



Standard Practice for Conditioning Paper and Paper Products for Testing¹

This standard is issued under the fixed designation D 685; 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 defines the standard atmospheres for normal preconditioning, conditioning, and testing of paper and paper products, paperboard, fiberboard, and containers made from them. It also specifies procedures for handling these materials in order that they may reach equilibrium with the respective atmosphere.

1.2 This practice does not include special conditioning and testing atmospheres, such as those that attempt to simulate tropical or arctic environments.

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 585 Practice for Sampling and Accepting a Single Lot of Paper, Paperboard, Fiberboard, and Related Products²

E 171 Specification for Standard Atmospheres for Conditioning and Testing Flexible Barrier Materials²

3. Significance and Use

3.1 The preconditioning requirement is important because physical properties of a sample at 50 % relative humidity depend upon whether the sample is brought to 50 % from a higher or lower relative humidity. A detailed discussion of the importance of preconditioning may be found in Annex A1.

3.2 The conditioning and testing atmospheres are important because both temperature and relative humidity have significant effects on the physical properties of paper and board. A more detailed discussion of the importance may be found in Annex A2.

4. Standard Atmospheres

4.1 *Preconditioning Atmosphere*—10 to 35 % relative hu-

midity and 22 to 40°C (see Annexes).

4.2 *Conditioning Atmosphere*— 50.0 ± 2.0 % relative humidity and $23.0 \pm 1.0^\circ\text{C}$.

4.3 *Testing Atmosphere*—Same as 4.2.

NOTE 1—It is important to distinguish between the overall limits of the temperatures within which conditioning and testing may be carried out and the limits within which the temperature must be maintained in order to maintain the specified relative humidity limits; that is, the close temperature tolerance of $\pm 1^\circ\text{C}$ required in 4.2 and 4.3 will not in itself ensure the close relative humidity requirement of ± 2 % relative humidity, as a sudden change of 1°C when at 23°C and 50 % relative humidity will change the relative humidity about 5 to 6 %.

5. Apparatus

5.1 *Preconditioning Chamber*—A room or cabinet in which sample sheets or specimens may be individually exposed to circulating air at the preconditioning relative humidity and temperature.

NOTE 2—For smaller sheets or specimens, the required preconditioning may be achieved easily with a simple cabinet, if no other means are available. If this cabinet is operated in a room maintained at 50 % relative humidity and 23°C and so designed that room air is drawn through it, and if the air entering and in the cabinet is heated to a temperature of $39 \pm 1^\circ\text{C}$, the relative humidity in the cabinet will be in the required range (that is, 20 ± 3 % relative humidity). Commercially available forced-ventilation “ovens” should prove satisfactory. Input air to the oven should be drawn from the standard room, output should be vented *outside* of the standard room.

5.1.1 For many papers and boards, approximately the same preconditioning moisture content obtained by the above procedure may be achieved by using a sealed cabinet operated in a room maintained at $23 \pm 1^\circ\text{C}$ and using a saturated solution of lithium chloride (LiCl) to obtain a relative humidity of about 12 to 13 %.

5.1.2 For larger rooms needed for preconditioning sealed containers and large sheets, the required low relative humidity may be achieved by drawing air over a refrigerator expansion coil operating at a few degrees above freezing temperature.

5.2 *Conditioning and Testing Chamber*—One or more rooms or cabinets in which sample sheets or specimens may be individually exposed to circulating air at the conditioning relative humidity and temperature, and then tested under the same conditions.

¹ This practice is under the jurisdiction of ASTM Committee D-6 on Paper and Paper Products and is the direct responsibility of Subcommittee D06.92 on Test Methods.

Current edition approved Sept. 15, 1993. Published November 1993. Originally published as D 685 – 42 T. Last previous edition D 685 – 92a.

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