

Recycled Polyethylene Terephthalate (PET) Testing

What Is Recycled Polyethylene Terephthalate (PET) Testing?

Recycled Polyethylene Terephthalate (PET) Testing involves a comprehensive suite of analytical procedures aimed at meticulously assessing the **quality, purity, characteristics, and conformity** of PET materials recovered from post-consumer and post-industrial waste, most commonly bottles and packaging.

Why Is Recycled Polyethylene Terephthalate (PET) Testing Important?

This crucial testing ensures that **recycled PET (rPET)** meets stringent industry standards, such as those detailed in **UNE-EN 15348**, and is suitable for its diverse end-uses, including new food-grade packaging (bottle-to-bottle), fibres for textiles, strapping, and thermoformed sheets.

Applus+ Laboratories holds ENAC accreditation (LE 1680) for polymer testing, demonstrating our unwavering commitment to **quality assurance** and precision in the characterisation of recycled materials. We are also COFRAC And NADCAP for melt temperature and density measurement.

What Compulsory Recycled Polyethylene Terephthalate (PET) Testing Do We Perform?

Our expert services evaluate the critical **physical, chemical, thermal, and rheological properties** that govern the successful processing and application of **recycled PET**. We offer in **sample preparation** from various forms of rPET, including the capability to perform **extrusion** and **injection moulding** to produce standardised test specimens. This ensures that test results are both accurate and truly representative of your **rPET recyclates**.

Our **Recycled PET testing** capabilities are carefully aligned with the characterisation requirements outlined in **UNE-EN 15348** and other relevant international standards.

Core Recycled PET Characterisation (Aligned with UNE-EN 15348)

These tests focus on the fundamental attributes of the **recycled PET** material, often considered mandatory for baseline **quality assessment** and batch consistency, whether for flakes or pellets.

Visual and Physical Characteristics:

- **Colour Analysis:** Performed via **visual inspection** for flakes and instrumentally using **colorimetry (in accordance with EN ISO/CIE 11664-4)** with spectrophotometer analysis for pellets. This ensures **colour consistency** and meets specific aesthetic or functional requirements for **rPET** products, including Delta E calculations.
- **Shape Evaluation:** Visual assessment to characterise the form of flakes or pellets.
- **Water Content Determination (Moisture Analysis):** Measured according to **UNE EN 15348 Annex B**, typically using the **Karl Fisher method**. Precise moisture analysis in a temperature-controlled environment is critical as PET is hygroscopic and excess moisture can degrade the material during melt processing.
- **Volumetric Density (Bulk Density):** Determined for pellets according to standards like **EN ISO 60** or **ASTM D1895 (Method C)**. This provides information on the packing characteristics of the material.
- **Particle Size Distribution and Pellet Size:**
 - For flakes: Analysis of **small particle content (fines)** as per **UNE EN 15348 Annex A** and determination of **maximum particle size** via sieving analysis.
 - For pellets (granza): Assessment of **pellet size**, often by weighing 100 granules or counting the number of granules in 1g.

Contamination Analysis:

- **PVC and Polyolefin Content:** Assessed as per **UNE EN 15348 Annex C, ISO 12418-2, or Annex D**. Techniques like **Pyro-GC-MS** can be employed. Identifying and quantifying these common contaminants is crucial for processing stability and final product quality.
- **Other Visible Contaminants:** Including **ferrous and non-ferrous metals**, labels from PET bottles, and other foreign materials, assessed according to **UNE EN 15348 Annex C** or **ISO 12418-2**. **ICP analysis** can be used for specific metal detection.

Processability and Thermal Properties:

- **Melt Mass-Flow Rate (MFR) / Melt Volume-Flow Rate (MVR):** Performed according to **EN ISO 1133-2**. This measures the flow characteristics of molten PET, an indicator of its average molecular weight and **processability**. (ENAC accredited for this test).
- **Melting Temperature (Tm) / Melting Point:** Determined using Differential Scanning Calorimetry (DSC) as per **EN ISO 11357-3**. This confirms the material as PET and provides information for setting processing temperatures.

Further Recommended Testing for Comprehensive PET Evaluation

This suite of tests provides a deeper understanding of the **recycled PET's** properties, often recommended for specific applications (especially food contact) or more stringent quality and regulatory requirements.

Advanced Physical and Mechanical Properties:

- **Density:** Determined according to **EN ISO 1183-1** (COFRAC/NADCAP accredited method available).
- **Intrinsic Viscosity (IV):** Measured according to standards like **ISO 1628-5**. IV is a key indicator of PET's molecular weight and is critical for predicting its mechanical performance, especially for bottle-grade rPET.
- **Hardness Testing:** Performed according to **ISO 868** (Shore D) (COFRAC/ENAC accredited method available).
- **Tensile Properties:** (Though not explicitly listed as mandatory in the provided PET document's table, this is a common and important test for mechanical performance characterisation, similar to PP/PE).

Composition, Purity and Stability:

- **Ash Content:** Measured according to **EN ISO 3451-5** to determine the amount of inorganic residue.
- **Thermal Stability (e.g., DSC analysis for degradation):** To assess how the material withstands processing temperatures without significant degradation.
- **Identification of Other Residuals/Contaminants:** Using techniques like **Infrared Spectroscopy (IR)**, X-Ray Fluorescence (XRF), DSC, GC-MS, or UPLC-MS for a broader screening of potential contaminants or additives.
- **Alkalinity:** Assessed as per **UNE EN 15348 Annex E**.
- **Filtration Test:** According to **UNE EN 15348 Annex F** or **EN ISO 23900-5** to assess the level of non-melting particulate contamination.

Safety for Specific Applications (e.g., Food Contact):

- **Migration Studies:** Essential for **food contact applications** to ensure that no substances migrate from the **rPET** into food at levels exceeding regulatory limits.
- **NIAS (Non-Intentionally Added Substances) Screening:** Identifying and quantifying substances that may be present in the **recycled PET** as a result of previous use or the recycling process itself.

What Are the Benefits of Recycled Polyethylene Terephthalate (PET) Testing?

Engaging in **Recycled Polyethylene Terephthalate (PET) Testing** with Applus+ Laboratories offers significant and multifaceted advantages for your business and products:

- **Ensure Product Quality and Regulatory Compliance:** Verifying **rPET** properties upholds high material and product **quality**, crucial for customer satisfaction and, especially for food contact, consumer **safety**.
- **Enhance Market Acceptance and Brand Reputation:** Providing certified test reports for your **recycled PET** significantly boosts its **credibility** and **transparency**. This makes your **rPET** a more attractive and trustworthy material for converters and brand owners, strengthening your market position.
- **Support Circular Economy and [Sustainability Commitments](#):** By rigorously testing and validating the **quality** of **recycled PET**, your organisation actively contributes to a robust **circular economy**. This reduces reliance on virgin plastics, conserves resources, minimises plastic waste, and promotes the use of [sustainable materials](#).
- **Optimise Processing and Reduce Production Issues:** Understanding the precise characteristics of your **rPET**, such as IV, moisture content, and MFR, allows for better control and optimisation of manufacturing processes, leading to reduced waste, improved efficiency, and consistent product output.

Why Choose Applus+ Laboratories for Recycled Polyethylene Terephthalate (PET) Testing?

Choosing [Applus+ Laboratories](#) for your **Recycled Polyethylene Terephthalate (PET) testing** needs means partnering with a globally recognised leader in [materials testing](#), inspection, and certification. We offer important advantages:

- **Recognised Expertise in Polymers:** We have extensive hands-on experience with polymer science and recycled materials, giving us practical insight into their real-world behaviour and properties.
- **Integrated Testing and Certification:** Streamlined **rPET testing** and **certification** from a single, expert team, simplifying regulatory navigation, especially for food-contact materials.
- **Accurate and Reliable Data:** Meticulous **PET testing** with stringent quality control, ENAC and specific method accreditations, delivering dependable data for informed decisions on your **rPET**.
- **Advanced Capabilities and Expertise:** State-of-the-art equipment and specialist knowledge for tackling **recycled PET** challenges, including contamination and NIAS screening.
- **Client-Focused Solutions:** Customised testing plans tailored to your unique **recycled PET** requirements, material challenges, and end-application needs.
- **Global Recognition and [Market Access](#):** Internationally respected reports and certifications, enhancing your **recycled PET** products' market standing and facilitating trade.



By partnering with Applus+ Laboratories, you gain access to world-class testing facilities, profound expert insights, and an unwavering commitment to helping you achieve your **quality, safety, compliance, and sustainability** goals for **recycled Polyethylene Terephthalate**.