DISTRICT OF COLUMBIA
CONSTRUCTION CODES SUPPLEMENT OF 2008
DCMR 12I ENERGY CONSERVATION CODE SUPPLEMENT

CHAPTER 1I ADMINISTRATION

Delete Sections 101.1, 101.2, 101.3, 101.4.2, 103, 104, 105, 106 and 107 of Chapter 1 of the Energy Conservation Code.

Add new Sections EC-101I to read as follows:

SECTION EC-101I GENERAL

Administration and enforcement of the *Energy Conservation Code* shall be governed by Chapter 1 of Title 12A of the District of Columbia Municipal Regulations.

Add new Sections EC-103I to read as follows:

SECTION EC-103I ALTERNATIVE MATERIALS – METHOD OF CONSTRUCTION, DESIGN OR INSULATING SYSTEMS

EC-103.1 General. This code is not intended to prevent the use of any material, method of construction, design or insulating system not specifically prescribed herein, provided that such construction, design, or insulating system has been approved by the code official as meeting the intent of this code.

> **EC-103.1.1 Above code programs.** The code official or other authority having jurisdiction shall be permitted to deem a national, state or local energy efficiency program to exceed the energy efficiency required by this code if the program provides a detailed written energy analysis study demonstrating that the requirements in the program exceed all requirements of this code and includes a requirement for inspections of each home by an accredited independent party to determine compliance. Buildings approved in writing by such an energy efficiency program and that meet all mandatory provisions of this chapter shall be considered in compliance with this code.

CHAPTER 2I DEFINITIONS

SECTION EC-202I GENERAL DEFINITIONS

Add the following definitions to the Energy Conservation Code to read as follows:

AIR BARRIER. Material(s) assembled and joined together to provide a barrier to air leakage through the building envelope. An air barrier may be a single material, or a combination of materials.

HIGH-EFFICACY LAMPS: Compact florescent lamps, T-8 or smaller diameter linear florescent lamps, or lamps with a minimum efficacy of:

1. 60 lumens per watt for lamps over 40 watts,
2. 50 lumens per watt for lamps over 15 watts to 40 watts,
3. 40 lumens per watt for lamps 15 watts or less

CHAPTER 4I RESIDENTIAL ENERGY EFFICIENCY

SECTION EC-402I BUILDING THERMAL ENVELOPE

Delete Table 402.1.1 of the Energy Conservation Code and add new Table EC-402.1.1 to read as follows:

TABLE EC-402.1.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT [a]

CLIMATE ZONE	FENES-TRATION U-FACTOR	SKY-LIGHT U-FACTOR [b]	GLAZED FENEST-RATION SHGC	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE [H]	FLOOR R-VALUE	BASEMENT [c] WALL R-VALUE	SLAB [d] R-VALUE & DEPTH	CRAWL SPACE [c] WALL R-VALUE
1	1.20	0.75	0.37	30	13	3/4	13	0	0	0
2	0.75	0.75	0.37	30	13	4/6	13	0	0	0
3	0.65	0.65	0.40 [e]	30	13	5/8	19	0	0	5 / 13
4 except Marine	0.35	0.60	NR	49	18	5/10	19	10 / 13	10, 2ft	10 / 13
5 and Marine 4	0.35	0.60	NR	38	19 or 13+5[g]	13/17	30 [f]	10 / 13	10, 2ft	10 / 13
6	0.35	0.60	NR	49	19 or 13+5[g]	15/19	30 [f]	10 / 13	10, 4ft	10 / 13
7 and 8	0.35	0.60	NR	49	21	19/21	30 [f]	10 / 13	10, 4ft	10 / 13

For SI: 1 foot = 304.8 mm.

a. *R*-values are minimums. *U*-factors and SHGC are maximums. R-19 shall be permitted to be compressed into a 2 × 6 cavity.
b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
c. The first *R*-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.
d. R-5 shall be added to the required slab edge *R*-values for heated slabs.
e. There are no SHGC requirements in the Marine zone.
f. Or insulation sufficient to fill the framing cavity, R-19 minimum.
g. "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.

Delete Table 402.1.3 of the Energy Conservation Code and add new Table EC-402.1.3 to read as follows:

TABLE EC-402.1.3
EQUIVALENT U-FACTORS [a]

CLIMATE ZONE	FENES-TRATION U-FACTOR	SKY-LIGHT U-FACTOR	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR	CRAWL SPACE WALL U-FACTOR
1	1.20	0.75	0.035	0.082	0.197	0.064	0.360	0.477
2	0.75	0.75	0.035	0.082	0.165	0.064	0.360	0.477
3	0.65	0.65	0.035	0.082	0.141	0.047	0.360	0.136
4 except Marine	0.35	0.60	0.26	0.062	0.141	0.047	0.059	0.065
5 and Marine 4	0.35	0.60	0.030	0.060	0.082	0.037	0.059	0.065
6	0.35	0.60	0.026	0.060	0.060	0.033	0.059	0.065
7 and 8	0.35	0.60	0.026	0.057	0.057	0.033	0.041	0.057

a. Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.

Delete Section 402.2.1 of the Energy Conservation Code and add new Section EC-402.2.1 to read as follows:

EC-402.2.1 Ceilings with attic spaces. When Section 402.1.1 would require R-38 in the ceiling, R-30 shall be deemed to satisfy the requirement for R-38 wherever the full height of uncompressed R-30 insulation extends over the wall top plate at the eaves. Similarly R-38 shall be deemed to satisfy the requirement for R-49 or higher wherever the full height of uncompressed R-38 insulation extends over the wall top plate at the eaves.

Add new Sections EC-402.4.2 and EC-402.4.3 and renumber Sections 402.4.2 and 402.4.3 of the Energy Conservation Code to read as follows:

EC-402.4.2 Air sealing and insulation. Building envelope air tightness and insulation installation shall be demonstrated to comply with one of the following options given by Section EC-402.4.2.1 or EC-402.4.2.2:

EC-402.4.2.1 Testing option. Building envelope tightness and insulation installation shall be considered acceptable when tested air leakage is less than 7 ACH when tested with a blower door at a pressure of 50 pascals. Testing shall occur after rough in and after installation of penetrations of the building envelope, including penetrations for utilities, plumbing, electrical, ventilation, and

combustion appliances.

During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed;
2. Dampers shall be closed, but not sealed; including exhaust, intake, makeup air, back draft, and flue dampers;
3. Interior doors shall be open;
4. Exterior openings for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling system(s) shall be turned off;
6. HVAC ducts shall not be sealed; and
7. Supply and return registers shall not be sealed.

EC-402.4.2.2 Visual inspection option: Building envelope tightness and insulation installation shall be considered acceptable when the items listed in Table EC-402.4.2, applicable to the method of construction, are field verified. Where required by the code official, an approved party independent from the installer of the insulation, shall inspect the air barrier and insulation.

TABLE EC-402.4.2
AIR BARRIER AND INSULATION INSPECTION

COMPONENT	CRITERIA
Air barrier and thermal barrier	Exterior thermal insulation is installed in substantial contact and continuous alignment with building envelope air barrier.
	Breaks or joints in the air barrier are filled or repaired. Air permeable insulation is not used as a sealing material. Air permeable insulation is inside of an air barrier.
Ceiling / attic	Air barrier in any dropped ceiling / soffit is substantially aligned with insulation and any gaps are sealed. Attic access (except unvented attic), knee wall door, or drop down stair is sealed.
Walls	Corners and headers are insulated.
	Junction of foundation and sill plate is sealed.
Windows and doors	Space between window/door jambs and framing is sealed.
Rim joists	Rim joists are insulated and include an air barrier.
Floors (including above garage and cantilevered floors)	Insulation is installed to maintain permanent contact with underside of subfloor decking. Air barrier is installed at any exposed edge of insulation.
Crawlspace walls	Insulation is permanently attached to walls. Exposed earth in unvented crawlspaces is covered with class I vapor retarder with overlapping joints taped.
Shafts, penetrations	Duct shafts, utility penetrations, knee walls, and flue shafts opening to exterior or unconditioned space are sealed.
Narrow cavities	Batts in narrow cavities are cut to fit, or narrow cavities are filled by spayed/blown insulation.
Garage separation	Air sealing is provided between the garage and conditioned spaces.
Recessed lighting	Recessed light fixtures are airtight, IC rated, and sealed to drywall. Exception--fixtures in conditioned space.
Plumbing and Wiring	Insulation is placed between outside and pipes. Batt insulation is cut to fit around wiring and plumbing, or sprayed/blown insulation extends behind piping and wiring.
Shower / tub on exterior wall	Showers and tubs on exterior walls have insulation and an air barrier separating them from the exterior wall.
Electrical / phone box on exterior walls	Air barrier extends behind boxes or an air sealed type boxes are installed.
Common wall	Air barrier is installed in common wall between dwelling units.
HVAC register boots	HVAC register boots that penetrate building envelope are sealed to subfloor or drywall.
Fireplace	Fireplace walls include an air barrier.

EC-402.4.3 Fireplaces. New wood-burning fireplaces shall have gasketed doors and outdoor combustion air.

EC-402.4.4 Fenestration air leakage. Windows, skylights and sliding glass doors shall have an air infiltration rate of no more than 0.3 cfm per square foot (1.5 L/s/m2), and swinging doors no more than 0.5 cfm per square foot (2.6 L/s/m2), when tested according to NFRC 400 or AAMA/WDMA/CSA101/I.S.2/A440 by an accredited, independent laboratory and listed and labeled by the manufacturer.

Exceptions: Site-built windows, skylights and doors.

EC-402.4.5 Recessed lighting. Recessed luminaires installed in the building thermal envelope shall be sealed to limit air leakage between conditioned and unconditioned spaces by being:

1. IC-rated and labeled with enclosures that are sealed or gasketed to prevent air leakage to the ceiling cavity or unconditioned space; or

2. IC-rated and labeled as meeting ASTM E 283 when tested at 1.57 psi (75 Pa) pressure differential with no more than 2.0 cfm (0.944 L/s) of air movement from the conditioned space to the ceiling cavity; or

3. Located inside an airtight sealed box with clearances of at least 0.5 inch (12.7 mm) from combustible material and 3 inches (76 mm) from insulation.

SECTION EC-403I SYSTEMS

Delete Sections 403.2.2 Energy Conservation Code and add new Section EC-403.2.2 to read as follows:

EC-403.2.2 Sealing. All ducts, air handlers, filter boxes, and building cavities used as ducts shall be sealed. Joints and seams shall comply with Section M-1601.3 of the *International Residential Code.*

Air handlers with a manufacturer's designation for an air leakage of no more than 2 percent of the design air flow rate when tested at an air pressure of 1-inch water gauge when all air inlets, air outlets, and condensate drain port(s) are sealed shall be deemed sealed. Air handlers with filter boxes shall be tested with the filter box in place.

Duct tightness shall be verified by either of the following:

1. Post-construction test: Leakage to outdoors shall be less than or equal to 8 CFM per 100 ft2 of conditioned floor area or a total leakage less than or equal to 12 CFM per 100 ft2 of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test.

2. Rough-in test: Total leakage shall be less than or equal to 6 CFM per 100 ft2 of conditioned floor area when tested at a pressure differential of 0.1 inches w.g. (25 Pa) across the roughed in system, including the manufacturer's air handler enclosure. All register boots shall be taped or otherwise sealed during the test. If the air handler is not installed at the time of the test, total leakage shall be less than or equal to 4 CFM per 100 ft2 of conditioned floor area.

   Exceptions: Duct tightness test is not required if the air handler and all ducts are located within conditioned space.

Add new Section EC-403.4 to the Energy Conservation Code and renumber Sections 403.4, 403.5,and 403.6 to read as follows:

EC-403.4 Service water heating. Service water heating systems and piping shall be installed in accordance with the applicable requirements of Sections 403.4.1 through 403.4.2.

EC-403.4.1 Insulation. All Service Hot Water piping shall be insulated to at least R-2 for the distance between the service water heater to within 5 feet of each fixture connected to the hot water pipe.

EC-403.4.2 Stub-in for solar water. All service water heating distribution systems shall have a stub-in connection point for future Solar Hot Water Systems in an accessible location within 5 feet of the roof.

EC-403.5 Circulating hot water systems. All circulating service hot water piping shall be insulated to at least R-2. Circulating hot water systems shall include an automatic or readily accessible manual switch that can turn off the hot water circulating pump when the system is not in use.

EC-403.6 Mechanical ventilation. Outdoor air intakes and exhausts shall have automatic or gravity dampers that close when the ventilation system is not operating.

EC-403.7 Equipment sizing. Heating and cooling equipment shall be sized in accordance with Section M1401.3 of the *International Residential Code.*

SECTION EC-404I ELECTRICAL POWER AND LIGHTING SYSTEMS

Add new Section EC-404I to read as follows:

SECTION EC-404I (Mandatory) ELECTRICAL POWER AND LIGHTING SYSTEMS

EC-404.1 Scope. This section applies to lighting equipment, related controls and electric circuits serving the interior spaces and exterior building facades of all residential buildings including accessory structures and garages.

EC-404.2 Lighting Equipment. A minimum of fifty percent of the lamps in permanently

installed lighting fixtures shall be high efficiency lamps.

Renumber Section 404 SIMULATED PERFORMANCE ALTERNATIVE of the International Energy Conservation Code to Section EC-405I SIMULATED PERFORMANCE ALTERNATIVE.

SECTION EC-405I SIMULATED PERFORMANCE ALTERNATIVE

Delete Table 404.5.2(1) of the Energy Conservation Code (2006) and replace with Table 405.2(1) to read as follows:

TABLE 405.5.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Above-grade walls	**Type:** mass wall if proposed wall is mass; otherwise wood frame	As proposed
	Gross Area: same as proposed	As proposed
	U-Factor: from Table 402.1.3	As proposed, assuming gaps/missing insulation equal to 5%, unless otherwise verified
	Solar anceabsorptions = 0.75	As proposed
	ERemittance = 0.90	As proposed
Basement and crawlspace walls	**Type:** same as proposed	As proposed
	Gross Area: same as proposed	As proposed
	U-Factor: from Table 402.1.3, with insulation layer on interior side of walls	As proposed, assuming gaps/missing insulation equal to 5%, unless otherwise verified
Above-grade floors	**Type:** wood frame	As proposed
	Gross Area: same as proposed	As proposed
	U-Factor: from Table 402.1.3	As proposed, assuming gaps/missing insulation equal to 5%, unless otherwise verified
Ceilings	**Type:** wood frame	As proposed
	Gross Area: same as proposed	As proposed
	U-Factor: from Table 402.1.3	As proposed, assuming gaps/missing insulation equal to 5%, unless otherwise verified
Roofs	**Type:** composition shingle on wood sheathing	As proposed
	Gross area: same as proposed	As proposed
	Solar absorptance = 0.75	As proposed
	Emittance = 0.90	As proposed

Attics	**Type:** vented with aperture = 1 ft^2 per 300 ft^2 ceiling area	As proposed
Foundations	**Type:** same as proposed	As proposed
Doors	**Area:** 40 ft^2 **Orientation:** North ***U*-factor:** same as fenestration from Table 402.1.3	As proposed As proposed As proposed
Glazing[a]	**Total area**[b] = (a) The proposed glazing area; where the proposed glazing area is less than 18% of the conditioned floor area (b) 18% of the conditioned floor area; where the proposed glazing area is 18% or more of the conditioned floor area **Orientation:** equally distributed to four cardinal compass orientations (N, E, S, & W) **U-factor:** from Table 402.1.2 **SHGC:** From Table 402.1 except that for climates with no requirement (NR) SHGC = 0.40 shall be used **Interior shade fraction**: Summer (all hours when cooling is required) = 0.70 Winter (all hours when heating is required) = 0.85 **External shading:** none	As proposed As proposed As proposed As proposed Same as standard reference design[c] As proposed
Skylights	None	As proposed
Thermally isolated sunrooms	None	As proposed
Air exchange rate	Specific Leakage Area (SLA)[d] = 0.00036 assuming no energy recovery	For residences that are not tested, the same as the standard reference design For residences without mechanical ventilation that are tested in accordance with ASHRAE 119, Section 5.1, the measured air exchange rate[e] but not less than 0.35 ACH For residences with mechanical ventilation that are tested in

		accordance with ASHRAE 119, Section 5.1, the measured air exchange rate[e] combined with the mechanical ventilation rate,[f] which shall not be less than $0.01 \times CFA + 7.5 \times (N_{br}+1)$ where: *CFA* = conditioned floor area N_{br} = number of bedrooms
Mechanical ventilation	None, except where mechanical ventilation is specified by the proposed design, in which case: Annual vent fan energy use: kWh/yr = $0.03942 \times CFA + 29.565 \times (N_{br}+1)$ where: *CFA* = conditioned floor area N_{br} = number of bedrooms	As proposed
Internal gains	IGain = $17{,}900 + 23.8 \times CFA + 4104 \times N_{br}$ (Btu/day per dwelling unit)	Same as standard reference design
Internal mass	An internal mass for furniture and contents of 8 pounds per square foot of floor area	Same as standard reference design, plus any additional mass specifically designed as a thermal storage element[g] but not integral to the building envelope or structure
Structural mass	For masonry floor slabs, 80% of floor area covered by R-2 carpet and pad, and 20% of floor directly exposed to room air For masonry basement walls, as proposed, but with insulation required by Table 402.1.3 located on the interior side of the walls For other walls, for ceilings, floors, and interior walls, wood frame construction	As proposed As proposed As proposed
Heating systems[h, i]	**Fuel type:** same as proposed design **Efficiencies:** **Electric:** air-source heat pump with prevailing federal minimum efficiency **Nonelectric furnaces:** natural gas furnace with prevailing federal minimum efficiency **Nonelectric boilers:** natural gas boiler with prevailing federal minimum efficiency **Capacity:** sized in accordance with Section M1401.3 of the *International Residential Code*	As proposed As proposed As proposed As proposed As proposed
Cooling systems [h,j]	**Fuel type:** Electric **Efficiency:** in accordance with	As proposed As proposed

	prevailing federal minimum standards **Capacity:** sized in accordance with Section M1401.3 of the *International Residential Code*	 As proposed
Service Water Heating[h,k]	**Fuel type:** same as proposed design **Efficiency:** in accordance with prevailing Federal minimum standards **Use:** gal/day = 30 + 10 × N_{br} **Tank temperature:** 120°F	As proposed As proposed Same as standard reference Same as standard reference
Thermal distribution systems	A thermal distribution system efficiency (DSE) of 0.88 shall be applied to both the heating and cooling system efficiencies for all systems other than tested duct systems. For tested duct systems, the leakage rate shall be the applicable maximum rate from Section 403.2.2.	As tested or as specified in Table 405.5.2(2) if not tested.
Thermostat	**Type:** Manual, cooling temperature setpoint = 75°F; Heating temperature set point = 70 °F	Same as standard reference

For SI: 1 square foot = 0.93 m_2; 1 British thermal unit = 1055 J; 1 pound per square foot = 4.88 kg/m_2; 1 gallon (U.S.) = 3.785 L; °C = (°F-32)/1.8.

a. Glazing shall be defined as sunlight-transmitting fenestration, including the area of sash, curbing or other framing elements, that enclose conditioned space. Glazing includes the area of sunlight-transmitting fenestration assemblies in walls bounding conditioned basements. For doors where the sunlight-transmitting opening is less than 50% of the door area, the glazing area is the sunlight transmitting opening area. For all other doors, the glazing area is the rough frame opening area for the door including the door and the frame.

b. For residences with conditioned basements, R-2 and R-4 residences and townhouses, the following formula shall be used to determine glazing area:

$AF\ x = A_s\ FAx\ F$

where:

AF = Total glazing area.

A^s = Standard reference design total glazing area.

FA = (Above-grade thermal boundary gross wall area)/(above-grade boundary wall area + 0.5 x below-grade boundary wall area).

F = (Above-grade thermal boundary wall area)/(above-grade thermal boundary wall area + common wall area) or 0.56, whichever is greater.

and where:

Thermal boundary wall is any wall that separates conditioned space from unconditioned space or ambient conditions.

Above-grade thermal boundary wall is any thermal boundary wall component not in contact with soil.

Below-grade boundary wall is any thermal boundary wall in soil contact.

Common wall area is the area of walls shared with an adjoining dwelling unit.

c. For fenestrations facing within 15 degrees (0.26 rad) of true south that are directly coupled to thermal storage mass, the winter interior shade fraction shall be permitted to be increased to 0.95 in the proposed design.

d. Where Leakage Area (L) is defined in accordance with Section 5.1 of ASHRAE 119 and where:

$SLA = L/CFA$

where L and CFA are in the same units.

e. Tested envelope leakage shall be determined and documented by an independent party approved by the code official. Hourly calculations as specified in the 2001 ASHRAE *Handbook of Fundamentals*, Chapter 26, page 26.21, Equation 40 (Sherman-Grimsrud model) or the equivalent 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 in accordance with Equation 43 of 2001 ASHRAE *Handbook of Fundamentals* page 26.24 and the "Whole-house Ventilation" provisions of 2001 ASHRAE *Handbook of Fundamentals*, page 26.19 for intermittent mechanical ventilation.

g. Thermal Storage Element shall mean a component not part of the floors, walls or ceilings that is part of a passive solar system, and that provides thermal storage such as enclosed water columns, rock beds, or phase-change containers. A thermal storage element must be in the same room as fenestration that faces within 15 degrees (0.26 rad) of true south, or must be connected to such a room with pipes or ducts that allow the element to be actively charged.

h. For a proposed design with multiple heating, cooling or water heating systems using different fuel types, the applicable standard reference design system capacities and fuel types shall be weighted in accordance with their respective loads as calculated by accepted engineering practice for each equipment and fuel type present.

i. For a proposed design without a proposed heating system, a heating system with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and proposed design. For electric heating systems, the prevailing federal minimum efficiency air-source heat pump shall be used for the standard reference design.
j. For a proposed design home without a proposed cooling system, an electric air conditioner with the prevailing federal minimum efficiency shall be assumed for both the standard reference design and the proposed design.
k. For a proposed design with a nonstorage-type water heater, a 40-gallon storage-type water heater with the prevailing federal minimum Energy Factor for the same fuel as the predominant heating fuel type shall be assumed. For the case of a proposed design without a proposed water heater, a 40-gallon storage-type water heater with the prevailing federal minimum efficiency for the same fuel as the predominant heating fuel type shall be assumed for both the proposed design and standard reference design.

Delete Table 404.5.2(2) of the Energy Conservation Code and add new Table EC-405.5(2) to read as follows:

TABLE EC-404.5.2(2)
DEFAULT DISTRIBUTION SYSTEM EFFICIENCIES FOR PROPOSED DESIGNS [a]

DISTRIBUTION SYSTEM CONFIGURATION AND CONDITION:	FORCED AIR SYSTEMS	HYDRONIC SYSTEMS[b]
Distribution system components located in unconditioned space	--	0.95
Untested distribution systems entirely located in conditioned space[c]	0.88	1.00
"Ductless" systems [d]	1.00	--

For SI: 1 cubic foot per minute = 0.47 L/s; 1 square foot = 0.093 m_2; 1 pound per square inch = 6895 Pa; 1 inch water gauge = 1250 Pa.

a. Default values given by this table are for untested distribution systems, which must still meet minimum requirements for duct system insulation.
b. Hydronic Systems shall mean those systems that distribute heating and cooling energy directly to individual spaces using liquids pumped through closed loop piping and that do not depend on ducted, forced air flows to maintain space temperatures.
c. Entire system in conditioned space shall mean that no component of the distribution system, including the air handler unit, is located outside of the conditioned space.
d. Ductless systems may have forced airflow across a coil but shall not have any ducted airflows external to the manufacturer's air handler enclosure.

CHAPTER 6I REFERENCED STANDARDS

Delete ASHRAE Reference Standard 90.1-2004 in the Energy Code and add new ASHRAE Reference Standard 90.1-2007 to read as follows

ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
1791 Tullie Circle, NE
Atlanta, GA 30329-2305

Standard Reference number	Title	Referenced in code section number
90.1-2007	Energy Standard for Buildings Except Low-rise Residential Buildings (ANSI/ASHRAE/IESNA 90.1-2007)…….. .. . . …..	501.1,501.2,502.1.1, Table 502.2(2)