TPU (Carbon Fiber Shaped Film) Product Manual

1.Product composition structure

Protective film
Hard Coating
TPU Base Film (carbon fiber shape)
Acrylic pressure sensitive adhesive
PET Liner

2.Technical Standards

2.1.Appearance performance

Product Name	TPU (Carbon Fiber Shaped Film) Paint Protection Film	
Use	Car paint protection	
Model	standard	
Point defects	0mm < Diameter≤0.6mm	Uncountable
	0.6mm < Diameter < 3.0mm	Allowed number: ≤20.0×S
	Diameter ≥3.0mm	Allowed number: ≤1.0×S
Linear defects	0.2 mm < Width≤0.5 mm, and the length is ≤80	Number of entries allowed: ≤2.0×S, and the line spacing ≥100
	Width > 0.5 mmor length > 80 mm	Not allowed
Scratching	Length ≤80 mm,and0.2 mm < Width≤0.5 mm	Number of entries allowed: ≤5.0×S, and the scratch spacing ≥
	Length > 80 mm,and0.2 mm < Width≤0.5 mm	Number of entries allowed: ≤1.0×S
	Width > 0.5 mm	Not allowed
Arch & Uneven membrane surface	177°≤Bending radius≤183°	Allowed
	Bending arc177°Or bending radius > 183°	Not allowed
Protective film with air bubbles	Visible	Allowed number: ≤2.0×S
foreign body	Visible	Not allowed
Cracking	Visible	Not allowed

Test method description:1.SThe membrane area is in square meters, with two decimal places.2.Coating dumb strip, removalHCAfter the protective film is applied, the sample surface is inspected visually naturally; 3. All appearance anomalies are measured in the area with the highest density of sampled anomalies;4.Point defects include crystal points, concave and convex points, shrinkage holes, fisheye points, etc. 5. Linear defects include adhesive surface lines, bubble lines, stop marks, indentations, rib lines, horizontal lines, etc.6.Foreign objects include mosquitoes, dried glue, dirty spots, etc.

2.2.Specification

Product Name	TPU (Carbon Fiber Shaped Film)
Thickness (Protective film)	50 (μm)
Thickness (TPU & HC & Glue)	220μm±15um
Thickness(PET release film)	75μm(Wet Application)/120um(Dry Application)

2.3.1Physical performance indicators

model	Test Data	Test Method
Glossiness (60°)	≥90 (%)	GB 8807
Coating elongation at break	≥100 (%)	GB/T 1040.1
Elongation at break of finished product	≥220 (%)	GB/T 1040.1
Finished product tensile strength at break	≥15 (N/25mm)	GB/T 1040.1
Finished product release force	≤0.35 (N/25mm)	GB/T 2792
Initial adhesion	≥6 (N/25mm)	FTM 9
24h,180°Peel force	≥8 (N/25mm)	GB/T 2792

Note: The above data are laboratory test data

Test method description: The elongation at break of the coating is in accordance with the provisions of GB/T 1040.1 Determination of tensile properties of plastics Part 1 General Principles. During the tensile test, the elongation at break of the finished product is recorded when the HC coating breaks during tensile testing.

2.3.2 Characteristics

Model	Measured Data	Test Method
Scratch repair ability	Heat Self-repair	(0.1mm) Copper brush&Drying gun
Water contact angle	≥100(°)	refer to DL/T864appendixA
Acid and alkali resistance	No visually visible coating disadvantages	Experimental method
YellowingE	≤2	GB/T 16422.1-2006
Stain Resistant	No visible water spots	GB/T 16422.2
Heat and humidity aging resistance	No visible bubbles, cracks, or discoloration	Constant temperature and humidity,168h
Puncture resistance	≥130 (N)	QC/T 1171-2022

Test method description:1. Scratch repair ability: use a copper brush with a copper wire size of less than 0.1mm, brush the coating surface in a circular manner for 10 times, then heat it with a baking gun or 100℃ boiling water, and visually inspect the disappearance of fine scratches;
2. Acid and alkali resistance: 10% hydrochloric acid and 0.1mol/L sodium hydroxide solution are applied to the surface of the sample and left naturally for 24 hours, and the appearance of the sample is evaluated for visually visible bubbles, cracks and other coating defects;
3. Anti-stain: use equipment with UV radiation, heating and spraying functions to destroy the sample. The parameter setting refers to the corresponding provisions of GB/T 16422.2, and the spray water uses general industrial water.
4. Resistance to wet and hot aging: keep the temperature constant at 80℃±2℃ and the relative humidity constant at 85%±2% during the test, and compare the gloss and 180° peel strength of the sample before wet and hot aging.