ANSI/AHRI Standard 1360 (I-P) with Addendum 1

2013 Standard for

Performance Rating of Computer and Data Processing Room Air Conditioners

Approved by ANSI on November 8, 2013

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ANSI/AHRI STANDARD 1360 (I-P)-2013 WITH ADDENDUM 1, *PERFORMANCE RATING OF COMPUTER AND DATA PROCESSING ROOM AIR CONDITIONERS*

April 2014

Note: This addendum is not ANSI approved but will be submitted to ANSI for approval.

Addendum 1 (dated April 2014) of AHRI Standard 1360 (I-P) -2013, *Performance Rating of Computer and Data Processing Room Air Conditioners*, modifies ANSI/AHRI Standard 1360 (I-P)-2013 as follows. The following changes have been incorporated (additions are shown with shading and the deletions shown with strikethroughs) into the second sentence of Section 6.8 of the already published 2013 version of ANSI/AHRI Standard 1360 (I-P)-2013.In addition, the Certified Ratings list inside the cover page has been updated. The units for pressure drop have been changed from psid to ft H_2O.

The change includes:

6.8 *Tolerances*. To comply with this standard, published Cooling Capacity ratings, ~~pressure drop ratings~~, and Coefficients of Performance shall be based on data obtained in accordance with the provisions of this section and shall be such that any production unit, when tested, will meet these ratings except for an allowance to cover testing and manufacturing variations. ~~Pressure drop ratings shall not exceed 110%~~ Cooling Capacity ratings shall not be less than 95%, and Coefficient of Performances shall not be less than 95% of the published values.

AHRI CERTIFICATION PROGRAM PROVISIONS

Certified Ratings

The following Certification Program ratings are verified by test:

~~1. Net Total Cooling Capacity at Rated Cooling Test A (Table 1), kW~~
2. Net Sensible Cooling Capacity at Rated Cooling Test A (Table 1), kW
3. Net Sensible Coefficient of Performance Rating (NSenCOP) at Rated Cooling Tests A
4. Airflow rate, scfm
5. Fluid Flow Rate (for Water, Glycol, and Chilled Water Units only), gpm
~~6. Fluid Pressure Drop (for Water, Glycol, and Chilled Water Units only), psid~~
7. Fluid Economizer System Flow Rate (for Water, Glycol, and Chilled Water Units only), gpm
~~8. Fluid Economizer System Pressure Drop (for Water, Glycol, and Chilled Water Units only), psid~~

7.1.2.10 Fluid pressure drop at rated cooling Test A (Table 1), ~~psid~~ ft H_2O
7.1.3.10 Fluid pressure drop at rated cooling Test A (Table 1), ~~psid~~ ft H_2O
7.1.4.10 Fluid pressure drop at rated cooling Test A (Table 1), ~~psid~~ ft H_2O
7.1.5.10 Fluid pressure drop at rated cooling Test A (Table 1), ~~psid~~ ft H_2O

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 tests conducted under the standards/guidelines will not be non-hazardous or free from risk.

Note:

This is a new standard.

For SI ratings, see ANSI/AHRI Standard 1361 (SI)-2013.

AHRI CERTIFICATION PROGRAM PROVISIONS

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2. Net Sensible Cooling Capacity at Rated Cooling Test A (Table 1), kW
3. Net Sensible Coefficient of Performance Rating (NSenCOP) at Rated Cooling Tests A
4. Airflow rate, scfm
5. Fluid Flow Rate (for Water, Glycol, and Chilled Water Units only), gpm
~~6. Fluid Pressure Drop (for Water, Glycol, and Chilled Water Units only), psid~~
7. Fluid Economizer System Flow Rate (for Water, Glycol, and Chilled Water Units only), gpm
~~8. Fluid Economizer System Pressure Drop (for Water, Glycol, and Chilled Water Units only), psid~~

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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: 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 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 floor mounted Computer and Data Processing Room Air Conditioners (CDPR) which have three types: up-flow air discharge, down-flow air discharge and horizontal free air discharge, as illustrated in Figure 1.

2.2 *Exclusions*. This standard does not apply to the rating of individual assemblies, such as condensing units or direct expansion fan-coil units, for separate use.

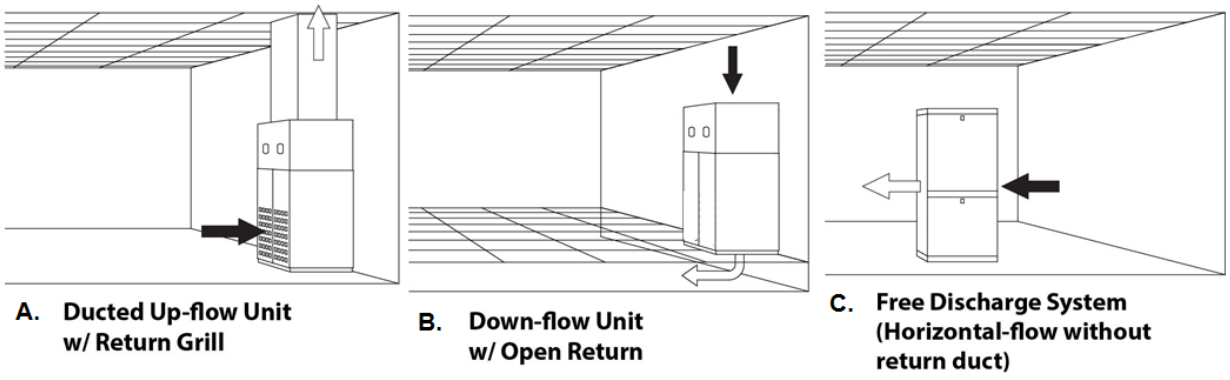

Figure 1. Different CDPR Unit Configurations.

Section 3. Definitions

All terms in this document will follow the standard industry definitions in the ASHRAE Wikipedia website (http://wiki.ashrae.org/index.php/ASHRAEwiki) unless otherwise defined in this section.

3.1 *Computer and Data Processing Room Air Conditioner (CDPR).* A Computer and Data Processing Room Air Conditioner consists of one or more factory-made assemblies, which include a direct expansion 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 direct expansion 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 air conditioner, either alone or in combination with a cooling and heating plant, are to provide air filtration, circulation, cooling, and optional reheating and humidity control.

3.2 *Computer Room Air Conditioner (CRAC).* Computer-room cooling units that utilize dedicated compressors and refrigerant cooling coils rather than chilled-water coils.

3.3 *Computer Room Air Handler (CRAH).* Computer-room cooling units that utilize chilled-water coils for cooling rather than dedicated compressors.

3.4 *Dehumidification Capacity.* Dehumidification Capacity shall be stated as the unit's total latent removal when in the full dehumidification mode of operation. This value shall be calculated as the difference between Net Total Cooling Capacity and Net Sensible Cooling Capacity when tested per the Standard Rating Conditions. Input ratings shall be the total power input to the unit; included but not limited to fan motor(s), compressor(s), damper(s) and control(s) etc.

3.5 *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 dry cooler, cooling tower, or condenser is utilized for heat rejection. This process is sometimes referred to as free cooling, econ-o-coil, or economizer.

3.6 *Humidification Capacity.* Humidification Capacity shall be stated as both total and net Humidification Capacity. The total Humidification Capacity reflects the unit's total humidification output without the mechanical cooling system operating when tested per the manufacturer's literature at Standard Rating Conditions. The net Humidification Capacity shall reflect the unit's total humidification output when concurrently operating the mechanical cooling system at full capacity and humidification system per manufacture's literature at Standard Rating Conditions. Input ratings shall be the total power input to the unit; included but not limited to fan motor(s), humidifier(s), compressor(s), damper(s) and control(s) etc.

3.7 *Integrated Net Sensible Coefficient of Performance (iNSenCOP).* An NSenCOP value that provides a consistent evaluation of the energy efficiency of a unit operated across the specified range of outdoor ambient temperatures (see Table 1).

3.8 *Net Sensible Coefficient of Performance (NSenCOP).* A ratio of the Net Sensible Cooling Capacity in watts to the total power input in watts (excluding reheaters and humidifiers) at any given set of rating conditions.

3.9 *Net Sensible Cooling Capacity.* The rate, expressed in kW, at which the equipment removes sensible heat from the air passing through it under specified conditions of operation.

3.10 *Net Total Cooling Capacity.* The rate, expressed in kW, at which the equipment removes heat from the air passing through it under specified conditions of operation.

3.11 *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 (identification) 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.

3.11.1 *Standard Rating.* A rating based on tests performed at Standard Rating Conditions.

3.11.2 *Application Rating.* A rating based on tests performed at application Rating Conditions (other than Standard Rating Conditions).

3.12 *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.

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

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

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

3.13.2 *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.

3.14 *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.

Section 4. Classification

4.1 Normally, CDPR units within the scope of this standard can be classified as shown below. There are five basic types of CDPRs.

Any of the below types may utilize a second, or dual, cooling coil that provides cooling by means of a free cooling liquid economizer of a separate building chilled-water system or refrigerant economizer that utilizes shared heat exchangers with the compressor based system and where refrigerant is moved my refrigerant pump or natural refrigerant convection. Any of the below types may contain internal humidifier and/or reheat capabilities.

Outdoor heat exchange effectiveness may be enhanced with adiabatic or indirect evaporative cooling.

4.1.1 *Single Packaged Unit*. A complete stand-alone unit.

4.1.2 *Condensing Units with Separate Coil and Fan*. The remote part of this unit contains the compressor and condenser while the indoor part of the unit is an evaporator and blower.

4.1.3 *Unit with Remote Condenser*. The remote part of this unit is an air-cooled condenser only, while the indoor part of the unit contains the compressor(s), evaporator coils and fan.

4.1.4 *Unit with Remote Air-Cooled Fluid Cooler or Cooling Tower*. The indoor part of the unit contains the compressor(s), evaporator coil, fan, and condenser. The heat rejection is by means of a remote device (a cooling tower or air-cooled fluid cooler) that uses water or glycol to transfer heat. Such units may also include an additional cooling coil for air-to-liquid heat transfer.

4.1.5 *Chilled-Water Unit*. The indoor part of the unit is an air handler with a water-cooled coil that is connected to the building chilled-water system.

Section 5. Test Requirements

5.1 *Test Requirements.* The tests required for this Standard shall be conducted in accordance with ANSI/ASHRAE Standard 127.

5.1.1 *Horizontal Free Air Discharge System.* For these systems, the static duct shall be 12 inches wider on each side and equal in height to the discharge opening of the unit under test.

5.1.2 *Split Systems Interconnecting Piping.* For air-cooled split systems, the interconnecting piping length shall be specified as per ANSI/AHRI Standard 340/360.

5.1.3 *Humidification Capacity Test.* Testing for Humidification Capacity shall be sampled at 5 minute intervals for a total of 13 readings in one hour.

Section 6. Rating Requirements

Section 6 describes all of the testing and rating requirements for this standard.

6.1 *Cooling System Standard Capacity Ratings*. Rated cooling is defined as 100% of the unit's maximum capacity and is sometimes referred to as a Standard Rating. Standard capacity ratings shall be established at the Standard Rating Conditions specified in rated cooling Test A of Table 1 for each application class that applies for this equipment. Standard Cooling Capacity shall be stated as Net Total and Net Sensible Cooling Capacity ratings and shall be net values, reflecting the energy dissipated into the conditioned space by the fan system.

6.1.1 *Values of Standard Capacity Ratings.* These ratings shall be expressed in terms of kW with three significant digits (e.g., 10.0 kW and 100 kW).

6.1.2 *Standard Rating Conditions*. The conditions of test for standard ratings shall include the following.

6.1.2.1 *Standard Cooling System Rating Temperatures*. All indoor and outdoor conditions for testing are defined in Table 1. Also defined in Table 1 are the various air and fluid temperatures that shall be used for heat rejection purposes. A unit shall be rated at all of the application classes that apply.

6.1.2.2 *Voltage and Frequency*. Nameplate voltages for 60 Hz shall be one or more of the following utilization voltages: 115, 200, 208, 230, 265, 460, and/or 575. Standard rating tests shall be performed at the unit nameplate rated voltages and frequency. For air conditioners with dual voltage ratings, standard rating tests shall be performed at both voltages or at the lower of the two voltages if only a single standard rating is to be published. If desired, 50 Hz ratings at 230 and/or 400 volts may be published using this standard but are not required.

6.1.2.3 *Unit Airflow Rate.* Standard cooling system ratings shall be determined at a total airflow rate (cooling coil airflow rate plus bypass airflow rate as configured or designed) delivered against at least the minimum external static pressures required by Section 6.1.2.6, as outlined below. The airflow rate for Class 1 and 2 applications shall not exceed 170 scfm/kW and Class 3 and 4 applications shall not exceed 130 scfm/kW.

Air conditioners shall be rated at those airflow rates specified by the manufacturer while in the rated cooling mode at conditions in Test A of Table 1. Once these conditions are established for this standard rating test, no further adjustment to the airflow rate shall be made.

6.1.2.4 *Condenser/Air Cooled Fluid Cooler Airflow Rate*. Standard ratings for units that are air cooled or glycol cooled with an air-cooled fluid cooler shall be determined at the condenser/air-cooled fluid cooler airflow rate that is inherent to the air conditioner when operated with all the resistance elements associated with the inlet or discharge attachments that the manufacturer considers normal installation practice. If fan speed control, or partial fan operation in a multifan condenser, is utilized for condensing temperature control, it may be utilized in this test as defined by the manufacturer. Airflow rates must be expressed as standard cubic feet per minute (scfm) standard air (density = 0.0749 lb/ft^3).

Table 1. Standard Rating Conditions[1]

Type	Fluid Conditions	Application Classes	Rated Cooling Tests				Humidification	Dehumidification
			A	B[7]	C[7]	D[2,7]		
Air Temperature Surrounding and Entering Indoor Part of unit (control is on return temperature)	Return Dry-bulb temperature, ºF	Class 1	75.0	75.0	75.0	75.0	75.0	75.0
		Class 2	85.0	85.0	85.0	85.0		
		Class 3	95.0	95.0	95.0	95.0		
		Class 4	105.0	105.0	105.0	105.0		
	Return Dew-point temperature, ºF	All Classes	52.0	52.0	52.0	52.0	42.0	59.0
Air-cooled units: entering outdoor ambient temperature.[8]	Dry-bulb Temperature, ºF	All Classes	95.0	80.0	65.0	40.0	65.0	95.0
Evaporative-cooled units (connected to cooling tower)[5]	Entering water temperature, ºF	All Classes	83.0	70.0	55.0	45.0	55.0	83.0
	Leaving water temperature, ºF	All Classes	95.0	N/A	N/A	N/A	N/A	95.0
	Fluid Flow Rate, gpm	All Classes	N/A	Max = Test A[3]	Max = Test A[3]	Max = Test A[3]	Max = Test A[3]	N/A
Glycol-cooled units (connected to a common glycol loop with a solution of 40% propylene glycol by volume)[6]	Entering glycol temperature, ºF	All Classes	104.0	85.0	65.0	35.0	65.0	104.0
	Leaving glycol temperature, ºF	All Classes	115.0	N/A	N/A	N/A	N/A	115.0
	Fluid Flow rate, gpm	All Classes	N/A	Max = Test A	Max = Test A	Max = Test A	Max = Test A	Max = Test A
Chilled-water air-handling units[4]	Entering water temperature, ºF	All Classes	50.0				50.0	50.0
	Leaving water temperature, ºF	All Classes	62.2				N/A	N/A
	Fluid Flow Rate, gpm	All Classes	N/A				Max = Rated Cooling	Max = Rated Cooling

Notes:

1. Users should be aware that the mass flow rate and Cooling Capacity of CDPRs typically decrease at elevations higher than sea level. Manufacturers should be consulted for capacity and airflow rating at these higher elevations to make sure that the CDPR fluid flow rates and Cooling Capacity meet the requirements of the application.
2. Test D is optional. If Test D is not performed, the results are the same as those for Test C.
3. Test setup is as in Test A, but the head pressure control may lower the flow rate.
4. Add pump total power input in kW to unit total input in kW (See Equation 1 below)
5. Add cooling tower and cooling loop pump total power input in kW to the unit total input in kW = 5% of the unit net sensible capacity. Temperatures are the temperatures of the fluid leaving the evaporative unit to the unit under test and return.
6. Add drycooler fan and condenser pump total power input in kW to the unit total input in kW = 7.5% of the unit net sensible capacity.
7. For Fluid Economizer application on evaporatively cooled or glycol-cooled units, add the power as defined in Notes 5 or 6, mentioned above.
8. For evaporatively enhanced outdoor air cooled condensers, the following outdoor wet bulb temperatures shall be coincident to dry bulb temperatures for Tests A, B, C & D: 74 ºF WB, 68 ºF WB, 57 ºF WB, 36 ºF WB, respectively. Similarly, for humidification and dehumidification tests, the wet bulb temperatures shall be: 65 ºF WB and 74 ºF WB, respectively. The evaporative water supply temperature shall not be less than the specified wet bulb temperatures.

The equation for pump power is as follows (See note 4 in Table 1):

$$W_{pump} = \dot{M} \cdot H \cdot SG / A \quad (1)$$

Where:

A = 3.448 (combined 65% efficiency is included)
H = Pressure drop from the entrance to the exit of the unit, ft H_2O
$\dot{M}$ = Flow rate, gpm
SG = Specific gravity of fluid
W_{pump} = Pump power input, watts

6.1.2.5 Cooling tests shall be conducted without operating the reheating, adiabatic or non-adiabatic humidification functions of the air conditioner.

6.1.2.6 *External Static Pressures, Duct Connected, Floor Plenum and Free Air Discharge*. For the appropriate system configuration described below, the total external static pressure shall be stated. Follow the procedure in ANSI/ASHRAE Standard 127 or as specified in Section 5.1.1 of this standard. Filters, filter plenum, heating devices, and other equipment recommended as part of the air conditioner shall be in place, and the total external resistance specified below will be available for the following systems. For the purposes of this test, the down-flow unit is effectively inclusive of the floor-stand with the discharge out the front of the floor-stand and the other three sides enclosed.

6.1.2.6.1 *Ducted Systems (up-flow units).* Air conditioners intended to be connected to supply and/or return ductwork shall be tested as follows:

6.1.2.6.1.1 Those with standard net sensible cooling ratings of less than 20.0 kW shall be tested at total external static resistance of 0.8 in. w.c.

6.1.2.6.1.2 Those with standard net sensible cooling ratings of 20.0 kW or more shall be tested at a total external static resistance of 1.0 in. w.c.

Unit airflow rate capacity is specified in Section 6.1.2.3.

6.1.2.6.2 *Raised Floor Plenum Systems (down-flow units).* Air conditioners intended for use with field-installed raised floor plenums shall be tested at an external resistance of 50 Pa. Unit airflow rate is specified in Section 6.1.2.3.

6.1.2.6.3 *Horizontal Free Air Discharge Systems (without field installed plennum).* Air conditioners intended for free air discharge shall be tested at total external resistance of 0 Pa. Unit airflow rate is specified in Section 6.1.2.3.

6.2 *Unit Efficiency*.

6.2.1 *Net Sensible Coefficient of Performance Rating (NSenCOP).* The NSenCOP shall be published at each of the four test conditions (A, B, C, D). For tests B, C and D the unit's net sensible cooling load, established by reconditioning heating system of the psychrometric chamber, shall be fixed at the net sensible capacity established in Test A. During tests B through D, the CRAC or CRAH under test must maintain the room temperature to a tolerance of ± 2.0 °F. If the test tolerance cannot be maintained, use the values from Test A for that test. An NSenCOP ratio shall be established at the defined test points by dividing the integrated net sensible cooling performed [kWh] by the total electrical energy consumed [kWh] over a one-hour period. The CRAC or CRAH unit volumetric airflow rate (standard cubic feet per minute) is allowed to deviate from Test A, provided net sensible capacity is held constant.

Input energy [kWh] shall be measured/monitored at all electrical source connections (e.g. main power circuit breaker(s), main power distribution block(s), main power disconnect(s)) of the CRAC or CRAH under test and ancillary systems e.g. air-cooled condenser, and including any of the ancillary total power input in kW consumption additions per the notes of Table 1. All such electrical source connections shall be included when computing

electrical energy consumed by the CRAC or CRAH under test. The power stated in notes 4, 5, 6 and 7 in Table 1, shall be used to establish energy of ancillary items for the duration of the test.

6.2.2 *Integrated Net Sensible Rating (iNSenCOP) Calculation.* The iNSenCOP rating is to be provided as a single "normalized" value to simplify unit to unit comparisons. The method shown below for calculating the normalized iNSenCOP may be used to calculate the unit's value at a specific geographic location. When iNSenCOP ratings are published, they are the normalized value.

The published iNSenCOP is a calculated value based on the NSenCOP test results from Tests A, B, C, and D. A weighted average of each of these test results is used based on the normalized values of A = 13.4%, B = 27.1%, C = 38.1%, and D = 21.5%.

$$\text{iNSenCOP} = (C_1 \times \text{Test A NSenCOP}) + (C_2 \times \text{Test B NSenCOP}) + (C_3 \times \text{Test C NSenCOP}) + (C_4 \times \text{Test D NSenCOP}) \quad (2)$$

Where:

C_1 = 0.134
C_2 = 0.271
C_3 = 0.381
C_4 = 0.215
iNSenCOP = Integrated Sensible Coefficient of Performance
NSenCOP = Net Sensible Coefficient of Performance

6.2.3 *Values of Standard Cooling System Power Input Ratings.* These cooling ratings shall be expressed in terms of kW with three significant digits (e.g., 10.0 kW and 100 kW).

6.3 *Humidification and Dehumidification Systems Capacities.* Humidification and Dehumidification Capacities shall be established at the Rating Conditions as specified in Table 1.

6.3.1 *Humidification Systems*. The Humidification Capacity measurement shall use air enthalpy method as prescribed in ANSI/ASHRAE Standard 37. Only the humidifier entering water conditions shall be referred from ANSI/AHRI Standard 640.

6.3.1.1 *Values of Standard Humidification System Capacity.* These capacities shall be expressed only in terms of lb/h with three significant figures.

6.3.1.2 *Values of Humidifier Power Input.* Input ratings shall be expressed in kW with three significant digits.

6.3.1.3 *Standard Humidification Conditions.* The conditions of test (with and without the cooling system in operation) shall include the standard humidification system conditions specified in Table 1.

6.3.1.4 *Voltage and Frequency.* Standard rating tests shall be performed at the rated voltages and frequency listed on the unit's nameplate. For air conditioners with dual voltage ratings listed on the unit's nameplate, a Standard Rating test shall be performed at both voltages or at the lower of the two voltages if only a single Standard Rating is to be published.

6.3.1.5 *Cooling Coil Airflow Rate*. Airflow shall remain as specified in Section 6.1.2.3 unless it is automatically changed by the standard control(s) provided with the indoor unit.

6.3.1.6 *Water Quality*. The water quality, conductivity and dissolved solids for the test are stated in ANSI/AHRI Standard 640.

6.3.2 *Dehumidification Systems*. The Dehumidification Capacity measurement shall use air enthalpy method as prescribed in ANSI/ASHRAE Standard 37.

6.3.2.1 *Values of Standard Dehumidification System Capacity*. These capacities shall be expressed in kW with three significant digits.

6.3.2.2 *Values of Dehumidification Power Input*. Input ratings shall be expressed in kW with three significant digits.

6.3.2.3 *Standard Dehumidification Conditions*. The conditions of testing shall include the standard dehumidification system temperature contained in Table 1.

6.3.2.4 *Voltage and Frequency.* Standard Rating tests shall be performed at the unit nameplate rated voltages and frequency.

6.3.2.5 *Cooling Coil Airflow Rate.* Airflow shall remain as specified in Section 6.1.2.3 unless it is automatically changed by standard controls provided with the indoor unit.

6.3.3 *Condenser Airflow Rate*. Condenser airflow shall remain as specified in Section 6.1.2.4

6.4 *Air Filter Standard Ratings.* Published air filter ratings shall be those defined in ANSI/ASHRAE Standard 52.2. At any test condition described by this standard, the system shall be tested with clean filters of the manufacturer's choice. Optional filter applications may also be shown based on tests or engineering calculations. For this standard, the minimum MERV rating of the filter shall be 8. Exception: free air discharge cooling shall be tested with a minimum MERV rating of 4.

6.5 *Application Ratings.* Capacity ratings and iNSenCOP values at conditions of temperature, humidity or altitude other than those specified in Section 6.1.2 may be published as Application Ratings and shall be based on calculations or tests using techniques described by this standard, with the method used to create the Application Rating clearly stated.

6.6 *Publication of Ratings.* Wherever Application Rating are published or printed, they shall include or be accompanied by the Standard Rating. Application Ratings shall be clearly designated as such, including a statement of the conditions at which the Application Ratings apply.

6.7 *Capacity Designation*. For air conditioners rated under this standard, the Cooling Capacity and Dehumidification Capacity designations used in published specifications, literature or advertising controlled by the manufacturer shall be expressed at the Standard Rating Conditions specified in Sections 6.1.2 and Section 6.3.

6.8 *Tolerances*. To comply with this standard, published Cooling Capacity ratings, ~~pressure drop ratings,~~ and Coefficients of Performance shall be based on data obtained in accordance with the provisions of this section and shall be such that any production unit, when tested, will meet these ratings except for an allowance to cover testing and manufacturing variations. ~~Pressure drop ratings shall not exceed 110%~~ Cooling Capacity ratings shall not be less than 95%, and Coefficients of Performance shall not be less than 95% of the published values.

Section 7. Minimum Data Requirements for Published Ratings

7.1 *Minimum Data Requirements for Published Ratings.* As a minimum, Published Ratings shall include all Standard Ratings. All claims to ratings within the scope of this standard shall include the statement "Rated in accordance with ANSI/AHRI Standard 1360 (I-P)." All claims to ratings outside the scope of this standard shall include the statement "Outside the scope of ANSI/AHRI Standard 1360 (I-P)." Wherever Application Ratings are published or printed, they shall include a statement of the conditions at which the ratings apply.

As a minimum, Published Ratings shall consist of the following information with application class(es) to be chosen by the manufacturer per Table 1:

7.1.1 For Air-Cooled Units

7.1.1.1 Net Total Cooling Capacity at rated cooling Test A (Table 1), kW

7.1.1.2 Net Sensible Cooling Capacity at Rated Cooling Test A (Table 1), kW

7.1.1.3 Total Humidification Capacity, lb/h

7.1.1.4 Net Humidification Capacity, lb/h

7.1.1.5 Dehumidification Capacity, kW

7.1.1.6 Net Sensible Coefficient of Performance (NSenCOP) at rated cooling Test A (see Table 1)

7.1.1.7 Integrated Sensible Coefficient of Performance (iNSenCOP)

7.1.1.8 Airflow rate, scfm

7.1.2 For Water-Cooled Units

7.1.2.1 Net Total Cooling Capacity at rated cooling Test A (Table 1), kW

7.1.2.2 Net Sensible Cooling Capacity at rated cooling Test A (Table 1), kW

7.1.2.3 Total Humidification Capacity, lb/h

7.1.2.4 Net Humidification Capacity, lb/h

7.1.2.5 Dehumidification Capacity, kW

7.1.2.6 Net Sensible Coefficient of Performance (NSenCOP) at rated cooling Test A (see Table 1)

7.1.2.7 Integrated Sensible Coefficient of Performance (iNSenCOP)

7.1.2.8 Airflow rate, scfm

7.1.2.9 Fluid flow at rated cooling Test A (Table 1), gpm

7.1.2.10 Fluid pressure drop at rated cooling Test A (Table 1), ~~psid~~ ft H_2O

7.1.3 For Glycol-Cooled Units

7.1.3.1 Net Total Cooling Capacity at rated cooling Test A (Table 1), kW

7.1.3.2 Net Sensible Cooling Capacity at rated cooling Test A (Table 1), kW

7.1.3.3 Total Humidification Capacity, lb/h

7.1.3.4 Net Humidification Capacity, lb/h

7.1.3.5 Dehumidification Capacity, kW

7.1.3.6 Net Sensible Coefficient of Performance (NSenCOP) at rated cooling Tests A (see Table 1)

7.1.3.7 Integrated Sensible Coefficient of Performance (iNSenCOP)

7.1.3.8 Airflow rate, scfm

7.1.3.9 Fluid flow at rated cooling Test A (Table 1), gpm

7.1.3.10 Fluid pressure drop at rated cooling Test A (Table 1), ~~psid~~ ft H_2O

7.1.4 For Chilled Water Units.

7.1.4.1 Net Total Cooling Capacity at rated cooling Test A (Table 1), kW

7.1.4.2 Net Sensible Cooling Capacity at rated cooling Test A (Table 1), kW

7.1.4.3 Total Humidification Capacity, lb/h

7.1.4.4 Net Humidification Capacity, lb/h

7.1.4.5 Dehumidification Capacity, kW

7.1.4.6 Net Sensible Coefficient of Performance (NSenCOP) at rated cooling Test A (Table 1)

7.1.4.7 Integrated Sensible Coefficient of Performance (iNSenCOP)

7.1.4.8 Airflow rate, scfm

7.1.4.9 Fluid flow at rated cooling Test A (Table 1), gpm

7.1.4.10 Fluid pressure drop at rated cooling Test A (Table 1), ~~psid~~ ft H_2O

7.1.5 For Fluid Economizer Units

7.1.5.1 Net Total Cooling Capacity at rated cooling Test A (Table 1), kW

7.1.5.2 Net Sensible Cooling Capacity at rated cooling Test A (Table 1), kW

7.1.5.3 Total Humidification Capacity, lb/h

7.1.5.4 Net Humidification Capacity, lb/h

7.1.5.5 Dehumidification Capacity, kW

7.1.5.6 Net Sensible Coefficient of Performance (NSenCOP) at rated cooling Test A (Table 1)

7.1.5.7 Integrated Sensible Coefficient of Performance (iNSenCOP)

7.1.5.8 Airflow rate, scfm

7.1.5.9 Fluid flow at rated cooling Tests B, C, & D (Table 1), gpm

7.1.5.10 Fluid pressure drop at rated cooling Tests B, C, & D (Table 1), ~~psid~~ ft H_2O

Section 8. Marking and Nameplate Data

8.1 *Marking and Nameplate Data*. As a minimum, the following information shall be shown in a conspicuous place on the equipment:

8.1.1 Name or trade name of manufacturer;
8.1.2 Manufacturer's model number;

Nameplate voltages for 60 Hertz systems shall include one or more of the equipment nameplate voltage ratings shown in Table 1 of ANSI/AHRI Standard 110. Nameplate voltages for 50 Hertz systems shall include one or more of the utilization voltages shown in Table 1 of IEC Standard 60038.

Section 9. Conformance

9.1 *Conformance.* While conformance with this standard is voluntary, conformance shall not be claimed or implied for products or equipment within the standard's *Purpose* (Section 1) and *Scope* (Section 2) unless such product claims meet all of the requirements of the standard and all of the testing and rating requirements are measured and reported in complete compliance with the standard. Any product that has not met all the requirements of the standard cannot reference, state, or acknowledge the standard in any written, oral, or electronic communication.

APPENDIX A. REFERENCES – NORMATIVE

A1 Listed here are all standards, handbooks, and other publications essential to the formation and implementation of the standard. All references in this appendix are considered part of the standard.

A1.1 ANSI/AHRI Standard 110-2012, *Air-Conditioning, Heating, and Refrigerating Equipment Nameplate Voltages*, 2012, Air-Conditioning Heating & Refrigeration Institute, 2111 Wilson Blvd., Suite 500, Arlington, VA 22201, U.S.A.

A1.2 ANSI/AHRI Standard 340/360-2007, *Performance Rating of Commercial and Industrial Unitary Air-conditioning and Heat Pump Equipment*, 2007, Air-Conditioning Heating & Refrigeration Institute, 2111 Wilson Blvd., Suite 500, Arlington, VA 22201, U.S.A.

A1.3 ANSI/AHRI Standard 640-2005, *Performance Rating of Commercial and Industrial Humidifiers*, 2005, Air-Conditioning Heating & Refrigeration Institute, 2111 Wilson Blvd., Suite 500, Arlington, VA 22201, U.S.A.

A1.4 ANSI/ASHRAE Standard 37-2009, *Method for Testing and Rating Unitary Air-Conditioning and Heat Pump Equipment*, 2009, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1791 Tullie Circle N.E., Atlanta, GA 30329, U.S.A.

A1.5 ANSI/ASHRAE Standard 52.2-2012, *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*, 2012, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1791 Tullie Circle N.E., Atlanta, GA 30329, U.S.A.

A1.6 ANSI/ASHRAE Standard 127-2012, *Method of Testing Method of Testing for Rating Computer and Data Processing Room Unitary Air Conditioners*, 2012, American Society of Heating, Refrigerating and Air-Conditioning Engineers, 1791 Tullie Circle N.E., Atlanta, GA 30329, U.S.A.

A1.7 *ASHRAEwiki, Terminology*. American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc, Web. 07 June 2013 <http://wiki.ashrae.org/>.

A1.8 IEC Standard 60038-2009, *IEC Standard Voltages*, 2009, International Electrotechnical Commission, 3, rue de Varembé, PO Box 131, CH-1211 Geneva 20, Switzerland.

APPENDIX B. REFERENCES – INFORMATIVE

B1 Listed here are standards, handbooks and other publications which may provide useful information and background but are not considered essential. References in this appendix are not considered part of the standard.

None.