



BPI Home Compostability Certification Scheme

Compostable products, resins, and components based on NF T 51-800

March 2025

Foreword

The International Biodegradable Products Institute (BPI) was formed as a non-profit in 1999 with the goal of scalable diversion of organic waste to composting by verifying that products and packaging will successfully break down in professionally managed composting facilities and home composting applications without harming the quality of finished compost. BPI operates North America's leading certification program for compostable resins, products and packaging, and maintains a publicly available database that lists every certified item by SKU.

Amendments

none

Earlier versions

none

Remarks

The English version of this certification scheme shall be taken as authoritative. No translation allowed without permission, and no guarantee is given to translated versions. BPI's Certification Marks are fully registered trademarks that cannot be used without a license.

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1. Scope

This certification scheme applies to compostable resins, components and final products, in connection with the testing foundations named below, and contains all requirements on issuing of the BPI home certification compostability mark. This proves that resins, components and final products fulfill BPI's requirements for home compostability, which are based on NF T 51-800. Variations between the French standard and BPI's scheme exist to align BPI's home and commercial compostability schemes, while being no less restrictive than the standard's specifications.

This certification scheme establishes the requirements that need to be met by the final product, resins or component directly, as well as requirements relating to the associated testing, monitoring and certification.

If a final product, resin or component demonstrates conformity to the criteria specified in this certification scheme, then a certificate will be issued, and the final product, resin, component will be listed in BPI's online database.

All products and packages must meet BPI's eligibility requirements detailed in Appendix B to be considered for certification. Products and packaging that do not meet these criteria are out of scope for this certification scheme.

2. Testing and Certification Specifications

The following referenced documents are the basis for testing and certification. For undated references, the latest edition of the referenced document (including any amendments) applies.

Final products, components and resins can be certified based on the following standards (certification standards):

NF T 51-800	Plastics – Specification for plastics suitable for home composting
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Final products, components and resins are required to demonstrate compliance with the requirements based on NF T 51-800 as described below in Section 6. Testing Requirements.

Laboratory testing must be performed according to the stipulations in the standard named above according to the standardized test methods listed, unless otherwise noted in this certification scheme.

Test methods:

<i>ASTM D646</i>	Standard Test Method for Mass Per Unit Area of Paper and Paperboard of Aramid Papers (Basis Weight)
<i>ASTM D1179</i>	Standard Test Methods for Fluoride Ion in Water
<i>ASTM D3776</i>	Standard Test Methods for Mass Per Unit Area (Weight) of Fabric
<i>ASTM D5729</i>	Standard Test Method for Thickness of Nonwoven Fabrics
<i>ASTM D6866</i>	Standard Test Methods for Determining the Biobased Content of Solid, Liquid, and Gaseous Samples Using Radiocarbon Analysis
<i>ASTM D6988</i>	Standard Guide for Determination of Thickness of Plastic Film Test Specimens
<i>ASTM F2251</i>	Standard Test Method for Thickness Measurement of Flexible Packaging Material
<i>EN 14582</i>	Characterization of waste - Halogen and sulfur content - Oxygen combustion in closed systems and determination methods
<i>EN 15408</i>	Solid recovered fuels - Methods for the determination of sulphur (S), chlorine (Cl), fluorine (F) and bromine (Br) content
<i>DIN 51723</i>	Determining The Fluorine Content of Solid Fuels
<i>ISO 534</i>	Paper and board — Determination of thickness, density and specific volume
<i>ISO 536</i>	Paper and board – Determination of grammage
<i>ISO 4591</i>	Plastics — Film and sheeting — Determination of average thickness of a sample, and average thickness and yield of a roll, by gravimetric techniques (gravimetric thickness)
<i>ISO 4593</i>	Plastics — Film and sheeting — Determination of thickness by mechanical scanning
<i>ISO 9073-2</i>	Test methods for nonwovens -- Part 2: Determination of thickness
<i>ISO 10304</i>	Water quality – Determination of dissolved anions by liquid chromatography of ions
<i>ISO 14855-1</i>	Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions -- Method by analysis of evolved carbon dioxide -- Part 1: General method
<i>ISO 14855-2</i>	Determination of the ultimate aerobic biodegradability of plastic materials under controlled composting conditions -- Method by analysis of evolved

	carbon dioxide -- Part 2: Gravimetric measurement of carbon dioxide evolved in a laboratory-scale test
<i>ISO 16929</i>	Plastics - Determination of the degree of disintegration of plastic materials under defined composting conditions in a pilot-scale test
<i>ISO 20200</i>	Plastics - Determination of the degree of disintegration of plastic materials under simulated composting conditions in a laboratory-scale test
<i>ISO 29073</i>	Test Method for Nonwoven Textile
<i>OECD 208</i>	Terrestrial Plant Test: 208: Seedling Emergence and Seedling Growth Test
<i>Standard Method 2540G</i>	Total, Fixed, and Volatile Solids in Solid and Semisolid Samples
<i>TAPPI T410</i>	Grammage of Paper and Paperboard
<i>TAPPI T411</i>	Thickness (caliper) of paper, paperboard, and combined board

The obligation to comply with relevant local laws and regulations is the responsibility of the manufacturer and is not relevant nor taken into account in this certification scheme.

3. Definitions

For the purposes of this certification scheme, the following definitions shall apply:

<i>Applicant</i>	Applicants can be either manufacturers or brand owners
<i>Blank compost</i>	Compost obtained from a parallel process without addition of sample material
<i>Blend</i>	Physical mixture of 2 or more materials without reactive process. A polymer, including masterbatches, colorbatches, etc., must be used at a threshold of 1% or greater for the mixture to be considered a blend.
<i>Certification</i>	Proof of conformity with the requirements of the named standards as well as with this certification scheme. A license to use the mark is granted
<i>Component/Intermediate</i>	Semi-finished item that will require disintegration testing when converted into a finished product (e.g., coating, adhesive, packaging roll stock)
<i>Continuous phase</i>	The background phase (polymer 1) of a multiphasic system with at least one further phase (polymer 2) (e.g. blend). A blend always has two phases: a continuous phase and the dispersed

	phase where the majority polymer is typically the continuous phase.
<i>Ingredient</i>	Substances or constituents, including a mixture of chemicals, added to a product, resin, or intermediate/component, e.g. adhesives, anti-blocking agents, plasticizers, inks. Does not include residuals, impurities or traces
<i>Film</i>	A term for sheeting having a nominal thickness not greater than 250 μm (0.01 in). In food packaging, this can also be defined as a thin continuous polymeric material used to separate areas or volumes, to hold items, to act as barriers, or as printable surfaces
<i>Fluorinated Substance</i>	per- and poly-fluorinated substance (PFC) organic fluorine substance containing carbon-fluorine bonds and carbon-carbon bonds but also other heteroatoms
<i>Grammage</i>	The area density of a paper or paperboard product, that is, its mass per unit of area (expressed either in grams per square meter or in pounds (lb) per a ream of sheets of a given (raw, uncut) basis paper size, known as basis weight)
<i>Materials of natural origin</i>	Chemically unmodified ligno-cellulosic and other naturally occurring organic materials, such as wood, wood fiber, cotton fiber, starch, recycled fiber pulp, or jute, as defined in D6868.
<i>Maximum thickness</i>	The greatest distance from the lower surface to the upper surface allowed for a certified item
<i>Printing Systems</i>	Consists of Print Receptive Primers/Ink Adhesion Promoters, Inks, Overprint Varnishes
<i>Product</i>	Finished article as received at a composting facility
<i>Production facility</i>	Location at which production of manufactured items is carried out. This is not necessarily identical to the certificate holder's address
<i>Resin</i>	Polymeric material consisting of molecules characterized by the repetition (neglecting ends, branch junctions, other minor irregularities) of one or more types of monomeric units
<i>Volatile solids</i>	Amount of organic matter present determined as the ratio of the difference between the dry mass of test sample and the mass remaining after incineration at 550 °C by the dry mass of test sample.

4. Certification Program for Home Compostability

Licensors will issue a Certificate to an Applicant, the Licensee or prospective Licensee, for a Product if it is determined, pursuant to the procedures set forth below, that all of the following criteria are met:

- A. The item (i.e. resin, component or finished product) is certified as meeting or exceeding ASTM D6400 for industrial compostability by BPI.
- B. The item (i.e., resin, component or finished product) meets the requirements of this certification scheme, which is based on NF T 51-800, as demonstrated by tests performed by a BPI Approved Laboratory according to the methodologies approved by BPI.
- C. The item (i.e., resin, component or finished product) meets the Application and Review Requirements set forth in this document and is in continuing compliance with the BPI License Agreement.

5. Application Requirements and Review

- A. Customer Documentation and Samples
 - a. Customers must complete the following forms:
 - i. Application (see formulation details below and note that all manufacturing facilities must be listed)
 - ii. Confidentiality Agreement (CDA) if there is not a current version on file
 - iii. Statement of no intentionally added organic fluorinated chemicals, such as perfluorinated and polyfluorinated substances.
- B. Formulation and Material Characteristics
 - a. Full formulation disclosure of each ingredient, even if below 0.1%, including its associated dry weight percent and supplier information, CAS#s and Safety Data Sheets (SDS), shall be submitted with the application for any ingredients that are not already BPI certified for home compostability. The overall formulation percentage shall equal 100.
 - i. In general, Category 1A or 1B carcinogens, mutagens or reproductive toxins (CMR) (according to the most current version of the GHS¹¹) shall not be intentionally used as ingredients. Any traces, residuals or impurities classified as Category 1A or 1B carcinogens, mutagens, reproductive toxicants according to the most current version of the GHS, shall not exceed 0.1% by dry weight in the product being certified, as assessed by SDS or additional disclosures from suppliers.
 - ii. In general, substances identified as Persistent, Bio accumulative, and Toxic (PBT) under US EPA or EU REACH Annex XIII shall not be

¹¹ https://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html

intentionally used as ingredients, and shall not exceed 0.1% per chemical by dry weight in the final product.

- iii. Organic fluorinated chemicals, such as perfluorinated and polyfluorinated substances, cannot be present.

- 1. NOTE: See section 6.C.f.iv for additional information and testing requirements.

- b. Any external ingredient/additive such as inks, coatings, lacquers and adhesives must be included in the formulation information.
- c. For multi-layer structures, each component must be separately listed, regardless of weight used, including adhesives.
- d. Description of the Product(s) as well as intended end use(s) and manufacturing processes for resins (injection, extrusion, thermoform, foodservice, film bags, laminations, etc.) must be included in the application.
 - i. Note: Once certified, only the specific brand names and item numbers (also known as stock keeping units or SKUs under which the product is identified to customers) listed on the certificate are considered covered by the certification.
- e. Maximum thickness and/or Maximum density/grammage (required for bagasse, molded pulp and paper products)
 - i. The maximum thickness/density/grammage assigned to a certificate is determined by the thickness/grammage/density of the certified item sample that successfully passed disintegration testing. The documented maximum thickness/grammage is equal to the arithmetic mean of the ten specimen measurements at the same thickest measuring point by the BPI Approved Lab for the disintegration test and confirmed by the verification samples measured by the Technical Reviewer (see Appendix C for guidance). The maximum thickness of a certified item in the marketplace cannot exceed the documented maximum thickness plus the standard deviation.
 - ii. When the thickness of the verification sample submitted to BPI's Technical Reviewer exceeds the average thickness plus the standard deviation, as presented in the disintegration report from a BPI Approved Lab, the Technical Reviewer will confer with the BPI Approved Lab to determine whether the same measuring points were used and to reconcile any identified discrepancies with measuring points. If it's determined that the same measuring locations were used, the applicant will be notified of the discrepancy and asked to confirm the samples tested and sent for verification were the same. In the case of an incorrect sample being sent for verification, a new set of verification samples may be requested for measurement. No more than three sets of samples will be evaluated for thickness measurements before a new disintegration test is required or an application is denied.
 - iii. The maximum thickness for a resin is determined by a successful disintegration test according to NF T 51-800. A resin certificate may be

issued based on a disintegration test conducted on a finished item, however the maximum thickness for the resin in that case will be equal to the thinnest measuring point on the finished item plus the standard deviation. Additional testing to determine the thinnest part of the disintegration test item, as determined by the technical drawings submitted to the BPI Approved Lab, may be required in such cases.

- iv. BPI Approved Labs will use the methods described in Appendix C when measuring the thickness/density/grammage of items undergoing disintegration testing, recertification, or validation testing (i.e., sublicensees) to determine the maximum thickness/grammage/density and/or ensure that a product's configuration remains unchanged.
- f. Supplemental information (e.g., existing third party compostability certifications, test reports from BPI Approved Laboratories).

C. Test Data to Demonstrate Compliance with NF T 51-800

To carry out the inspections and tests necessary for the evaluation and certifications, BPI uses BPI Approved Labs, test laboratories either accredited in the appropriate scope, or audited to show compliance, managed by the Technical Reviewer (DIN CERTCO) and published on BPI's website as an approved lab.

All documents must be submitted in English.

- D. Upon receipt of sample shipping forms, representative samples must be submitted to the Technical Reviewer (DIN CERTCO).

Samples will be documented, with thickness/grammage measured, FTIR and photographs.

6. Testing Requirements

- A. Biodegradation: If the test report is older than two years, at the time of application, the BPI Approved Lab will be asked to confirm the validity of the results in writing and the manufacturer must confirm that the product/resin/component has not been changed since testing.
 - a. For individual components, compounds, and substrates, biodegradation by at least one of the following:
 - i. Provide evidence of biodegradation through the use of a Licensor Certified Product certified by BPI for home compostability.
 - ii. Provide evidence of biodegradation through testing performed by a BPI Approved Laboratory:
 - 1. Under controlled conditions.
 - 2. For all test methods, the test environment shall be at an ambient temperature of $25 \pm 5^\circ \text{C}$.
 - 3. All products must demonstrate a satisfactory rate and level of

- biodegradation when tested in accordance with ISO 14855-1 or ISO 14855-2.
4. 90% absolute biodegradation or 90% relative to a suitable positive reference substrate, within 12 months. Evidence must be proven via a test according to the standards named under Section 2.
 - a. The cellulosic-fiber-based substrate or components are permitted to fulfill the requirements of biodegradation without testing if they are “materials of natural origin” demonstrated by showing that over 95 % of their carbon comes from biobased resources, using Test Methods D6866. Materials of natural origin are assumed to be biodegradable.
 5. Individual organic ingredients present in concentrations between 1%-10% by dry weight, including, pigments, inks, colorants, scents, secondary polymers, and glues, etc., must be tested separately and meet the biodegradation requirements according to this home composting scheme unless they are already certified compostable to industrial standards by BPI or meet BPI’s biodegradability requirements for industrial certification.
 - a. BPI reserves the right to request separate biodegradability testing of individual organic ingredients to the home composting biodegradation requirements.
 - b. This rule shall apply to individual organic ingredients present in concentration between 1-10% by dry weight until June 30, 2026. Beginning July 1, 2026, this rule shall apply to individual organic ingredients present in concentration between 1-15% by dry weight.
 6. Ingredients at or below 1% by dry weight are exempt from biodegradation testing, so long as the total of these does not exceed 5% by dry weight.
 - a. By June 30, 2026, the total must not exceed 3% by dry weight.
 - b. This includes all waxes, including natural waxes.
 7. Ingredients used with proportions of more than 10% by dry weight of the item being certified may be tested separately or as part of the end item.
 - a. If a copolymer or homopolymer is used above 10%, BPI reserves the right to request separate biodegradability testing of that component, with sufficient justification (e.g., for a traditionally non-biodegradable polymer such as polyethylene).

- b. By June 30, 2026, ingredients used with proportions of more than 15% by dry weight of the item being certified may be tested separately or as part of the end item.
 - 8. Ingredients on the Positive List in Appendix A may be permitted without biodegradation testing.
 - 9. A test is considered valid if:
 - a. The degree of biodegradation of the reference material is more than 70% after 90 days.
 - b. The difference between the percentage of biodegradation of the reference material in the different vessels is less than 20% at the end of the test.
 - c. The inoculum in the blank has produced more than 10 mg but less than 50 mg of carbon dioxide per gram of volatile solids after 10 days.
- B. Disintegration of the Final Product: If the test report is older than two years, at the time of application, the BPI Approved Lab will be asked to confirm the validity of the results in writing, and the manufacturer must confirm that the resin/product/component has not been changed since testing.

NOTE: Disintegration tests for components may be omitted, however the other requirements need to be met.

 - a. Quantitative disintegration of the final product at its maximum thickness, grammage, basis weight, and/or density, according to methods accepted in the most recent version of NF T 51-800.
 - i. After composting for no more than 180 days at $25\pm5^{\circ}\text{C}$, no more than 10% of the tested material's original dry weight may be found in a > 2 mm screen fraction. The test shall be carried out in accordance with the pilot-scale test in ISO 16929, or the lab-scale test ISO 20200.
 - ii. Special attention should be given to the visual aspects of compost. Visual contamination of compost as evidenced by reduction of aesthetic acceptability should not be significantly increased by any post-composting residues of the introduced packaging material.
 - iii. Residues remaining in packaging or substances that may be dispatched along with the compost product must be suitable for composting.
 - iv. Manufactured items where the contents for the most part remain present in the product during and after use and during composting (e.g., beverage extraction from a bag or capsule) shall be tested according to the Special Rule prescribed in Section 11, item VI.
- C. Compost Quality: If the test report is older than two years at the time of application, the BPI Approved Lab will be asked to confirm the validity of the results in writing, and the manufacturer must confirm that the product/resin/component has not been changed since testing.

- a. Effects of compost on two higher plants shall be determined by comparing compost produced with and without addition of test material, according to OECD 208 with the modifications mentioned in NF T 51-800 section 6.4.3 and Annex B.
- b. Compost to be used for plant toxicity tests shall be prepared according to ISO 16929 using a 10% sample input concentration. It is acceptable to use up to 9% of this input quantity in reduced-size form (e.g., as a powder).
- c. Testing shall be run in line with OECD 208 with the modifications mentioned in NF T 51-800 and must include the germination rate and biomass results.
 - i. Deviating from the standard, the use of a minimum of 50 seeds per replicate is allowed, if the test is performed using barley.
 - ii. It is possible to test samples designed to establish a maximum loading rate, rather than testing the actual finished item to be certified.
- d. Ingredients above 0.1% by dry weight must be determined to be harmless for the composting process by one or more of the following:
 - i. Safety Data Sheet;
 - ii. Pass testing of the finished product containing that ingredient; or
 - iii. Pass testing of the individual ingredient, either tested on its own or in combination with other ingredients.
- e. Ingredients below 0.1% by dry weight are not required to be tested separately. However, if these ingredients sum up to more than 0.5 % dry mass the following plant toxicity testing applies:
 - i. Pass testing of the finished product containing these ingredients with their maximum intended usage or
 - ii. Pass testing of individual ingredients, either tested on their own or in combination with all the other ingredients summing up to 0.5% or more.
- f. Regulated Metals, Total Fluorine and Ash Contents (Volatile Solids)
 - i. Test data must not be older than one (1) year.
 - ii. Tests to be performed on the final product. Alternatively, in the case of printed or colored products, the unprinted product and the inks (or a blend of the inks) can be analyzed separately.
 - iii. Concentrations of regulated elements (regulated metals and other substances hazardous to the environment) shall not exceed the limits described in Table 1 of section 6.2.2 of NF T 51-800 without exception.
 - 1. If thresholds in NF T 51-800 differ from the thresholds in BPI's Commercial Compostability Certification scheme, the more restrictive threshold shall prevail.
 - iv. Total fluorine must not exceed a maximum of 100 ppm, to restrict organic fluorinated chemicals.
 - 1. Naturally occurring fluorine resulting in greater than 100 ppm in the finished product may be accepted if ingredients are isolated to demonstrate the source is not from an organic

- fluorinated chemical (e.g., naturally occurring from inorganic fillers like talc).
- 2. The total fluorine concentration shall be analyzed using EN 14582, ISO 10304, DIN 51723, EN 15408, or ASTM D1179-04 test methods, where samples are prepared by digestion, not extraction.
- v. Ash requirements: packaging products shall contain at least 50% volatile solids which exclude largely inert materials, as determined by Standard Method 2540G or equivalent method provided that all performance requirements are met.
- g. FTIR and/or ATR
 - i. Test data must not be older than one (1) year.
 - ii. To be performed on the final product / product layers.
 - iii. To be performed on all sample formats submitted (e.g., resins, films, coated side, and uncoated side).
 - iv. In case of multi-component structures, all components need to be analyzed separately:
 - 1. Outer layers (in reflectance mode/ATR);
 - 2. Full laminate (in transmission mode);
 - 3. Inner layer material(s) separately (physically separated by the lab or provided separately);
 - 4. If all layers cannot be separated for analysis, this would not prevent the article from being certified. However, if the component identity is not clear through FTIR in transmission and/or reflectance mode, then supplemental information and/or testing may be necessary.

7. Certification Validity

BPI Reviews for an application will be valid for three (3) years, providing that the Product formulation is unchanged, and the Product thickness or density is not increased. Recertification testing is performed on products, resins and components every three years, to ensure that the formulation and configuration remain unchanged. This must be evidenced on schedule via confirmation of the current formulation, test reports from the last 12 months (Metals, Total Fluorine, Ash, FTIR, thickness, grammage), and samples sent in for assessment. If the formulation has changed significantly, additional testing may be required.

Applicant must follow instructions in Section 5 “Application Requirements and Review.”

8. Modification of an Existing Certification

The type and scope of supplementary testing will be determined by BPI in individual cases in coordination with the Technical Reviewer (DIN CERTCO). This is typically for small changes, such as adding printing inks to a previously unprinted item.

Alterations/Amendments

The certificate holder is required to notify BPI of all alterations to the manufactured item without delay. BPI will decide the extent to which testing must be performed and whether the change is significant. The respective test report(s) shall be sent to BPI by the BPI Approved Lab.

Should BPI and the Technical Reviewer (DIN CERTCO) determine that a substantial alteration has occurred, the certificate with the corresponding registration number shall expire. For the modified manufactured item, a new application for initial certification authorizing the use of the Home Compostability Certification Mark may be submitted.

The certificate holder remains responsible to notify BPI of any changes in the formal details (e.g., name of certificate holder or his address). For this purpose, an application for amendment must be sent to BPI. The certificate will be changed respectively.

The certificate holder may apply to BPI for an extension of the existing certificate for further design-types (sub-types) of the same type. It is for BPI to decide whether these amendments require a complementary examination. The design-types shall be entered in the certificate for the already certified product and, provided that the conditions are fulfilled, shall be regarded as an integral part of the same certificate.

9. Sampling

The samples used for initial certification and recertification testing must be delivered by the manufacturer to the BPI Approved Laboratory which has been commissioned to perform the tests, and similar samples must be sent to the Technical Reviewer (DIN CERTCO) or a lab designated by the Technical Reviewer (DIN CERTCO). The manufacturer bears the associated costs.

10. Certification

Certification in the sense of this scheme relates to the assessment of conformity of products, component or a resin by BPI and the Technical Reviewer (DIN CERTCO) on the basis of test reports submitted by BPI Approved Labs. In doing so, the products, component or resin being certified with the requirements of this scheme and the respective standards are examined and subsequently monitored.

11. Special Rules

1. For Blends of two BPI home compostable certified polymers either of the same or different polymer type

- a. If certification is being requested for an item consisting solely of two BPI home compostable certified polymers, and no additional additives are used, the following documents and information must be submitted:
 - i. Application form, including percentages of ingredients by dry weight;
 - ii. An infrared transmission spectrum, metals, and Ash test, as described in Section 6.C.f and Section 6.C.g;
 - iii. A photo, where applicable;
 - iv. Measurement of thickness or grammage as described in Section 5.B.e.
- b. The quantitative disintegration test may be omitted if the maximum layer thickness of the blend does not exceed the lowest maximum certified layer thickness of the polymers in use.

Example 1:

Polymer A1 is certified at 1.5mm

Polymer A2 is certified at 0.5mm

Disintegration testing can be waived if the thickness of the blend does not exceed 0.5mm.

Example 2:

Polymer A1 is certified at 2.0 mm

Polymer B1 is certified at 3.0mm

Disintegration testing can be waived if the thickness of the blend does not exceed 2.0mm.

2. Range for blends with the same or different continuous phase of 2 different polymers

For the certification of a range that consists solely of 2 BPI home compostable certified polymers with no additional additives, optimized disintegration testing structures can be used to certify compositional ranges.

Disintegration testing of different blend proportions of 2 different or same polymers can be waived if the continuous phase remains the same and the blend does not exceed the lowest maximum certified thickness of the lowest certified polymer.

Disintegration tests are to be performed on each end point ratio, if the continuous phase changes. The testing program will be defined in cooperation with the BPI, BPI's Technical Reviewer, and the BPI Approved Lab. In order to identify the continuous phase, the applicant must provide electron microscopy spectra (such as SEM or TEM) of each end point. The thickness approved will be according to the requirements of Section 5.B.e.

Example:

End Point 1:

Polymer A1 is certified for home compostability by BPI and is 80% of formulation (continuous phase)

Polymer B1 is certified for home compostability by BPI and is 20% of formulation

End Point 2:

Polymer A1 is certified for home compostability by BPI and is 20% of formulation

Polymer B1 is certified for home compostability by BPI and is 80% of formulation (continuous phase)

In End Point 1, polymer A1 is the continuous phase. In End Point 2, polymer B1 is the continuous phase. Both end points successfully disintegrated at a thickness of 2.0mm, therefore formulations that are at or between 80/20 to 20/80 may be certified without additional disintegration testing as long as they don't exceed 2.0mm thickness. If different end point thicknesses are tested, then only the lower thickness will be allowed.

3. Variations in the manufacturing process

To cover for variations in composition which are inherent to the manufacturing process, the BPI certificate is valid for a variant of this same material under the condition that this variant contains the same and no more constituents as the home compostable certified basic material and the ratio between the different constituents does not vary more than 20 % relatively speaking (e.g., the certification of a basic material with a composition of 70% - 20% - 9% - 1% is also valid for a variant with a composition of 70 +- 14% - 20 +- 4% - 9 +- 1.8% - 1 +- 0.2 % for the same components, taking into account that the total is still 100%). Subsequent variations must be compared to the tested material used in the original certification. BPI home compostability certification of a variant of a tested material having a composition falling within these levels of tolerance is not automatically granted and needs to be checked by BPI for compliance.

4. Manufactured items consisting of recycled paper

If BPI home certification is sought for a final product or intermediate/component consisting of recycled paper, then the following information must be submitted along with the application form, in addition to the standard requirements.

- a. Test report on the quality of the compost (plant toxicity) per NF T 51-800 If available, use samples from three (3) production runs to capture variation (lot to lot) as a composite sample.
- b. Signed self-declaration from Supplier of Quality Management Procedures (QMPs) for recycled paper sourcing, such as FDA requirements guaranteeing a program is in place. Self-declaration document should address, but not be limited to, the following elements to document an appropriate program is in place:
 1. Control of fiber source;
 2. Safe for intended use;
 3. Contains no, and was not used to hold, a poisonous or deleterious substance;
 4. Processes to prevent contamination (e.g., biological, chemical and/or physical).
- c. Recertification of finished products must additionally have:
 - i. Self-declaration document should address, but not be limited to, the following elements to document an appropriate program, remains in place:
 1. Control of fiber source;
 2. Safe for intended use;
 3. Contains no, and was not used to hold, a poisonous or deleterious substance;
 4. Process to prevent contamination (e.g., biological, chemical and/or physical).

5. Manufactured items composed of home compostable certified materials and materials indicated in Appendix A

If home certification is being requested for a manufactured item that is intended to contain the fillers and processing auxiliaries indicated in Appendix A, it is possible to certify individual compositions within a predefined composition range, without a new disintegration test (section 3 above).

Within the separate subgroups or sections (as per Appendix A), other mixtures may, under the following conditions, be certified up to the upper limit documented in the test report:

- a. For a home certified material, a supplier change for a specific constituent(s) on the Positive List in Appendix A may be approved without a new disintegration test under the condition that the constituent formulation from the new supplier is identical to the original constituent(s) under consideration. As proof that the

constituent from the new supplier does not introduce unacceptable levels of regulated metals into the environment, metals and FTIR tests must be submitted along with the application form.

6. Products/packages where the contents remain in the item during composting (e.g., coffee pods)

For the purpose of assessment, these products are defined to be composed of an outer envelope or enclosure and internal contents, where the purpose is water extraction of the contents. The contents remain within the envelope or enclosure during product use and, for the most part, after use (e.g., after water extraction through a capsule), and the item would be received by a compost facility in this condition. The products allowed under this Special Rule are coffee, tea, and solubles (specifically food or beverage substances, i.e., soup, hot chocolate).

The outer envelope or enclosure represents the part of the product containing the contents and includes capsules, pads and bags.

Assessment of products under this Special rule shall consist of the following:

- a. The biodegradation, ecotoxicity and material characterization on the product shall be performed only on the outer envelope or enclosure without the contents (i.e., without the coffee, tea or other solubles).
- b. The quantitative disintegration shall be performed on the whole product, that is, outer envelope or enclosure with contents. The quantitative disintegration test can be performed on a wet product, corresponding to an actually used coffee pod/capsule or tea bag. The 1% sample loading specified by ISO 16929 and in Section 6, Disintegration of the Final Product, would in this case refer to the dry weight of the outer envelope or enclosure without contents. Because the envelope or enclosure will still contain its contents when it is tested for disintegration, the amount of sample material compared to the compost might become too high and possibly hinder the composting process. Therefore, only for items assessed under this Special Rule, it is allowed to reduce the percentage of the dry weight of the outer envelope or enclosure down to 0.5% relative to the wet weight of the compost.
- c. No additional quantitative disintegration test is required for a change of content category of a previously tested outer envelope or enclosure when the change of content is:
 - i. From coffee to tea;
 - ii. From coffee to solubles;
 - iii. From tea to solubles.

No additional quantitative disintegration test is required for changes within a content category (e.g., changing types of coffee, changing types of tea, changing types of solubles). For other changes of content, an additional quantitative disintegration test of an already tested outer envelope or enclosure may be required.

- d. No additional quantitative disintegration test is required for a change in filter or lid, if that filter or lid is certified separately or if test reports on the new item demonstrate compliance with the ASTM standards. A change to the main structure (e.g., the rigid ring or cup) would require a new quantitative disintegration test.
 - i. If the new filter/lid in use contains a new adhesive for the ring/filter/lid/capsule substructure, then a new quantitative disintegration test is required.

7. Special cases for products/intermediates

a. Hollow body

In the case of hollow bodies with small diameter apertures (e.g., drinking straw), the maximum permissible wall thickness d_{\max} is limited to 50 % of the certified material thickness. This applies to all hollow bodies for which the ratio of volume to aperture area yields a value for x greater than 10 cm.

Calculation is based on the following formula:

$$x = \frac{\text{container volume}}{\text{aperture area}}$$

b. Packaging units

Packaging units are distinguished in easily manually separable units and not easily manually separable units.

- i. Easily separable units (e.g., yoghurt containers with lids).

These products will be processed as a packaging unit. All parts must independently show conformity with this certification scheme. Therefore, the calculation of potential ingredients will be referred to each single unit. Nevertheless, the complete and un-separated packaging unit needs to meet the requirements as well.

- ii. Not manually separable units

This refers to products like labels on packaging. These products will be processed as one unit. Any ingredients contained are being related to the whole unit.

If only part of the item is compostable, and would need to be disassembled, consideration is needed for appropriate labeling, and likelihood that a consumer will actually do the sorting. These must be reviewed on a case-by-case basis.

8. Self-adhesive labels

- a. The BPI Home Compostability Certification Mark shall only be used on self-adhesive labels in the following cases:
 - i. When directly applied to fruits or vegetables;
 - ii. If sold exclusively with a home compostable certified product or package and fulfilling the following requirements.
- b. A home compostable certified self-adhesive label and a home compostable certified product (film, takeout container, packaging) can be combined into a finished package or product, provided the following conditions are fulfilled:
 - i. The maximum surface area of the label does not exceed 10 % of the total surface area of the package/film.
 - ii. The maximum thickness of both the label and the package/film does not exceed 50 % of the certified thickness/grammage.

If above 10% of the total surface area then a quantitative disintegration test would be required. Additionally, the backing paper must be clearly identified to consumers as non-compostable, unless it has also been home compostable certified.

9. Substituting a BPI home compostable certified polymer with the same polymer that is also BPI home compostable certified by another supplier or another grade of the same BPI home compostable certified polymer from the same supplier, in a BPI home compostable certified final product

For a home compostable certified final product, a supplier and/or grade change for the home compostable certified polymer may be approved without a new quantitative disintegration test under the conditions that:

- a. The alternate BPI home compostable certified polymer has an equal or higher certified thickness than the certified final product;
- b. Thickness, density and/or grammage of each final product must be equal to or lower than the currently certified final product (see Section 5.B.e. for guidance);
- c. Metals + Total Fluorine, Ash analysis, FT-IR and thickness/grammage are submitted for each final product with constituent(s) from new supplier(s) and/or grade(s), as specified in Section 6.C. and according to the timeframe as determined by BPI; and
- d. There are no other formulation change(s) that would affect disintegration behavior according to other sections of this scheme.

10. Surface Printing Systems

Surface Printing Systems must meet all plant toxicity, heavy metals and total fluorine and ash requirements. For biodegradation, an individual organic ingredient must meet the biodegradation limits in section 6.A., with the following provisions:

- a. All final structures with Surface Printing Systems with cross-linked inks must be tested for disintegration, unless otherwise addressed by a separate rule.

- b. All final structures where an ingredient in the Surface Printing System is 100% coverage or greater, such as flood coat inks, overprint varnishes, etc., must be tested for disintegration with the maximum amount of polymeric ingredient applied, unless otherwise addressed by a separate rule.

11. Adding color or filler/processing auxiliary (from Appendix A) masterbatch

When adding a color or filler/processing auxiliary (from Appendix A) masterbatch to a home compostable certified product, additional quantitative disintegration testing might not be required if the carrier polymer used in the masterbatch is certified and is the same type of polymer as one of the polymer(s) used in the BPI home compostable certified product.

If the carrier polymer is not the same type as one of the polymer(s) used in the home compostable certified product or it is not certified, a new quantitative disintegration test would be required for the final product.

Other tests might still be required to cover the active ingredient in the masterbatch, for example plant toxicity and heavy metals, and other biodegradation rules will apply.

Appendix A similarly requires disintegration when fillers, colors and processing auxiliaries are used in excess of 3% in the final product (see Appendix A).

12. Substituting a monomeric component or monomeric reactant in the synthesis process with the same monomeric component or monomeric reactant from a different supplier for a BPI home compostable certified polymer

For a home compostable certified final polymer, a monomeric component or monomeric reactant change for the home compostable certified polymer may be approved without new ultimate biodegradation, plant ecotoxicity and quantitative disintegration testing under the conditions that:

- a. The CAS number of the monomeric component or monomeric reactant must be the same;
- b. The SDS shows equal or higher purity, aligned with stipulations in section 5.B.a.;
- c. Technical data sheet and/or additional information confirming that the physical properties of the resulting polymer made of the alternate monomeric component(s) or reactant(s) (i.e., melt flow index, molecular weight, viscosity, Differential Scanning Calorimetry (DSC)) are covered by existing test data for the certified final polymer;
- d. FT-IR is submitted for final polymer with monomeric component(s) and/or monomeric reactant(s) from new supplier(s), as specified in Section 6.C.;
- e. There are no formulation change(s) that would affect biodegradation, plant ecotoxicity and quantitative disintegration behavior according to other sections of this scheme.

12. Sublicenses

According to BPI's License Agreement, the rules governing BPI Certification Mark use, sublicenses are necessary if home compostable certified manufactured items are intended to be brought onto the market on behalf of companies other than the main certificate holder.

In all cases, a sublicense is only possible if the BPI License Member (in good standing) requests the sublicense be given to the applicant and the product to be sublicensed is not different in any way from what was BPI home compostable certified. This includes but is not limited to any changes in source or suppliers, printing, coatings, thickness (see Section 5.B.e. for guidance), or if the product will be packaged with other products that are not BPI certified, etc. A sublicense is only valid as long as the original certificate is valid. All use of the BPI Certification Mark or claims on any sublicensed product, packaging or promotional materials must be approved by BPI.

Films, resins, and components are not typically sublicensed, due to the potential for false certification claims from companies converting these items into finished products.

A. Types of Sublicenses:

- a. Sublicense 1: A sublicense agreement is required between BPI, the certificate holder and the sublicense applicant and the sublicense applicant must have its own unique Certification Mark/ID.
 - i. A company (sublicense applicant) who does not hold the certificate wants to sell a BPI home compostable certified product as a product to be resold.
 - ii. The product is not visibly co-branded with the original certificate holder (only the sublicense applicant will have their brand on the product).
- b. Sublicense 2: A sublicense agreement is required between BPI, the certificate holder, and the sublicense applicant. The sublicense applicant may choose to use either its own unique Certification Mark/ID or the certificate holder's, but it must be uniform across all products.
 - i. A company (sublicense applicant) who does not hold the certificate wants to sell a BPI home compostable certified product as a product to be resold.
 - ii. The product is visibly co-branded with both the sublicense applicant's brand and the original certificate holder's brand.
- c. Hybrid Sublicense: A hybrid sublicense agreement between BPI, the certificate holder and the sublicense applicant allows a sublicense to cover:
 - i. Assembly of the sublicensed item by the sublicensee when the full item has already been home compostable certified by the licensee (e.g., a

coffee pod is certified, and a sublicensee is doing the assembly at their own facility).

1. Sublicensee must send verification samples to BPI's Technical Reviewer for thickness (see Section 5.B.e. for guidance), FTIR, and photographing.
- ii. A sublicensee adding either a time/date stamp or the BPI Certification Mark ONLY to a sublicensed item. Ink use must be below the dry weight percentage threshold for compost quality testing as stipulated in Section 6.C. Compost Quality, Paragraphs d. and e. in the BPI Home Compostability Certification Scheme.
 1. Sublicensee must send a printed sample to the Technical Reviewer (DIN CERTCO) for photographing and submit a heavy metals test report and safety data sheets for the ink.

BPI reserves the right to determine eligibility of products for a hybrid sublicense.

B. Certifying an identical product

If a company (not owned by the certificate holder) wants to make the same exact product certified by BPI, with the original certificate holder's permission, a sublicense is not sufficient; they must certify the product.

C. Adding a manufacturing site

If a company wants to add an additional production site or change the production site (owned or hired by the certificate holder) to make the same exact product home certified by BPI for their use, then a sublicense is not necessary; they must demonstrate that it is the same exact product (e.g., sending samples produced at that site and FTIR testing, and thickness/grammage/density). For thickness/grammage/density measurements, refer Section 5.B.e. for guidance).

13. Conformity Assessment

On the basis of the documents submitted to BPI, the Technical Reviewer (DIN CERTCO) will conduct the conformity examination. The assessment is made with the aid of the test reports as to whether the product meets the requirements of the home certification scheme and of the underlying standards. The applicant will receive written notification from BPI in the event of any possible deviations.

14. Publication

All certificate holders can be viewed on BPI's database (www.products.bpiworld.org). Manufacturers, users and consumers use this research possibility for obtaining information on certified products.

Besides the contact details of the certificate holders (telephone, email, website), it is also possible to view the technical data regarding dimensions and maximum layer thicknesses for the home certified product and registered component. Individual SKUs are listed for each home certified item, and the published list is considered definitive.

15. Cancellation of Certificates

In the event that the new home certification assessment according to Section 5 has not been completed before expiration of the validity period, the certificates and the registration number expires without the necessity for explicit notification from BPI.

Furthermore, certificates can be cancelled if, for example:

- a. The BPI Certification Mark is misused by the certificate holder.
- b. The requirements laid down in the certification scheme or its accompanying documents are not fulfilled.
- c. If invoices are outstanding beyond 60 days.
- d. The prerequisites for the issuing of the certificate are no longer fulfilled.

16. Alterations to Cited Standards, Tests Used in Cited Standards or BPI Home Certification Scheme

If the test specifications/requirements are modified, an application for the alteration of the home certification shall be generally submitted within 6 months of receiving notification from BPI, and, as a rule, after 12 months, proof of conformity with the modified specifications shall be submitted (e.g., in the form of a positive test report), where applicable. The exact time limit will be defined by BPI based on the alterations that were made.

17. Compliance Checks for Resins, Components, Products

In the event that a home certified product on the market is found to be defective, the certificate holder shall be contacted in writing by BPI to rectify the defects.

In conjunction with BPI, the Technical Reviewer (DIN CERTCO) shall decide whether it is a serious or a minor defect.

In the case of serious defects having a direct or indirect effect on the degradation properties, the manufacturer must ensure that, until the defects have been rectified, the products are no longer marked with the BPI Certification Mark.

The defects must also be rectified without delay in installed products or products in storage. The manufacturer must submit proof to BPI within 3 months, in the form of a test report on the product, that the defects have been rectified and that the product in question again fulfills the stipulated requirements.

In the case of defects that have no influence on the degradation properties of the product (minor defects), the manufacturer must submit suitable proof to BPI within 3 months that the defects in the product in question have been rectified.

Should the manufacturer fail to observe these deadlines, the product certification will be canceled.

Should grounds for complaint continue to exist, BPI shall initially suspend the certificate and at the same time issue a final deadline for the rectification of the defects. Should the certificate holder fail to meet this demand, or fail to meet it within the grace period, or if it is not possible to prove that the defects have been rectified, the certificate shall be canceled.

Appendix A - Fillers, Colors and Processing Auxiliaries

If a home certification is being requested for a manufactured item that is intended to contain fillers and processing auxiliaries indicated below, it is possible to register individual compositions within a predefined composition range.

Materials may be used in varying proportions up to the given upper limits as ingredients in manufacturing or processing of compostable materials, so long as metals requirements for the finished product are still met. Filler or fiber in excess of 3% by dry weight present in a product, regardless of whether it is listed below, requires the product + filler/fiber to be tested quantitatively for disintegration.

For a home certified material, a supplier change for a specific constituent(s) on the list below may be approved without a new disintegration test under the condition that the constituent formulation from the new supplier is identical to the original constituent(s) under consideration. As proof that the constituent from the new supplier does not introduce unacceptable levels of regulated metals into the environment, metals and FTIR tests must be submitted along with the application form.

Main Group 1: Fillers

Subgroup 1.1: Inorganic constituents (fillers and pigments) - admixture up to a maximum of 49 % (by weight)

- a. Aluminum silicates
- b. Ammonium carbonate
- c. Calcium carbonate (treatments and/or coatings must be disclosed)
- d. Chalk (treatments and/or coatings must be disclosed)
- e. Calcium chloride
- f. Carbon black (pigment)
- g. Dolomite
- h. Iron oxides (pigment)
- i. Graphite (pigment)
- j. Gypsum
- k. Kaolin clay
- l. Mica
- m. Natural silicates
- n. Silicon dioxide; quartz
- o. Sodium carbonate
- p. Talc (treatments and/or coatings must be disclosed)
- q. Titanium dioxide (pigment)
- r. Wollastonite

Subgroup 1.2: Organic fillers - admixture up to a maximum of 49 % (by weight)

Subgroups 1.2.1 and 1.2.2 refer to filler materials, not to substrates.

Section 1.2.1: Non-modified native cellulose

- a. Vegetable fibers

Section 1.2.2: Non-modified native ligno-cellulose

These chemically unmodified materials are used as filler materials or reinforcing materials for biopolymers according to ASTM D6400. They are excluded from biodegradation testing; however, disintegration, ecotoxicity and metal and fluorine requirements must be met. For their use as substrates, biobased testing rules in ASTM D6400, and if applicable, ASTM D6868 and/or ASTM D8410 apply.

- a. Wood flour/wood fibers
- b. Vegetable fibers
- c. Cork
- d. Bark

Section 1.2.3: Chemically non-modified natural starch

- a. Starch
- b. Rye flour and other flours

Examples for chemically unmodified starch are physical reduction of molecular weight (e.g., by means of mineral acids) or similar. They are excluded from biodegradation testing; however, disintegration, ecotoxicity and metal and fluorine requirements must be met, if applicable, e.g., depending on the information in the Safety Data Sheet (purity, CAS#, etc.).

Main Group 2: Processing auxiliaries

Subgroup 2.1: Processing auxiliaries - admixture up to a maximum of 10 %

- a. Benzoic acid/sodium benzoate
- b. Erucic acid amide/erucic amide
- c. Glycerol monostearate
- d. Glycerol monooleate
- e. Stearates
- f. Urea

Subgroup 2.2: Processing auxiliaries - admixture up to a maximum of 49 %

- a. Glycerin/glycerol
- b. Sorbite
- c. Citric acid ester (with linear, aliphatic chains up to a chain length of C22)
- d. Glycerol acetates
- e. Xylite

Appendix B - BPI Eligibility Requirements

In addition to meeting the technical requirements in this certification scheme, and the BPI Certification Mark requirements in the License Agreement, all finished products and packages must be in scope and on the eligible list that appears at the end of this Appendix. The eligibility criteria are based on the following principles:

- The item must be associated with desirable organic wastes (e.g., food scraps and yard trimmings) that are collected for composting.
- The item cannot be a redesign of something that is a better fit for recycling based on existing demand, infrastructure, and consumer awareness (e.g., water bottles).
- The item cannot require disassembly in order to be composted.

Items That Do Not Meet Eligibility Requirements

For items that do not meet BPI's eligibility requirements, conditional certification may be granted for regional pilot projects, closed-loop venues, take-back programs, or other scenarios that demonstrate how leakage of materials into mainstream recycling will be prevented is demonstrated. Approval for these projects is decided by the Executive Director and BPI Board of Directors, after consultation with the Composter and Municipality Advisory Panel.

BPI Composter and Municipality Advisory Panel

BPI's Composter and Municipality Advisory Panel evaluates BPI's eligibility requirements and the list of eligible and ineligible finished products that appears at the end of this Appendix.

The Composter and Municipality Advisory Panel is overseen by the Executive Director and is comprised of a minimum of two Composters that accept compostable products and packaging and two Municipalities managing organics diversion programs that accept compostable products and packaging. This panel will meet monthly (or as needed) to review any changes to the list of eligible and ineligible products. A majority vote is required for any proposed changes, which will then go to the BPI Board of Directors, which similarly must be approved by a majority vote.

Companies who wish to submit a product or packaging concept to the panel can do so by sending an email to certification@bpiworld.org.

List of Common Eligible and Ineligible Finished Products

In Scope (Eligible)

- Foodservice Products and Packaging
 - Hot Cups, Cold Cups, Lids, Straws, Sleeves
 - Cutlery (loose and with compostable wrapper), Plates, Bowls, Take-Out Containers, Trays
 - Napkins, Paper Towels, Wraps, Wipes (for food-contact use)
 - Pizza Boxes, Cup Carriers, Platters

- Bags
 - Food scraps bags, can liners for food waste, drawstring food waste bags
 - Yard trimmings bags
 - Produce bags
 - Sandwich and resealable food storage bags
 - Retail/Takeout bags for “food use” (e.g. restaurants, supermarkets, farmers markets)
 - Pet food bags
- Coffee pods/capsules/tea bags, including solubles (specifically food or beverage substances, i.e., soup) pods/capsules, bags.
- Produce stickers, self-adhesive labels
- Flexible food packaging
 - Coffee beans/ground coffee, coffee pod mother bag
 - Snack packaging (chip bags, bar wrappers)
 - Stand-up pouches for food (including resealable)
 - Flour bags (stand-up pouch and paper-based)
- Foam shipping packaging for food use (currently packing peanuts, foam panels)
- Foam food-trays (meat, produce, etc.)
- Cling wrap and shrink films for food use
- Parchment and wax paper
- Agricultural mulch film, growing mediums, plant pots

Out of Scope (Ineligible without approval -- see above)

- ALL Non-Food Packaging
 - e.g., Apparel packaging, E-commerce packaging, electronics packaging, mixed retail packaging
- ALL Non-Food / Non-Yard Waste Bags
 - e.g., general use shopping bags, portable toilet bags, “trash” bags, pet waste bags, cat litter bags
- Bottles
- Shipping mailers
- 3D printing filament
- Dental hygiene products (e.g. toothbrushes, floss)
- Apparel including shoes
- Building materials
- Non-food cleaning wipes and sponges
- Diapers
- Foam packaging for pharmaceuticals or general shipping

Appendix C - Guide for determination of maximum thickness, density, and grammage of specimens for disintegration testing requirements

This guide is intended to provide common practices among labs to determine the maximum thickness of plastic, paper, and other samples where their maximum thickness, grammage and/or density will be used directly in defining the final product's compostability according to disintegration tests requirements in support of BPI home certification.

The maximum thickness/grammage/density for certification purposes is determined by the mean value of the maximum measurements obtained as described in the following sections. This guide should be used except as otherwise required by the Technical Reviewer (DIN CERTCO). If the lab or applicant has a question, the Technical Reviewer (DIN CERTCO) can review the item and provide guidance as part of the test scheme.

c.1 Thickness Measurement and Documentation Standards for 2-D products (such as film):

- i. The maximum thickness is measured. For this purpose, at least 10 specimens (preferably from the same lot) are measured at the same measuring point.
- ii. Document the mean value of the maximum and minimum measurements with their corresponding standard deviation for each sample type.
- iii. For bagasse, non-woven, woven and fabrics, molded pulp, and paper products, a maximum grammage measurement on at least 10 specimens is also required. Document the mean value of the maximum and minimum measurements with their corresponding standard deviation for each sample type.
- iv. The test report must state the type (including the foot size and foot pressure, if applicable) and measurement inaccuracy of the equipment used to take the measurements and a photograph or a precise description/drawing of the object showing exactly where the thickness measurements were taken shall be included in the report.
- v. Table C.1. provides further guidance on sampling, calibration, conditioning, and procedures.

Table C.1. Thickness and grammage determination methods

	Thickness determination method*	Grammage determination method*	Sample conditioning*
Plastic	ASTM D6988, ISO 4591, ISO 4593	NO	NO
Paper, bagasse, molded pulp	TAPPI T411, ISO 534	TAPPI T410, ASTM D646, ISO 536	YES (23 ± 1°C; 50 ± 2% RH)

Non-woven	ASTM D5729, ISO 9073-2	ASTM D3776, ISO 29073	YES (20 ± 1°C; 65 ± 2% RH)
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** It may be possible to use other methods to obtain equivalent results. Conditioning of the samples will depend on the material under evaluation. If conditioning before testing is appropriate, normal, and desirable, refer to this table or to DIN CERTCO for guidance.*

c.2 Thickness Measurement and Documentation Standards for 3-D Structures

- i. Take thickness measurements from each unique part of the structure, ensuring measurements are taken at the thickest part of each unique part. For example:
 - a. For cups, measure the wall, the side seam, the bottom seam, and bottom
 - b. For cutlery, measure handles, rims, and all other significant parts of each type of cutlery (spoon, fork, etc.)
 - c. For bags, measure the wall, the seam at the bottom and/or handle, and at the drawstring, if present
 - d. For drawstring bags, measure the wall, the draw string, overlap drawstring and bag (middle), seam overlap drawstring and bag
 - e. For straws, measure the wall
 - f. For coffee pods/capsules, the measurements shall be done in each single part according to their specific structure (see below Figure C.1 some examples for guidance):
 - For lid: follow instructions for 2-D products (films) – section c.1
 - For internal filter: follow instructions for 2-D products (films) – section c.1
 - For upper/bottom sieve: measure the wall, edge, and bottom.
 - For casing: measure the wall, edge, and bottom.
 - For whole pod/capsule: measure the overlap lid and casing



Figure C.1. Examples of typical coffee pod structures

- g. For flexible packaging, measure a single sheet (the sum of all external and internal layers) and measure the seam excluding the overlap flap. If the seam is ridged or rippled, measure the seam at the ridge. In the case of compressible products, adopt the appropriate procedures as described in ASTM F2251, ISO 4593, or other methods to obtain equivalent results.
 - h. For products with a complex geometry (e.g., complex plastic containers, complex hollow items, any structure where access is limited to one side) it is recommended to use ultrasonic thickness gauges or similar method/instrument that offers a wide measurement range, unless otherwise arranged with DIN CERTCO.
- ii. Take measurements from the exact same locations on at least 10 identical samples (preferably from the same lot).
 - iii. Document the mean value of the maximum and minimum measurements with their corresponding standard deviation for each sample type.
 - iv. For bagasse, non-woven, molded pulp, and paper products, a maximum density/grammage measurement is also required. Document the mean value of the maximum and minimum measurements with their corresponding standard deviation for each sample type.
 - v. In the test report, state the type (including the foot size and foot pressure, if applicable) and measurement accuracy of the equipment used to take the measurements and include a photograph or a precise description/drawing of the object showing exactly where the thickness measurements were taken.
 - vi. For guidance on calibration and sample conditioning please refer to Table C.1.
- c.3. Thickness Measurement and Documentation Standards for Non-Standard Products (To Be Used with Technical Reviewer's (DIN CERTCO's) Approval Only)

- i. For natural and chemically unmodified lignocellulosic fiber-only items (including leaf, bamboo, wood) with natural variability in thickness/grammage that does not allow consistent product dimension tolerances during the manufacturing process, then:
 - a. Measure thickness of each part of the structure, ensuring measurements are taken at the thickest part of each unique part. In case of a significantly high standard deviation, the Technical Reviewer (DIN CERTCO) will confer with the BPI Approved Lab to determine the specific measuring points.
 - b. Take measurements from the exact same locations on at least 10 identical samples (preferably from the same lot).
 - c. Document the mean value of the maximum and minimum measurements with their corresponding standard deviation for each sample type.
 - d. An average weight-per-item-measurement is also required. Document the weight of each item. Take weight measurements on at least 10 identical samples. Document the mean value of the maximum and minimum measurements with their corresponding standard deviation for each sample type.
 - e. In the test report, state the type of equipment and measurement accuracy used and include a photograph or a precise description/drawing of the object showing exactly where the thickness measurements were taken.
- ii. For expanded polymer products with non-uniform distribution of porosity, determination of thickness and weight-per-item is necessary, as described in section c.3.1. No grammage measurement is required.
- iii. Due to the increasing complexity of current packaging products in the market, all other products that present extraordinary features that are not described here, the methodology to follow needs to be consulted in advance with the Technical Reviewer (DIN CERTCO).

In the case of a recertification, if changes in the measurement location on the product have caused a difference in the documented maximum thickness, density and/or grammage, the lab may provide a set of measurements using this updated guidance and an affirmation that the product appears to be unchanged, but the location of measurements has changed, causing the discrepancy.