RHODE ISLAND
STATE BUILDING CODE

SBC-8 State Energy Conservation Code

Effective July 1, 2010
Replaces Regulation SBC-8
Dated January 1, 2007

STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS

Department of Administration
BUILDING CODE STANDARDS COMMITTEE
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11th EDITION

Regulation SBC-8
State Energy Conservation Code
July 1, 2010

The Building Code Standards Committee, in accordance with the rule making authority of Title 23, Chapter 23-27.3, Section 109.1, paragraphs a through c inclusive, has formally adopted and promulgated as the Rhode Island State Building Code, the provisions of the International Energy Conservation Code, 2009 edition, as published by the International Code Council, Inc. (I.C.C.), together with amendments thereto hereinafter set forth to the articles and sections of this code:

The provisions of Title 23, Chapter 27.3 of the General Laws of Rhode Island establishing administration and enforcement are hereby incorporated by reference. Regulatory Administration Chapter 1 immediately follows and is supplemental to the General Laws.

Editorial Note: Code users please note:
When purchasing or using the State Energy Conservation Code 2010 code, please take note of the particular printing edition. Errata to that printing edition is available on-line directly at no charge at *www.iccsafe.org/cs/codes/pages/errata.aspx* or call the office of the State Building Code Commissioner at 401-222-1129 for further information.

Printed copies of the administrative and enforcement provisions of Title 23, Chapter 27.3 are available at the Office of the State Building Code Commission or on-line at *http://www.rilin.state.ri.us/Statutes/TITLE23/23-27.3/INDEX.HTM*.

The State Energy Conservation Code, 2009 Edition, is protected by the copyright that has been issued to the ICC. As a result, the State Building Code is not available in complete form to the public in an electronic format. The State Energy Conservation Code 2010 edition that is referred to within is contained in a printed volume and is also in an electronic format that have been published by the ICC under an exclusive license.

The Office of the State Building Code Commissioner has purchased volumes of these codes and they shall be distributed to Rhode Island cities and towns during the month of June 2010 so that local officials will have access to the code prior to the implementation of these rules on July 1, 2010.

In order to assure public access to this code the Office of the State Building Code Commissioner shall provide a copy of this code to the Rhode Island State Library, which is located on the second floor of the State House. In addition, all codes may be viewed during business hours at the Department of Administration's Library which is located on the fourth floor of the William E. Powers Building, One Capitol Hill, Providence.

The Legislative Regulation Committee approved adoption of this code on March 4, 2010.

By:
John P. Leyden
Executive Secretary
Rhode Island Building Code Standards Committee

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STATE BUILDING CODE REGULATIONS – 2010

The following list includes all regulations promulgated by the State Building Code Standards Committee. All regulations are available for a fee at the State Building Commission.

1.	Building Code	SBC-1-2010
2.	One and Two Family Dwelling Code	SBC-2-2010
3.	Plumbing Code	SBC-3-2010
4.	Mechanical Code	SBC-4-2010
5.	Electrical Code	SBC-5-2009
6.	Property Maintenance Code	SBC-6-2010
7.	Reserved	
8.	Energy Conservation Code	SBC-8-2010
9	Enforcement and Implementation Procedures for Projects Under the Jurisdiction of The State of Rhode Island	SBC-9
10.	Code Interpretations	SBC-10
11.	Certification of Building Officials, Building, Electrical, Plumbing and Mechanical Inspectors	SBC-11-2010
12.	New Materials and Methods of Construction	SBC-12
13.	State Building Code for Existing Schools	SBC-13
14.	Reserved	
15.	Reserved	
16.	Reserved	
17.	Public Buildings Accessibility Meeting Standards	SBC-17
18.	Native Lumber	SBC-18
19.	Fuel Gas Code	SBC-19-2010

Format: These code changes follow numbering sequence and topics of the INTERNATIONAL ENERGY CONSERVATION CODE 2009 (first printing). All Provisions of IECC 2009 are retained unless indicated as deleted or revised. Published errata are available from the ICC website dependent on the printing issue number and date.

Chapter 1

ADMINISTRATION

Revise IECC section 101.1, Title, to read as follows:

101.1 Title: These regulations shall be known as the State Energy Conservation Code Regulation SBC-8 - 2010 hereafter referred to as "this code".

Add the following new section 101.1.1 referenced codes.

101.1.1 Referenced Codes. The other codes listed in Sections 101.4.1 through 101.4.7 and referenced elsewhere in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference.

1. **Electrical.** The provisions of Rhode Island State Electrical Code SBC-5-2008 shall apply wherever referenced in this code as the ICC Electrical Code, and shall apply to the installation of electrical systems, including alterations, repairs, replacement, equipment, appliances, fixtures, fittings, and appurtenances thereto.

2. **Gas.** The provisions of the Rhode Island State Fuel Gas Code SBC-19-2010 shall apply wherever referenced in this code as the International Fuel Gas Code, and shall apply to the installation of gas piping from the point of delivery, gas appliances and related accessories as covered in this code. These requirements apply to gas piping systems extending from the point of delivery to the inlet connections of appliances and the installation and operation of residential and commercial gas appliances and related accessories.

3. **Mechanical.** The provisions of the Rhode Island State Mechanical Code SBC-4-2010 shall apply wherever referenced in this code as the International Mechanical Code and shall apply to the installation, alterations, repairs and replacement of the mechanical systems, including equipment, appliances, fixtures, fittings and/or appurtenances, including ventilating, heating, cooling, air-conditioning and refrigeration systems, incinerators and other energy-related systems.

4. **Plumbing.** The provisions of Rhode Island State Plumbing Code SBC-3-2010 shall apply wherever referenced in this code as the International Plumbing Code, and shall apply to the installation, alteration, repair and replacement of plumbing systems, including equipment, appliances, fixtures, fittings and appurtenances, and where connected to a water or sewage system and all aspects of a medical gas system.

5. **Property Maintenance.** The provisions of the Rhode Island State Property Maintenance Code SBC-6-2010 Provides requirements for continued use and maintenance buildings and property, and of related plumbing, mechanical, electrical and fire protection systems in existing
residential nonresidential structures.

6. **Fire Prevention Code.** Wherever and whenever provisions of the Internatinal Fire Code 2009 editions are referenced, the appropriate Rhode Island Fire Safety Code requirements shall apply.

7. **Building Code.** The provisions of the Rhode Island State Building Code SBC-1-2010 shall apply wherever referenced in this code as the International Building Code, and shall apply to all matters governing the design and construction of buildings.

8. **Existing Building Code.** The provisions of the State Building Codes SBC-1-2010 in conjunction with the State Rehabilitation Code SRC-1 and the Rhode Island Fire Safety Code shall apply wherever referenced in this code as the International Existing Building Code.

Any and all such references to the various International Code Council family of code shall be substituted for the appropriate state code as indicated above.

Chapter 3

Climate Zones

Delete section 301 in its entirety and substitute the following.

Section 301
Climate Zones

301.1 General Rhode Island shall be considered as climate zone 5A with the following design conditions.

Table 301.1 Delete and substitute the following:

Table 301.1 Exterior Design Conditions.	Value	Value
Climate zone	Providence County	All others
Winter, design dry-bulb (degree F)	0	5
Summer, design dry-bulb	87	89
Summer design wet-bulb	71	73
Degree days heating	6831	5950
Degree days cooling	371	811

Add the Following Figure 301

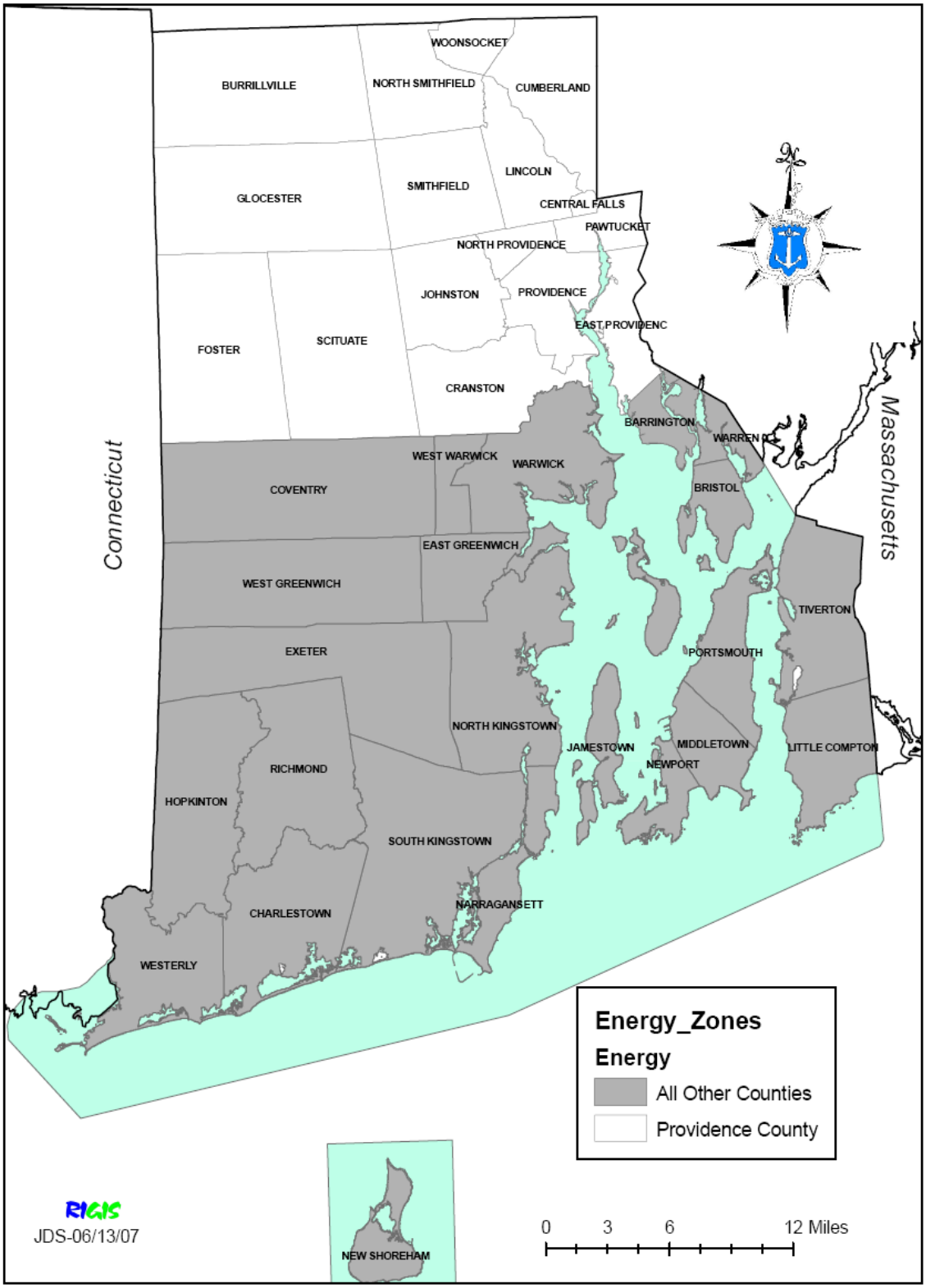

Figure 301

Delete without substitution section 301.2 and 301.3

Delete table 301.3(2) and substitute the following

TABLE 301.3(2)
RHODE ISLAND CLIMATE ZONE DEFINITION

Zone Number	THERMAL CRITERIA	
	IP UNITS	SI UNITS
5	5400 ,HDD65^{0}F≤ 7200	3000 < HDD18^{0C} ≤ 4000

Chapter 4

401.2 Add the following:
401.2 Compliance. Projects shall comply with Sections 401, 402.4, 402.5, and 403.1, 403.2.2, and 403.3 through 403.9 (referred to as the mandatory provisions) and either:

1. Sections 402.1 through 402.3, 403.2.1 and 404.1 (pre-scriptive): or
2. Section 405 (performance) or
1. Compliance submission of Res-Check for Zone 5 and Chapter 4 mandatory requirements**.**

401.3 Certificate: Add the following

A certificate similar to this shall be attached to or near the electrical panel board.

ENERGY CERTIFICATE

STREET ADDRESS: _____

CITY/TOWN: _____

PREDOMINANT VALUES:

R VALUE CEILING/ROOF _____
R VALUE WALLS _____
R VALUE FOUNDATION _____
R VALUE DUCTS Outside conditioned space _____
U FACTOR FENESTRATION _____
SHGC Fenestration _____
Gas Fired un-vented room heater _____ _____
Yes **No**
Baseboard Electric heater _____ _____
Yes **No**
Electric Furnace _____ _____
Yes **No**
U FACTOR SKYLIGHT
SHGC skylight _____
Efficiency and type of heating equipment _____
Efficiency and type of cooling equipment _____
Efficiency and type of service water heater _____

CERTIFICATE COMPLETED BY BUILDER/REGISTERED DESIGN PROFESSIONAL

_____
SIGNATURE

Table 402.1.1 delete and substitute the following

TABLE 402.1.1
INSULATION AND FENESTRATION REQUIRMENTS BY COMPONENT[a]

CLIMATE ZONE	FERNESTRATION *U*-FACTOR[b]	SKYLIGHT[b] *U*-FACTOR	GLAZED FERNESTRATION SHGC[b]	CEILING *R*-VALUE	WOOD FRAME WALL R-VALUE[g]	MASS WALL R-VALUE	FLOOR R-VALUE	BASEMENT[C] WALL R-VALUE	SLAB[d] R-VALUE & DEBTTH	CRAWL SPACE[C] WALL *R*-VALUE
5	0.35	0.60	NR	38	20 or 13+5[f]	13/17	30[e]	10/13	10.2 ft	10/13

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 × 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. "10/13" means R-10 continuous insulated sheathing on the interior or exterior of the homeor 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
e. Or insulation sufficient to fill the framing cavity, R-19 minimum.
f. "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25 percent or less of the exterior,
insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior,
structural sheathing shall be supplemented with insulated sheathing of at least R-2.
g. The second *R*-value applies when more than half the insulation is on the interior of the mass wall.

Delete in its entirely table 402.1.3 and substitute the following

TABLE 402.1.3
EQUIVALENT U-FACTORS[a]

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR[b]	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR[c]	CRAWL SPACE WALL U-FACTOR[e]
5	0.35	0.60	0.030	~~0.057~~ .060	0.082	0.033	0.059	0.065

a. Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.
b. When more than half the insulation is on the interior, the mass wall *U*-factors shall be a and the same as the frame wall *U*-factor
c. Foundation *U*-factor requirements shown in Table 402.1.3 include wall construction and interior air films but exclude soil conductivity and exterior air films. *U*-factors for determining code compliance in accordance with Section 402.1.4 (total U Alternative) of Section 405 (Simulated Performance Alternative) shall be modified to include soil conductivity and exterior air films.

402.1.4 Total UA alternative Delete and substitute

402.1.4 Total UA alternative. If the total *building thermal envelope* UA (sum of *U*-factor times assembly area) is less than or equal to the total UA resulting from using the *U*-factors in Table 402.1.3 (multiplied by the same assembly area as in the proposed building), the building shall be considered in compliance with Table 402.1.1. The UA calculation shall include the thermal bridge effects of framing materials. The UA calculation shall include the thermal bridging effects of framing materials. The SHGC requirements shall be met in addition to UA compliance.

Add the following section:

403.10 Minimum equipment performance. Heating and cooling equipment shall have minimum equipment performance as indicated in Table 403.1.

TABLE 403.1
MINIMUM EQUIPMENT PERFORMANCE

EQUIPMENT CATEGORY	SUBCATEGORY	REFERENCED STANDARD	MINIMUM PERFORMANCE	Maximum Electricity Ratio
Natural Gas and propane fired furnaces		DOE 10CFR Part 430 Subpart B Appendix N	AFUE 90%[b]	2%
Oil Fired Furnace <94,00 BTU/hr		DOE 10CFR Part 430 Subpart B Appendix N	AFU 83%[b]	2%
Oil Fired Furnace >94,000 BTU/hr		DOE 10CFR Part 430 Subpart B Appendix N	AFU 83%[b]	2.3%
Natural Gas, Oil and Propane Fired Steam Boilers		DOE 10CFR Part 430 Subpart B Appendix N	AFU 82%[b,c]	NA
Air-cooled heat pumps, Heating mode<65,000 Btu/h cooling capacity	Split systems Single package	ARI 210/240	8 HSPF[a,b] 7.6 HSPF[a,b]	
Air-cooled air conditioners and heat pumps, Cooling mode <65,000 Btu/h cooling capacity	Split systems Single package	ARI 210/240	13.0 SEER[b] 12.0 SEER[b]	

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

a. For multi-capacity equipment, the minimum performance shall apply to each capacity step provided. Multi-capacity refers to manufacturer-published ratings for more than one capacity mode allowed by the product's controls.

b. This is used to be consistent with the National Appliance Energy Conservation Act (NAECA) of 1987 (Public Law 100-12).

Except for gas-fired steam boilers for which the minimum AFUE shall be 75 percent

Delete and substitute footnote e and f in table 405.5.2(1)

e. Tested envelope leakage shall be determined and documented by an independent party approved by the *code official*. Hourly calculations shall be used to determine the energy loads resulting from infiltration.

f. The combined air exchange rate for infiltration and mechanical ventilation shall be determined for intermittent mechanical ventilation.

Chapter 5

501.2 Delete exception in its entirety

Table 502.1.2 delete and substitute

TABLE 502.1.2
BUILDING ENVELOPE REQUIREMENTS OPAQUE ELEMENT, MAXIMUM *U*-FACTORS

CLIMATE ZONE	5	
	All other	Group R
Roofs		
Insulation entirely above deck	U-0.048	U-04.048
Metal buildings	U-0.055	U-0.055
Attic and other	U-0.027	U-00027
Walls, Above Grade		
Mass	U-0.90	U-0.80
Metal building	U-0.069	U-0.069
Metal framed	U-0.064	U-0.064
Wood framed and other	U-0.064	U-0.051
Walls, Below Grade		
Below-grade wall[a]	C-0.119	C-0.119
Floors		
Mass	U-0.074	U-0.064
Joist/Framing	U-0.033	U-0.033
Slab-on Grade Floors		
Unheated slabs	F-0.730	F-0.540
Heated slabs	F-0.860	F0.860

a. When heated slabs are placed below-grade, below grade walls must meet the *F*-factor requirements for perimeter insulation according to the heated slab-on-grade construction.

Table 502.2 (1) – Delete and substitute

TABLE 502.2(1)
BUILDING ENVELOPE REQUIREMENTS – OPAQUE ASSEMLIES

CLIMATE ZONE	5	
	ALL OTHERS	**GROUP R**
Roofs		
Insulation entirely Above deck	R-20ci	R-20ci
Metal buildings (with R-5 thermal blocks[a,b])	R-13 + R-13	R-19
Attic and other	R-38	R-38
Walls, Above Grade		
Mass	R-11.4ci	R-13.3 ci
Metal building[b]	R-13 + R-5.6ci	R-13 + R-5.6ci
Metal framed	R-13 + R-7.5ci	R-13 + R-7.5ci
Wood framed and other	R-13 + R-3.8ci	R-13 + 3.8
Walls, Below Grade		
Below grade wall[c]	R-7.5ci	R-7.5ci
Floors		
Mass	R-10ci	R-12.5ci
Joist/framing Steel/(wood)	R-30	R-30
Slab-on-Grade Floors		
Unheated Slabs	R-3 thermal break at wall to floor joint R-7.5 for 24 inches below	R-10 for 24 in. below
Heated slabs	R-15 for 24 in. below	R-15 for 24 in. below
Opaque doors		
Swinging	U –0.70	U –0.70
Roll-up or sliding	U -0.50	U -0.50

For SI: 1 inch = 25.4mm.
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. 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.

Table 502.3 delete and substitute

TABLE 502.3
BUILDING ENVELOPE REQUIREMENTS: FENESTRATION

CLIMATE ZONE	5
Vertical fenestration (40% maximum of above-grade wall)	
***U*-factor**	
Framing materials other than metal with or without metal reinforcement or cladding	
U-factor	0.35
Metal framing with or without thermal break	
Curtin wall/storefront *U*-factor	0.45
Entrance door *U*-factor	0.80
All other *U-factor*[a]	0.55
SHGC-all frame types	
SHGC:PF < 0.25	0.40
SHGC: 0.25 ≤ PF < 0.5	NR
SHGC: PF ≥ 0.5	NR
Skylights (3% maximum)	
U-factor	0.60
SHGC	0.40

NR = No requirements.
PF = Projection factor (see Section 502.3.2).
a. All others includes operable windows, fixed windows and nonetrance doors.

502.4.4 Relocate to section 503.4.7

502.4.9 Air Barrier Add the following:

502.4.9.1 Air Barriers: The Building envelope shall be designed and constructed with a continuous air barrier to control air leakage into, and out of the conditioned space and space designed to maintain temperature or humidity levels which differ from those in the conditioned space by more than 50% of the difference between the conditioned space and design ambient conditions. The air barrier shall have the following characteristics:

1. It shall be continuous, with all joints made air-tight
2. It shall have an air permeability not to exceed 0.004 cfm/ft^2 under a pressure differential of 0.3 in. water.
3. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressure on the envelope without damage or displacement and shall be transfer the load to the structure. It shall not displace adjacent materials under full load.
4. The air barrier shall be joined in an air-tight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Connections shall be made between:
    a. Foundation and walls.
    b. Walls and windows or doors.
    c. Different wall systems
    d. Wall and roof.

e. Wall and roof over unconditioned space.
f. Walls, floor and roof across construction, control and expansion joints.
g. Walls, floors and roof to utility, pipe and duct penetrations.

Air barrier penetrations: All penetrations of the air barrier and paths of air
502.4.9.2 infiltration/exfiltration shall be made air-tight.

503.2.1 Delete and Substitute

503.2.1 Calculation of heating and cooling loads. Design loads shall be determined in accordance with the procedures described in the ASHRAE/ACCA Standard 183. Heating and cooling loads shall be adjusted to account for load reductions that are achieved when energy recovery systems are utilized in the HVAC system Alternatively, design loads shall be determined by an *approved* equivalent computation procedure, using the design parameters specified in Chapter 3.

503.2.4.4 Delete and substitute the following exceptions.

1. Gravity exhaust dampers shall be permitted in buildings less than three stories in height.
2. Gravity dampers shall be permitted for exhaust airflows of 300 CFM (.14 m3/s) when serving a single space.

503.2.4.5 Delete and substitute

503.2.4.5 Snow melt system controls. Snow and ice-melting system are allowed only when there is no increase in supplied energy consumption, Snow- and ice-melting systems, supplied through energy service to the building, shall include automatic controls capable of shutting off the system when the pavement temperature is above 50°F (10°C)
and no precipitation is falling and an automatic or manual control that will allow shutoff when the outdoor temperature is above 40°F (4°C) so that the potential for snow or ice accumulation is negligible.

503.2.7 Delete and substitute

503.2.7 Duct and plenum insulation and sealing. All supply and return air ducts and plenums shall be insulated with a minimum of R-8 insulation when located in unconditioned spaces and a minimum of R-12 insulation when located outside the building. When located within a building envelope assembly, the duct or plenum shall be separated from the building exterior or unconditioned or exempt spaces by a minimum of R-8 insulation.

Exceptions:

1. When located within equipment.
2. When the design temperature difference between the interior and exterior of the duct or plenum does not exceed 15°F (8°C).

503.2.9 Delete and substitute the following

503.2.9 HVAC System completion.

Prior to the issuance of a certificate of occupancy upon the request of the AHJ evidence of system completion in accordance with sections 503.2.9.1 through 503.2.9.3 shall be provided.

Delete Table 503.3.1(1) and substitute the following table:

Table 503.3.1(1)

Climate Zone 5-A	Economizers on all individual cooling units ≥ 54,000 Btu/h

503.4.7 Add the following section moved from section 502.4.4

503.4.7 Hot gas by pass limitation. Cooling systems shall not use hot gas bypass or other evaporator pressure control systems unless the system is designed with multiple steps of unloading or continuous capacity modulation. The capacity of the hot gas bypass shall be limited as indicated in Table 503.4.7.

Exception: Unitary packaged systems with cooling capacities not greater than 90,000 Btu/h (26 379 W).

TABLE 503.4.7
MAXIMUM HOT GAS BYPASS CAPACITY

RATED CAPACITY	MAXIMUM HOT GAS BYPASS CAPACITY (% of total capacity)
≤ 240,000 Btu/h	50%
> 240,000 Btu/h	25%

For SI: 1 Btu/h = 0.29 watts.

506 Delete in its entirety

Chapter 6

Reference Standards

Delete without substitute

ASHRE – 2005	ASHRE Handbook of Fundamentals
ASHRE – 2004	ASHRE HVAC Systems and Equipment Hand Book – 2004.