AHRI Standard 1360 (I-P)

2017 Standard for

Performance Rating of Computer and Data Processing Room Air Conditioners

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Note:

This 2017 standard supersedes ANSI/AHRI Standard 1360 (I-P)-2016.

For SI ratings, see AHRI Standard 1361 (SI)-2017.

AHRI CERTIFICATION PROGRAM PROVISIONS

The current scope of the Datacom Cooling (DCOM) Certification Programs can be found on AHRI website www.ahrinet.org. The scope of the Certification Programs should not be confused with the scope of the standard, as the standard also includes ratings for products that are not covered by a certification program.

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PERFORMANCE RATING OF COMPUTER AND DATA PROCESSING ROOM AIR CONDITIONERS

Section 1. Purpose

1.1 *Purpose.* The purpose of this standard is to establish for Computer and Data Processing Room Air Conditioners (CDPR): definitions; classification; test requirements; rating requirements; minimum data requirements for Published Ratings; 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, users, and regulators.

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 Floor Mounted and Ceiling Mounted Computer and Data Processing Room Air Conditioners as defined in Section 3.

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 AHRI Standard 210/240 and AHRI Standard 340/360.

2.2.3 Variable refrigerant flow multi-split air conditioners and heat pumps as defined in AHRI Standard 1230.

2.2.4 Single package vertical air conditioners and heat pumps rated using ANSI/AHRI Standard 390.

2.2.5 Packaged terminal air-conditioners and heat pumps rated using AHRI Standard 310/380.

Section 3. Definitions

All terms in this document will follow the standard industry definitions in the *ASHRAE Terminology website* (https://www.ashrae.org/resources--publications/free-resources/ashrae-terminology) unless otherwise defined in this section.

3.1 *Application Configurations.* Variations of Standard Models shall be tested and rated as Standard Models. Refer to Tables C1 and C2.

3.2 *Ceiling Mounted Unit.* A type of CDPR designed and marketed to be installed above a dropped ceiling inside the building. These have one airflow direction through the unit (horizontal) and multiple airflow connections.

3.2.1 *Connections.*

3.2.1.1 *Discharge from Unit*.

3.2.1.1.1 *Ducted Discharge.* A unit which discharges air into attached field installed ductwork.

3.2.1.1.2 *Free Air Discharge.* A unit with a factory installed integral grill or a field installed factory grill or plenum which does not have field installed ductwork attached.

3.2.1.2 *Return to Unit*.

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3.2.1.2.1 *Ducted Return.* A unit which returns air from attached field installed ductwork.

3.2.1.2.2 *Free Air Return.* A unit with a factory installed integral grill or a field installed factory grill or plenum which does not have field installed ductwork attached.

3.3 *Computer and Data Processing Room Air Conditioner (CDPR).* An air conditioning unit specifically designed and marketed for cooling Data Centers and Information Technology Equipment (ITE) year round. A CDPR consists of one or more factory-made assemblies, which include a direct expansion evaporator or chilled water cooling coil, an air-moving device(s) and air-filtering device(s). The air conditioner may include a compressor, condenser, humidifier or reheating function. The functions of a CDPR, either alone or in combination with a cooling plant, are to provide air filtration, air circulation, cooling, and humidity control (if the necessary options are included for humidity control).

3.4 *Computer Room Air Conditioner (CRAC).* A CDPR that utilizes dedicated compressors and refrigerant cooling coils rather than chilled-water coils.

3.4.1 *Air-cooled*. A CRAC whose refrigeration system has an air-cooled condenser heat exchanger.
3.4.2 *Glycol-cooled*. A CRAC whose refrigeration system has a glycol-cooled condenser heat exchanger.
3.4.3 *Water-cooled*. A CRAC whose refrigeration system has a water-cooled condenser heat exchanger.

3.5 *Computer Room Air Handler (CRAH).* A CDPR that utilizes chilled-water coils for cooling rather than dedicated compressors.

3.6 *Data Center.* A building, room(s), or portions thereof, serving an ITE load.

3.7 *Floor Mounted Unit.* A type of CDPR designed and marketed to be installed on a raised floor, floor stand, or a solid floor inside the building. These have two airflow configuration options: Direction and Connection. Each Floor Mounted CDPR can be a combination of one Direction and two Connections (one Discharge from Unit and one Return to Unit)

3.7.1 *Connections.*

3.7.1.1 *Discharge from Unit*.

3.7.1.1.1 *Ducted Discharge.* A unit which discharges air into attached field installed ductwork.

3.7.1.1.2 *Free Air Discharge.* A unit with a factory installed integral grill or a field installed factory built plenum which does not have field installed ductwork attached.

3.7.1.1.3 *Raised Floor Plenum Discharge.* A unit which is sitting on and discharges air into an opening in a raised floor plenum.

3.7.1.2 *Return to Unit*.

3.7.1.2.1 *Ducted Return.* A unit which has and returns air into a field installed ductwork attached.

3.7.1.2.2 *Free Air Return.* A unit with a factory installed integral grill or a field installed factory built plenum which does not have field installed ductwork attached.

3.7.1.2.3 *Raised Floor Plenum Return.* A unit which is sitting on and takes in return air from an opening in a raised floor plenum.

3.7.2 *Direction*.

3.7.2.1 *Downflow*. Air passes vertically downward through cooling coil. Return air enters the top of the unit and discharge air leaves at the bottom of the unit.

3.7.2.2 *Horizontal-flow*. Air passes horizontally through cooling coil. Return air enters the rear of the unit and discharge air leaves at the front of the unit.

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3.7.2.3 *Upflow*. Air passes vertically upward through cooling coil. Return air enters the bottom of the unit and discharge air leaves at the top of the unit.

3.8 *Fluid Economizer*. An option available with a CRAC or CRAH system in which a cold fluid is circulated by a pump through an indoor heat exchanger to provide cooling during lower outdoor ambient conditions, in order to reduce or eliminate compressor operation. The fluid could be chilled water, water/glycol solution, or refrigerant. An external fluid cooler such as a drycooler, cooling tower, or condenser is utilized for heat rejection. This is sometimes referred to as a free cooling coil, econ-o-coil, or economizer.

3.9 *Information Technology Equipment (ITE).* IT equipment includes IT racks and cabinets, computers, data storage, servers and network/communication equipment which generate heat.

3.10 *Integrated Net Sensible Coefficient of Performance (iNSenCOP)*. A value that provides a standardized evaluation of the annualized cooling energy efficiency of a unit operated across the specified range of outdoor ambient temperatures (see Table 2 and Informative Appendix D).

3.11 *Net Sensible Coefficient of Performance (NSenCOP).* A ratio of the Net Sensible Cooling Capacity in kilowatts to the total power input in kilowatts (excluding reheaters and humidifiers) at any given set of Rating Conditions.

3.12 *Net Sensible Cooling Capacity.* The rate, expressed in Btu/h and/or kW, at which the equipment removes sensible heat from the air passing through it under specified conditions of operation, including the fan energy dissipated into the conditioned space.

3.13 *Net Total Cooling Capacity.* The rate, expressed in Btu/h and/or kW, at which the equipment removes total heat from the air passing through it under specified conditions of operation, including the fan energy dissipated into the conditioned space.

3.14 *Published Rating.* A statement of the assigned values of those performance characteristics, under stated Rating Conditions, by which a unit may be chosen to fit its application. These values apply to all units of like nominal size and type produced by the same manufacturer. As used herein, the term Published Rating includes the rating of all performance characteristics shown on the unit or published in specifications, advertising or other literature controlled by the manufacturer, at stated Rating Conditions.

3.14.1 *Application Rating.* A rating based on tests of configured models at application Rating Conditions (other than Standard Rating Conditions).

3.14.2 *Standard Rating.* A 100% capacity rating based on tests of Standard Models performed at Standard Rating Conditions specified in Tables 2 and 3. Refer to Appendix C for a description of Standard Models.

3.15 *Rating Conditions*. Any set of operating conditions under which a single level of performance results and which cause only that level of performance to occur.

3.15.1 *Standard Rating Conditions.* Rating Conditions used as the basis of comparison for performance characteristics.

3.16 *"Shall," "Should," "Recommended," or "It Is Recommended."* "Shall," "should," "recommended," or "it is recommended" shall be interpreted as follows:

3.16.1 *Shall*. Where "shall" or "shall not" is used for a provision specified, that provision is mandatory if compliance with the standard is claimed.

3.16.2 *Should, Recommended, or It Is Recommended*. "Should," "recommended," or "it is recommended" is used to indicate provisions which are not mandatory but which are desirable as good practice.

3.17 *Standard Air.* Air weighing 0.075 lb/ft^3 which approximates dry air at 70°F and at a barometric pressure of 29.92 in Hg.

3.18 *Standard Airflow*. The volumetric flowrate of air corrected to standard air conditions expressed in standard cubic feet per minute (scfm).

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3.19 *Standard Model.* A specific configuration for rating of the CDPR basic indoor cooling unit types as defined below and as shown in Appendix C.

3.19.1 *Ceiling Mounted Unit–ducted.* A Ceiling Mounted Unit with Ducted Discharge and Ducted Return. Ceiling Mounted Units with the option for ducted or non-ducted installation shall be rated as Ceiling Mounted Unit–ducted.

3.19.2 *Ceiling Mounted Unit–nonducted.* A Ceiling Mounted Unit with Free Air Discharge and Free Air Return. Ceiling Mounted Units with the option for ducted or non-ducted installation shall be rated as Ceiling Mounted Unit–ducted.

3.19.3 *Downflow Unit.* A Floor Mounted Downflow Raised Floor Plenum Discharge Unit with discharge air into a raised floor plenum and Free Air Return.

3.19.4 *Horizontal-flow Unit.* A Floor Mounted Horizontal-flow Free Air Discharge Unit with both Free Air Discharge and Free Air Return.

3.19.5 *Upflow Unit–ducted.* A Floor Mounted Upflow Ducted Discharge Unit with Ducted Discharge air and Free Air Return and does not have a factory-installed integral supply air grill or factory-installed supply air plenum.

3.19.6 *Upflow Unit–nonducted.* A Floor Mounted Upflow Free Air Discharge Unit with factory installed integral grill(s) or factory-installed supply air plenum and with both Free Air Discharge and Free Air Return. Floor Mounted Units with the option for ducted or non-ducted installation with a free discharge plenum shall be rated as ducted.

3.20 *Total Humidification Capacity.* The unit's total humidification output operating at Standard Rating Conditions (see Table 2). The mechanical cooling system is disabled to establish this rating.

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