Reinforced Flame Retardant PBT (Polybutylene Terephthalate) Technical Data Sheet

Reinforced flame retardant PBT is a high-performance modified engineering plastic, prepared by adding glass fiber reinforcement and flame retardant additives to pure PBT. It integrates the excellent electrical insulation, chemical resistance and dimensional stability of PBT, with enhanced mechanical strength, rigidity and excellent flame retardant performance (up to UL94 V-0 grade). It is widely used in electronic and electrical, automotive electronics, precision components and other fields that require both flame retardancy and structural strength.

1. Basic Physical Properties

Property Item	Unit	15% Glass Fiber Reinforced Flame Retardant PBT	30% Glass Fiber Reinforced Flame Retardant PBT	Unreinforced Flame Retardant PBT	Test Standard
Density	g/cm³	1.40-1.45	1.55-1.60	1.30-1.35	ISO 1183-1
Water Absorption (24h, 23℃)	%	0.06-0.08	0.05-0.07	0.08-0.10	ISO 62
Melting Point	℃	220-230	220-230	225-235	DSC Test
Glass Transition Temperature	℃	45-55	48-58	42-52	DSC Test
Crystallinity	%	40-45	45-50	38-43	X-ray Diffraction

Appearance	-	Opaque White/Gray Granules	Opaque Gray/Black Granules	Translucent White Granules	Visual Inspection
Flame Retardant Rating	-	UL94 V-0 (0.8mm)	UL94 V-0 (0.8mm)	UL94 V-0 (1.6mm)	UL94 Test

2. Core Mechanical Properties (Key Indicators)

Performance Indicator	Unit	15% Glass Fiber Reinforced Flame Retardant PBT	30% Glass Fiber Reinforced Flame Retardant PBT	Unreinforced Flame Retardant PBT	Test Standard
Tensile Strength	MPa	80-95	125-140	55-65	ISO 527-1/-2
Elongation at Break	%	5-8	2-4	15-25	ISO 527-1/-2
Flexural Strength	MPa	120-140	190-210	80-95	ISO 178
Flexural Modulus	GPa	4.5-5.5	8.0-9.5	2.5-3.5	ISO 178
Notched Impact Strength (23℃)	kJ/m²	10-15	8-12	18-25	ISO 179-1
Unnotched Impact Strength (23℃)	kJ/m²	80-100	60-80	120-150	ISO 179-1
Rockwell Hardness	R	110-120	120-130	105-115	ISO 2039-2
Coefficient	-	0.20-0.28	0.22-0.30	0.18-0.25	ASTM

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3. Thermal Properties

Thermal Performance Indicator	Unit	15% Glass Fiber Reinforced Flame Retardant PBT	30% Glass Fiber Reinforced Flame Retardant PBT	Test Standard
Heat Deflection Temperature (HDT, 1.82MPa)	℃	160-180	200-210	ISO 75-1/-2
Continuous Service Temperature	℃	100-120	120-140	Long-term Test
Short-term Peak Temperature	℃	180-200	200-220	Instant Thermal Shock
Brittleness Temperature	℃	-40	-40	ISO 974
Coefficient of Thermal Expansion	10^{-5}/℃	4.0-6.0	2.0-3.5	ISO 11359-2
Thermal Conductivity	W/(m·K)	0.28-0.32	0.35-0.40	ISO 22007-2
Thermal Decomposition Temperature	℃	>300	>300	TGA Test

4. Electrical Properties

Electrical Performance Indicator	Unit	Reinforced Flame Retardant PBT (General Grade)	Test Standard
Dielectric Constant (1MHz)	-	3.2-3.8	ASTM D150
Dielectric Loss Factor (1kHz)	-	0.01-0.02	ASTM D150
Volume Resistivity	Ω·cm	$>10^{15}$	ASTM D257
Surface Resistivity	Ω/sq	$>10^{14}$	ASTM D257
Arc Resistance	sec	120-150	ASTM D495
Dielectric Strength	kV/mm	20-25	IEC 60243-1
Comparative Tracking Index (CTI)	V	≥300	IEC 60112

5. Chemical Properties & Environmental Resistance

Medium Type	Corrosion Resistance	Remarks
Water & Water Vapor	Excellent	Low water absorption, no obvious dimensional change
Weak Acid (pH > 4)	Good	Stable at room temperature, no corrosion
Strong Acid (pH < 4)	Poor	Easy to hydrolyze and degrade under long-term contact
Weak Alkali (pH < 10)	Good	Stable performance under normal use conditions
Strong Alkali (pH > 10)	Poor	Easy to be corroded at

		high temperature
Alcohol & Glycol Solvents	Excellent	No swelling, stable performance
Ester & Ketone Solvents	Poor	Easy to swell and crack, avoid contact
Aromatic & Chlorinated Hydrocarbons	Poor	Dissolution may occur, not suitable for long-term contact
Mineral Oil & Fuel Oil	Excellent	No swelling, suitable for automotive and industrial applications
UV Radiation	Medium	UV stabilizer recommended for long-term outdoor use

6. Processing Properties (Injection Molding Application)

Processing Parameter	Unit	15% Glass Fiber Reinforced Grade	30% Glass Fiber Reinforced Grade	Remarks
Barrel Processing Temperature	℃	240-260	250-270	Avoid overheating to prevent flame retardant decompositio n
Mold Temperature	℃	60-80	70-100	Improve crystallinity and surface finish
Melt Flow Index (250℃/2.16kg)	g/10min	15-30	8-20	Stable melt viscosity, suitable for complex parts

Injection Pressure	MPa	80-110	100-130	Adjust according to product thickness and complexity
Holding Pressure	MPa	40-60	50-70	Reduce shrinkage and deformation
Cooling Time	sec	15-30	20-40	Extended properly for thick-walled products
Drying Condition	-	120-140℃×4-6h	120-140℃×6-8h	Moisture content must be controlled below 0.05%
Screw Speed	rpm	50-90	40-80	Avoid high shear causing glass fiber breakage

7. Key Quality Indicators of High-Quality Reinforced Flame Retardant PBT

- Flame Retardant Stability: Stable flame retardant performance, up to UL94 V-0 grade (0.8mm), no flame retardant precipitation during processing
- Glass Fiber Dispersion: Uniform glass fiber distribution, no agglomeration, stable mechanical performance between batches
- Low Impurity Content: Ash content ≤0.15%, no black spots or foreign impurities, high molding surface finish
- Thermal & Processing Stability: No obvious yellowing, degradation or performance attenuation during high-temperature processing
- Environmental Compliance: Meet RoHS, REACH standards; halogen-free flame retardant grade optional, no harmful additives
- Dimensional Stability: Low shrinkage, low warpage, suitable for precision injection molding parts

8. Common Modified Grades & Typical Applications

Modified Grade	Core Performance Improvement	Typical Applications
15% Glass Fiber Reinforced Flame Retardant PBT	Balanced strength and toughness, good processability	Electronic connectors, switch shells, small precision parts
30% Glass Fiber Reinforced Flame Retardant PBT	High rigidity, high heat resistance, excellent dimensional stability	Automotive electronic parts, transformer skeletons, power supply shells
Halogen-Free Flame Retardant Reinforced PBT	Environmentally friendly, low smoke, low toxicity, UL94 V-0 grade	High-end electronic products, medical equipment accessories
High Heat Resistance Flame Retardant PBT	HDT up to 220℃ (1.82MPa), excellent high-temperature stability	Engine peripheral parts, high-temperature sensor brackets
High Flow Flame Retardant PBT	Good fluidity, suitable for thin-walled and complex parts	Thin-walled connectors, LED lamp holders, precision electronic components

Important Notes

1. Reinforced flame retardant PBT has low water absorption, but still needs sufficient drying before processing to avoid silver streaks, bubbles and other defects caused by moisture.

2. The processing temperature should be strictly controlled, and long-term processing above 275℃ should be avoided to prevent thermal decomposition of the flame retardant and reduction of flame retardant performance.

3. The flame retardant grade is closely related to the product thickness; the thinner the product, the more difficult it is to reach the UL94 V-0 grade, so the thickness should be reasonably designed according to the flame retardant requirements.

4. Glass fiber reinforced grade PBT has certain wear on the injection molding machine screw and mold, so it is recommended to use wear-resistant screws and molds.

5. All data listed in this document are typical industrial standard values, which may vary slightly with different formulations, processing equipment and test conditions.

6. Custom grades with specific flame retardant levels, glass fiber content, heat resistance and processing performance can be developed according to customer requirements.