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DEPARTMENT OF ENERGY

10 CFR Parts 429 and 430

[Docket No. EERE-2009-BT-TP-0004]

RIN 1904-AB94

Energy Conservation Program: Test Procedures for Central Air Conditioners and Heat Pumps; Correction

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Final rule; technical correction.

SUMMARY: On June 8, 2016, the U.S. Department of Energy (DOE) published a final rule in the **Federal Register** that amended the test procedures for central air conditioners and heat pumps. This final rule corrects multiple editorial errors in that final rule.

DATES: Effective Date: **[INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER].**

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SUPPLEMENTARY INFORMATION:

I. Background

On June 8, 2016, DOE's Office of Energy Efficiency and Renewable Energy published a test procedure final rule in the Federal Register titled, "Test Procedures for Central Air Conditioners and Heat Pumps" ("June 2016 final rule"). 81 FR 36992. Since the publication of that final rule, it has come to DOE's attention that, due to a technical oversight, certain portions of the regulatory text adopted in the June 2016 final rule for 10 CFR part 429 and appendix M to subpart B of 10 CFR part 430 ("appendix M") contained editorial errors.

As part of that final rule, DOE amended 10 CFR 429.16, which addresses certification of central air conditioners and heat pumps, and 10 CFR 429.70, which addresses alternate efficiency determination methods. This correction addresses editorial errors in § 429.16(a)(1), (d)(1), (d)(2), and (e)(4). Specifically, at §429.16(a)(1), DOE included a cross reference to paragraph (c)(2) that should have referred to paragraph (b)(2)(i). In §429.16(d)(1) and (2), DOE mistakenly transposed the words "less" and "greater." At §429.16(e)(4), DOE erroneously referred to cubic feet per minute (cfm) instead of cubic feet per minute of standard air (scfm). At

§429.16(e)(4)(viii), DOE failed to remove regulatory text associated with changes to the test procedure for variable speed heat pumps not adopted in the June 2016 final rule that had been proposed on November 9, 2015 in a supplementary notice of proposed rulemaking (“November 2015 SNO PR”). 80 FR 69278. In order to remedy these errors, DOE is issuing this final rule correction to revise the text in these sections.

In addition, the June 2016 final rule revised appendix M to subpart B of 10 CFR part 430 (“appendix M”), which specifies the “Uniform Test Method for the Measurement the Energy Consumption of Central Air Conditioners and Heat Pumps.” This correction also addresses several editorial errors in appendix M.

In section 3.11.1 of appendix M, “If using the outdoor air enthalpy method as the secondary test method,” DOE erroneously numbered two subsections with the number “3.11.1.1.” The second of these two is renumbered to “3.11.1.2.”

In section 4.1 of appendix M, “Seasonal Energy Efficiency Ratio (SEER) Calculations,” DOE erroneously numbered subsection 4.1.3 as “4.1.2.3,” which propagated errors in numbering from that point through the end of section 4.1 and created erroneous cross-references to these sections. Section 4.1.2.3 is renumbered as section “4.1.3,” and the following section numbers through the end of section 4.1 are renumbered accordingly. Additionally, cross-references to the renumbered sections are revised.

Sections 2.11 and 3.19 of appendix M contain errors in the tolerance allowed between temperature measurements. The preamble to the June 2016 final rule states that the maximum allowable temperature difference is 2.0 °F and that it applies to the average measurements for the test period. 81 FR 36991, 37028 (June 8, 2016). In section 2.11, DOE erroneously referred to “maximum difference between readings” rather than adding the clarification discussed in the

preamble that “readings” referred to the average temperatures measured during the test period. In section 3.1.9, DOE similarly failed to include the clarifying information on the tolerance and erroneously provided a tolerance of 1.5 °F rather than 2.0 °F. DOE is correcting section 2.11 accordingly and correcting 3.1.9 to refer directly to section 2.11 rather than correcting the provided tolerance.

Tables 8, 9, 15, 16, and 17 of appendix M contained various errors in testing tolerances for external resistance to airflow, airflow nozzle pressure difference, and electric voltage. In the preamble of the June 2016 Final Rule, DOE explained its intention to maintain the external resistance to airflow tolerance at 0.05 inches of water, to maintain the airflow nozzle pressure difference tolerance at 2.0%, and to maintain the electric voltage tolerance at 2.0%. 81 FR 36991, 37036 (June 8, 2016). However, this was not reflected in tables 8, 9, 15, 16 and 17 of appendix M, and the tables are revised to reflect these corrections.

In section 3.13.1.d of appendix M, $P2_x$ was erroneously printed instead of P_x in two instances. This section provides instructions for measurement of the indoor unit low voltage power P_x , which is later subtracted from the measurement of heating season total off mode power ($P2_x$) for coil-only split systems and for blower coil split systems for which a furnace or a modular blower is the designated air mover. Instances of $P2_x$ in section 3.13.1.d of appendix M are revised to P_x .

Finally, many of the instructions in the final rule that indicate that a default cyclic degradation coefficient is to be used if the tests to determine this value are not conducted, but erroneously did not specify that the default value is to be used if the value determined using the test exceeded the default value. 81 FR 36991, 37033 (June 8, 2016). DOE intended that the

default value is to be used if the value determined using the test exceeds the default value for the cyclic degradation coefficient, and is correcting this omission in this final rule correction.

II. Need for Correction

As published, the adopted test procedure text may potentially result in confusion regarding how to correctly conduct DOE's central air conditioners and heat pumps test procedure.

Because this final rule would simply correct errors in the regulatory text without making substantive changes to the test procedures, the changes addressed in this document are technical in nature. Accordingly, DOE finds that there is good cause under 5 U.S.C. 553(b)(B) to not issue a separate notice to solicit public comment on the changes contained in this document. Issuing a separate notice to solicit public comment would be impracticable, unnecessary, and contrary to the public interest.

III. Procedural Requirements

DOE has concluded that the determinations made pursuant to the various procedural requirements applicable to the June 8, 2016 test procedure final rule remain unchanged for this final rule technical correction. These determinations are set forth in the June 8, 2016 final rule. 81 FR 36992.

List of Subjects

10 CFR Part 429

Administrative practice and procedure, Confidential business information, Energy conservation, Reporting and recordkeeping requirements.

10 CFR Part 430

Administrative practice and procedure, Confidential business information, Energy conservation, Energy conservation test procedures, Household appliances, Imports, Incorporation by reference, Intergovernmental relations, Small businesses.

Issued in Washington, DC, on August 5, 2016.

Kathleen Hogan,
Deputy Assistant Secretary for Energy Efficiency,
Energy Efficiency and Renewable Energy.

For the reasons stated in the preamble, DOE amends parts 429 and 430 of chapter II of title 10, Code of Federal Regulations to read as follows:

**PART 429—CERTIFICATION, COMPLIANCE, AND ENFORCEMENT FOR
CONSUMER PRODUCTS AND COMMERCIAL AND INDUSTRIAL EQUIPMENT**

1. The authority citation for part 429 continues to read as follows:

Authority: 42 U.S.C. 6291–6317; 28 U.S.C. 2461 note.

§ 429.16 [Amended]

2. Section 429.16 is amended:

- a. In paragraph (a)(1), in the last row of the table, by removing “(c)(2)” and adding in its place “(b)(2)(i)”;
- b. In paragraph (d)(1) by removing “less” and adding in its place “greater”;
- c. In paragraph (d)(2) by removing “greater” and adding in its place “less”;
- d. In paragraph (e)(4) by:
 - i. Adding “of standard air” after “(in cubic feet per minute”;
 - ii. Removing the two instances of “(cfm)” and adding in its place “(scfm)”;
 - iii. Removing paragraph (viii).

PART 430—ENERGY CONSERVATION PROGRAM FOR CONSUMER PRODUCTS

3. The authority citation for part 430 continues to read as follows:

Authority: 42 U.S.C. 6291–6309; 28 U.S.C. 2461 note.

4. Appendix M to subpart B of part 430 is amended by:
 - a. In section 2.11.b(2), first paragraph, last sentence, removing “readings” and adding in its place “average temperatures measured during the test period”;
 - b. Revising section 3.1.9;
 - c. Revising section 3.2.1, introductory text;
 - d. In section 3.2.3.d., adding a sentence after the first sentence;
 - e. In section 3.3, paragraph d., revising Table 8;
 - f. In section 3.5, paragraph h., revising Table 9 and its footnotes;
 - g. In section 3.5.3, adding a sentence after the second sentence;
 - h. Revising section 3.6.3.b., introductory text;
 - i. In section 3.7, paragraph a., revising Table 15;
 - j. In section 3.8.a., removing the sixth sentence;
 - k. In section 3.8.1, adding a sentence after the third sentence and revising Table 16;
 - l. In section 3.9, paragraph f., revising Table 17;
 - m. In section 3.11, redesignating the second section 3.11.1.1 (“Official Test”) as section 3.11.1.2;
 - n. In section 3.13.1.d, removing the two instances of “ $P2_x$ ” and adding in their places “ P_x ”;
 - o. In section 4.1.1.b, adding a second sentence;
 - p. In section 4.1.2.1.c, adding a second sentence;

- q. Redesignating sections 4.1.4.1 and 4.1.4.2 as sections 4.1.5.1 and 4.1.5.2, respectively;
- r. Redesignating section 4.1.4 as section 4.1.5;
- s. Redesignating sections 4.1.3.1, 4.1.3.2, and 4.1.3.3 as sections 4.1.4.1, 4.1.4.2, and 4.1.4.3, respectively;
- t. Redesignating section 4.1.3 as section 4.1.4;
- u. Redesignating section 4.1.2.7 as section 4.1.3.4;
- v. Redesignating section 4.1.2.6 as section 4.1.3.3;
- w. Redesignating section 4.1.2.5 as section 4.1.3.2;
- x. Redesignating section 4.1.2.4 as section 4.1.3.1;
- y. Redesignating section 4.1.2.3 as section 4.1.3;
- z. In newly redesignated section 4.1.3.1, revising the equation and related information immediately before Table 18;
- aa. In newly redesignated section 4.1.4.1, adding a sentence after the last sentence of the section;
- bb. In section 4.2.1, adding the sentence “Evaluate the heating mode cyclic degradation factor \dot{C}_b^h as specified in section 3.8.1 of this appendix.”, after “Use Equation 4.2-2 to determine BL(Tj). Obtain fractional bin hours for the heating season, n_j/N , from Table 19.”; and
- cc. In section 4.2.3.1, adding the sentence “Evaluate the heating mode cyclic degradation factor C_D^h as specified in section 3.8.1 of this appendix.”, after “ $\delta'(Tj)$ = the low temperature cutoff factor, dimensionless.”;

The revisions and additions read as follows.

APPENDIX M TO SUBPART B OF PART 430—UNIFORM TEST METHOD FOR MEASURING THE ENERGY CONSUMPTION OF CENTRAL AIR CONDITIONERS AND HEAT PUMPS

* * * * *

3.1.9 Requirement for the Air Temperature Distribution Entering the Outdoor Coil

Monitor the temperatures of the air entering the outdoor coil using air sampling devices and/or temperature sensor grids, maintaining the required tolerances, if applicable, as described in section 2.11 of this appendix.

* * * * *

3.2.1 Tests for a System Having a Single-Speed Compressor and Fixed Cooling Air Volume Rate

This set of tests is for single-speed-compressor units that do not have a cooling minimum air volume rate or a cooling intermediate air volume rate that is different than the cooling full load air volume rate. Conduct two steady-state wet coil tests, the A and B Tests. Use the two optional dry-coil tests, the steady-state C Test and the cyclic D Test, to determine the cooling mode cyclic degradation coefficient, C_D^c . If the two optional tests are conducted but yield a tested C_D^c that exceeds the default C_D^c or if the two optional tests are not conducted, assign C_D^c the default value of 0.25 (for outdoor units with no match) or 0.20 (for all other systems). Table 4 specifies test conditions for these four tests.

* * * * *

3.2.3 Tests for a Unit Having a Two-Capacity Compressor (See Section 1.2 of This Appendix, Definitions)

* * * * *

d. *** If the two optional tests are conducted but yield a tested C_D^c ($k = 2$) that exceeds the default C_D^c ($k = 2$) or if the two optional tests are not conducted, assign C_D^c ($k = 2$) the default value. ***

* * * * *

3.3. * * *

d. * * *

Table 8 -- Test Operating and Test Condition Tolerances for Section 3.3 Steady-State Wet Coil Cooling Mode Tests and Section 3.4 Dry Coil Cooling Mode Tests

	Test operating tolerance ¹	Test condition tolerance ¹
Indoor dry-bulb, °F		
Entering temperature	2.0	0.5
Leaving temperature	2.0	
Indoor wet-bulb, °F		
Entering temperature	1.0	² 0.3
Leaving temperature	² 1.0	
Outdoor dry-bulb, °F		
Entering temperature	2.0	0.5
Leaving temperature	³ 2.0	
Outdoor wet-bulb, °F		
Entering temperature	1.0	⁴ 0.3

Leaving temperature	³ 1.0	
External resistance to airflow, inches of water	0.05	⁵ 0.02
Electrical voltage, % of rdg.	2.0	1.5
Nozzle pressure drop, % of rdg.	2.0	

¹See section 1.2 of this appendix, Definitions.

²Only applies during wet coil tests; does not apply during steady-state, dry coil cooling mode tests.

³Only applies when using the outdoor air enthalpy method.

⁴Only applies during wet coil cooling mode tests where the unit rejects condensate to the outdoor coil.

⁵Only applies when testing non-ducted units.

* * * * *

3.5 * * *

h. * * *

Table 9 --Test Operating and Test Condition Tolerances for Cyclic Dry Coil Cooling Mode Tests

	Test Operating Tolerance ¹	Test Condition Tolerance ¹
Indoor entering dry-bulb temperature ² , °F	2.0	0.5
Indoor entering wet-bulb temperature, °F		(³)
Outdoor entering dry-bulb temperature ² , °F	2.0	0.5
External resistance to airflow ² , inches of water	0.05	
Airflow nozzle pressure difference or velocity pressure ² , % of reading	2.0	⁴ 2.0
Electrical voltage ⁵ , % of rdg.	2.0	1.5

¹See section 1.2 of this appendix, Definitions.

²Applies during the interval that air flows through the indoor (outdoor) coil except for the first 30 seconds after flow initiation. For units having a variable-speed indoor blower that ramps, the tolerances listed for the external resistance to airflow apply from 30 seconds after achieving full speed until ramp down begins.

³Shall at no time exceed a wet-bulb temperature that results in condensate forming on the indoor coil.

⁴The test condition shall be the average nozzle pressure difference or velocity pressure measured during the steady-state dry coil test.

⁵Applies during the interval when at least one of the following—the compressor, the outdoor fan, or, if applicable, the indoor blower—are operating except for the first 30 seconds after compressor start-up.

* * * * *

3.5.3 Cooling-Mode Cyclic-Degradation Coefficient Calculation

If the two optional tests are conducted but yield a tested C_D^c that exceeds the default C_D^c or if the two optional tests are not conducted, assign C_D^c the default value of 0.25 for variable-speed compressor systems and outdoor units with no match, and 0.20 for all other systems.

* * * * *

3.6.3 Tests for a Heat Pump Having a Two-Capacity Compressor (see Section 1.2 of This Appendix, Definitions), Including Two-Capacity, Northern Heat Pumps (see Section 1.2 of This Appendix, Definitions)

* * * * *

b. Conduct the optional high temperature cyclic test ($H1C_1$) to determine the heating mode cyclic-degradation coefficient, C_D^h . If this optional test is conducted but yields a tested C_D^h that exceeds the default C_D^h or if the optional test is not conducted, assign C_D^h the default value of 0.25. If a two-capacity heat pump locks out low capacity operation at lower outdoor temperatures, conduct the high temperature cyclic test ($H1C_2$) to determine the high-capacity

heating mode cyclic-degradation coefficient, C_D^h ($k=2$). If this optional test at high capacity is conducted but yields a tested C_D^h ($k = 2$) that exceeds the default C_D^h ($k = 2$) or if the optional test is not conducted, assign C_D^h the default value. The default C_D^h ($k=2$) is the same value as determined or assigned for the low-capacity cyclic-degradation coefficient, C_D^h [or equivalently, C_D^h ($k=1$)]. Table 12 specifies test conditions for these nine tests.

* * * * *

3.7 * * *

a. * * *

Table 15--Test Operating and Test Condition Tolerances for Section 3.7 and Section 3.10 Steady-State Heating Mode Tests

	Test operating tolerance ¹	Test condition tolerance ¹
Indoor dry-bulb, °F:		
Entering temperature	2.0	0.5
Leaving temperature	2.0	
Indoor wet-bulb, °F:		
Entering temperature	1.0	
Leaving temperature	1.0	
Outdoor dry-bulb, °F:		
Entering temperature	2.0	0.5
Leaving temperature	² 2.0	
Outdoor wet-bulb, °F:		
Entering temperature	1.0	0.3
Leaving temperature	² 1.0	
External resistance to airflow, inches of water	0.05	³ 0.02
Electrical voltage, % of rdg	2.0	1.5
Nozzle pressure drop, % of rdg	2.0	

¹See section 1.2 of this appendix, Definitions.

²Only applies when the Outdoor Air Enthalpy Method is used.

³Only applies when testing non-ducted units.

* * * * *

3.8.1 * * *

* **If the optional cyclic test is conducted but yields a tested C_D^h that exceeds the default C_D^h or if the optional test is not conducted, assign C_D^h the default value of 0.25.***

* * * * *

Table 16--Test operating and test condition tolerances for cyclic heating mode tests.

	Test operating tolerance ¹	Test condition tolerance ¹
Indoor entering dry-bulb temperature, ² °F	2.0	0.5
Indoor entering wet-bulb temperature, ² °F	1.0	
Outdoor entering dry-bulb temperature, ² °F	2.0	0.5
Outdoor entering wet-bulb temperature, ² °F	2.0	1.0
External resistance to air-flow, ² inches of water	0.05	
Airflow nozzle pressure difference or velocity pressure, ² % of reading	2.0	³ 2.0
Electrical voltage, ⁴ % of rdg	2.0	1.5

¹See section 1.2 of this appendix, Definitions.

²Applies during the interval that air flows through the indoor (outdoor) coil except for the first 30 seconds after flow initiation. For units having a variable-speed indoor blower that ramps, the tolerances listed for the external resistance to airflow shall apply from 30 seconds after achieving full speed until ramp down begins.

³The test condition shall be the average nozzle pressure difference or velocity pressure measured during the steady-state test conducted at the same test conditions.

⁴Applies during the interval that at least one of the following—the compressor, the outdoor fan, or, if applicable, the indoor blower—are operating, except for the first 30 seconds after compressor start-up.

* * * * *

3.9 * * *

f. * * *

Table 17--Test Operating and Test Condition Tolerances for Frost Accumulation Heating Mode Tests

	Test operating tolerance ¹		Test condition tolerance ¹ Sub-interval H ²
	Sub-interval H ²	Sub-interval D ³	
Indoor entering dry-bulb temperature, °F	2.0	⁴ 4.0	0.5
Indoor entering wet-bulb temperature, °F	1.0		
Outdoor entering dry-bulb temperature, °F	2.0	10.0	1.0
Outdoor entering wet-bulb temperature, °F	1.5		0.5
External resistance to airflow, inches of water	0.05		0.02 ⁵
Electrical voltage, % of rdg	2.0		1.5

¹See section 1.2 of this appendix, Definitions.

²Applies when the heat pump is in the heating mode, except for the first 10 minutes after termination of a defrost cycle.

³Applies during a defrost cycle and during the first 10 minutes after the termination of a defrost cycle when the heat pump is operating in the heating mode.

⁴For heat pumps that turn off the indoor blower during the defrost cycle, the noted tolerance only applies during the 10 minute interval that follows defrost termination.

⁵Only applies when testing non-ducted heat pumps.

* * * * *

4.1.1 * * *

b. ***Evaluate the cooling mode cyclic degradation factor C_D^c as specified in section 3.5.3 of this appendix.

* * * * *

4.1.2.1 * * *

c. ***Evaluate the cooling mode cyclic degradation factor C_D^c as specified in section 3.5.3 of this appendix.

* * * * *

4.1.3.1* * *

n_j/N = fractional bin hours for the cooling season; the ratio of the number of hours during the cooling season when the outdoor temperature fell within the range represented by bin temperature T_j to the total number of hours in the cooling season, dimensionless.

Obtain the fractional bin hours for the cooling season, n_j/N , from Table 18. Use Equations 4.1.3-1 and 4.1.3-2, respectively, to evaluate $\dot{Q}_c^{k=1}(T_j)$ and $\dot{E}_c^{k=1}(T_j)$. Evaluate the cooling mode cyclic degradation factor C_D^c as specified in section 3.5.3 of this appendix.

* * * * *

4.1.4.1 * * *

***Evaluate the cooling mode cyclic degradation factor C_D^c as specified in section 3.5.3 of this appendix.

* * * * *

Appendix M to Subpart B of Part 430 -- [Amended]

5. In the table below, for each section of appendix M to subpart B of part 430 indicated in the left column, remove the language indicated in the middle column from wherever it appears in that section, and add the language indicated in the right column.

Sections	Remove	Add
3.2.2.1, 3.2.3.a.	A default value of C_D^c may be used in lieu of conducting the cyclic test. The default value of C_D^c is 0.20.	If the two optional tests are conducted but yield a tested C_D^c that exceeds the default C_D^c or if the two optional tests are not conducted, assign C_D^c the default value of 0.20.
3.2.4.a.	A default value for C_D^c may be used in lieu of conducting the cyclic test. The default value of C_D^c is 0.25.	If the two optional tests are conducted but yield a tested C_D^c that exceeds the default C_D^c or if the two optional tests are not conducted, assign C_D^c the default value of 0.25.
3.6.1	A default value for C_D^h may be used in lieu of conducting the cyclic test. The default value of C_D^h is 0.25.	If this optional test is conducted but yields a tested C_D^h that exceeds the default C_D^h or if the optional test is not conducted, assign C_D^h the default value of 0.25.
3.6.2, 3.6.4.a.	A default value for C_D^h may be used in lieu of conducting the cyclic. The default value of C_D^h is 0.25.	If this optional test is conducted but yields a tested C_D^h that exceeds the default C_D^h or if the optional test is not conducted, assign C_D^h the default value of 0.25.

Appendix M to Subpart B of Part 430 – [Amended]

6. For each newly redesignated section of appendix M to subpart B of part 430 in the first column, remove the cross reference sections in the middle column, and add in their places, the cross reference sections in the right column.

Section	Remove	Add
4.1.3	4.1.2.4 4.1.2.5 4.1.2.6 4.1.2.7	4.1.3.1 4.1.3.2 4.1.3.3 4.1.3.4
4.1.4.3	4.1.2.7	4.1.3.4

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