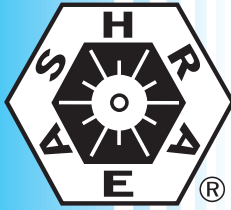


ANSI/ASHRAE Standard 116-1995 (RA 2005)
Reaffirmation of ANSI/ASHRAE Standard 116-1995



ASHRAE STANDARD

Methods of Testing for Rating Seasonal Efficiency of Unitary Air Conditioners and Heat Pumps

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NOTE

When addenda, interpretations, or errata to this standard have been approved, they can be downloaded free of charge from the ASHRAE Web site at <http://www.ashrae.org>.

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1. PURPOSE

This standard provides test methods and calculational procedures for determining the capacities and cooling seasonal efficiency ratios for unitary air-conditioning and heat pump equipment and heating seasonal performance factors for heat pump equipment.

2. SCOPE

2.1 This standard covers electrically driven, air-cooled air conditioners and heat pumps used in residential applications with cooling capacity of 65,000 Btu/h and less or, in the case of heating-only heat pumps, heating capacity of 65,000 Btu/h and less.

2.2 The methods of test in this standard are broadly applicable, but this standard provides cooling and heating hours in temperature bins for only the contiguous states of the continental USA.

2.3 This standard includes test methods for steady-state, cyclic, and part-load performance and methods for establishing seasonal performance. Equipment with single-speed, multiple-speed, variable-speed, unloading, or multiple compressors for ducted and ductless systems is included.

2.4 This standard does not apply to room air conditioners. See ASHRAE Standards 16 and 58.

3. DEFINITIONS AND NOMENCLATURE

air-conditioning systems:

cooling (heating) air-conditioning system: specific air-treating combination that may consist of means for ventilation, air circulation, humidity control, air cleaning, and heat transfer, with controlled means for cooling (heating).

single package air-conditioning system: air-conditioning system consisting of equipment provided entirely in one assembly or enclosure.

split air-conditioning system: air-conditioning system consisting of equipment provided in more than one assembly or enclosure, usually with supply air distribution equipment housed separately from refrigerant condensing equipment.

air, standard (I-P): dry air at 70°F and 14.696 psia. Under these conditions, dry air has a mass density of 0.075 lb/ft³. This is not the same as SI standard air.

ARI: Air-Conditioning and Refrigeration Institute.

bin: in the bin method, a statistical class (sometimes, a class interval) for outdoor air temperature, with the class limits expressed in a temperature unit.

bin method: energy calculation method, usually used in prediction, in which the annual (or monthly) energy use of a building is calculated as the sum of the energy used for all of the outdoor temperature bins. The bin method allows heat

pump (or other heater or cooler) performance, which is different for each bin, to be accounted for.

capacity, air conditioner, latent (dehumidifying): available steady-state refrigerating capacity of an air conditioner for removing latent heat from the space to be conditioned (Btu/h).

capacity, air conditioner, sensible: available steady-state refrigerating capacity of an air conditioner for removing sensible heat from the space to be conditioned (Btu/h).

capacity, air conditioner, total: available capacity of an air conditioner for removing sensible and latent heat from the space to be conditioned (Btu/h).

capacity, heating: the rate at which the equipment adds heat to the air passing through it under specified conditions of operation (Btu/h).

coefficient of performance, heating (COP): ratio of the rate of heat delivered to the conditioned space to the rate of energy input, in consistent units, for a complete operating heat pump system or some specific portion of that system under designated operating conditions. Derived by the equations in 9.2.3 and 9.2.4.

coil, indoor: the heat exchanger that removes heat from or adds heat to the conditioned space.

coil, outdoor: the heat exchanger that rejects heat to or absorbs heat from a source external to the conditioned space.

cooling load factor (CLF): ratio of the cooling building load to the steady-state cooling capacity (derived by the equation in 9.2.2).

degradation coefficient (C_D): factor of efficiency loss due to the cycling of the unit. It is the effect of reduction in performance under cyclic operation as derived by the equations in 9.2.2 and 9.2.4.

energy:

- (a) capability for doing work.
- (b) capacity for producing an effect, having several forms, which may be either stored or transient and can be transformed from one form into another.

energy-efficiency ratio, cooling (EER): ratio of net cooling capacity in Btu/h to the total rate of electric input in watts, under designated operating conditions.

equilibrium: for the purposes of this standard, equilibrium is a steady-state condition during which the fluctuations of variables being measured remain within stated limits as given in Section 8.

heat, latent: change of enthalpy during a change of phase (Btu/h).

heat, sensible: heat that causes a change in temperature (Btu/h).