Designation: D 4332 – 01

Standard Practice for Conditioning Containers, Packages, or Packaging Components for Testing[1]

This standard is issued under the fixed designation D 4332; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice provides for standard and special conditioning and testing atmospheres that may be used to simulate particular field conditions that a container, package, or packaging component may encounter during its life or testing cycle.

1.2 This practice describes procedures for conditioning these containers, packages, or packaging components so that they may reach equilibrium with the atmosphere to which they may be exposed.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 685 Practice for Conditioning Paper and Paper Products for Testing[2]

D 996 Terminology of Packaging and Distribution Environments[2]

E 41 Terminology Relating to Conditioning[3]

E 171 Specification for Standard Atmospheres for Conditioning and Testing Materials[2]

E 337 Test Method for Measuring Humidity with a Psychrometer (the Measurement of Wet- and Dry-Bulb Temperatures)[4]

2.2 *ISO Standard:*

2233 Packaging—Complete, Filled Transport Packages: Conditioning for Testing[5]

2.3 *Forest Products Laboratory:*

Moisture Content vs. Relative Humidity Chart

3. Terminology

3.1 Terms and definitions used in this practice may be found in Terminology D 996, Terminology E 41, or Specification E 171.

4. Significance and Use

4.1 Many materials from which containers and packages are made, especially cellulosic materials, undergo changes in physical properties as the temperature and the relative humidity (RH) to which they are exposed are varied. Therefore, the package should be placed and kept in a specified atmosphere for a length of time such that subsequent measurements of physical properties will be meaningful and reproducible.

4.2 The conditions described in this practice are either historically accepted standard conditions or special laboratory conditions chosen to represent particular phases of the distribution environment. These special conditions do not necessarily duplicate actual field conditions, but tend to simulate them and have effects on packages and materials which may be related to their field performance.

5. Atmospheric Conditions

5.1 *Preconditioning Atmosphere*—20 to 40°C (68 to 104°F) and 10 to 35 % relative humidity.

5.2 *Standard Conditioning Atmosphere*— 23 ± 1°C (73.4 ± 2°F) and 50 ± 2 % relative humidity.

NOTE 1—Average values must fall within these limits. Short-term fluctuations and measurement limitations may cause individual measurements to vary up to ±2°C (±3.6°F) and ±5 % relative humidity without significant impairment of test precision.

NOTE 2—The standard conditioning in the United States is different than in many other countries that use the ISO 2233 preferred conditions (G) of 20°C (68°F) and 65 % relative humidity.

5.3 *Special Atmospheres*—The special standard atmospheric conditions shown in Table 1 may be selected when appropriate.

NOTE 3—Temperature and humidity tolerances of ±1°C (±1.8°F) and ±2 % relative humidity are desirable but not always attainable.

NOTE 4—In the absence of a specific requirement for a particular atmospheric condition, use the conditioning atmosphere given in 5.2.

NOTE 5—Conditioning at the desert condition (Table 1) at a constant temperature of 60°C (140°F) may have effects on some materials that do not relate to effects of cyclical field conditions.

5.3.1 Preferred atmospheres approved by ISO, but not required in this practice are shown in Table 2.

5.4 The measurement of temperature and relative humidity

[1] This practice is under the jurisdiction of ASTM Committee D10 on Packaging and is the direct responsibility of Subcommittee D10.23 on Natural Environment Test Methods.

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[2] *Annual Book of ASTM Standards*, Vol 15.09.

[3] *Annual Book of ASTM Standards*, Vol 14.02.

[4] *Annual Book of ASTM Standards*, Vol 11.03.

[5] Available from American National Standards Institute, 11 W. 42nd St., 13th Floor, New York, NY 10036.