STANDARD

ANSI/ASHRAE Standard 35-2014
(Supersedes ANSI/ASHRAE Standard 35-2010)

Method of Testing Desiccants for Refrigerant Drying

Approved by the ASHRAE Standards Committee on January 18, 2014; by the ASHRAE Board of Directors on January 22, 2014; and by the American National Standards Institute on January 23, 2014.

ASHRAE Standards are scheduled to be updated on a five-year cycle; the date following the standard number is the year of ASHRAE Board of Directors approval. The latest edition of an ASHRAE Standard may be purchased on the ASHRAE website (www.ashrae.org) or from ASHRAE Customer Service, 1791 Tullie Circle, NE, Atlanta, GA 30329-2305. E-mail: orders@ashrae.org. Fax: 678-539-2129. Telephone: 404-636-8400 (worldwide) or toll free 1-800-527-4723 (for orders in US and Canada). For reprint permission, go to www.ashrae.org/permissions.

 ISSN 1041-2336

Approved American National Standard
ANSI
www.ansi.org

SPECIAL NOTE

This American National Standard (ANS) is a national voluntary consensus standard developed under the auspices of ASHRAE. *Consensus* is defined by the American National Standards Institute (ANSI), of which ASHRAE is a member and which has approved this standard as an ANS, as "substantial agreement reached by directly and materially affected interest categories. This signifies the concurrence of more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that an effort be made toward their resolution." Compliance with this standard is voluntary until and unless a legal jurisdiction makes compliance mandatory through legislation.

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

ASHRAE Standards are prepared by a Project Committee appointed specifically for the purpose of writing the Standard. The Project Committee Chair and Vice-Chair must be members of ASHRAE; while other committee members may or may not be ASHRAE members, all must be technically qualified in the subject area of the Standard. Every effort is made to balance the concerned interests on all Project Committees.

The Manager of Standards of ASHRAE should be contacted for:

a. interpretation of the contents of this Standard,
b. participation in the next review of the Standard,
c. offering constructive criticism for improving the Standard, or
d. permission to reprint portions of the Standard.

CONTENTS

ANSI/ASHRAE Standard 35-2014, Method of Testing Desiccants for Refrigerant Drying

NOTE

Approved addenda, errata, or interpretations for this standard can be downloaded free of charge from the ASHRAE Web site 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

First published in 1976, ASHRAE Standard 35 was reaffirmed in 1983 and revised in 1992 and again in 2010.The 2010 version included a change to use the Karl Fischer coulometric titrator, a commonly used laboratory instrument, which simplified the test and provides more accurate results than the previous test method.

This current 2014 revision to Standard 35 includes updated references and minor editorial changes. The standard was prepared under the auspices of ASHRAE. It may be used, in whole or in part, by an association or government agency with due credit to ASHRAE. Adherence is strictly on a voluntary basis and merely in the interest of obtaining uniform standards throughout the industry.

1. PURPOSE

This standard establishes a method of testing desiccants for use in refrigerant drying.

2. SCOPE

2.1 This standard provides a method of testing desiccants only. For testing and rating driers that use these desiccants, refer to ANSI/ASHRAE Standard 63.1, *Method of Testing Liquid Line Refrigerant Driers* (see Informative Annex A—Bibliography).

2.2 The principle of this standard is to keep a desiccant of known water content in contact with the desired refrigerant until equilibrium has been established under known temperature conditions, after which the water content of the refrigerant is determined.

2.3 This standard is applicable to all desiccants that do not react with the desired refrigerant.

3. DEFINITIONS

For the purposes of this standard, the following terms and definitions apply.

desiccant: a solid that will collect and hold water and is insoluble in the refrigerant medium used.

equilibrium-point dryness (EPD): the water content of a liquid refrigerant after being in contact with a specific desiccant at a particular temperature long enough to reach an equilibrium state. Equilibrium-point dryness (EPD) is expressed as milligrams of water per kilogram of refrigerant (parts per million [ppm]).

water capacity: the amount of water collected and held by the desiccant while maintaining a specified EPD in the liquid refrigerant passing through it at a certain liquid-refrigerant temperature. Water capacity is measured in parts of water per 100 parts of desiccant by weight activated in accordance with the manufacturer's instructions.

4. CLASSIFICATION

4.1 This method of test is concerned with testing desiccants, specifically with determining the water capacity of a desiccant and the water concentration of a refrigerant when they are in equilibrium.

4.2 Since this standard is concerned only with equilibrium conditions at a given temperature, no consideration is given to the effect of the design of the container holding the desiccant.

Note: In ASHRAE Standard 63.1, the method of testing discussed here, with certain modifications, is used to test the desiccant contained in a completed drier unit to determine its water capacity when in equilibrium with the refrigerant containing a given amount of water. (See Informative Annex A—Bibliography.)

4.3 This method of testing desiccants uses liquid refrigerant in equilibrium with the desiccant.

4.4 The rate of drying is not considered in this standard. Measurements are made under conditions ensuring practical equilibrium.

4.5 Physical characteristics of the desiccant such as particle size, dusting properties, hardness, and the form of desiccant (i.e., molded or granular) are not considered in this standard.

5. APPARATUS

The following apparatus is required for the method of testing in this standard.

5.1 A constant-temperature bath or cabinet that is able to maintain a given temperature with an accuracy of ±1°C (±2°F) and is capable of being set at any temperature within the range of desiccant use. The equilibration vessel may be placed inside a constant-temperature cabinet.

5.2 An analytical balance having a sensitivity of 0.0001 g (2×10^{-7} lb).

5.3 A pan-type balance having a sensitivity of 0.01 g (2×10^{-5} lb) and a capacity of 5000 g (11 lb).

5.4 A stainless-steel equilibration vessel with minimum capacity of 300 mL (10 oz). This vessel shall have a maximum working pressure in excess of the anticipated test pressure. The vessel with its associated valve shall be adequately leak tested and dried prior to performing the test.

5.5 A Karl Fischer coulometric titrator. As specified in the titrator instructions, a flowmeter and a 3A molecular sieve drier may be used. Also, a heat source (e.g., a heat gun), a temperature-monitoring device (for equilibration temperatures above room temperature), and a vacuum pump with a micron gauge are required.

Note: The automatic concentration calculation feature of the Karl Fischer coulometric titrator may be used.