

# Reference Materials List

The companies and organizations listed on the Reference Materials list provide reference materials and/or calibration standards or services for TAPPI Test Methods. Please refer to the appropriate test method for details. Addresses for these organizations will be found in the Suppliers Directory. TAPPI does not sanction the companies cited in this list.

This information is obtained by the Standard Specific Interest Group responsible for each method and is confirmed by the suppliers themselves. The suppliers are required to conform to the guidelines set forth in TAPPI T 1211 "Acceptance Procedures for Calibration Laboratories." The suppliers are requested to complete a form which allows them to self-certify by confirming that one or more of these conditions are met: (1) the laboratory has been certified based on the current ISO/IEC standard for laboratory certification (i.e., ISO/IEC 17025 or transitioning from the former ISO/IEC Guide 25 to ISO/IEC 17025); (2) the laboratory has certification under NIST 150; or (3) the laboratory has been certified as a Standardizing or Authorized Laboratory by ISO.

If the supplier does not meet one of the three conditions for self-certification, they are asked to review a list of criteria as outlined in T 1211 and indicate their company's compliance to these criteria. The following is a listing of the criteria each company is asked to review and confirm which conditions are met by their laboratory:

**This organization certifies that it:**

- (a) is a source of reference materials and is willing to sell or provide the materials to any other company or organization that has a legitimate interest in using the method in conjunction with testing activities  
Yes \_\_\_ No \_\_\_
- (b) provides calibration services  
Yes \_\_\_ No \_\_\_
- (c) maintains a master instrument for the purpose of providing calibration services  
Yes \_\_\_ No \_\_\_
- (d) maintains its instrumentation in keeping with TAPPI Test Method procedures and/or procedures as specified by other relevant internationally recognized standardization methods  
Yes \_\_\_ No \_\_\_
- (e) has participated, where possible, in at least one inter-laboratory check annually for the purpose of providing a comparative measurement, and the results of said comparison is available for inspection  
Yes \_\_\_ No \_\_\_
- (f) maintains and provides for the traceability of relevant calibration standards used in the calibration of user instruments  
Yes \_\_\_ No \_\_\_
- (g) maintains and provides for inspection, on request by TAPPI or users of the calibration services, documentation on the procedures and instruments used in the calibration of user instrumentation, as well as documentation on the sources or instruments used in the preparation of and checking the assigned values of standardized materials distributed for calibration of field instruments.  
Yes \_\_\_ No \_\_\_
- (h) makes available as part of the distribution of reference or standardized materials the documentation of traceability described in (g).  
Yes \_\_\_ No \_\_\_
- (i) is committed to the task of maintaining the master instruments and/or the production of calibration standards.  
Yes \_\_\_ No \_\_\_
- (j) has reasonable financial resources to carry out their duties in the development of standardized materials and for the maintenance of the necessary instrumentation.  
Yes \_\_\_ No \_\_\_
- (k) is organized in such a manner that there are clear lines of authority over the calibration functions and integrity is maintained at all times.  
Yes \_\_\_ No \_\_\_
- (l) has staff which has the necessary education and experience to carry out their required duties.  
Yes \_\_\_ No \_\_\_
- (m) maintains the staff and supervision skill levels through continued education.  
Yes \_\_\_ No \_\_\_
- (n) maintains personnel training records to document the skills and training required by (l) and (m).  
Yes \_\_\_ No \_\_\_

This listing of suppliers of reference materials for TAPPI Test Methods indicates whether the manufacturer of the materials has self-certified by meeting one or more of the conditions for self-certification (i.e., meets conditions 1, 2, or 3 as described above), or whether the company has registered as a supplier of reference materials and has submitted to TAPPI the proper form to indicate which of the criteria listed above is met by the organization (i.e., responded to the questions in Section 2 of the form). The detailed responses to the criteria are available to any interested parties and may be requested from the Director of Quality and Standards at TAPPI.

NOTE: Only TAPPI Test Methods with known reference materials are listed. Any errors or unlisted suppliers should be brought to the attention of the TAPPI Quality and Standards Department.

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	Reference Materials Supplier	Meets conditions 1, 2, or 3*	Responded to questions on form
T 200 Laboratory beating of pulp (Valley beater method)	Voith Paper Inc.		X
T 213 Dirt in pulp - chart method	Printing Industries of America/Graphic Arts Technical Foundation (manufacturer) [NOTE: TAPPI is the vendor]		X
T 227 Freeness of pulp (Canadian standard method)	FPInnovations	X	
T 231 Zero-span breaking strength of pulp (dry zero-span tensile)	QS Fibre Inc. Tinius Olsen Testing Machine Company, Inc.		X X
T 261 Fines fraction by weight of paper stock by wet screening	Paper Research Materials, Inc.		X
T 271 Fiber length of pulp and paper by automated optical analyzer using polarized light	Technidyne Laboratory Services		X
T 403 Bursting strength of paper	FPInnovations Technidyne Laboratory Services Custom Scientific Instruments, Inc	X X	X
T 411 Thickness (caliper) of paper, paperboard, and combined board	FPInnovations Technidyne Laboratory Services Custom Scientific Instruments, Inc	X	X X
T 425 Opacity of paper (15/d geometry, illuminant A/2 degrees, 89% reflectance backing and paper backing)	Technidyne Laboratory Services		X
T 437 Dirt in paper and paperboard	Printing Industries of America/Graphic Arts Technical Foundation (manufacturer) [NOTE: TAPPI is the vendor]		X
T 452 Brightness of pulp, paper, and paperboard (directional reflectance at 457 nm)	Technidyne Laboratory Services		X
T 456 Tensile breaking strength of water-saturated paper and paperboard (“wet tensile strength”)	Tinius Olsen Testing Machine Company, Inc.		X
T 460 Air resistance of paper (Gurley method)	Technidyne Laboratory Services		X
T 461 Flame resistance of treated paper and paperboard	Custom Scientific Instruments, Inc		X
T 476 Abrasion loss of paper and paperboard (Taber-type method)	Taber Industries		X
T 479 Smoothness of paper (Bekk method)	Technidyne Laboratory Services	X	
T 480 Specular gloss of paper and paperboard at 75 degrees	Technidyne Laboratory Services		X
T 489 Bending resistance (stiffness) of paper and paperboard (Taber-type tester in basic configuration)	Taber Industries		X

T 494 Tensile properties of paper and paperboard (using constant rate of elongation apparatus)	Tinius Olsen Testing Machine Company, Inc.			X
T 500 Book bulk and bulking number of paper	Custom Scientific Instruments, Inc.			X
T 511 Folding endurance of paper (MIT tester)	Tinius Olsen Testing Machine Company, Inc.			X
T 519 Diffuse opacity of paper (d/0 paper backing)	FPInnovations RISE Innventia AB Technidyne Laboratory Services	X X		X
T 524 Color of paper and paperboard (45/0, C/2)	Technidyne Laboratory Services			X
T 525 Diffuse brightness of paper, paperboard and pulp (d/0)	FPInnovations RISE Innventia AB Technidyne Laboratory Services	X X X		
T 527 Color of paper and paperboard (d/0, C/2)	FPInnovations RISE Innventia AB Technidyne Laboratory Services	X X X		
T 534 Brightness of clay and other mineral pigments (d/0 diffuse)	RISE Innventia AB Technidyne Laboratory Services	X X		
T 536 Resistance of paper to passage of air (high-pressure Gurley method)	Technidyne Laboratory Services			X
T 537 Dirt count in paper and paperboard (optical character recognition - OCR)	Printing Industries of America/Graphic Arts Technical Foundation (manufacturer) [NOTE: TAPPI is the vendor]			X
T 538 Roughness of paper and paperboard (Sheffield method)	Technidyne Laboratory Services			X
T 541 Internal bond strength of paperboard (z-direction tensile)	Custom Scientific Instruments, Inc. Tinius Olsen Testing Machine Company, Inc.			X X
T 547 Air permeance of paper and paperboard (Sheffield method)	Technidyne Laboratory Services			X
T 555 Roughness of paper and paperboard (print-surf method)	FPInnovations Technidyne Laboratory Services	X		X
T 560 CIE whiteness and tint of paper and paperboard (d/0 geometry, C/2 illuminant/observer)	RISE Innventia AB Technidyne Laboratory Services	X		X
T 562 CIE whiteness and tint of paper and paperboard (45/0 geometry, C/2 illuminant/observer)	Technidyne Laboratory Services	X		
T 563 Equivalent black area (EBA) and count of visible dirt in pulp, paper and paperboard by image analysis	Applied Image Group (manufacturer) [NOTE: TAPPI is the vendor]			X

T 564 Transparent chart for the estimation of defect size	Printing Industries of America/Graphic Arts Technical Foundation (manufacturer) [NOTE: TAPPI is the vendor]		X
T 566 Bending resistance (stiffness) of paper (Taber-type tester in 0 to 10 Taber stiffness unit configuration)	Taber Industries		X
T 567 Determination of effective residual ink concentration (ERIC) by infrared reflectance measurement	FPInnovations RISE Innventia AB Technidyne Laboratory Services	X X X	
T 646 Brightness of clay and other mineral pigments (45/0)	Technidyne Laboratory Services		X
T 653 Specular gloss of paper and paperboard at 20 degrees	Technidyne Laboratory Services		X
T 803 Puncture test of container board	Tinius Olsen Testing Machine Company, Inc.		X
T 804 Compression test of fiberboard shipping containers	Tinius Olsen Testing Machine Company, Inc.		X
T 807 Bursting strength of paperboard and linerboard	FPInnovations	X	
T 808 Flat crush test of corrugated board (flexible beam method)	Tinius Olsen Testing Machine Company, Inc.		X
T 809 Flat crush of corrugating medium (CMT test)	Tinius Olsen Testing Machine Company, Inc.		X
T 811 Edgewise compressive strength of corrugated fiberboard (short column test)	Tinius Olsen Testing Machine Company, Inc.		X
T 815 Coefficient of static friction (slide angle) of packaging and packaging materials (including shipping sack papers, corrugated and solid fiberboard) (inclined plane method)	Custom Scientific Instruments, Inc.		X
T 818 Ring crush of paperboard (flexible beam method)	Tinius Olsen Testing Machine Company, Inc.		X
T 820 Flexural stiffness of corrugated board	Tinius Olsen Testing Machine Company, Inc.		X
T 822 Ring crush of paperboard (rigid support method)	Tinius Olsen Testing Machine Company, Inc.		X
T 824 Fluted edge crush of corrugating medium (flexible beam method)	Tinius Olsen Testing Machine Company, Inc.		X
T 826 Short span compressive strength of containerboard	Tinius Olsen Testing Machine Company, Inc.		X
T 836 Bending stiffness, four point method	Tinius Olsen Testing Machine Company, Inc.		X
T 830 Ink rub test of container board and corrugated board	Danilee Company, LLC		X

\*see first page for description of Conditions 1, 2, and 3