# ANSI/AHRI Standard 340/360-2007 with Addenda 1 and 2 (Formerly ARI Standard 340/360-2007)

## 2007 Standard for

# Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment

Approved American National Standard

ANSI

Approved by ANSI on 27 October 2011

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# ANSI/AHRI STANDARD 340/360-2007 WITH ADDENDUM 2,

# Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment

## June 2011

Addendum 2 (dated June 2011) of ANSI/AHRI Standard 340/360-2007, *"Changes to ANSI/AHRI Standard 340/360-2007"* is provided as follows. The particular additions are shown with shading and deletions shown with strikethroughs. The following changes have been incorporated (additions are shown by shading and deletions are shown by ~~strikethroughs~~) into the already published 2007 version of ANSI/AHRI Standard 340/360 to avoid confusion.

1. The language in Section 6.2.2 associated with units using discrete step fan control and variable air volume units has been revised. An external static equation has been added to the footnotes of Table 6.

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**External Static**

The following equation has been added to the footnote of Table 6 of ANSI/AHRI Standard 340/360-2007:

$$ExternalStatic = FullLoadExternalStatic \times \left( \frac{PartLoadCFM}{FullLoadCFM} \right)^2$$

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# ANSI/AHRI STANDARD 340/360-2007 WITH ADDENDUM 1,

# Performance Rating of Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment

## December 2010

Addendum 1 (dated December 2010) of ANSI/AHRI Standard 340/360-2007, *"Changes to ANSI/AHRI Standard 340/360-2007"* is provided as follows. The particular additions are shown with shading and deletions shown with strikethroughs. The following changes have been incorporated (additions are shown by shading and deletions are shown by ~~strikethroughs~~) into the already published 2007 version of ANSI/AHRI Standard 340/360 to avoid confusion.

1. The certification program scope, on the inside front cover, has been revised.
2. New provisions have been added to the footnotes of Tables 5 and 6 to specify the tolerances associated with external static pressure for all units, and the leaving air dry-bulb temperature on variable air volume (VAV) units, respectively.

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## Tolerances

The following tolerance has been added to the footnote of Table 5 of ANSI/AHRI Standard 340/360-2007:

The tolerance for external static pressure (averaged during the run time) for all equipment is -0 in $H_2O$ [0 Pa], +0.05 in $H_2O$ [12.5 Pa].

The following tolerance has been added to the footnote of Table 6 of ANSI/AHRI Standard 340/360-2007:

The tolerance for the leaving air dry-bulb temperature on VAV units is ±0.3 °F [±0.2 °C].

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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.

# APPLICABILITY

Integrated Energy Efficiency Ratio (IEER) is effective beginning January 1, 2010. Integrated Part-Load Value (IPLV) ~~is~~ was in effect until ~~January 1, 2010~~ December 31, 2009. ~~On January 1, 2010, IEER will supersede IPLV.~~ IEER superseded IPLV on January 1, 2010.

### AHRI CERTIFICATION PROGRAM PROVISIONS

#### Scope of the Certification Program

The Certification Program includes:

- all air-cooled, water-cooled and evaporatively-cooled unitary air-conditioning, air-source unitary heat pump equipment, and air-conditioning condensing units rated at or above 65,000 Btu/h [19,000 W] at AHRI Standard Rating Conditions (Cooling) but below 250,000 Btu/h [73,200 W] at AHRI Standard Rating Conditions (Cooling).
- all air-cooled packaged unitary air-conditioners from 250,000 Btu/h to less than 760,000 Btu/h at AHRI Standard Rating Conditions (Cooling).

#### Certified Ratings

The following Certification Program ratings are verified by test:

*Unitary Air-Conditioners and Air-Conditioning Condensing Units*

Air-cooled, water-cooled and evaporatively-cooled from 65,000 Btu/h [19,000 W] to below 250,000 Btu/h [73,200 W].

1. AHRI Standard Rating Cooling Capacity, Btu/h
2. Energy Efficiency Ratio, EER, Btu/W·h
3. Integrated Energy Efficiency Ratio, (IEER) (effective January 1, 2010) or Integrated Part-Load Value, (IPLV) (effective through December 31, 2009)

*Air-Source Unitary Heat Pump Equipment*

Air-cooled from 65,000 Btu/h [19,000 W] to below 250,000 Btu/h [73,200 W].

1. AHRI Standard Rating Cooling Capacity, Btu/h
2. Energy Efficiency Ratio, EER, Btu/W·h
3. High Temperature Heating Standard Rating Capacity, Btu/h
4. High Temperature Coefficient of Performance (COP 47°F)
5. Low Temperature Heating Standard Rating Capacity, Btu/h
6. Low Temperature Coefficient of Performance (COP 17°F)
7. Integrated Energy Efficiency Ratio, (IEER) (effective January 1, 2010) or Integrated Part-Load Value, (IPLV) (effective through December 31, 2009)

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Unitary Air-Cooled Packaged Air-Conditioners from 250,000 Btu/h [73,200 W] to below 760,000 Btu/h [220,000 W].

1. AHRI Standard Rating Cooling Capacity, Btu/h
2. Energy Efficiency Ratio, EER, Btu/W·h
3. Integrated Part-Load Value, IPLV (effective through 31 December, 2009) or Integrated Energy Efficiency Ratio, (IEER) (effective 1 January, 2010)

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 by test.

Note:
This standard supersedes ARI Standard 340/360-2004.

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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 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 as defined in AHRI Standard 210/240, *Unitary Air-Conditioning and Air-Source Heat Pump Equipment,* with capacities less than 65,000 Btu/h [19,000 W], or to Unitary Heat Operated Air-Conditioning Equipment, or Water-Source Heat Pumps as defined in ISO 13256-1, *Water-source heat pumps – Testing and rating for performance – Part I: Water-to-air and Brine-to-air heat pumps*.

**2.2.3** Rating of units equipped with desuperheater/water heating devices (as defined in ANSI/ASHRAE Standard 137) in operation.

## Section 3. Definitions

All terms in this document follow the standard industry definitions in the current edition of *ASHRAE Terminology of Heating, Ventilation Air-Conditioning and Refrigeration,* unless otherwise defined in this section.

**3.1** *Coefficient of Performance.* A ratio of the cooling/heating capacity in watts [W] to the power input values in watts [W] at any given set of rating conditions expressed in watts/watts [W/W]. For heating COP, supplementary resistance heat shall be excluded.

**3.1.1** *Standard Coefficient of Performance.* A ratio of the capacity to power input value obtained at Standard Rating Conditions.

**3.2** *Commercial and Industrial Unitary Air-Conditioner.* One or more factory-made assemblies, which normally include a cooling coil, an air moving device, a compressor(s) and condenser combination, and may include a heating Function as well. Where such equipment is provided in more than one assembly, the separate assemblies shall be designed to be used together, and the requirements of rating outlined in this standard shall be based upon the use of matched assemblies.



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