

PLA/PBAT Biodegradable Composite Technical Data Sheet

PLA/PBAT biodegradable composite is a fully compostable modified polymer material, blended with Polylactic Acid (PLA) and Poly(butylene adipate-co-terephthalate) (PBAT). It perfectly combines the high rigidity, good dimensional stability of PLA and the excellent toughness, flexibility, elongation performance of PBAT, with full biodegradability and compostability compliant with international standards. It is widely used in eco-friendly packaging, disposable products, agricultural films, daily necessities and other green application fields.

1. Basic Physical Properties

Property Item	Unit	Standard Grade PLA/PBAT Blend	High Toughness Film Grade	High Rigidity Injection Grade	Test Standard
Density	g/cm ³	1.23-1.25	1.22-1.24	1.24-1.26	ISO 1183-1
Water Absorption (24h, 23°C)	%	0.2-0.4	0.1-0.3	0.3-0.5	ISO 62
Melting Point	°C	130-145	115-130	140-155	DSC Test
Glass Transition Temperature	°C	40-50	35-45	50-60	DSC Test
Crystallinity	%	28-35	25-30	35-40	X-ray Diffraction
Appearance	-	Translucent Off-White Granules	Translucent Milky Granules	Opaque Off-White Granules	Visual Inspection

Biodegradation Rate	%	≥90 (180 days)	≥90 (180 days)	≥90 (180 days)	ISO 14855-1
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2. Core Mechanical Properties (Key Indicators)

Performance Indicator	Unit	Standard Grade PLA/PBAT Blend	High Toughness Film Grade	High Rigidity Injection Grade	Test Standard
Tensile Strength	MPa	25-35	18-25	35-45	ISO 527-1/-2
Elongation at Break	%	300-500	600-900	100-200	ISO 527-1/-2
Flexural Strength	MPa	40-50	30-40	50-60	ISO 178
Flexural Modulus	GPa	1.2-1.6	0.8-1.2	1.8-2.2	ISO 178
Notched Impact Strength (23°C)	kJ/m ²	30-40	40-50	15-25	ISO 179-1
Unnotched Impact Strength (23°C)	kJ/m ²	150-200	200-280	80-120	ISO 179-1
Rockwell Hardness	R	90-95	80-85	100-105	ISO 2039-2
Tear Strength	kN/m	40-50	50-65	30-40	ISO 34-1

3. Thermal Properties

Thermal Performance	Unit	Standard Grade	High Heat Resistance	Test Standard
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Indicator		PLA/PBAT Blend	Grade	
Heat Deflection Temperature (HDT, 1.82MPa)	°C	45-55	65-75	ISO 75-1/-2
Continuous Service Temperature	°C	40-50	55-65	Long-term Test
Short-term Peak Temperature	°C	70-80	85-95	Instant Thermal Shock
Brittleness Temperature	°C	-35	-30	ISO 974
Coefficient of Thermal Expansion	$10^{-5}/^{\circ}\text{C}$	9-12	8-10	ISO 11359-2
Thermal Conductivity	W/(m·K)	0.22-0.25	0.23-0.26	ISO 22007-2
Thermal Decomposition Temperature	°C	>270	>280	TGA Test

4. Electrical Properties

Electrical Performance Indicator	Unit	General Grade PLA/PBAT	Test Standard
Dielectric Constant (1MHz)	-	3.0-3.5	ASTM D150
Dielectric Loss Factor (1kHz)	-	0.01-0.02	ASTM D150

Volume Resistivity	$\Omega \cdot \text{cm}$	$>10^{14}$	ASTM D257
Surface Resistivity	Ω/sq	$>10^{13}$	ASTM D257
Arc Resistance	sec	90-110	ASTM D495
Dielectric Strength	kV/mm	18-22	IEC 60243-1
Flame Retardant Rating	-	UL94 HB	UL94 Test

5. Chemical Properties & Environmental Resistance

Medium Type	Corrosion Resistance	Remarks
Water & Water Vapor	Good	Low water absorption, stable dimensional performance
Weak Acid (pH > 4)	Good	Stable at room temperature, no obvious corrosion
Strong Acid (pH < 4)	Poor	Hydrolysis and performance degradation at high temperature
Weak Alkali (pH < 10)	Good	Stable under normal use conditions
Strong Alkali (pH > 10)	Poor	Easy to corrode and soften
Alcohol Solvents	Excellent	No swelling, no performance change
Ester & Ketone Solvents	Poor	Swelling, softening and cracking may occur
Aromatic & Chlorinated Hydrocarbons	Poor	Dissolution and structural damage

Mineral Oil & Grease	Good	No obvious swelling, suitable for food contact
Industrial Composting Environment	Excellent	Fully biodegradable into CO ₂ , water and organic matter within 180 days
UV Radiation	Medium	UV stabilizer recommended for long-term outdoor use

6. Processing Properties (Injection Molding & Blowing Film)

Processing Parameter	Unit	Injection Molding Grade	Film Blowing Grade	Remarks
Barrel Processing Temperature	°C	170-190	160-180	Strictly control temperature, no overheating
Mold Temperature	°C	30-40	25-35	Improve surface finish and molding stability
Melt Flow Index (190°C/2.16kg)	g/10min	5-20	8-25	Stable melt viscosity, easy processing
Injection Pressure	MPa	60-90	-	Adjust according to product thickness
Holding Pressure	MPa	30-50	-	Reduce shrinkage and deformation

Cooling Time	sec	10-25	-	Extended properly for thick-walled products
Drying Condition	-	60°C×2-4h	60°C×2-3h	Moisture content must be controlled below 0.1%
Screw Speed	rpm	40-80	60-100	Avoid high shear causing material degradation

7. Key Quality Indicators of High-Quality PLA/PBAT

- **Biodegradation Compliance:** Fully meet ISO 14855, ASTM D6400, EN 13432 international compostable standards
- **Batch Stability:** Consistent blending ratio, stable performance between batches, performance fluctuation ≤5%
- **Low Impurity Content:** Ash content ≤0.1%, no black spots or foreign impurities, high molding surface finish
- **Thermal Processing Stability:** No obvious yellowing, degradation or performance attenuation during processing
- **Environmental Compliance:** Free of heavy metals, phthalates and harmful additives, food contact grade available
- **Molding Adaptability:** Good fluidity, suitable for injection molding, film blowing, blister and other processing technologies

8. Common Modified Grades & Typical Applications

Modified Grade	Core Performance Improvement	Typical Applications
Standard Compatibilized Grade	Balanced rigidity and toughness, wide processing range	Disposable tableware, daily packaging, plastic parts
High Toughness Film Grade	Ultra-high elongation, excellent tear resistance	Biodegradable bags, shopping bags, mulch

		film, packaging film
High Heat Resistance Grade	Improved heat distortion temperature, high temperature resistance	Food containers, lunch boxes, microwaveable packaging
High Rigidity Injection Grade	High strength, good dimensional stability, low warpage	Eco-friendly plastic parts, disposable utensils, flower pots
UV Resistant Outdoor Grade	Anti-UV, anti-aging, extended outdoor service life	Agricultural mulch film, outdoor packaging, garden supplies

Important Notes

1. PLA/PBAT material is sensitive to moisture and high temperature, sufficient drying is required before processing to avoid silver streaks, bubbles and performance degradation.
2. Processing temperature shall not exceed 200°C for a long time, so as to avoid thermal decomposition affecting material performance and biodegradation effect.
3. This material can realize complete biodegradation only under industrial composting conditions (58±2°C, high humidity, microbial environment), and the degradation rate is slow in normal temperature and natural environment.
4. All data listed in this document are typical industrial standard values, which may vary slightly with different formulations, processing equipment and test conditions.
5. We can provide customized grades with special performance, including targeted adjustment of toughness, heat resistance, biodegradation rate and processing performance according to customer requirements.