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T 465

DRAFT NO. 02 SARG

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WORKING GROUP CHAIRMAN To be determined.

SUBJECT CATEGORY Physical Properties

RELATED METHODS See "Additional Information"

CAUTION:
This Test Method may include safety precautions which are believed to be appropriate at the time of publication of the method. The intent of these is to alert the user of the method to safety issues related to such use. The user is responsible for determining that the safety precautions are complete and are appropriate to their use of the method, and for ensuring that suitable safety practices have not changed since publication of the method. This method may require the use, disposal, or both, of chemicals which may present serious health hazards to humans. Procedures for the handling of such substances are set forth on Material Safety Data Sheets which must be developed by all manufacturers and importers of potentially hazardous chemicals and maintained by all distributors of potentially hazardous chemicals. Prior to the use of this method, the user must determine whether any of the chemicals to be used or disposed of are potentially hazardous and, if so, must follow strictly the procedures specified by both the manufacturer, as well as local, state, and federal authorities for safe use and disposal of these chemicals.

Static creasing of paper for water vapor transmission tests

(Five-year review of Standard Practice T 465 sp-16)

(No changes from previous draft. Standard Reaffirmed)

1. Scope

1.1 This standard practice is used for the creasing of paper and other thin sheet materials to provide reproducibly creased specimens for testing water vapor transmission. It is not applicable to paperboard.

1.2 This is a standard practice for static creasing; for kinetic creasing see TAPPI T 512 "Creasing of Flexible Packaging Material Paper Specimens for Testing."

1.3 This procedure can be used with water vapor transmission tests TAPPI T 448 "Water vapor transmission rate of sheet materials at standard temperature and humidity", TAPPI T 464 "Gravimetric determination of water vapor transmission rate of sheet materials at high temperature and humidity," and TAPPI T 523 "Dynamic measurement of water vapor transfer through sheet materials."

2. Summary

The procedure described is for creasing square specimens which will yield test areas from 60 to 140 cm^2 (about 10-20 $in.^2$), although it may be adapted to other areas. When performed as specified, the creasing mass is 100 g/mm of crease (5.6 lb/in.), and the ratio of the effective area of the test specimen in square centimeters to the total length of creases in centimeters is as 1 is to 1.05-1.10 (in in. as 2.5 is to 2.67-2.75).

3. Significance

This procedure does not necessarily reproduce commercial creasing which is imparted kinetically, but it does provide a controlled means to assess the possible effect of creasing on the barrier properties of the material.

4. Apparatus

4.1 *Creasing surface,* consisting of a flat, smooth, rectangular plate, e.g., a piece of machined metal, steel, about 6-13 mm (about 0.25-0.5 in.) thick, whose width is at least 25 mm (1 in.) greater than the length of the specimens to be creased.

4.2 *Creasing platen,* consisting of a flat, smooth, square, or rectangular metal plate (steel) whose length is about 13 mm greater than that of the specimens to be creased. Its mass in kilograms is one-tenth the specimen length in millimeters. For convenience, a handle for tilting the platen should be provided, its mass to be included as part of the platen mass.

NOTE 1: If a hinge is used to connect the platen and the creasing surface, it must be carefully designed to prevent binding, because binding will reduce the effective weight of the platen. It is simpler to fix a low back-stop to the creasing surface to aid in positioning the platen.

4.3 Ruler or scale marked in 1 mm increments.

4.4 *Flat strip of wood,* such as a ruler, to give the specimen a very light preliminary crease.

5. Test specimen

5.1 Obtain a sample of the paper in accordance with TAPPI T 400 “Sampling and Accepting a Single Lot of Paper, Paperboard, Containerboard, or Related Product.”

5.2 For each test, cut a square specimen with the edges parallel to the principal directions of the paper and large enough that one specimen for the water vapor transmission test can be obtained from it.

6. Procedure

6.1 Crease the specimen, after conditioning it in an atmosphere in accordance with TAPPI T 402 "Standard Conditioning and Testing Atmospheres for Paper, Board, Pulp Handsheets, and Related Products," as follows:

6.2 With a pencil lightly mark a series of lines parallel to one edge of a specimen and spaced 19 mm ± 1 mm (0.75 in.) apart, arranging the lines so one goes through the center of the effective test area.

NOTE 2: If a large number of specimens are to be prepared, a jig or template will greatly facilitate this marking.

6.3 Starting with the first mark next to one edge, fold the specimen on this mark parallel to this edge and lightly crease the fold by gently pressing the ruler upon it.

6.4 Tilt the creasing platen and slip the lightly creased specimen under it and parallel to its edge so that the crease lies under the center of gravity of the platen. Lower the platen very gently to rest on the crease, leave for 12 ± 2 s, then raise the platen and remove the specimen.

6.5 Unfold the specimen so that the valley of the crease is up, flatten the crease by pressing it gently with the ruler, and make another lightly creased fold at the next adjacent mark along the edge and parallel to the first crease, but make this fold about the opposite side of the sheet.

6.6 Repeat 6.4 and 6.5 until creases have been made through all the marks on one edge of the specimen. The specimen now has zig-zag folds and looks like accordian pleating.

6.7 Repeat 6.2, 6.3, 6.4, 6.5, and 6.6 along an adjacent edge to produce a similar set of creases intersecting the first set at right angles.

NOTE 3: While a spacing of about 19 mm will give substantially the required ratio of length of crease to area for the range of specimen sizes mentioned, the exact spacing may be found by geometrical construction using the "trial and error" method.

6.8 Obtain a specimen of the desired size for the water vapor apparatus from the creased specimen so that the center of the effective test area coincides with the center of the crossed crease lines.

6.9 The specimens are now ready to be tested.

7. Report

No report is required for this standard practice.

8. Precision

A precision statement is not applicable for this standard practice.

9. Keywords

Paper, Static tests, Creasing, Water vapor permeability, Mass transfer.

10. Additional information

10.1 Effective date of issue: To be assigned.

10.2 This method was issued in 1944 as a Suggested Method and became an Official Standard in 1977. It became a Classical Method in 1985. In 1995, it was revised under the new test method guidelines as a Standard Practice.

10.3 A precision statement is not applicable. The result of creasing is measured by the final results as obtained under other methods (TAPPI T 464 "Gravimetric Determination of Water Vapor Transmission Rate of Sheet Materials at High Temperature and Humidity" and TAPPI T 523 "Dynamic Measurement of Water Vapor Transfer Through Sheet Materials") for water vapor transmission.

10.4 Steel is the required material for the plates, because the hardness of alternative surfaces making the crease would have a marked effect on the severity of the crease.

10.5 Related methods: ISO Standard 2528; PAPTAC D.15; and SCAN P22.

Your comments and suggestions on this procedure are earnestly requested and should be sent to the TAPPI Standards Department. ■