



**BSR/ASHRAE/IES Addendum bl  
to ANSI/ASHRAE/IES Standard 90.1-2016**

**Public Review Draft**

# **Proposed Addendum bl to Standard 90.1-2016, Energy Standard for Buildings Except Low-Rise Residential Buildings**

**First Public Review (November 2018)  
(Draft Shows Proposed Changes to Current Standard)**

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**ASHRAE, 1791 Tullie Circle, NE, Atlanta GA 30329-2305**

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## FOREWORD

*This addendum updates table 6.8.1-1 for the following changes;*

- 1. Updated the requirements for 65,000 to 760,000 Btu/h air cooled products to show the agreed to Appliance Standards and Rulemaking Federal Advisory Committee (ASRAC) efficiencies for the 65,000 Btu/h to 760,000 Btu/h packages that are schedule to go into effect on 1/1/2023*
- 2. The ASRAC agreement was only for 65,000 to 760,000 Btu/h products. AHRI ULE section has meet and unanimously agreed to also update the IEER requirements for air cooled >760,000 Btu/h products with an effective date of 1/1/2023.*
- 3. Update the air cooled <65,000 Btu/h 3 phase US efficiencies to harmonize with the DOE national efficiencies for single phase. This also includes conversion to the new SEER2 metric that is defined in the 10 CFR Appendix M1 that goes into effect on 1/1/2023 for single phase equipment. The effective date for three phase will also be 1/1/2023 and is the same as single phase.*
- 4. Updated to the name for thru the wall units to space constrained air cooled and updated the efficiency requirements to align with DOE requirements for single phase space constrained products.*
- 5. Updated the small duct high velocity efficiency requirements to align with DOE requirements single phase products.*
- 6. With the change to the new SEER2, EER2, and HSPF2 metric there are new test procedures that need to be followed. DOE has defined these in 10 CFR 430 Appendix M1. AHRI is modifying AHRI 210/240 to create a new version called AHRI 210/240-2023 that will be released in January 2019. In the referenced test procedures the requirements are clarified what standard should be used when.*
- 7. Corrections were made for several minor errors in conversion in the SI tables.*
- 8. We also clarified that air cooled <65,000 Btu/h single phase efficiencies outside the US are covered by this table because US single phase products were moved to informative appendix F. The <65,000 Btu/h single phase US requirements are regulated as consumer products by DOE as per NAECA and are covered in appendix F. Note this addendum does not make any revisions to table F-1. Revisions to table F-1 are covered by another addendum.*

*The economic justification for the more stringent efficiency levels for air cooled <65,000 Btu/h single phase and air cooled 65,000 to 760,000 Btu/h was addressed in the DOE rulemaking documents for the applicable energy conservation standards rulemakings. The proposed changes for >760,000 Btu/h category are aligned with the 65,000 to 760,000 Btu/h DOE rulemaking studies so similar cost justification will apply.*

**[Note to Reviewers: This addendum makes proposed changes to the current standard. These changes are indicated in the text by underlining (for additions) and ~~strikethrough~~ (for deletions) except where the reviewer instructions**

*specifically describe some other means of showing the changes. Only these changes to the current standard are open for review and comment at this time. Additional material is provided for context only and is not open for comment except as it relates to the proposed changes.]*

## Addendum bl to 90.1-2016

Modify the IP table 6.8.1-1 as shown;

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements**

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure <sup>a</sup>
Air conditioners, air cooled	<65,000 Btu/h <sup>b</sup>	All	Split system, three phase and outside US single phase <sup>b</sup>	13.0 SEER before 1/1/2023 13.4 SEER2 after 1/1/2023	AHRI 210/240-2017 before 1/1/2023
			Single Package, three phase and outside US single phase <sup>b</sup>	14.0 SEER before 1/1/2023 13.4 SEER2 after 1/1/2023	AHRI 210/240-2023 after 1/1/2023
<del>Through the wall, air cooled</del> Space constrained air cooled	≤30,000 Btu/h <sup>b</sup>	All	Split system, three phase and outside US single phase <sup>b</sup>	12.0 SEER before 1/1/2023 11.7 SEER2 after 1/1/2023	AHRI 210/240-2017 before 1/1/2023
			Single Package, three phase and outside US single phase <sup>b</sup>	12.0 SEER before 1/1/2023 11.7 SEER2 after 1/1/2023	AHRI 210/240-2023 after 1/1/2023
Small duct, high velocity, air cooled	<65,000 Btu/h <sup>b</sup>	All	Split system, three phase and outside US single phase <sup>b</sup>	44.0 12.0 SEER before 1/1/2023 12.0 SEER2 after 1/1/2023	AHRI 210/240-2017 before 1/1/2023  AHRI 210/240-2023 after 1/1/2023
Air conditioners, air cooled	≥65,000 Btu/h and <135,000 Btu/h	Electric resistance (or none)	Split system and single package	11.2 EER 12.9 IEER before 1/1/2023 14.8 IEER after 1/1/2023	AHRI 340/360
		All other		11.0 EER 12.7 IEER before 1/1/2023 14.6 IEER after 1/1/2023	
	≥135,000 Btu/h and <240,000 Btu/h	Electric resistance (or none)	11.0 EER 12.4 IEER before 1/1/2023 14.2 IEER after 1/1/2023		
		All other	10.8 EER 12.2 IEER before 1/1/2023 14.0 IEER after 1/1/2023		
	≥240,000 Btu/h and <760,000 Btu/h	Electric resistance (or none)	10.0 EER 11.6 IEER before 1/1/2023 13.2 IEER after 1/1/2023		
		All other	9.8 EER 11.4 IEER before 1/1/2023 13.0 IEER after 1/1/2023		
≥760,000 Btu/h	Electric resistance (or none)	9.7 EER 11.2 IEER before 1/1/2023 12.5 IEER after 1/1/2023			

		All other		9.5 <i>EER</i> 11.0 <i>IEER</i> before 1/1/2023 12.3 <i>IEER</i> after 1/1/2023	
Air conditioners, water cooled	<65,000 Btu/h	All	Split system and single package	12.1 <i>EER</i> 12.3 <i>IEER</i>	AHRI 210/240
	≥65,000 Btu/h and <135,000 Btu/h	<i>Electric resistance</i> (or none)		12.1 <i>EER</i> 13.9 <i>IEER</i>	AHRI 340/360
		All other		11.9 <i>EER</i> 13.7 <i>IEER</i>	
	≥135,000 Btu/h and <240,000 Btu/h	<i>Electric resistance</i> (or none)		12.5 <i>EER</i> 13.9 <i>IEER</i>	AHRI 340/360
		All other		12.3 <i>EER</i> 13.7 <i>IEER</i>	
	≥240,000 Btu/h and <760,000 Btu/h	<i>Electric resistance</i> (or none)		12.4 <i>EER</i> 13.6 <i>IEER</i>	AHRI 340/360
		All other		12.2 <i>EER</i> 13.4 <i>IEER</i>	
≥760,000 Btu/h	<i>Electric resistance</i> (or none)	12.2 <i>EER</i> 13.5 <i>IEER</i>	AHRI 340/360		
	All other	12.0 <i>EER</i> 13.3 <i>IEER</i>			
Air conditioners, evaporatively cooled	<65,000 Btu/h <sup>b</sup>	All	Split system and single package	12.1 <i>EER</i> 12.3 <i>IEER</i>	AHRI 210/240
	≥65,000 Btu/h and <135,000 Btu/h	<i>Electric resistance</i> (or none)		12.1 <i>EER</i> 12.3 <i>IEER</i>	AHRI 340/360
		All other		11.9 <i>EER</i> 12.1 <i>IEER</i>	
	≥135,000 Btu/h and <240,000 Btu/h	<i>Electric resistance</i> (or none)		12.0 <i>EER</i> 12.2 <i>IEER</i>	AHRI 340/360
		All other		11.8 <i>EER</i> 12.0 <i>IEER</i>	
	≥240,000 Btu/h and <760,000 Btu/h	<i>Electric resistance</i> (or none)		11.9 <i>EER</i> 12.1 <i>IEER</i>	AHRI 340/360
		All other		11.7 <i>EER</i> 11.9 <i>IEER</i>	
≥760,000 Btu/h	<i>Electric resistance</i> (or none)	11.7 <i>EER</i> 11.9 <i>IEER</i>	AHRI 340/360		
	All other	11.5 <i>EER</i> 11.7 <i>IEER</i>			
Condensing units, air cooled	≥135,000 Btu/h			10.5 <i>EER</i> 11.8 <i>IEER</i>	AHRI 365
Condensing units, water cooled	≥135,000 Btu/h			13.5 <i>EER</i> 14.0 <i>IEER</i>	AHRI 365
Condensing units, evaporatively cooled	≥135,000 Btu/h			13.5 <i>EER</i> 14.0 <i>IEER</i>	AHRI 365

a. Section 12 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.  
 b. Single-phase, US air-cooled air conditioners <65,000 Btu/h are regulated as consumer products by the U.S. Department of Energy Code of Federal Regulations 10 CFR 430. SEER and SEER2 values for single-phase products are set by the U.S. Department of Energy.  
**Informative Note:** See Informative Appendix E for the U.S. Department of Energy minimum efficiency requirements of single-phase air conditioners.

Modify the SI table as shown;

**Table 6.8.1-1 Electrically Operated Unitary Air Conditioners and Condensing Units—Minimum Efficiency Requirements**

Equipment Type	Size Category	Heating Section Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure <sup>a</sup>
Air conditioners, air cooled	<19 kW <sup>b</sup>	All	Split system, three phase and outside US single phase <sup>b</sup>	3.81 SCOP <sub>C</sub> before 1/1/2023 3.93 SCOP <sub>2C</sub> after 1/1/2023	AHRI 210/240-2017 before 1/1/2023
			Single Package, three phase and outside US single phase <sup>b</sup>	4.10 SCOP <sub>C</sub> before 1/1/2023 3.93 SCOP <sub>2C</sub> after 1/1/2023	AHRI 210/240-2023 after 1/1/2023
<del>Through the wall, air cooled</del> <u>Space constrained air cooled</u>	≤9 kW <sup>b</sup>	All	Split system, three phase and outside US single phase <sup>b</sup>	<del>3.54</del> 3.52 SCOP <sub>C</sub> before 1/1/2023 3.43 SCOP <sub>2C</sub> after 1/1/2023	AHRI 210/240-2017 before 1/1/2023
			Single Package, three phase and outside US single phase <sup>b</sup>	<del>3.54-3.52</del> SCOP <sub>C</sub> before 1/1/2023 3.43 SCOP <sub>2C</sub> after 1/1/2023	AHRI 210/240-2023 after 1/1/2023
Small duct, high velocity, air cooled	<19 kW <sup>b</sup>	All	Split system, three phase and outside US single phase <sup>b</sup>	<del>3.22</del> 3.52 SCOP <sub>C</sub> before 1/1/2023 3.52 SCOP <sub>2C</sub> after 1/1/2023	AHRI 210/240-2017 before 1/1/2023  AHRI 210/240-2023 after 1/1/2023
Air conditioners, air cooled	≥19 kW and <40 kW	Electric resistance (or none)	Split system and single package	3.28 COP <sub>C</sub> 3.78 ICOP <sub>C</sub> before 1/1/2023 4.34 ICOP <sub>C</sub> after 1/1/2023	AHRI 340/360
		All other		3.22 COP <sub>C</sub> <del>3.76</del> 3.72 ICOP <sub>C</sub> before 1/1/2023 4.28 ICOP <sub>C</sub> after 1/1/2023	
	≥40 kW and <70 kW	Electric resistance (or none)	3.22 COP <sub>C</sub> <del>3.75</del> 3.63 ICOP <sub>C</sub> before 1/1/2023 4.16 ICOP <sub>C</sub> after 1/1/2023		
		All other	<del>3.46</del> 3.17 COP <sub>C</sub> <del>3.72</del> 3.58 ICOP <sub>C</sub> before 1/1/2023 4.10 ICOP <sub>C</sub> after 1/1/2023		
	≥70 kW and <223 kW	Electric resistance (or none)	2.93 COP <sub>C</sub> 3.40 ICOP <sub>C</sub> before 1/1/2023 3.87 ICOP <sub>C</sub> after 1/1/2023		
		All other	2.87 COP <sub>C</sub> 3.34 ICOP <sub>C</sub> before 1/1/2023 3.81 ICOP <sub>C</sub> after 1/1/2023		
	≥223 kW	Electric resistance (or none)	2.84 COP <sub>C</sub> 3.28 ICOP <sub>C</sub> before 1/1/2023 3.66 ICOP <sub>C</sub> after 1/1/2023		
		All other	2.78 COP <sub>C</sub>		

				3.22 $ICOP_C$ before 1/1/2023 3.60 $ICOP_C$ after 1/1/2023		
Air conditioners, water cooled	<19 kW	All	Split system and single package	<del>3.54</del> 3.55 $COP_C$ 3.60 $ICOP_C$	AHRI 210/240	
	≥19 kW and <40 kW	Electric resistance (or none)		<del>3.54</del> 3.55 $COP_C$ 4.07 $ICOP_C$	AHRI 340/360	
		All other		<del>3.48</del> 3.49 $COP_C$ 4.02 $ICOP_C$		
	≥40 kW and <70 kW	Electric resistance (or none)		3.66 $COP_C$ 4.07 $ICOP_C$		
		All other		3.60 $COP_C$ 4.02 $ICOP_C$		
	≥70 kW and <223 kW	Electric resistance (or none)		3.63 $COP_C$ 3.99 $ICOP_C$		
		All other		<del>3.57</del> 3.58 $COP_C$ 3.93 $ICOP_C$		
	≥223 kW	Electric resistance (or none)		<del>3.57</del> 3.58 $COP_C$ 3.96 $ICOP_C$		
		All other		<del>3.51</del> 3.52 $COP_C$ 3.90 $ICOP_C$		
	<u>Air conditioners, evaporatively cooled</u>	<19 kW		All		<u>Split system and single package</u>
≥19 kW and <40 kW		Electric resistance (or none)	<del>3.54</del> 3.55 $COP_C$ 3.60 $ICOP_C$	AHRI 340/360		
		All other	<del>3.48</del> 3.49 $COP_C$ <del>3.54</del> 3.55 $ICOP_C$			
≥40 kW and <70 kW		Electric resistance (or none)	<del>3.54</del> 3.52 $COP_C$ <del>3.57</del> 3.58 $ICOP_C$			
		All other	3.46 $COP_C$ <del>3.51</del> 3.52 $ICOP_C$			
≥70 kW and <223 kW		Electric resistance (or none)	<del>3.48</del> 3.49 $COP_C$ <del>3.54</del> 3.55 $ICOP_C$			
		All other	3.43 $COP_C$ <del>3.48</del> 3.49 $ICOP_C$			
≥223 kW		Electric resistance (or none)	3.43 $COP_C$ <del>3.48</del> 3.49 $ICOP_C$			
		All other	3.37 $COP_C$ 3.43 $ICOP_C$			
Condensing units, air cooled		≥40 kW			<del>3.07</del> 3.08 $COP_C$ 3.46 $ICOP_C$	
Condensing units, water cooled	≥40 kW		<del>3.95</del> 3.96 $COP_C$ 4.10 $ICOP_C$		AHRI 365	
Condensing units, evaporatively cooled	≥40 kW		<del>3.95</del> 3.96 $COP_C$ 4.10 $ICOP_C$		AHRI 365	

a. Section 12 contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

b. Single-phase, US air-cooled air conditioners <19 kW are regulated as consumer products by the U.S. Department of Energy Code of Federal Regulations 10 CFR 430.  $SCOP_C$  and  $SCOP2_C$  values for single-phase products are set by the U.S. Department of Energy.

**Informative Note:** See Informative Appendix F for the U.S. Department of Energy minimum efficiency requirements of single-phase air conditioners.

