shall be provided for the following:

(i) **Display/Accent Lighting**—display or accent lighting shall have a separate control device.

(ii) **Case Lighting**—lighting in cases used for display purposes shall have a separate control device.

(iii) **Hotel and Motel Guest Room Lighting**—hotel and motel guest rooms and guest suites shall have a master control device at the main room entry that controls all permanently installed luminaires and switched receptacles.

(iv) **Task Lighting**—supplemental task lighting, including permanently installed under-shelf or under-cabinet lighting, shall have a control device integral to the luminaires or be controlled by a wall-mounted control device provided the control device is readily accessible and located so that the occupant can see the controlled lighting.

(v) **Non-visual Lighting**—lighting for non-visual applications, such as plant growth and food warming, shall have a separate control device.

(vi) **Demonstration Lighting**—lighting equipment that is for sale or for demonstrations in lighting education shall have a separate control device.

1) **Exceptions:** Where LED lighting is used no additional control is required for items 1, 2, or 4.

(e) **505.2.4 Functional Testing.** Controls for automatic lighting systems shall be tested prior to and as a condition for issuance of an approval under Section 104.8. Testing shall ensure that control hardware and software are calibrated, adjusted, programmed, and in proper working condition in accordance with the construction documents and manufacturer's installation instructions. The contractor shall be responsible for completing, or having completed, the functional testing and shall provide documentation to the *code official* certifying that the installed lighting controls meet the provisions of Section 505.

When *occupant sensors*, time switches, programmable schedule controls, *photo sensors* or *day-lighting controls* are installed, at a minimum, the following procedures shall be performed:

(i) Confirm that the placement, sensitivity and time-out adjustments for *occupant sensors* yield acceptable performance, i.e. lights turn off only after space is vacated and do not turn on unless space is occupied.

(ii) Confirm that the time switches and programmable schedule controls are programmed to turn the lights off.

(iii) Confirm that photosensor controls reduce electric light based on the amount of usable daylight in the space as specified.

(f) 505.3 and 505.4. See this sections of the IECC.

(g) 505.5 Interior lighting power requirements (Prescriptive). See this section of the IECC except as provided below:

(i) 505.5.2 Delete the text of this table and replace with the following:

LIGHTING POWER DENSITY		
Building Area Type^a	Whole Building	Space by Space
	(W/ft²)	
Active Storage		0.8
Atrium – First Three Floors		0.6
Atrium – Each Additional Floor		0.2
AUTOMOTIVE FACILITY	0.9	
Classroom/lecture/training		1.3
Conference/Meeting/Multipurpose		1.1
Corridor/Transition		0.5
Electrical/Mechanical		1.1
Food Preparation		1.2
Inactive Storage		0.2
Lobby		1.1
Restroom		0.8
Stairway		0.6
CONVENTION CENTER	1.2	
Exhibit Space		1.3
Audience/Seating Area		0.9
COURTHOUSE	1.2	
Audience/Seating Area		0.9
Courtroom		1.9
Confinement Cells		0.9
Judges Chambers		1.3
Dressing/Locker/Fitting Room		0.6
DINING: BAR LOUNGE/LEISURE	1.3	
Lounge/Leisure Dining		1.4
DINING: CAFETERIA/FAST FOOD	1.4	
DINING: FAMILY	1.6	
Dining		1.4
Kitchen		1.2
DORMITORY	1	
Living Quarters		1.1
Bedroom		0.5
Study Hall		1.4

EXERCISE CENTER	1	
Dressing/Locker/Fitting Room		0.6
Audience/Seating Area		0.3
Exercise Area		0.9
Exercise Area/Gymnasium		0.9
RETAIL: SUPERMARKET	1.3	
GYMNASIUM	1.1	
Dressing/Locker/Fitting Room		0.6
Audience/Seating Area		0.4
Playing Area		1.4
Exercise Area		0.9
HEALTHCARE CLINIC	1	
Corridors w/patient waiting, exam		1
Exam/Treatment		1.5
Emergency		2.7
Public & Staff Lounge		0.8
Hospital/Medical supplies		1.4
Hospital - Nursery		0.6
Nurse station		1
Physical therapy		0.9
Patient Room		0.7
Pharmacy		1.2
Hospital/Radiology		0.4
Operating Room		2.2
Recovery		0.8
Active storage		0.9
Laundry-Washing		0.6
HOTEL	1	
Dining Area		1.3
Guest quarters		1.1
Reception/Waiting		2.5
Lobby		1.1
LIBRARY	1.3	
Library-Audio Visual		0.7
Stacks		1.7
Card File & Cataloguing		1.1
Reading Area		1.2
MANUFACTURING FACILITY	1.3	
MOTEL	1	
Dining Area		1.2
Guest quarters		1.1
Reception/Waiting		2.1
MOTION PICTURE THEATER	1.2	
Audience/Seating Area		1.2
Lobby		1
MULTI-FAMILY	0.7	
MUSEUM	1.1	
Active Storage		0.8
General exhibition		1
Restoration		1.7
OFFICE	0.9	
Enclosed		1
Open Plan		1

PARKING GARAGE	0.3	
PENITENTIARY	1.0	
PERFORMING ARTS THEATER	1.6	
Audience/Seating Area		2.6
Lobby		3.3
Dressing/Locker/Fitting Room		1.1
POLICE STATIONS	1	
FIRE STATIONS	0.8	
Fire Station Engine Room		0.8
Sleeping Quarters		0.3
Audience/Seating Area		0.8
Police Station Laboratory		1.4
POST OFFICETS/SF	1.1	
Sorting Area		1.2
Lobby		1
RELIGIOUS BUILDINGS	1.3	
Lobby		0.6
Worship/Pulpit/Choir		2.4
RETAIL	1.3	
Department Store Sales Area		1.3
Specialty Store Sales Area		1.8
Fine Merchandise Sales Area		2.9
Supermarket Sales Area		1.3
Personal Services Sales Area		1.3
Mass Merchandising Sales Area		1.3
Mall Concourse		1.7
SCHOOL/UNIVERSITY	1.2	
Classroom		1.3
Audience		0.7
Dining		1.1
Office		1.1
Corridor		0.5
Storage		0.5
Laboratory		1.1
RETAIL: SPECIALTY b	1.6	
TOWN HALL	1.1	
TRANSPORTATION	1	
Dining Area		2.1
Baggage Area		1
Airport - Concourse		0.6
Terminal - Ticket Counter		1.5
Reception/Waiting		0.5
SPORTS ARENA	1.1	
WAREHOUSE	0.6	
Fine Material		1.4
Medium/Bulky Material		0.6
WORKSHOP	1.4	

For SI: 1 foot = 304.8 mm, 1 watt per square foot = W/0.0929 m2.

- a. In cases where both a general building area type and a more specific building area type are listed, the more specific building area type shall apply.
- b. Where lighting equipment is specified to be installed to highlight specific merchandise in addition to lighting equipment specified for general lighting and is switched or dimmed on circuits different from the circuits for general lighting, the smaller of the actual wattage of the lighting equipment installed specifically for merchandise, or

additional lighting power as determined below shall be added to the interior lighting power determined in accordance with this line item. Calculate the additional lighting power as follows: Additional Interior Lighting Power Allowance = (Retail Area 1 X 0.6-4W/ft²) + (Retail Area 2 X 0.6 W/ft²) + (Retail Area 3 X 1.4 0.9 W/ft²) + (Retail Area 4 X 2.5 1.5 W/ft²).

where:

- Retail Area 1 = The floor area for all products not listed in Retail Area 2, 3 or 4;
- Retail Area 2 = The floor area used for the sale of vehicles, sporting goods and small electronics.
- Retail Area 3 = The floor area used for the sale of furniture, clothing, cosmetics and artwork.
- Retail Area 4 = The floor area used for the sale of jewelry, crystal and china.

Exception: Other merchandise categories are permitted to be included in Retail Areas 2 through 4 above, provided that justification documenting the need for additional lighting power based on visual inspection, contrast, or other critical display is *approved* by the authority having jurisdiction.

(8) 506 Total Building performance. Renumber section 506 of the IECC to read number 507.

(9) Insert the following provision in **Section 506** of the IECC. **ADDITIONAL EFFICIENCY PACKAGE OPTIONS. :**

(a) 506.1 Requirements. Buildings shall comply with at least one of the following: a. 506.2 Efficient HVAC Performance Requirement; b. 506.3 Efficient Lighting System Requirement; c. 506.4 On-Site Supply of Renewable Energy.

At the time of plan submittal, the *code official* shall be provided, by the permittee, documentation designating the intent to comply with Section 506.2, 506.3 or 506.4 in their entirety. Individual tenant spaces must comply with either 506.2 or 506.3 in their entirety unless documentation can be provided that demonstrates compliance with Section 506.4 for the entire building.

(b) 506.2 Efficient Mechanical Equipment.

Equipment shall meet the minimum efficiency requirements of Tables 506.2(1) through 506.2(7) in addition to the requirements in Section 503. This section shall only be used where an equipment efficiency option is available.

TABLE 506.2(1)

**UNITARY AIR CONDITIONERS AND CONDENSING UNITS,
ELECTRICALLY OPERATED, EFFICIENCY REQUIREMENTS**

	> 760,000 Btu/h		For zones 1 to 5: 10.2 EERb, 11.0 IPLVb For zones 6 to 8: 9.7 EERb, 11.0 IPLVb
Air conditioners, Water and evaporatively cooled		Split system and single package	14.0 EER

For SI: 1 British thermal unit per hour = 0.2931 W.

a. IPLVs are only applicable to equipment with capacity modulation.

b. Deduct 0.2 from the required EERs and IPLVs for units with a heating section other than electric resistance heat.

EQUIPMENT TYPE	SIZE CATEGORY	SUBCATEGORY OR RATING CONDITION	REQUIRED EFFICIENCY_a
Air conditioners, Air cooled	< 65,000 Btu/hd	Split system	For zones 1 to 5: 15.0 SEER, 12.5 EER For zones 6 to 8: 14 SEER, 12 EER
		Single package	For zones 1 to 5: 15.0 SEER, 12.0 EER For zones 6 to 8: 14.0 SEER 11.6 EER

	> 65,000 Btu/h and < 240,000 Btu/h	Split system and single package	For zones 1 to 5: 12.0 EERb, 12.4 IPLVb For zones 6 to 8: 11.5 EERb, 11.9 IPLVb
	> 240,000 Btu/h and < 760,000 Btu/h	Split system and single package	For zones 1 to 5: 10.8 EERb, 12.0 IPLVb For zones 6 to 8: 10.5 EERb, 10.9 IPLVb

TABLE 506.2(2)
UNITARY AND APPLIED HEAT PUMPS, ELECTRICALLY
OPERATED, EFFICIENCY REQUIREMENTS

EQUIPMENT TYPE	SIZE CATEGORY	SUBCATEGORY OR RATING CONDITION	REQUIRED EFFICIENCY^a
Air cooled (Cooling mode)	< 65,000 Btu/hd	Split system	For zones 1 to 5: 15.0 SEER, 12.5 EER For zones 6 to 8: 14.0 SEER, 12.0 EER
		Single package	For zones 1 to 5: 15.0 SEER, 12.0 EER For zones 6 to 8: 14.0 SEER, 11.6 EER
	> 65,000 Btu/h and < 240,000 Btu/h	Split system and single package	For zones 1 to 5: 12.0 SEER, 12.4 EER For zones 6 to 8: 11.5 EERb, 11.9 IPLVb
	> 240,000 Btu/h	Split system and single package	For zones 1 to 5: 12.0 SEER, 12.4 EER For zones 6 to 8: 10.5 EERb, 10.9 IPLVb
Water SOURCES (Cooling mode)	< 135,000 Btu/h	85°F entering water	14.0 EER
Air cooled (Heating mode)	< 65,000 Btu/hd (Cooling capacity)	Split system	For zones 1 to 5: 9.0 HSPF For zones 6 to 8: 8.5 HSPF
		Single package	For zones 1 to 5: 8.5 HSPF For zones 6 to 8: 8.0 HSPF
	> 65,000 Btu/h and < 135,000 Btu/h (Cooling capacity)	47°F db/43°F wb outdoor air	3.4 COP
		17°F db/15°F wb outdoor air	2.4 COP
	> 135,000 Btu/h (Cooling capacity)	47°F db/43°F wb outdoor air	3.2 COP
		77°F db/15°F wb outdoor air	2.1 COP
Water SOURCES (Heating mode)	< 135,000 Btu/h (Cooling capacity)	70°F entering water	4.6 COP

For SI: °C = [(°F) - 32] / 1.8, 1 British thermal unit per hour = 0.2931 W.

db = dry-bulb temperature, °F; wb = wet-bulb temperature, °F

a. IPLVs and Part load rating conditions are only applicable to equipment with capacity modulation.

b. Deduct 0.2 from the required EERs and IPLVs for units with a heating section other than electric resistance heat.

TABLE 506.2(3)
PACKAGED TERMINAL AIR CONDITIONERS AND
PACKAGED TERMINAL HEAT PUMPS

EQUIPMENT TYPE	SIZE CATEGORY	REQUIRED EFFICIENCY^b
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<u>Air conditioners</u>	<u>< 7,000 Btu / h</u>	<u>11.9 EER</u>
<u>& Heat Pumps</u> <u>(Cooling Mode)</u>	<u>7,000 Btu / h and < 10,000 Btu / h</u>	<u>11.3 EER</u>
	<u>10,000 Btu / h and < 13,000 Btu / h</u>	<u>10.7 EER</u>
	<u>> 13,000 Btu / h</u>	<u>9.5 EER</u>

a. Replacement units must be factory labeled as follows: “MANUFACTURED FOR REPLACEMENT APPLICATIONS ONLY: NOT TO BE INSTALLED IN NEW CONSTRUCTION PROJECTS.” Replacement efficiencies apply only to units with existing sleeves less than 16 inches (406 mm) high and less than 42 inches (1067 mm) wide.

TABLE 506.2(4)

**WARM AIR FURNACES AND COMBINATION WARM AIR FURNACES/AIR-CONDITIONING UNITS,
WARM AIR DUCT FURNACES AND UNIT HEATERS, EFFICIENCY REQUIREMENTS**

<u>EQUIPMENT TYPE</u>	<u>SIZE CATEGORY (INPUT)</u>	<u>SUBCATEGORY OR RATING CONDITION</u>	<u>REQUIRED EFFICIENCY</u>	<u>TEST PROCEDURE</u>
<u>Warm air furnaces, gas fired</u>	<u>< 225,000 Btu/h</u>	<u>—</u>	<u>For zones 1 & 2, NR.</u> <u>For zones 3 & 4 90 AFUE or 90 Et</u> <u>For zones 4-8 are 92 AFUE or 92 Et</u>	<u>DOE 10 CFR Part 430</u> <u>or ANSI Z21.47</u>
	<u>> 225,000 Btu/h</u>	<u>Maximum capacity</u>	<u>90% Ec note 1</u>	<u>ANSI Z21.47</u>
<u>Warm air furnaces, oil fired</u>	<u>< 225,000 Btu/h</u>	<u>—</u>	<u>For zones 1 & 2, NR.</u> <u>For zones 3 to 8 are 85 AFUE or 85 Et</u>	<u>DOE 10 CFR Part 430</u> <u>or UL 727</u>
	<u>> 225,000 Btu/h</u>	<u>Maximum capacity</u>	<u>85% Et, Note 1</u>	<u>UL 727</u>
<u>Warm air duct furnaces, gas fired</u>	<u>All capacities</u>	<u>Maximum capacity</u>	<u>90% Ec</u>	<u>ANSI Z83.8</u>
<u>Warm air unit heaters, gas fired</u>	<u>All capacities</u>	<u>Maximum capacity</u>	<u>90% Ec</u>	<u>ANSI Z83.8</u>
<u>Warm air unit heaters, oil fired</u>	<u>All capacities</u>	<u>Maximum capacity</u>	<u>90% Ec</u>	<u>UL 731</u>

TBD - To be decided

For SI: 1 British thermal unit per hour = 0.2931 W.

1 Units must also include an IID (intermittent ignition device), have jackets not exceeding 0.75 percent of the input rating, and have either power venting or a flue damper. A vent damper is an acceptable alternative to a flue damper for those furnaces where combustion air is drawn from the conditioned space.

Where there two ratings units not covered by the National Appliance Energy Conservation Act of 1987 (NAECA) (3-phase power or cooling capacity greater than or equal to 65,000 Btu/h [19 kW]) shall comply with either rating.

Et = Thermal efficiency.

Ec = Combustion efficiency (100% less flue losses).

Efficient furnace fan: All fossil fuel furnaces in zones 3 to 8 shall have a furnace electricity ratio not greater than 2% and shall include a manufacturer's designation of the furnace electricity ratio.

TABLE 506.2(5)

BOILER, EFFICIENCY REQUIREMENTS

<u>EQUIPMENT TYPE</u>	<u>SIZE CATEGORY</u>	<u>TEST PROCEDURE</u>	<u>REQUIRED EFFICIENCY</u>
<u>Gas Hot Water</u>	<u>< 300,000 Btu / h</u>	<u>DOE 10 CFR Part 430</u>	<u>90% Et</u>

	> 300,000 Btu / h and > 2.5 mBtu/h	DOE 10 CFR Part 431	89% Et
Gas Steam	< 300,000 Btu / h	DOE 10 CFR Part 430	89% Et
	> 300,000 Btu / h	DOE 10 CFR Part 431	89% Et
Oil	< 300,000 Btu / h	DOE 10 CFR Part 430	90% Et
	> 300,000 Btu / h	DOE 10 CFR Part 431	89% Et
Et = thermal efficiency			

**TABLE 506.2(6)
CHILLERS - EFFICIENCY REQUIREMENTS**

EQUIPMENT TYPE	SIZE CATEGORY	REQUIRED EFFICIENCY- CHILLERS		OPTIONAL COMPLIANCE PATH - REQUIRED EFFICIENCY - CHILLERS WITH VSD	
		Full Load (KW /TON)	IPLV (KW /TON)	Full Load (KW /TON)	IPLV (KW /TON)
Air Cooled w/ Condenser	All	1.2	1.0	N/A	N/A
Air Cooled w/o Condenser	All	1.08	1.08	N/A	N/A
Water Cooled, Reciprocating	All	0.840	0.630	N/A	N/A
Water Cooled, Rotary Screw and Scroll	< 90 tons	0.780	0.600	N/A	N/A
	³ 90 tons and < 150 tons	0.730	0.550	N/A	N/A
	³ 150 tons and < 300 tons	0.610	0.510	N/A	N/A
	> 300 tons	0.600	0.490	N/A	N/A
Water Cooled, Centrifugal	< 150 tons	0.610	0.620	0.630	0.400
	³ 150 tons and < 300 tons	0.590	0.560	0.600	0.400
	300 tons and < 600 tons	0.570	0.510	0.580	0.400
	> 600 tons	0.550	0.510	0.550	0.400

- a. Compliance with full load efficiency numbers and IPLV numbers are both required.
b. Only Chillers with Variable Speed Drives (VSD) may use the optional compliance path-for chiller efficiency.
N/A – No credit can be taken for this option

**TABLE 506.2(7)
ABSORPTION CHILLERS - EFFICIENCY REQUIREMENTS**

EQUIPMENT TYPE	REQUIRED EFFICIENCY FULL LOAD COP (IPLV)
Air Cooled, Single Effect	0.60, allowed only in heat recovery applications
Water Cooled, Single Effect	0.70, allowed only in heat recovery applications
Double Effect - Direct Fired	1.0 (1.05)
Double Effect - Indirect Fired	1.20

(c) **506.3 Efficient Lighting System.** Whole Building Lighting Power Density (Watts/sf) shall meet the requirements of Table 506.3, and automatic daylighting control requirements in Section 506.3.2.

(i) **506.3.1 Reduced Lighting Power Density -** The total interior lighting power (watts) is the sum of all interior lighting powers for all areas in the building. The interior lighting power is the floor area for the building times the value from Table 506.3.

TABLE 506.3 – REDUCED INTERIOR LIGHTING POWER

BUILDING TYPE^a	REDUCED WHOLE BUILDING (Watts/Ft²)
AUTOMOTIVE FACILITY	0.79
CONVENTION CENTER	1.16
COURTHOUSE	1.08
DINING: BAR LOUNGE/LEISURE	1.19
DINING: CAFETERIA/FAST FOOD	1.34
DINING:FAMILY	1.50
DORMITORY	0.90
EXERCISE CENTER	0.92
FIRE STATIONS	0.74
GYMNASIUM	1.07
HEALTHCARE CLINIC	0.89
HOTEL	0.90
LIBRARY	1.00
MANUFACTURING FACILITY	1.24
MOTEL	0.90
MOTION PICTURE THEATER	1.18
MUSEUM	1.04
OFFICE	0.80
PERFORMING ARTS THEATER	1.46
POLICE STATIONS	0.89
POST OFFICE	0.98
RELIGIOUS BUILDINGS	1.18
RETAIL	1.30
RETAIL: SPECIALTY	1.40
RETAIL: SUPERMARKET	1.30
SCHOOL/UNIVERSITY	1.01
TOWN HALL	0.94
TRANSPORTATION	0.85
WAREHOUSE ^b	0.60
WORKSHOP	1.20

For SI: 1 foot = 304.8 mm, 1 watt per square foot = W/0.0929 m².

a. In cases where both a general building area type and a more specific building area type are listed, the more specific building area type shall apply.

b. At least one half of the floor area shall be in the daylight zone. Automatic day-lighting controls shall be installed in day-lit zones and shall meet the requirements of Section 505.2.2.2.3.

(ii) 506.3.2 Automatic Day-lighting Controls. Automatic day-lighting controls shall be installed in all daylight zones and shall meet the requirements of Section 505.2.2.2.

(d) 506.4 On-site Supply of Renewable Energy

(i) The building or surrounding property shall supply 3% or more of the building energy use associated with systems and equipment covered by this code through on-site renewable energy. On-site power generation using nonrenewable sources does not meet this requirement.

(ii) The *code official* shall be provided with an energy analysis as described in Section 507 that documents that on-site renewable energy production is capable of providing at least 3% of the total estimated annual purchased energy for the building functions regulated by this code, or a calculation demonstrating that on-site renewable energy production has a nominal (maximum) rating of at least 1.75 BTUs or at least 0.50 watts per square foot of conditioned floor area.

[14.7.6.14 NMAC - Rp, 14.7.6.13, NMAC, 7-1-10]

14.7.6.14 CHAPTER 6 REFERENCED STANDARDS: See this section of the IECC.

[14.7.6.14 NMAC - Rp, 14.7.6.14, NMAC, 7-1-10]

HISTORY OF 14.7.6 NMAC:

Pre NMAC History: None.

History of Repealed Material:

14.7.6 NMAC, 2003 New Mexico Energy Conservation Code (filed 5-27-04) repealed 7-1-10.

NMAC History:

14.7.6 NMAC, 2003 New Mexico Energy Conservation Code (filed 5-27-04) replaced by 14.7.6 NMAC, 2006 New Mexico Energy Conservation Code, effective 7-1-10.