T 523 om-02

SUGGESTED METHOD – 0000
OFFICIAL STANDARD – 1974
CORRECTED – 1976
OFFICIAL TEST METHOD – 1982
REVISED – 1987
REVISED – 1993
REVISED – 1997
REVISED – 2002

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.

Dynamic measurement of water vapor transfer through sheet materials

1. Scope and summary

1.1 This method describes a procedure using a closed cell to evaluate rapidly, at any normal or elevated temperature, the water vapor transfer rate (WVTR) of packaging materials in sheet form, especially barrier films of coated paper.

1.2 This procedure involves clamping a specimen sheet between a high-humidity chamber (90% RH) and a dry chamber (5% or less RH) and determining the rate of change of humidity in the dry chamber. By means of a calibration curve these dynamic test results can be converted to grams of moisture per square meter-day.

1.3 This is a general method permitting the use of any dynamic measuring instrument.

1.4 This method is not intended for any environmental, FDA, or other regulatory application. Please refer to the specific regulatory section for any such application.

2. Significance

2.1 Climatic conditions to which packaging materials are exposed vary widely, so a water vapor transmission test by any procedure serves to compare different materials rather than to predict their actual performance in the field. Although some barrier materials undergo changes in their solid state below 38°C, this elevated temperature is frequently used to expedite gravimetric water transmission testing (TAPPI T 464 “Gravimetric Determination of Water Vapor Transmission Rate of Sheet Materials at High Temperature and Humidity”). Dynamic procedures are sufficiently sensitive that neither dangerously elevated temperatures nor a large humidity gradient is required.

2.2 The rate of transfer of moisture from a relatively humid atmosphere through a barrier to a drier atmosphere changes with time until a condition of equilibrium is reached. The length of the transient period varies with the capacity of the test material to dissolve and retain water. If swelling of the test material occurs, there will also be change in the diffusion coefficient. With a hydrophobic plastic film, for example, equilibrium normally will be reached in less than 1 h. For papers with barrier films on each side, equilibrium may require days.

Approved by the Standard Specific Interest Group for this Test Method
TAPPI