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ANSI/ASHRAE Standard 133-2024
Method of Testing Direct Evaporative Air Coolers

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NOTE

Approved addenda, errata, or interpretations for this standard can be downloaded free of charge from the ASHRAE website at www.ashrae.org/technology.

(This foreword is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

FOREWORD

ANSI/ASHARE Standard 133 provides procedures for testing direct evaporative cooling devices under laboratory conditions to obtain rating information. As an ASHRAE method-of-test standard, it is intended to offer recommended practices and accurate measurement procedures. In addition, the committee incorporates the effects of ambient conditions, testing error, instrument accuracy, and the need to make certain that no other sources of heat transfer are taking place during the testing.

The revised 2024 edition represents a comprehensive update of the standard, including changes to meet ASHRAE's mandatory language requirements.

1. PURPOSE

This standard establishes a uniform method of laboratory testing for rating packaged and component direct evaporative air coolers (DECs).

2. SCOPE

2.1 The scope of this standard covers a method of testing for rating saturation effectiveness, airflow rate, and total power of packaged and component direct evaporative air coolers.

2.2 Covered tests include the methods for measuring the static pressure differential of the direct evaporative air cooler, density of the air, and speed of rotation of the fan.

2.3 This standard requires that packaged and component direct evaporative air coolers be simultaneously tested for airflow, total power, and saturation effectiveness.

2.4 The ratings resulting from application of this standard are intended for use by manufacturers, specifiers, installers, and users of evaporative air-cooling apparatus for residential, commercial, agricultural, and industrial ventilation; air cooling applications; and for commercial, industrial, and agricultural processing applications.

3. DEFINITIONS AND ACRONYMS

appurtenance device electric input power: the electric input power to drive accessories—not including fans, pumps, or rotary devices—that are supplied as a standard component of the production model of the direct evaporative air cooler (DEC). Appurtenance device electric input power includes water metering devices, conductivity controllers, timers, dump valves, pumps, solenoids, and transformers providing low voltage to control mechanisms and freeze protection devices.

boundaries: DEC inlet and outlet boundaries are defined as the interface between the cooling unit and the remainder of the system, and these boundaries are at a plane perpendicular to the airstream where it enters or leaves the DEC. Various appurtenances, such as filter media assemblies, inlet boxes, inlet vanes, inlet cones, silencers, screens, rain hoods, dampers, discharge cones, and eaves, that are supplied as standard components to the unit shall be included as a part of the cooling unit between the inlet and outlet boundaries.

component direct evaporative cooler (DEC): an unpackaged DEC that does not include a fan, and may have a pump or rotary wetting device, and may also have its media wetted down by a laboratory source. An example of a component DEC is shown in Informative Appendix B, Figure B-2.

DEC airflow rate: the mass airflow rate or volumetric airflow rate at the test conditions.

DEC outlet area: the total inside area measured in the plane(s) of the outlet opening(s).

DEC static pressure differential: the static pressure differential measured across the DEC and its appurtenances.

DEC water flow rate: the flow rate of water distributed within the DEC from the reservoir to the media by a pump. This is not to be confused with water provided to make up for water evaporated by the DEC.

design temperature: the design dry-bulb temperature for the space being cooled by the DEC shall be 32.2°C (90°F).

determination: a complete set of measurements for a particular point of operation of a DEC. The measurements shall be used to determine all DEC performance variables as defined in this standard.