

The information and data contained in this document were prepared by a technical working group of the Association. The working group and the Association assume no liability or responsibility in connection with the use of such information or data, including but not limited to any liability under patent, copyright, or trade secret laws. The user is responsible for determining that this document is the most recent edition published.

PLEASE NOTE: A TAPPI Useful Method (UM) is a document written to describe a test, procedure, or practice which may be proposed by a Working Group of no fewer than three TAPPI members not employed by the same organization and written in the same general style as a TAPPI Standard Test Method, but with the inclusion or exclusion of certain sections as deemed appropriate by the Working Group, and with minimum precision requirements that may be expanded at the discretion of the Working Group. A UM is written with no less attention to proper use of the language to describe the procedure using essentially the same elements of a TAPPI Standard Test Method, but in a less rigorous manner. TAPPI Useful Methods do not receive the same review through a rigorous process of openness, voluntary review, and consensus as do the TAPPI Standard Test Methods, and as such, are not intended to be used as referee methods as the TAPPI Standard Test Methods are.

CAUTION:

This 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.

Color strength and shade of dye

Scope

The following methods are designed for the evaluation of dyes used for coloring paper in terms of a preselected dye referred to as the standard dye. These methods are most suited for the evaluation of dyes within a laboratory, since variations in pulps, water conditions, pH, and the observer will influence a correlation of data between laboratories. Method A is for soluble dyes and applies to dyes to be used solely for calender staining and other types of surface coloring. Method B is for soluble and insoluble colorants intended for beater applications.

Some acid dyes, e.g., Acid Yellow 23, Acid Yellow 36, and Acid Blue 9, cannot be evaluated by the beater dyeing method. However, the other acid dyes, basic dyes, and direct dyes may be evaluated by this method.

Safety precautions

Handle all dyes and sizing chemicals in accordance to manufacturer's safe handling and disposal instructions.

Sampling

Unless it is known that each container is filled with dye from the same manufactured lot, it is advisable to sample separately every container. Open the container and push aside the surface layer of dye. Take a representative sample weighing about 100 g and place in a dry stoppered bottle.

Approved by a Working Group of TAPPI in accordance with the Useful Method Guidelines

Method A

This method is for calender staining and other types of surface-coloring acid dyes.

Apparatus

1. *Developing trays*, two or more quarter- or half-plate photographer's glass or white-enameled developing trays.
2. *Standard papers* for dyeing test, 3 × 7 in. (7 × 18 cm) pieces of white, smooth-finish filter paper.
3. *Board*, pieces of white, opaque paperboard, 3 × 3 in. (7 × 7 cm).
4. *Dye test solution*, 2.0 g dye dissolved in 300 mL distilled water at 100°C (212°F), cooled to 20°C (68°F) and diluted to 1 L.

Procedure

Into separate trays measure equal quantities of the dye solution to be compared. Holding the strips of the filter paper by their narrow edges, draw them through the solutions at equal and constant speeds; then hang up the wet strips to air-dry. When dry, trim 0.25 in. (6.5 mm) off each side of the strip and 0.5 in. (13.0 mm) off each end. Fold the two ends to the center and staple this side to a white, opaque paperboard of the same size as the folded specimen, keeping the felt side of the filter paper out. The white, opaque paperboard used for backing prevents "show-through" and must be the same paper for all comparisons.

Make all dippings in duplicate. If two strips dyed in the same bath do not match perfectly, make further dippings until matches are obtained.

Compare the dyeings against the standard for strength and shade, using daylight or a standard daylight lamp.

If a difference in the strength of the two specimens is indicated, prepare fresh trays of the dye solution, diluting the stronger one so as to include increments of 5 parts of water per 100 of diluted dye solution until a strength match is obtained, for example:

100% dye solution strength = 100 parts dye solution.

95% dye solution strength = 95 parts dye solution + 5 parts water

90% dye solution strength = 90 parts dye solution + 10 parts water

Report

Report the number of parts of the sample dye equivalent in coloring power to 100 parts of the dye used as a standard. This is calculated as follows:

$$C = 100 B/A$$

where

C = 100 parts of standard dye
 B = parts of sample dyes per 100 parts of sample dye solution
 A = parts of standard dye per 100 parts of standard dye solution

Sample calculations

One hundred parts of standard dye match 75 parts of dye A plus 25 parts of water. Then 100 parts of the standard dye are equivalent to $(100 \times 75) / 100 = 75$ parts of dye A.

Eighty parts of standard dye plus 20 parts of water match 100 parts of dye B. Then 100 parts of the standard dye are equivalent to $100 \times 100 / 80 = 125$ parts of dye B.