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An American National Standard

Standard Practice for the Separation and Examination of Stickies[1]

This standard is issued under the fixed designation D 6148; 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 is applicable to a wide range of virgin pulps or pulps derived from recovered materials or recovered paper of the type typically used to produce paper, paperboard and other paper products.

1.2 This practice describes laboratory procedures whereby stickies are typically separated from pulp fibers, and then the separated stickies fraction is examined by qualitative or quantitative procedures, or both.

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 Product[2]

D 1968 Terminology Relating to Paper and Paper Products[2]

D 2019 Test Method for Dirt in Paper and Paperboard[2]

E 122 Practice for Calculating Sample Size to Estimate, With a Specified Tolerable Error, the Average for Characteristic of a Lot or Process[3]

2.2 *TAPPI Documents*[4]

T 205 Forming Handsheets for Physical Testing of Pulp

T 210 Sampling and Testing Wood Pulp Shipments for Moisture

T 412 Moisture in Pulp, Paper and Paperboard

UM 242 Shive Content in Mechanical Pulp (Somerville Fractionator)

3. Terminology

3.1 *Definitions:*

3.1.1 Definitions used in this practice are those found in Terminology D 1968 or the *Dictionary of Paper*.[4]

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *stickies*, *n*—particulate, generally non-fibrous, contaminants suspended in pulps of the type used in papermaking which adhere to themselves, other components of the paper structure, components of the papermaking machinery, and in the case where the contaminants are incorporated into finished paper or paper products, cause the unexpected and generally undesirable adherence one to another of units of the finished paper or paper product.

3.2.1.1 *Discussion*—The suspended particulate contaminants are usually of low specific gravity and include, but are not limited to, residual materials such as adhesives and coating residues, films, tapes, rubber-like particles, inks, and hydrolysis products of synthetic sizing materials.

4. Summary of Practice

4.1 A slurry of pulp fibers, after mechanical disintegration if necessary, is placed in a separatory device in contact with a plate or screen of defined area having openings of specified number and size.

4.1.1 The characteristics of the plate or screen shall be such that the stickies contaminants are separated from papermaking fibers at an efficiency required to differentiate and discriminate between test materials that are known to contain different levels of stickies, or that have been found to exhibit different performance in the papermaking process due to the levels of stickies incorporated within them.

4.1.2 In some separatory devices, the slurry is recirculated in contact with the plate or screen within the separator device to achieve stickies separation. In other devices, stickies remaining on the plate or screen are washed free from the plate or screen with a supply of fresh water, or mechanically removed with tweezers or a similar device. Sometimes both procedures occur.

4.1.3 The typical plate or screen used for stickies separation in this practice contains slots having a width of 0.15 mm (0.006 in.), however slotted plates or screens having a different width opening, for example 0.10 mm (0.004 in.) or 0.20 mm (0.008 in.), have been successfully used in specific applications.

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[1] This practice is under the jurisdiction of ASTM Committee D06 on Paper and Paper Products and is the direct responsibility of Subcommittee D06.92 on 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] Available from the Technical Association of the Pulp and Paper Industry, Technology Park, P.O. Box 105113, Atlanta, GA 30348.

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4.2 The quantity, qualitative characteristics, or both, of the separated stickies may be determined by any of the following instruments or approaches, singly or in combination, based on the measurement information required:

4.2.1 Touch or visual inspection using tweezers, dissecting needles, size estimation gages, or similar devices (size, color, presence or absence of stickiness),

4.2.2 Automated image analysis (number and size of particles),

4.2.3 Reaction to heat (thermal properties),

4.2.4 Examination under radiant energy including, but not limited to ultraviolet, near infrared, or infrared radiation (spectroscopic [structural] properties),

4.2.5 Examination using chemical reagents including dyes or solvents (chemical properties),

4.2.6 Gravimetric quantification, and

4.2.7 Other suitable means of choice, as defined by the users of this practice.

5. Significance and Use

5.1 The increased use of alternative fiber sources, including but not limited to fiber from recovered material or recovered paper, or both, has increasingly resulted in the presence of stickies in fiber sources of the type typically used in papermaking and, to a lesser extent, in their presence in finished papers and paper products made from such fiber sources.

5.2 This practice provides a consistent format in which to separate and make either qualitative or quantitative measurements, or both, on stickies.

5.3 This practice is suitable for application throughout the entire process of paper production and use, enabling the producer, converter and user of paper to measure, describe, and specify required properties of pulp, paper, and paper products with regard to stickies.

6. Equipment

NOTE 1—Various pieces of equipment may be used in performing the procedure described in this practice. The exact equipment required varies based upon the portions of the procedure used.

6.1 *Disintegrator*, as described in TAPPI T 205, Appendix A.

NOTE 2—The disintegrator may not be required or even desirable when slurried pulps from the papermaking process are being evaluated.

6.2 Separatory instrument or device for removing stickies from the pulp slurry. The instrument or device shall separate pulp from stickies based upon a screening technique, and shall incorporate a screen or plate with the following characteristics:

6.2.1 Slots in the screen or plate of the instrument or device are of such dimension that all fibers in the slurry are allowed to pass through,

NOTE 3—In spite of this requirement, long fiber strings or fiber bundles will frequently be retained on the plate or screen.

6.2.2 The plate or screen in the instrument or device retains stickies at a level and efficiency that efficient and statistically reliable differentiation among pulps known to contain measurably different stickies levels is possible,

6.2.3 The orientation and size of the slots in the plate or screen may be precisely described, verified, and reliably reproduced.

6.2.4 The Somerville Fractionator (TAPPI UM 242)[5] and the Pulmac MasterScreen[5] have been found to comply with these requirements and are suitable instruments for use in this practice. There may be other suitable separatory units which meet the requirements, as well.

NOTE 4—No screening or separating device has yet demonstrated the ability to quantitatively remove from a slurry of pulp fibers every sticky particle that may result in the probability of negative performance characteristics in some application of interest for a particular pulp or paper material. What the practically useful stickies separating system does is to remove some reproducible portion of the stickies present. The portion of the stickies removed will be a function of the specific interaction of the separating system's screen or plate opening size, the amount of solids (both pulp fibers and stickies) present in the test specimen, and characteristics of the stickies separating system including flow rate, recycling and washing system used, and the particle size distribution of the stickies particles present. Since two stickies separating systems with different operational characteristics are unlikely to produce the same specific interaction between the screening system and the test specimen, non-identical separatory systems will generally produce results which are different quantitatively, qualitatively, or both. However, separating screens or plates chosen to meet the general criteria above will rank different test specimens in the same general order with respect to stickies, even though there will be differences between separation systems in the specific qualitative and quantitative information derived.

6.3 *Filter Paper* to fit the system used (as required).

6.4 *Particle Size Comparison Chart*, such as the dirt speck comparison chart described in Test Method D 2019 for visual estimation of size of stickies particles separated from specimen (as desired).

6.5 *Common Laboratory Equipment*, such as tweezers, dissecting needles, glassware, and similar.

6.6 *Specific Instrumentation*, such as balances, spectrophotometers, thermal analysis units, and similar, as required for any specific stickies identification procedures which are to be used as agreed by the users of the practice (as desired).

NOTE 5—The specific performance capabilities of instrumentation used for examination of the stickies fraction are not specified here because of the wide variety of equipment available and in use for stickies examination. The user must be judicious in the choice of the equipment used, however. For example, because of the very small amount of stickies collected from some specimens, use of a semi-micro balance capable of weighing to ±0.00001 g, rather than the usual analytical balance weighing to ±0.0001 g may be required to perform gravimetric quantitation (see 4.2.6).

6.7 *Microscope* (monocular- or stereomicroscope) or magnifying light stand (if desired).

6.8 *Image Analysis System* to measure number and size distribution, or both, of collected stickies particles (if desired).

[5] The device known as the Somerville Fractionator was first disclosed in 1932 (see Bibliography, Ref 2). It is described in TAPPI UM 242, and is available from vendors of paper testing equipment. The sole source of supply of the device known as the Pulmac MasterScreen known to the committee at this time is Pulmac Instruments International, Inc., Box 50 HCR 34, Montpelier, VT 05602. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at meeting of the responsible technical committee, which you may attend.

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