

AHRI Standard 340/360

2015 Standard for
**Performance Rating
of Commercial and Industrial
Unitary Air-conditioning and
Heat Pump Equipment**



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IMPORTANT

SAFETY DISCLAIMER

AHRI does not set safety standards and does not certify or guarantee the safety of any products, components or systems designed, tested, rated, installed or operated in accordance with this standard/guideline. It is strongly recommended that products be designed, constructed, assembled, installed and operated in accordance with nationally recognized safety standards and code requirements appropriate for products covered by this standard/guideline.

AHRI uses its best efforts to develop standards/guidelines employing state-of-the-art and accepted industry practices. AHRI does not certify or guarantee that any test conducted under its standards/guidelines will be non-hazardous or free from risk.

Note:

This 2015 standard supersedes ANSI/AHRI Standard 340/360-2007 with Addendum 1 and 2.

AHRI CERTIFICATION PROGRAM PROVISIONS

Scope of the Certification Program

The Certification Program applies to 50 Hz and 60 Hz equipment including:

- Unitary Air-conditioners and Heat Pumps from 65,000 Btu/h to less than 250,000 Btu/h;
 - Single Packaged and Split Systems
 - Air-cooled and water-cooled
- Air-cooled Air-conditioning Condensing Units from 135,000 Btu/h to less than 250,000 Btu/h (covered by AHRI Standard 365);
- Air-cooled Single Packaged Unitary Air-conditioners from 250,000 Btu/h to less than 760,000 Btu/h.

Products sold in the intended market of the US and Canada must comply with the “certify all requirements”. For 60 Hz and 50 Hz products sold outside the intended market of the US and Canada, certification is optional. If the participant does not wish to carry certification of a model sold for use outside the intended market, this product shall carry a separate and unique model number from an existing AHRI certified model number to avoid market confusion.

Certified Ratings

The following certified ratings are verified by test:

Unitary Air-conditioners

Air-cooled, water-cooled and evaporatively-cooled from 65,000 Btu/h to below 250,000 Btu/h.

1. Cooling Capacity, Btu/h at Standard Rating Conditions
2. Energy Efficiency Ratio, EER, Btu/W·h at Standard Rating Conditions
3. Integrated Energy Efficiency Ratio, (IEER), Btu/W·h at Standard Rating Conditions

Unitary Air-Cooled Packaged Air-Conditioners from 250,000 Btu/h to less than 760,000 Btu/h.

1. Cooling Capacity, Btu/h at Standard Rating Conditions
2. Energy Efficiency Ratio, EER, Btu/W·h at Standard Rating Conditions
3. Integrated Energy Efficiency Ratio, (IEER), Btu/W·h at Standard Rating Conditions

Air-source Unitary Heat Pump Equipment

Air-cooled from 65,000 Btu/h to below 250,000 Btu/h.

1. Cooling Capacity, Btu/h at Standard Rating Conditions
2. Energy Efficiency Ratio, EER, Btu/W·h at Standard Rating Conditions
3. Integrated Energy Efficiency Ratio, IEER, Btu/W·h at Standard Rating Conditions
4. High Temperature Heating Standard Rating Capacity, Btu/h at 47°F
5. High Temperature Coefficient of Performance, COP_H, W/W, at 47°F
6. Low Temperature Heating Standard Rating Capacity, Btu/h, at 17°F
7. Low Temperature Coefficient of Performance, COP_H, W/W, at 17°F

Conformance to the requirements of the maximum operating condition test, cooling low temperature operation test, insulation efficiency test (cooling), and condensate disposal test (cooling) are also verified initially by test for manufacturers applying into the AHRI ULE Certification Program.

Foreword:

AHRI Standard 340/360 – 2015 contains many significant revisions to the 2007 standard.

1. The revised standard includes definition and test requirements for Double-duct commercial unitary equipment.
2. Definitions have been expanded and clarified including an updated definition for IEER.
3. Table 1, *Classification of Commercial and Industrial Unitary Air-Conditioner Equipment* has been rewritten for clarity.
4. Table 2, *Classification of Commercial and Industrial Unitary Heat Pump Equipment* has been rewritten for clarity.
5. The part load efficiency, IEER, test method is simplified by eliminating the iterative OD test conditions needed to achieve a desired load point. The new method requires an additional test point at known conditions to be run in order to interpolate to the desired load point. This simplifies the test procedure (Table 6). This method also reduces the uncertainty with the addition of a 3% tolerance for part load percent.
6. Section 5, *Test Requirements*, has been expanded to cover items not documented in ASHRAE Standard 37.
7. The standard adds a tolerance of 3% on required part load Percent Load point where interpolation and degradation is not required (Table 7).
8. The revised standard includes optional *International Rating Conditions* (Section 6.3) relevant to international requirements that may be used optionally. The Rating Conditions are intended to align with ISO 5151, 13253 and 15042 conditions.
9. The standard includes a step by step procedure to generate IEER ratings based on either test method or computer simulation. This also includes clarification on procedures for fixed, capacity, staged capacity and variable capacity units (Section 6.4).
10. Verification test uncertainty allowances have been explained and clarified for the performance metrics in the standard. (Section 6.5 & Section 6.6).
11. Documentation of the confidence level has been added at 90% for EER, IEER and COP.
12. Tolerances have been added for airflow at $\pm 3\%$.
13. Appendix D, *Atmospheric Pressure Correction*, has been added to the standard, which prescribes a computational method to correct measured product performance for air density variations resulting from atmospheric pressure changes due to weather conditions and altitude. Revisions were made throughout the standard to reflect the atmospheric pressure corrections.
14. Appendix E, *Unit Configuration for Standard Efficiency Determination*, has also been added to the standard, which prescribes the requirements for the configuration of a unit that is used for determining the Standard Rating Cooling and Heating Capacity and efficiency metrics. Appendix E documents DOE certification requirements agreed to with the development of the AEDM procedure.
15. The revised standard tightens the tolerances on external static pressure and airflow. (Appendix F, Section F4 & F5).
16. Appendix G, *Examples of IEER Calculations*, provides a comprehensive set of IEER calculation examples covering many potential product configurations.
17. References have been updated to reflect the latest available standards.
18. Appendix F, *Method of Testing Unitary Air Conditioning Products*, has been updated to reflect test procedures not defined by ASHRAE 37-2009.

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PERFORMANCE RATING OF COMMERCIAL AND INDUSTRIAL UNITARY AIR-CONDITIONING AND HEAT PUMP EQUIPMENT

Section 1. Purpose

1.1 *Purpose.* The purpose of this standard is to establish for Commercial and Industrial Unitary Air-conditioning and Heat Pump Equipment: definitions; classifications; test requirements; rating requirements; minimum data requirements for Published Ratings; operating requirements; marking and nameplate data; and conformance conditions.

1.1.1 *Intent.* This standard is intended for the guidance of the industry, including manufacturers, engineers, installers, contractors, federal and state regulations, and efficiency standards developed by American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), International Energy Conservation Code (IECC), Canadian Standards Association (CSA), Department of Energy (DOE), and users.

1.1.2 *Review and Amendment.* This standard is subject to review and amendment as technology advances.

Section 2. Scope

2.1 *Scope.* This standard applies to factory-made Commercial and Industrial Unitary Air-conditioning and Heat Pump Equipment as defined in Section 3.

2.1.1 *Energy Source.* This standard applies only to electrically operated, vapor compression refrigeration systems.

2.2 *Exclusions.* This standard does not apply to the following:

2.2.1 Rating and testing of individual assemblies, such as condensing units or coils, for separate use.

2.2.2 Unitary Air-conditioners and Unitary Heat Pumps as defined in ANSI/AHRI Standard 210/240, with capacities less than 65,000 Btu/h.

2.2.3 Water-Source Heat Pumps as defined in ISO/ANSI/AHRI/ASHRAE 13256-1.

2.2.4 Variable Refrigerant Flow Air Conditioners and Heat Pumps as defined in ANSI/AHRI Standard 1230.

2.2.5 Rating of units equipped with desuperheater/water heating devices (as defined in ANSI/AHRI Standard 470) in operation.

2.2.6 Commercial and Industrial Condensing Units with a capacity greater than 135,000 Btu/h as defined in ANSI/AHRI Standard 365 (I-P), *Performance Rating of Commercial and Industrial Unitary Air-conditioning Condensing Units*.

2.3 *Other Applicable Standards.* Commercial and Industrial Unitary Air-conditioning and Heat Pump Equipment may also be rated using the following standards:

2.3.1 Single vertical packaged air conditioners rated using ANSI/AHRI Standard 390.

2.3.2 Dedicated outdoor air systems rated using ANSI/AHRI Standard 920 (I-P).

2.3.3 Air conditioners and condensing units serving computer rooms rated using ANSI/AHRI Standard 1360.

2.3.4 Commercial and industrial unitary air-conditioning condensing units rated using ANSI/AHRI Standard 365 (I-P).