

T 213 om-10

SUGGESTED METHOD – 1936
OFFICIAL STANDARD – 1977
OFFICIAL TEST METHOD – 1985
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Dirt in pulp – chart method

1. Scope

1.1 This method (1,2) is adapted to the numerical estimation of dirt in pulp and recycled pulp in terms of equivalent black area.

1.2 The results will differ from those obtained by TAPPI T 246 “Foreign Particulate Matter in Pulp by Transmitted Light” (now withdrawn) in that it is the contrasting color of foreign matter rather than its opaqueness that affects the result.

1.3 An automated procedure for dirt count can be found in TAPPI T 563 “Equivalent Black Area (EBA) and Count of Visible Dirt in Pulp, Paper, and Paperboard by Image Analysis.” Both this procedure and T 563 are based on Equivalent Black Area (EBA) measurement.

2. Significance

2.1 This method provides a test for estimating the amount of dirt in pulp including recycled pulps to help the mill meet its needs for production of fine or other speck-free papers.

2.2 The estimated equivalent black area of a gray or colored speck is smaller than its actual area, in inverse proportion to the intensity of its color contrast with its background. Thus, the equivalent black area of a black spot in a nonbleached pulp would be considerably smaller than its actual area because its appearance would not be as pronounced as it would be if it were in a white pulp.

3. Definitions

3.1 *Dirt* is defined as foreign matter in a sheet which, when examined by reflected, not transmitted light, has a marked contrasting color to the rest of the sheet and has an equivalent black area (see 3.2) of 0.04 mm² or more.

3.2 *Equivalent black area (EBA)* of a dirt speck is defined as the area of a round black spot on a white background of the TAPPI Dirt Estimation Chart which makes the same visual impression on its background as does the dirt speck on the particular background in which it is embedded.

Approved by the Standard Specific Interest Group for this Test Method



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4. Apparatus

4.1 *Dirt Estimation Chart*¹ (see Fig. 1). The actual chart is a photograph approximately 3½ in. × 5 in. (89 mm × 127 mm) of a series of round black spots of various areas on a white background such that using an instrument and method in accordance with TAPPI T 452 “Brightness of Pulp, Paper, and Paperboard (Directional Reflectance at 457 nm)” the reflectance of the white background is $81.5 \pm 1.0\%$ and that of the black dots is $2.4 \pm 0.4\%$. In accordance with Graff’s findings (2) all the round spots on the present chart, except those listed, are correct to within 10% or 0.005 mm^2 , whichever is the larger. For special accuracy, these designated areas should be changed to those given in parentheses: 1.00 (1.08); 0.80 (0.76); 0.60 (0.58); 0.40 (0.42); 0.30 (0.31); 0.25 (0.26); 0.20 (0.21); 0.15 (0.16); 0.10 (0.11); 0.09 (0.10). It is the same as for TAPPI T 437 “Dirt in Paper and Paperboard.” Only the round spots are used for the analysis.

4.1.1 Only the photographic dirt charts specified in Section 4 shall be used when performing the procedure in this test method. The use of any other type chart made by a process other than photographic, including all printing techniques including but not limited to electrostatic copy, ink jet, or laser jet on paper, or transparent bases and/or plastic-covered charts, do not comply with the requirements of this method and shall not be used.

4.1.2 Only the round spots on the chart are used for the analysis.

4.1.3 For highly precise work, the spot sizes can be measured microscopically and correction factors can be developed and used as indicated by Graff (2).

4.2 *Illumination.* Lighting arrangements to give about 535 lm/m^2 (about 50 fc) of white or daylight light on the specimen. Since the light affects equally the appearance of both the dirt specks and the comparison spots on the charts, the intensity of illumination is not critical. For grooved pulp sheets, care should be taken to position the light source so that the pulp ridges do not cast shadows.

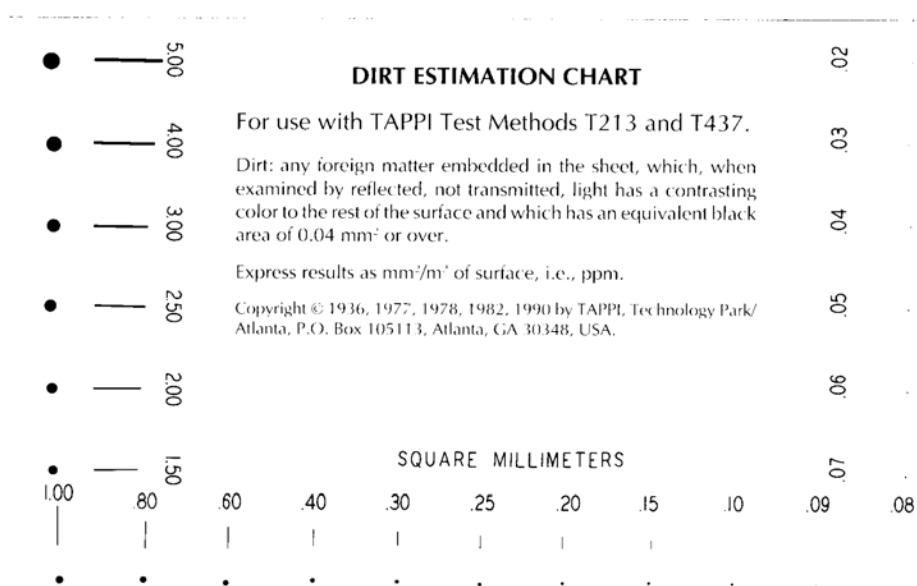


Fig. 1. Dirt Estimation Chart.

5. Sampling and test specimens

5.1 Obtain a sample selected in accordance with a predetermined sampling procedure.

5.1.1 *Sheets.* Select at least 10, preferably 20 or more, sheets; each sheet (specimen) having an exposed area

¹ Available for purchase from TAPPI.