Biodegradability & Compostability Certifications Reference

Certification	US Test Standard	International Test Standard Closest Equivalent	Certifying Bodies
Industrial Compost *Requires a commercial compost facility to break down*	**ASTM D6400** – Standard Specification for the Labeling of Plastics Designed to be Aerobically Composted in Municipal or Industrial Facilities. *ASTM D6400 is designed to cover plastic films and bags.* ***ASTM D6868*** *is also for packaging that is designed to be composted, including plastic-coated paper and board.*	**EN 13432** – European requirements for packaging recoverable through composting and biodegradation. May feature the "seedling compostable" logo.	**BPI** (Biodegradable Products Institute in the US, based on results of ASTM D6400/6868 tests) **TUV Austria *OK compost INDUSTRIAL*** (Europe and internationally, based on results of EN 13432 tests) **CMA** (Compost Manufacturing Alliance) based on results of ASTM D6400/6868 compliance & field testing
Home Compost *Can break down in ambient backyard compost conditions*	*There is not currently an ASTM test standard in the US for home compostability*	**AS 5810 –** Biodegradable plastics suitable for home composting (Australia) – may feature cup "home compostable" logo at right **NF T 51-800** – Specifications for plastics suitable for home composting (France) **prEN 17427 –** Requirements and test scheme for carrier bags suitable for treatment in well-managed household composting plants (Europe)	**BPI** (Biodegradable Products Institute in the US, based on NF T 51-800 compostability standard) **TUV Austria *OK compost HOME*** (Europe and internationally, based on results of AS 5810 tests)
Landfill Biodegradation *Will break down in typical landfill conditions which lack oxygen*	**ASTM D5526 –** Standard Test Method for Determining Anaerobic Biodegradation of Plastic Materials Under Accelerated Landfill Conditions	*There is not currently a European test standard for landfill biodegradation*	*Currently no official certifications for landfill biodegradation*
Marine Biodegradation *Will break down in cold salt water*	**ASTM D6691 –** Standard Test Method for Determining Aerobic Biodegradation of Plastic Materials in the Marine Environment by a Defined Microbial Consortium or Natural Sea Water Inoculum	**OECD 306 –** Biodegradability in seawater (France) **ISO 16221** – Water quality: guidance for determination of biodegradability in the marine environment (international)	**TUV Austria *OK biodegradable MARINE*** (Europe and internationally, based on ASTM D6691 tests and criteria from withdrawn ASTM D7081 – Standard Specification for Non-Floating Biodegradable Plastics in the Marine Environment

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TUV Austria OK vs BPI – Industrial Compost Certification

Certification	Mark	Testing Standard	Biodegradation Requirements	Disintegration Requirements	Ecotoxicity	PFAs Restrictions
BPI Industrial Compostable		Based on ASTM D6400 (plastics), ASTM D6868 (coatings on paper), and ASTM D8410 (fiber-based)	**Temperature & Timeframe:** 25 ±5°C, 12 months **Conversion to CO_2:** 90% absolute or relative to cellulose control	**Temperature & Timeframe:** 25 ±5°C, max. 180 days **Criteria:** ≤ 10% (dry weight) of test material shall fail to pass through a 2 mm sieve **Visual Contamination:** No visual contamination allowed	**Testing:** Multiple mixtures of compost with and without disintegrated test material **Requirement:** Seed germination and plant biomass must be ≥90% of the blank compost control.	**Restrictions:** No intentionally added PFAS; 100 ppm max threshold
TUV Austria OK Compost – Industrial		Based on EN 13432/14995 (plastics for industrial composting)	**Temperature & Timeframes:** 20-30°C (below 30°C), 12 months **Conversion to CO_2:** 90% relative to cellulose control	**Temperature & Timeframe:** 20-30°C, max 6 months **Criteria**: < 10% (dry weight) of test material shall fail to pass through a 2 mm sieve **Visual Contamination:** No visual contamination allowed	**Testing:** Test material is added to compost at 10% (wet mass) **Requirements:** Seed germination and plant biomass must be ≥90% of the blank control compost. No phytotoxic effects should be observed.	**Restrictions:** No specific PFAS regulation but has restriction on total fluorine content; 100 mg/kg total fluorine max threshold
CMA Composter Approved		Based on ASTM D6400, ASTM D6868, and EN 13432, & utilizes field-based testing.	Doesn't specify, other than the requirement that products must demonstrate compliance with applicable ASTM standards. ASTM requirements: ≥ 90% conversion to CO_2 within 6 months, at 58 ±2 °C	>80% disintegration for fiber-based products and >90% disintegration for biopolymers when placed in a commercial composting process under normal operating conditions	**ASTM requirements:** Germination rate and plant biomass > 90% on minimum of 100 seeds	**Restrictions:** No specific PFAS regulation but has a restriction on total fluorine content; <100 ppm by a closed-vessel preparation method

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TUV Austria OK vs BPI – Home Compost Certification

Certification	Mark	Testing Standard	Biodegradation Requirements	Disintegration Requirements	Ecotoxicity	PFAs Restrictions
BPI Home Compostable		Based on NF T 51-800: Plastics – Specification for plastics suitable for home composting	**Temperature & Timeframe:** 25 ±5°C, 12 months **Conversion to CO_2:** 90% absolute or relative	**Temperature & Timeframe:** 25 ±5°C, max 180 days **Criteria:** ≤ 10% (dry weight) of test material shall fail to pass through a 2 mm sieve **Visual Contamination:** No visual contamination allowed	**Testing:** Multiple mixtures of compost with and without disintegrated test material **Requirement:** Seed germination and plant biomass must be ≥90% of the blank compost control	**Restrictions:** No intentionally added PFAS; 100 ppm max threshold
TUV Austria OK Compost – Industrial		Not based on a particular standard, but is the basis for several standards (AS 5810, NF T 51-800, prEN 17427)	**Temperature & Timeframe:** 20-30°C (below 30°C), 12 months **Conversion to CO_2**: 90% relative to cellulose control	**Temperature & Timeframe:** 20-30°C, max 6 months **Criteria:** < 10% (dry weight) of test material shall fail to pass through a 2 mm sieve **Visual Contamination:** No visual contamination allowed	**Testing:** Test material is added to compost at 10% (wet mass) **Requirements:** All constituents must meet concentration limits specified in EN standards. Does not require achieving a specific % of plant growth threshold	**Restrictions:** No specific PFAS regulation but has restriction on total fluorine content; 100 mg/kg total fluorine max threshold

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Frequently Asked Questions

Biodegradation vs. Disintegration – What do they mean?

Biodegradation and disintegration are both required for compostability, but they measure two different things.

- Biodegradation refers to the chemical breakdown of a material by microorganisms. In compostability testing, it is measured by how much of the material is converted into carbon dioxide (CO_2), water, and biomass.
- Disintegration refers to the physical breakdown of a material into smaller pieces during the composting process. It is measured by how much material remains after composting and sieving.

Testing for both biodegradation and disintegration is important, because a material may disintegrate into tiny fragments but not biodegrade, meaning the fragments persist as microplastics. Conversely, a material may biodegrade chemically but not physically break apart fast enough to meet composting timeframes. True compostability requires both!

Biodegradation Threshold: Why is it 90% and not 100%? Does that mean 10% could end up as microplastics?

The 90% biodegradation standard represents completeness of biodegradation, not 10% remaining material. It's set at 90% because biological experiments always have a ±10% experimental error. The difference in percentage is purely statistical for regulatory purposes.

What this means is that if a product meets 90% biodegradation, there should be no concern about microplastics. Think of it like your gas tank gauge. When your car's fuel gauge gets near "full," it's basically impossible to tell the difference between 90% full and 100% full. The sensor isn't that precise, and the top of the tank is shaped so the gauge barely moves. Biodegradation testing works the same way: once you hit about 90% broken down material, the measurement tool can't reliably tell if the last bit is gone or not. Additionally, to ensure that the undetectable 10% isn't something that won't break down, certifications require that any component making up 1-15% of the total product must be tested separately to ensure proper biodegradation.

What is PFAs testing? Why is it important?

PFAS testing refers to analytical methods used to detect the presence of per- and polyfluoroalkyl substances (PFAS). PFAS are a large class of synthetic fluorinated chemicals sometimes called "forever chemicals" that are often used in stain-resistant coatings, grease-resistant packaging, nonstick treatments, and various industrial processes.

PFAS are extremely persistent in the environment and do not biodegrade, which makes them incompatible with compostability claims. Additionally, consistent exposure to certain PFAS is associated with several health risks. BPI's compostability certification has a zero-acceptance policy on intentionally added PFAS and sets a strict threshold of 100 ppm (parts per million). TUV Austria OK certifications don't explicitly prohibit intentionally added PFAS, but they set a similar threshold on fluorine content (100 ppm), which can be used as an indicator of fluorinated substances that may include PFAS.

What is CMA and what does it do?

The Compost Manufacturing Alliance (CMA) is an organization that provides industrial composting facilities with an acceptance standard for compostables by performing field disintegration testing as an alternative to (or in addition to) in-lab testing. While certification bodies like BPI and TUV perform testing in lab settings, CMA provides the opportunity to test in real-world compost facilities, which can provide extra assurance to composters that these products will biodegrade properly in their facilities.

CMA receives samples, logs them, and places them at one or more composting sites for testing. At the end of the composting cycle, items are sifted from the feedstock and presented in a detailed photo report providing pass/fail information.

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Types of Plastics & Bioplastics

“Bioplastics” encompass several different materials with different properties and end-of-life solutions. When dealing with bioplastics, Atlantic would most likely be interacting with renewable, compostable bioplastics in the top-right corner below.

Biodegradable / Compostable

Petroleum-Based, Compostable Bioplastics

- **Structure**: fossil-based PBAT and PCL
- **Formulation**: New formulation – not made to behave like a traditional plastic
- **End of Life:** May be compostable; check for certification. Not recyclable.

Bio-Based, Compostable Bioplastics

- **Structure**: fossil-based PBAT and PCL
- **Formulation**: New formulation – not made to behave like a traditional plastic
- **End of Life:** May be compostable; check for certification. Not recyclable.

100% Petroleum-Based — **20% - 100% Renewable Inputs**

Traditional Plastics

- **Structure**: Typically made of bio-based PE or bio-based PET
- **Formulation**: “Drop-in” formulation – behaves like a traditional plastic
- **End of Life:** Often recyclable; not compostable or biodegradable

Bio-Based, Often Recyclable Bioplastics

- **Structure**: Made of fossil-based petrochemicals to create PE, PP, PS, & more
- **Formulation**: “Drop-in” formulation – is a traditional plastic
- **End of Life:** While all are hypothetically recyclable, some are not practical to recycle

Non-Biodegradable / Compostable

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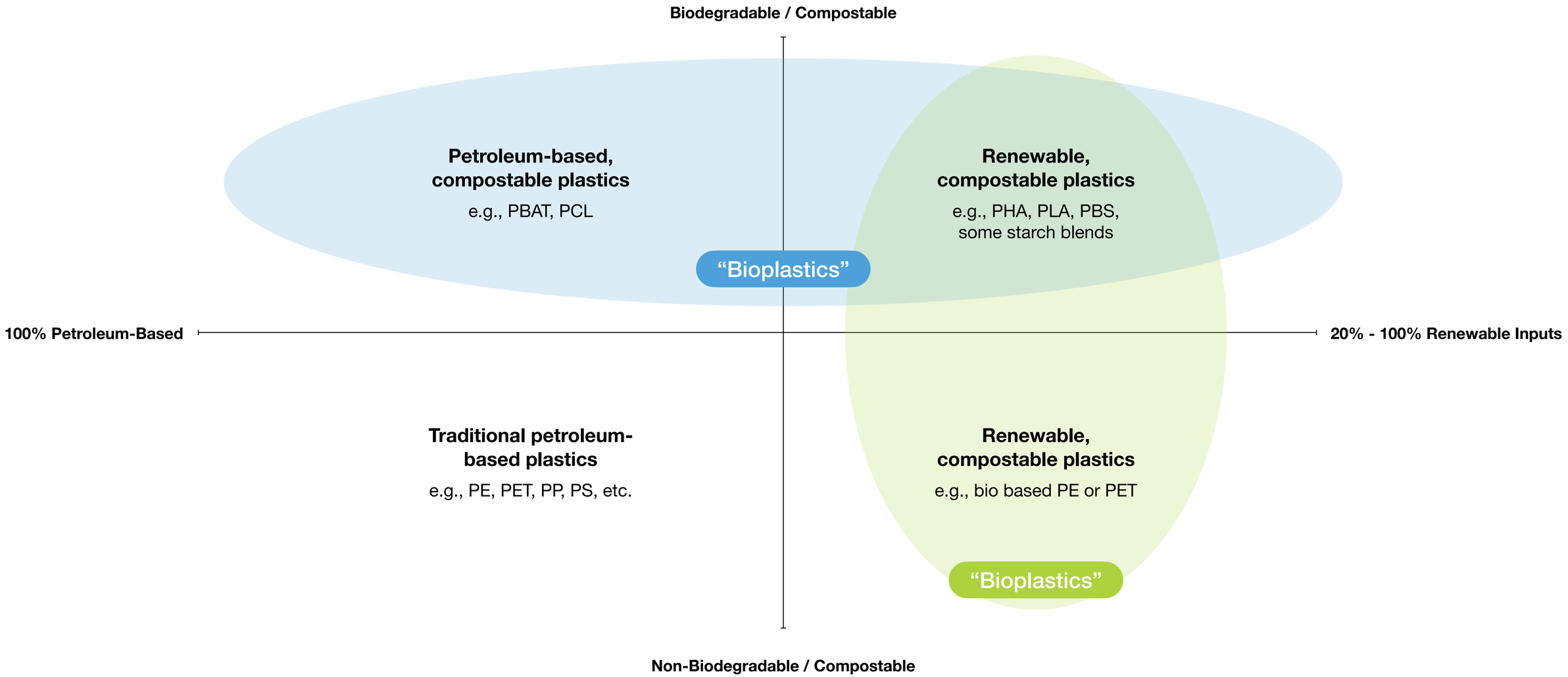
Types of Plastics & Bioplastics



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