ANSI/ASHRAE Standard 25-2001 (RA 2006)
Reaffirmation of ANSI/ASHRAE Standard 25-2001

# ASHRAE STANDARD

# Methods of Testing Forced Convection and Natural Convection Air Coolers for Refrigeration

Approved by the ASHRAE Standards Committee on June 23, 2001, and reaffirmed on January 21, 2006; by the ASHRAE Board of Directors on June 28, 2001, and reaffirmed on January 26, 2006; and by the American National Standards Institute on December 17, 2001, and reaffirmed on January 27, 2006.

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## FOREWORD

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*The changes made for the 2006 reaffirmation were:*

- *Reaffirmation dates were updated in Section 6.1*
- *Code numbers referenced in Section 7.1.1.3 were updated*
- *"That" was corrected to "than" in Section 7.2.2*
- *"Arithmetical" was corrected to "arithmetic" in Section 8.3.6*
- *The explanation of Appendix A was added just before that section*

## 1. PURPOSE

This standard

a. establishes uniform methods of testing for obtaining performance data,
b. lists and defines the terms used in testing,
c. specifies data to be recorded and formulas to be used in calculations, and
d. sets limits and tolerances in testing.

## 2. SCOPE

This standard prescribes methods of testing the cooling capacities and airflow rates of forced convection and natural convection air coolers for refrigeration. It does not include air coolers of the recalculated primary liquid refrigerant type. It does not include air-conditioning units for which testing methods are given in other standards.

## 3. DEFINITIONS AND SYMBOLS

### 3.1 Definitions

***air cooler:*** a factory-made device to transfer heat from a refrigerated space to a refrigerant through the medium of air. Coolers shall consist of the unit as delivered and fitted with the accessories, such as heat exchangers, that are supplied with or as a part of the cooler.

***dry-type air cooler:*** an air cooler wherein heat transfer is not implemented by a liquid spray during the operating period.

***external static pressure loss:*** the static pressure loss resulting from airflow through ductwork and other external elements fitted to the air cooler.

***forced circulation-type air cooler:*** an air cooler with the means to mechanically circulate the air.

***free delivery-type air cooler:*** an air cooler designed to take air from and discharge it into the cooled space without ductwork or other external elements that impose air resistance.

***gross total cooling effect:*** the heat absorbed by the refrigerant. This is the sum of the net total cooling effect and the heat equivalent of the energy required to operate the cooler.

***internal static pressure loss:*** the air pressure loss resulting from airflow through the assembled cooler as supplied from the factory.

***latent cooling effect:*** that portion of the cooling effect that results in water vapor condensation in the air circulating through the cooler.

***natural convection-type air cooler:*** an air cooler that depends on natural convection for air circulation.

***net total cooling effect:*** the refrigeration capacity available for space and product cooling. It is equal to the gross total cooling effect less the heat equivalent of energy required to operate the cooler.

***nonvolatile refrigerant:*** one that remains a liquid during the process of absorbing heat within the air cooler.

***preliminary run:*** successive sets of readings compiled during continuous cooler operation with the objective of establishing a steady-state condition.

***pressure-type air cooler:*** an air cooler designed for use with external elements that impose air resistance.

***sensible cooling effect:*** that portion of the total cooling effect that results in changes in dry-bulb temperature of the air and vapor mixture circulating through the cooler. It is expressed either as net or gross depending on whether the heat equivalent of the energy required to operate the cooler is included or omitted.

***sensible heat ratio:*** the ratio of net sensible cooling effect to the net total cooling effect.

***set of readings:*** a complete series of data, taken as simultaneously as practicable, that includes all the information required for the determination of cooler performance.

***spray-type air cooler:*** an air cooler, with or without cooling surface, fitted to spray liquid continuously into the airstream.

***standard conditions:*** the specific set of conditions listed.

***standard rating:*** air cooler performance at specified standard conditions in ARI or other recognized standards.