

PETG Metal Decorative Film Inspection Standard

NO.	Inspection Item		Test Method/Basis	Judgment Standard	Inspection Equipment
1	Product Size		Width	Slicing width $\pm$ 2.0mm,Coil width $\pm$ 2.0mm.	Tape measure
			Thickness (Measure the position of 12 points evenly in the width direction)	0.10<math>d\leq0.20 $\pm$ 0.01 0.20<math>d\leq0.40 $\pm$ 0.02 0.40<math>d\leq0.80 $\pm$ 0.03	Micrometer
2	Surface flatness		Check with eyes and board surface at 20 °to 90 °under sufficient light	After the surface treatment, place the product on a flat surface for inspection , No obvious unevenness and bending are allowed (close to the flatness of the original board).	Visual estimation
3	Effective area of surface treatment		Visual inspection	On the front side of the product, do not apply coating within 3–5 mm from both ends.	Tape measure
4	Surface treatment effect		Q/WSC-PK-JY-048 Visual inspection , from different perspectives	The surface must be smooth with uniform color. There should be no missed coating, dirt, impurities, or oil residue. The reverse side must be free of UV coating agent. When inspected with a high-intensity flashlight from different angles, no dense pits or bumps are permitted, and no transfer film wrinkle lines or patterns are allowed. For textured glitter silver finishes, the texture must be clear and consistent.	Visual estimation
5	Directionality		Visual inspection	During substrate surface treatment, the outermost layer should be the feed end. After treatment, the core of the roll becomes the outermost layer. The roll must then be sent to the film laminating machine for protective film application according to this rule. If rewinding is required under special circumstances and this orientation is disrupted, the roll must be rewound again to restore the correct direction to prevent color variation due to inconsistent orientation.	Visual estimation
6	Protective film	Conventional	Visual inspection	The following defects are not allowed: adhesive residue, scratches, damage, wrinkles, lifted film, bubbles, or contamination from oil debris. Edges must be trimmed neatly.	Visual estimation
		Temperature resistance	GB/T 17657-2022	Constant Temperature and Humidity Test Chamber , Condition: 60°C, 50–60% relative humidity, 168 hours.After film removal, the product surface must show no adhesive residue.A minimum of 3 samples are required for testing.	Constant temperature and humidity test chamber
		Resistance to cold and heat cycle		Constant Temperature and Humidity Test Chamber: One test cycle consists of: 60°C at 50-60% relative humidity for 4 hours, followed by -20°C at 0% relative humidity for 4 hours. A total of 6 cycles shall be performed.After the final cycle, the test is concluded when the temperature recovers to approximately 25-30°C. The test samples shall then be placed under standard atmospheric conditions for 2 hours.Upon completion of this conditioning period, the samples shall be inspected. After peeling off the protective film, the product surface shall show no adhesive residue, and the protective film itself shall show no signs of embrittlement. A minimum of 3 samples are required for this test.	
7	Bump/Pockmark/Crystal point/Impurity point		Visual inspection	Points with $\Phi \geq 1.0\text{mm}$ are not allowed, $1.0\text{mm} > \Phi \geq 0.5\text{mm}$ allow1, $0.5\text{mm} > \Phi \geq 0.3\text{mm}$ allow2 , point distance should be $\geq 150\text{mm}$, $0.3\text{mm} > \Phi \geq 0.15\text{mm}$ allow3 , point distance should be $\geq 100\text{mm}$, $\Phi \leq 0.15\text{mm}$ The defective points are not dense.	Visual inspection with a film dot gauge (calculated by an area of 500mm*500mm) ,viewing distance 50cm.
8	Scratch		Visual inspection	Allow 1 length $\leq 30\text{mm}$, line width $\leq 0.05\text{mm}$, front view is not visible,oblique view visible without tactile scratches.	Visual inspection with a film dot gauge (calculated by an area of 500mm*500mm) , viewing distance50cm.
9	Cutout		Visual inspection	Requires a smooth and straight surface, free from chipping, dog-tooth edge cracks, film peeling and other defects.	Visual estimation
10	Rupture		Visual inspection	Not allowed.	Visual estimation

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11	Color		GB/T 17657-2022 in 4.34	Visual color must be essentially consistent with no significant variation. When compared to the standard reference sample, the color difference must be $\Delta E \leq 1.5$. (mainly visual, supplemented by color difference value).	Visual inspection, color difference meter
12	Back coating tension		ASTM D3363	After back coating $\geq 38\text{mN/m}$ (3 seconds without shrinkage).	Dyne pen
13	Coating hardness		GB/T 17657-2022 in 4.58	Hardness $\geq H$, Test Method: Using a Mitsubishi pencil with a 500g load at a 45° angle. Note: Samples shall be taken from the 100mm position from the top edge. One sample each from the left, middle, and right sections must be tested. For each sample, the test is performed 5 times. A sample is considered acceptable if no scratch or gouge is observed in at least 4 out of the 5 tests.	Electric pencil hardness tester / weight
14	Coating thickness		GB/T 13452.2-2008 ISO 2808:2007	$\leq 10\mu\text{m}$.	Coating thickness gauge
15	Wear resistance		ASTM F2496 ISO 1518-1 ISO 1518-2 GME 60248 D42 1775	$\geq 50\text{r}$, A pressure of 750 g/cm^2 is applied to the coated surface. After 50 cycles, the abraded area may show only slight pinpoint scratches or no scratching at all.	Reciprocating abrasion testing machine/#0000 steel wool
16	Glossiness	High gloss	GB/T9754-2007	/	Gloss Meter
		Matte		The sample is placed flat on the test bench, and the gloss meter angle is adjusted to 60° test. The test results are: $20^\circ \text{angle} \leq 1.5$, $60^\circ \text{angle} \leq 6.0$, $85^\circ \text{angle} \leq 40.0$.	
17	Scratch resistance	Ordinary	/	/	/
		Scratch resistance (Customized)	GB/T17657-2022 in 4.42	1.2N(60g), ① More than 90% of the surface of the test piece has no continuous scratches ② Coating thickness $\leq 10\mu\text{m}$ ③ Front and back sides, horizontal and vertical winding to 3inch core, no cracking is OK	Scratch resistance tester
18	Surface stain resistance		GB/T17657-2022 in 4.43	① After 16 hours, there is no obvious discoloration after the pollution resistance test. ② After 30 minutes, there is no obvious discoloration after the acetone test. ③ Red ink can be wiped off with clean water. ④ 6824 Oily pen can be wiped off with 75% alcohol. ⑤ 6824 Oily pen can be wiped clean with nano sponge magic eraser dry wipe.	Huang Yu liquid shoe polish, Nestlé coffee 80°C water, soy sauce, acetone, cola, aged vinegar, red ink, 6824 oily pen, 75% alcohol, nano sponge magic eraser
19	Contact Angle		GB/T 30693-2014	Test water with 3 microliters of water, contact angle $\geq 88^\circ$.	Water contact angle tester
20	Adhesion	Conventional	GB/T17657-2022 in 4.57	$\geq 4\text{B}$, left, middle and right hundred grid tests 3 times each.	3M#600/681 (replacement 610) Test tape/gridder
		Boiling in water		/	
21	Yellowing resistance (168h UVA340)		GB/T23983-2009 GB/T17657-2022 in 4.32	$\Delta E \leq 3$ (Surface oil: $\Delta E \leq 0.7$).	UV yellowing resistance test chamber
22	Lightfastness		GT/T17657-2022 in 4.31	≥ 3 level.	Xenon arc lamp test chamber, 8 grade blue wool standard sample, gray card
23	Winding		Packaging operation specification	1250mm $\times$ 3inch compression-resistant polished pipe, smooth surface, no unevenness, neatly rolled, no edge running, 250meters/roll, protective film facing outwards.	Visual estimation

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24	Product packaging	Packaging operation specification	The tape is dark brown tape. After processing, first wrap it with stretch film, and then wrap the product horizontally with tape3-5laps to prevent the side of the product from being misaligned. The outer packaging is packaged with pearl foam packaging paper printed withLOGO, and both ends of the product are sealed and packaged with paper corner protectors and hardened corner protectors. The packaging should be complete and undamaged.	Visual estimation
25	Product identification sample	Visual inspection	① On the outer packaging paper, aligned with the top center position directly above the logo and below the corner protectors, affix one large label (58mm*218mm, 3 labels in total) with identical information, centered on the back of an A4 sample (210mm*297mm). The labeling should be standardized, comprehensive, clear, and accurate. ② The label should include the following information: Product Name, Product Series, Protective Film Name, Product Article Number, Product Specifications, Product Quantity, Base Material Number, Surface Treatment Number, Production Date, and other information. ③ Label information, physical object, A4 sample, the three must be consistent.	Visual estimation