ADDENDA

ANSI/ASHRAE/IES Addendum cd to
ANSI/ASHRAE/IES Standard 90.1-2013

Energy Standard for Buildings Except Low-Rise Residential Buildings

Approved by the ASHRAE Standards Committee on August 24, 2016; by the ASHRAE Board of Directors on Septebmer 6, 2016; by the IES Board of Directors on September 26, 2016; and by the American National Standards Institute on October 7, 2016.

This addendum was approved by a Standing Standard Project Committee (SSPC) for which the Standards Committee has established a documented program for regular publication of addenda or revisions, including procedures for timely, documented, consensus action on requests for change to any part of the standard. The change submittal form, instructions, and deadlines may be obtained in electronic form from the ASHRAE website (www.ashrae.org) or in paper form from the Senior Manager of Standards.

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ASHRAE obtains consensus through participation of its national and international members, associated societies, and public review.

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FOREWORD

Dedicated outdoor air systems (DOAS) were introduced over 25 years ago and are now used in many buildings covered by ASHRAE Standard 90.1. However, the current Standard 90.1 has no minimum energy efficiency requirements for this equipment. Through AHRI, manufacturers of DOAS developed Standard 920 (I-P) to establish common rating conditions for these products. In addition, AHRI is currently developing a certification program and will soon publish certified ratings on its directory of certified products.

This proposal establishes for the first time a product class for DOAS. The intent is to recognize the technology in Standard 90.1 by requiring minimum energy efficiency standards. Integrated Seasonal Moisture Removal Efficiency (ISMRE) and Integrated Seasonal Coefficient of Performance (ISCOP) are proposed for a full range of product classes at standard rating conditions listed in AHRI Standard 920. These levels will be subject to further review and evaluation once a third-party certification is established and more data are available.

Note: In this addendum, changes to the current standard are indicated in the text by underlining (for additions) and strikethrough (for deletions) unless the instructions specifically mention some other means of indicating the changes.

Addendum cd to 90.1-2013

Add the following definitions to Section 3.2 (I-P).

DX-dedicated outdoor air system units (DX-DOAS units). A type of air-cooled, water-cooled, or water source factory assembled product which dehumidifies 100% Outdoor Air to a low dew point, and includes reheat that is capable of controlling the supply dry-bulb temperature of the dehumidified air to the designed supply air temperature. This conditioned outdoor air is then delivered directly or indirectly to the Conditioned Space(s). It may pre-condition Outdoor Air by containing an enthalpy wheel, sensible wheel, desiccant wheel, plate heat exchanger, heat pipes, or other heat or mass transfer apparatus.

Integrated Seasonal Coefficient of Performance (ISCOP). This seasonal efficiency number is a combined value based on the formula listed in AHRI Standard 920 of the two (2) COP values for the heating season of a DX-DOAS Unit Water or Air Source Heat Pump expressed in W/W.

Integrated Seasonal Moisture Removal Efficiency (ISMRE). This seasonal efficiency number is a combined value based on the formula listed in AHRI Standard 920 of the four (4) dehumidification Moisture Removal Efficiency (MRE) ratings required for DX-DOAS Units expressed in lb of moisture/kWh.

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Add new Tables 6.8.1-14 and 6.8.1-15 as follows (I-P):

TABLE 6.8.1-14 Electrically Operated DX-DOAS Units, Single Package and Remote Condenser, Without Energy Recovery – Minimum Efficiency Requirements

Equipment Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
Air Cooled (Dehumidification Mode)	-	4.0 ISMRE	AHRI 920
Air Source Heat Pumps (Dehumidification Mode)	-	4.0 ISMRE	
Water Cooled (Dehumidification Mode)	Cooling Tower Condenser Water	4.9 ISMRE	
	Chilled Water	6.0 ISMRE	
Air Source Heat Pumps (Heating Mode)	-	2.7 ISCOP	
Water Source Heat Pump (Dehumidification Mode)	Ground Source, Closed Loop	4.8 ISMRE	
	Ground-water Source	5.0 ISMRE	
	Water Source	4.0 ISMRE	
Water Source Heat Pump (Heating Mode)	Ground Source, Closed Loop	2.0 ISCOP	
	Ground-water Source	3.2 ISCOP	
	Water Source	3.5 ISCOP	

TABLE 6.8.1-15 Electrically Operated DX-DOAS Units, Single Package and Remote Condenser, With Energy Recovery – Minimum Efficiency Requirements

Equipment Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
Air Cooled (Dehumidification Mode)	-	5.2 ISMRE	AHRI 920
Air Source Heat Pumps (Dehumidification Mode)		5.2 ISMRE	
Water Cooled (Dehumidification Mode)	Cooling Tower Condenser Water	5.3 ISMRE	
	Chilled Water	6.6 ISMRE	
Air Source Heat Pumps (Heating Mode)	-	3.3 ISCOP	
Water Source Heat Pump (Dehumidification Mode)	Ground Source, Closed Loop	5.2 ISMRE	
	Ground-water Source	5.8 ISMRE	
	Water Source	4.8 ISMRE	
Water Source Heat Pump (Heating Mode)	Ground Source, Closed Loop	3.8 ISCOP	
	Ground-water Source	4.0 ISCOP	
	Water Source	4.8 ISCOP	

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Add the following normative reference under Air Conditioning, Heating and Refrigeration Institute (AHRI) in Section 12 (I-P)

AHRI Standard 920 (I-P)-2015	Performance Rating of DX-Dedicated Outdoor Air System Units

Add the following definitions to Section 3.2 (SI).

DX-dedicated outdoor air system units (DX-DOAS units). A type of air-cooled, water-cooled, or water source factory assembled product which dehumidifies 100% Outdoor Air to a low dew point, and includes reheat that is capable of controlling the supply dry-bulb temperature of the dehumidified air to the designed supply air temperature. This conditioned outdoor air is then delivered directly or indirectly to the Conditioned Space(s). It may pre-condition Outdoor Air by containing an enthalpy wheel, sensible wheel, desiccant wheel, plate heat exchanger, heat pipes, or other heat or mass transfer apparatus.

Integrated Seasonal Coefficient of Performance (ISCOP). This seasonal efficiency number is a combined value based on the formula listed in AHRI Standard 921 of the two (2) COP values for the heating season of a DX-DOAS Unit Water or Air Source Heat Pump expressed in W/W.

Integrated Seasonal Moisture Removal Efficiency (ISMRE). This seasonal efficiency number is a combined value based on the formula listed in AHRI Standard 921 of the four (4) dehumidification Moisture Removal Efficiency (MRE) ratings required for DX-DOAS Units expressed in kg of moisture/kWh.

Add new Tables 6.8.1-14 6.8.1-15 as follows (SI).

TABLE 6.8.1-14 Electrically Operated DX-DOAS Units, Single Package and Remote Condenser, Without Energy Recovery – Minimum Efficiency Requirements

Equipment Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
Air Cooled (Dehumidification Mode)	-	1.8 ISMRE	AHRI 921
Air Source Heat Pumps (Dehumidification Mode)	-	1.8 ISMRE	
Water Cooled (Dehumidification Mode)	Cooling Tower Condenser Water	2.2 ISMRE	
	Chilled Water	2.7 ISMRE	
Air Source Heat Pumps (Heating Mode)	-	1.2 ISCOP	
Water Source Heat Pump (Dehumidification Mode)	Ground Source, Closed Loop	2.2 ISMRE	
	Ground-water Source	2.3 ISMRE	
	Water Source	1.8 ISMRE	
Water Source Heat Pump (Heating Mode)	Ground Source, Closed Loop	2.0 ISCOP	
	Ground-water Source	3.2 ISCOP	
	Water Source	3.5 ISCOP	

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TABLE 6.8.1-15 Electrically Operated DX-DOAS Units, Single Package and Remote Condenser, With Energy Recovery – Minimum Efficiency Requirements

Equipment Type	Subcategory or Rating Condition	Minimum Efficiency	Test Procedure
Air Cooled (Dehumidification Mode)	-	2.4 ISMRE	AHRI 921
Air Source Heat Pumps (Dehumidification Mode)		2.4 ISMRE	
Water Cooled (Dehumidification Mode)	Cooling Tower Condenser Water	2.4 ISMRE	
	Chilled Water	3.0 ISMRE	
Air Source Heat Pumps (Heating Mode)	-	3.3 ISCOP	
Water Source Heat Pump (Dehumidification Mode)	Ground Source, Closed Loop	2.4 ISMRE	
	Ground-water Source	2.6 ISMRE	
	Water Source	2.2 ISMRE	
Water Source Heat Pump (Heating Mode)	Ground Source, Closed Loop	3.8 ISCOP	
	Ground-water Source	4.0 ISCOP	
	Water Source	4.8 ISCOP	

Add the following normative reference under Air Conditioning, Heating and Refrigeration Institute (AHRI) in Section 12 (SI).

AHRI Standard 921 (SI)-2015	Performance Rating of DX-Dedicated Outdoor Air System Units

POLICY STATEMENT DEFINING ASHRAE'S CONCERN FOR THE ENVIRONMENTAL IMPACT OF ITS ACTIVITIES

ASHRAE is concerned with the impact of its members' activities on both the indoor and outdoor environment. ASHRAE's members will strive to minimize any possible deleterious effect on the indoor and outdoor environment of the systems and components in their responsibility while maximizing the beneficial effects these systems provide, consistent with accepted Standards and the practical state of the art.

ASHRAE's short-range goal is to ensure that the systems and components within its scope do not impact the indoor and outdoor environment to a greater extent than specified by the Standards and Guidelines as established by itself and other responsible bodies.

As an ongoing goal, ASHRAE will, through its Standards Committee and extensive Technical Committee structure, continue to generate up-to-date Standards and Guidelines where appropriate and adopt, recommend, and promote those new and revised Standards developed by other responsible organizations.

Through its *Handbook*, appropriate chapters will contain up-to-date Standards and design considerations as the material is systematically revised.

ASHRAE will take the lead with respect to dissemination of environmental information of its primary interest and will seek out and disseminate information from other responsible organizations that is pertinent, as guides to updating Standards and Guidelines.

The effects of the design and selection of equipment and systems will be considered within the scope of the system's intended use and expected misuse. The disposal of hazardous materials, if any, will also be considered.

ASHRAE's primary concern for environmental impact will be at the site where equipment within ASHRAE's scope operates. However, energy source selection and the possible environmental impact due to the energy source and energy transportation will be considered where possible. Recommendations concerning energy source selection should be made by its members.

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