



STANDARD

ANSI/ASHRAE Standard 127-2012
(Supersedes ANSI/ASHRAE Standard 127-2007)

Method of Testing for Rating Computer and Data Processing Room Unitary Air Conditioners

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FOREWORD

ANSI/ASHRAE Standard 127 was first published in 1988 and revised in 2001 and 2007. This revision of the standard makes some significant changes to the 2007 edition. The major revisions and the rationale for them are summarized in the following paragraphs.

Definitions

The previous terms sensible coefficient of performance (SCOP) and adjusted sensible coefficient of performance (ASCOP) have been replaced with the new terms net sensible coefficient of performance (NSenCOP) and integrated sensible coefficient of performance (iNSenCOP) to remove the confusion caused by the use of the prior terms being used in other ASHRAE documents with different definitions. Some common industry terms used within the standard have been added as well.

Rating Requirements

- 1. The standard has been modified to cover four different product application classifications. This reflects the industry need to modify equipment to accept higher and higher return temperatures, thus increasing efficiency.*
- 2. The chilled-water conditions have been adjusted on the chilled-water air handlers to emphasize the higher system efficiency when higher temperatures are used, even though the specific units involved will appear to be lower in capacity and efficiency.*
- 3. The paragraphs have been reorganized to minimize the confusion between capacity ratings and efficiency ratings.*
- 4. A "normalized" or "weighted" efficiency rating has been created to provide a single efficiency number, thus simplifying the comparison of similar units. The raw numbers were retained, however, so engineers can continue to calculate the unit's efficiency at any geographic location.*
- 5. The test points on water-cooled (evaporative) direct expansion (DX) units have been adjusted to correspond to AHRI 340/360 as well as a typical cooling tower approach.*
- 6. The Test D values have been adjusted to correspond to the values required in ANSI/ASHRAE/IES Standard 90.1 for 100% free cooling.*
- 7. Normalizing values were provided for fluid coolers, fluid cooler pumps, and chilled-water-loop pumps so all technologies could be more easily compared.*

1. PURPOSE

The purpose of the standard is to establish a uniform set of requirements for rating computer and data processing room unitary air conditioners (CDPR).

2. SCOPE

This standard applies to classes of unitary equipment that are used to air condition a computer room and data processing equipment. This standard does not apply to the rating of individual assemblies, such as condensing units or direct expansion fan-coil units, for separate use.

3. DEFINITIONS

computer and data processing room unitary air conditioner (CDPR): a computer and data processing room unitary air conditioner consisting of one or more factory-made assemblies, which include a DX evaporator or chilled-water cooling coil, an air-moving device, and air-filtering devices. The air conditioner may include a compressor, condenser, humidifier, or reheating function. Where DX equipment is provided in more than one assembly and the separate assemblies are to be used together, the requirements of rating outlined in this standard are based upon the use of matched assemblies. The functions of a CDPR, either alone or in combination with a cooling and heating plant, are to provide air filtration, circulation, cooling, reheating, and humidity control.

computer room air conditioner (CRAC): generally refers to computer-room cooling units that utilize dedicated compressors and refrigerant cooling coils rather than chilled-water coils.

computer room air handler (CRAH): generally refers to computer-room cooling units that utilize chilled-water coils for cooling rather than dedicated compressors.

cooling system energy coefficient of performance (COP): a ratio calculated by dividing the net total cooling capacity in watts by the total power input in watts (excluding reheaters and humidifiers) at any given set of rating conditions. The net total cooling capacity is the total gross capacity minus the energy dissipated into the cooled space by the blower system.

net sensible coefficient of performance (NSenCOP): a ratio calculated by dividing the net sensible cooling capacity in watts by the total power input in watts (excluding reheaters and humidifiers) at any given set of rating conditions. The net sensible cooling capacity is the gross sensible capacity minus the energy dissipated into the cooled space by the fan system (further explained in Section 5.1).

integrated sensible coefficient of performance (iNSenCOP): an NSenCOP value that provides a consistent evaluation of the energy efficiency of a unit operated in different ambient temperatures. It is calculated by the method defined in Section 5.2.

fluid economizer: a system configuration potentially available when an external fluid cooler is utilized for heat rejection. It utilizes a separate cooling coil within the unit for cooling