EC121–09/10

403.6, Table 403.6 (New), Chapter 6; IRC N1103.6, Table N1103.6 (New), Chapter 44

Proponent: Bill Prindle, ICF International, representing the Energy Efficient Codes Coalition; Jeff Harris, Alliance to Save Energy; Harry Misuriello, American Council for an Energy-Efficient Economy (ACEEE); Garrett Stone, Brickfield, Burchette, Ritts & Stone; Steve Rosenstock, Edison Electric Institute; Brian Dean, ICF International

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC COMMITTEE. PART II WILL BE HEARD BY THE IRC BUILDING/ENERGY COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I – IECC

1. Revise as follows:

403.6 Equipment sizing (Mandatory). Heating and cooling equipment shall be sized in accordance with Section 503.2.1, 503.2.2 and Table 403.6 ~~M1401.3 of the *International Residential Code*~~.

2. Add new table as follows:

TABLE 403.6
HEATING AND COOLING EQUIPMENT SIZING

UNIT	MAXIMUM PERCENTAGE OVESIZING [a,b]	CLIMATE ZONE	MINIMUM EFFICIENCY & TEST PROCEDURES
Air Conditioners	15%	ALL	Air Cooled: AHRI 210/240
Multi-speed[c] Air-Source Heat Pumps and Ground-Source Heat Pumps	15%	ALL	Air Cooled: AHRI 210/240 Water or Ground: AHRA/ASHRAE 13256-1
Single -speed Air-Source Heat Pumps and Ground Source Heat Pumps	15% 25%	1-3 ---- 4-8	Air Cooled: AHRI 210/240 Water or Ground: AHRA/ASHRAE 13256-1 Packaged: AHRI 310/380
All fuel-fired heating appliances	40%	ALL	DOE 10 CFR Part 430 or: Gas Fired: ANSI Z21.47 Oil Fired: UL 727

a. Equipment shall be sized in accordance with ACCA Manual J:
   1. Indoor and outdoor coils shall be matched for size;
   2. Outdoor temperatures shall be the 99.0% and 1.0% design temperatures as published in the ASHRAE Handbook of Fundamentals for the most representative city for which design temperature data are available, or other approved source;
   3. Indoor temperatures shall be 75 F for cooling and 72 F for heating;
   4. Infiltration rate shall be assumed as 0.00036 Specific Leakage Area (SLA).

b. Once the appropriate equipment size is determined, if that specific size does not exist, the next larger size of manufactured equipment shall be acceptable, regardless of the percentage listed.

c. Multi-speed units shall be permitted to exceed the listed percentage only to the cooling capacity necessary to control humidity levels.

3. Add new standard to Chapter 6 as follows:

ACCA Manual J 2006 Residential Load Calculation

PART II – IRC BUILDING/ENERGY

1. Revise as follows:

N1103.6 Equipment sizing. Heating and cooling *equipment* shall be sized ~~as specified~~ in accordance with Section M1401.3 and Table N1103.6.

2. Add new table as follows:

TABLE N1103.6
HEATING AND COOLING EQUIPMENT SIZING

UNIT	MAXIMUM PERCENTAGE OVESIZING [a,b]	CLIMATE ZONE	MINIMUM EFFICIENCY & TEST PROCEDURES
Air Conditioners	15%	ALL	Air Cooled: AHRI 210/240
Multi-speed[c] Air-Source Heat Pumps and Ground-Source Heat Pumps	15%	ALL	Air Cooled: AHRI 210/240 Water or Ground: AHRA/ASHRAE 13256-1
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3. Indoor temperatures shall be 75 F for cooling and 72 F for heating;
4. Infiltration rate shall be assumed as 0.00036 Specific Leakage Area (SLA).

b. Once the appropriate equipment size is determined, if that specific size does not exist, the next larger size of manufactured equipment shall be acceptable, regardless of the percentage listed.

c. Multi-speed units shall be permitted to exceed the listed percentage only to the cooling capacity necessary to control humidity levels.

3. Add new standards to Chapter 44 as follows:

AHRI

210/240—03 Unitary Air-Conditioning and Air-Source Heat Pump Equipment

310/380—93 Standard for Packaged Terminal Air-conditioners and Heat Pumps

AHRA/ASHRAE

13256-1 (2005) Water-source Heat Pumps—Testing and Rating for Performance—Part 1: Water-to-air and Brine-to-air Heat Pumps (ANSI/ASHRAE/IESNA 90.1-2004)

ANSI

Z21.47-03 Gas-Fired Central Furnaces

DOE

10 CFR Part 430, Subpart B,
Appendix E (1998) Uniform Test Method for Measuring the Energy Consumption of Water Heaters

UL

727—06 Oil-fired Central Furnaces

Reason: By establishing specific requirements in the IECC for proper equipment sizing, this proposal is an important part of the goal to increase the energy efficiency in the code. Equipment that is excessively oversized utilizes more energy and fails to properly condition the space. Research and survey data is limited, but typically indicates that air conditioning equipment may be over-sized by more than 50%, resulting in increased energy consumption and adverse impacts on energy use, comfort and moisture control. Moreover, oversizing of equipment can lead to unnecessary higher construction cost.

The current *IECC* and *IRC* energy chapter merely reference section M1401.3 of the IRC. Section M1401.3 then directs the user to ACCA Manual J. In response to this concern, this proposal specifically directs the user to Manual J and adds Manual J as a referenced standard to the IECC. Since Manual J is already an approved referenced standard in the *IRC*, we believe that adding the reference to a second I-code (IECC) is not an issue. Additionally, since the test procedures (AHRI 210/240, AHRI 310/380, AHRA/ASHRAE 13256-1, ANSI Z21.47, DOE 10 CFR Part 430, UL 727) are referenced standards that are used in Chapter 5 of the IECC, we believe that adding these references to a second I-code (IRC) should also not be an issue.

Current code language, in M1401.3, references ACCA Manual J for load calculation, but does not require that the installed equipment meet a required size. The new language sets a requirement and includes explicit information needed for consistent load calculations and installed equipment size. The actual installed equipment size may be oversized and installed at the next available manufactured size.

The proposed requirements are primarily based on limits that are suggested in ACCA Manual S, which states the following:

Cooling-only equipment should be sized so that the total cooling capacity does not exceed the total cooling load by more than 15%.

If heat pump equipment (air-source or water-source) is installed in a warm or moderate climate, the total cooling capacity should not exceed the total cooling load by more than 15%.

If heat pump equipment (air-source or water-source) is installed in a cold climate (where heating costs are a primary concern), the total cooling capacity can exceed the total cooling load by as much as 25%.

Furnace and boiler oversizing is not recommended because comfort may be compromised when a furnace or boiler short-cycles. The output capacity of the furnace or boiler must be greater than the design load, but no more than 40% larger than the design heating load.

Cost Impact: The code change proposal will not increase the cost of construction.

Analysis: A review of the standard(s) proposed for inclusion in the code, ACCA-06, AHRI 210/240, 310/380, AHRA/ASHRAE 13256-1, ANSI Z21.47, DOE 10 CFR Part 430, UL 727, for compliance with ICC criteria for referenced standards given in Section 3.6 of Council Policy #CP 28 will be posted on the ICC website on or before September 24, 2009.

PART I – IECC

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

PART II – IRC BUILDING/ENERGY

Public Hearing:	Committee:	AS	AM	D
	Assembly:	ASF	AMF	DF

ICCFILENAME: PRINDLE-EC-25-403.6-N1103.6