

Comprehensive Guide for Plating & Coating Processes

電鍍和塗層製程指南

COATING & PLATING 塗層和電鍍	METHOD 工藝	ROHS/ WEEE COMPLIANT 符合 ROHS/WEEE 標準	APPLICABLE MATERIALS 材料	BENEFITS 優點/益處
Chemical conversion (Passivation) 化成皮膜處理	Trivalent chromium (Cr+3) 三價鉻	YES 是	Die-casting Aluminum alloys 壓鑄鋁合金 Aluminum alloys 鋁合金	1. Cost is better than Cr+6, because the toxic is less. 成本比六價鉻好，因為毒性較小 2. Improved corrosion resistance. 提高耐腐蝕性能 3. Lower concentration levels result in less chromium waste. 濃度較低的水平會導致較少的鉻廢物 4. Painting adhesionability 噴塗附著性
	Cr-free passivation 無鉻鈍化/非鉻皮膜	YES 是	Die-casting Aluminum alloys 壓鑄鋁合金 Aluminum alloys 鋁合金	1. Corrosion resistant 耐腐蝕性 2. Painting adhesionability 噴塗附著性
	Hexavalent chromium (Cr+6) 六價鉻	NO 否	Die-casting Aluminum alloys 壓鑄鋁合金 Aluminum alloys 鋁合金	1. Corrosion resistant 耐腐蝕性 2. Painting adhesionability 噴塗附著性
	Phosphate passivation 磷酸鹽鈍化	YES 是	Die-casting Aluminum alloys 壓鑄鋁合金 Aluminum alloys 鋁合金	1. Corrosion resistant 耐腐蝕性 2. Painting adhesionability 噴塗附著性
	Passivation for stainless steel 不鏽鋼鈍化	YES 是	Stainless steel 不銹鋼	Improved stainless steel corrosion protection without plating. 在不進行電鍍的情況下提高不銹鋼的防腐蝕性
	Black oxide for stainless steel 不鏽鋼黑化	YES 是	Stainless steel 不銹鋼	1. Corrosion resistant 耐腐蝕性 2. Painting adhesionability 噴塗附著性
	Electro Polishing 電解拋光	YES 是	Die-casting Aluminum alloys 壓鑄鋁合金 Aluminum alloys 鋁合金 Stainless steel 不銹鋼	Reduces or eliminates stressed and disturbed layers caused by heat treating, decarburization, microscopic scratches, tool marks, grinding checks, cutting and abrasive finishing, thus greatly improving fatigue life. 減少或消除熱處理、脫碳、微觀刮痕、刀痕、研磨檢查、切割和磨砂加工引起的應力和擾動層，從而大大提高疲勞壽命
Electroplating 電解電鍍	Chrome series 鉻電鍍	YES 是	1. Hard Chrome Plating 硬鉻 2. Satin Chrome Plating 霧鉻 3. Black Chrome Plating 黑鉻 4. Chromium(III) Fluoride Plating 氟化鉻	1. Protection 保護 2. Special surface properties 特殊的表面性能 3. Engineering or mechanical properties 工程或機械性質
	Nickel series 鎳電鍍	YES 是	1. Nickel Plating 一般鎳 2. Black Nickel Plating 黑鎳 3. White Nickel Plating 白鎳 4. Dull Nickel Plating 霧鎳/啞鎳 5. Pearl Bright Nickel Plating 珍珠鎳 6. Satin Nickel Plating 沙丁鎳 7. Semi-Bright Nickel 半光鎳	
	Tin series 錫電鍍	YES 是	1. Matte Tin Plating 霧錫 2. Bright Tin Plating 亮錫	
	Copper series 銅電鍍	YES 是	1. Copper Sulfate 硫酸銅 2. Copper Pyrophosphate Plating 焦磷酸銅電鍍 3. Cyanide Copper Plating Solution 氰化銅電鍍 4. Antique Bronze Plating (A.B) 青古銅 5. Antique Copper Plated (A.C) 紅古銅	
	Gold series 金電鍍	YES 是	1. Gold Plating (Gilding) 電鍍金 2. Pearl Golden Plating 珍珠金 3. Satin Gold Plating 沙電金	

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Electroplating 電解電鍍		Zinc series 鋅電鍍	YES 是	1. Blue Zinc Plating 藍鋅 2. White Zinc Plating 白鋅 3. Yellow Zinc Plating (Y.ZP) 五彩鋅 4. Black Zinc Plating 黑鋅	1. Protection 保護 2. Special surface properties 特殊的表面性能 3. Engineering or mechanical properties 工程或機械性質
		Alloy series 合金電鍍	YES 是	1. Black Alloy Plating 黑錫鍍電鍍/黑鍍 2. Tin-Copper Alloy Plating 錫銅電鍍/代鍍 3. Zinc-Nickel Alloy Plating 鋅鎳合金 4. Zinc-Tin 鋅錫合金 5. Nickel-Iron Alloy Plating 鎳鐵合金 6. Zn-Fe Alloy Plating 鋅鐵合金 7. Gold-Tin Alloy Plating 金錫合金	
Electroless Plating (Chemical Plating) 無電解電鍍 (化學電鍍)	Electroless Plating (Chemical Plating) 無電解電鍍 (化學電鍍)	Electroless Nickel Plating 化學鎳	YES 是	1. Al alloys 鋁合金 2. Cu alloys 銅合金 3. Carbon steel 碳素鋼 4. Stainless steel 不銹鋼 5. Die-casting 壓鑄 6. MIM parts 金屬射出成型零件	1. Even coating 塗層均勻 2. No sophisticated jigs or racks required 無需複雜的夾具或架子 3. Flexibility in plating volume and thickness 電鍍量和厚度的彈性 4. Complex filtration method is not required 不需要複雜的過濾方法 5. Matte, semi-bright or bright finishes available 霧面、半光亮或亮光飾面可供選擇
		Electroless Copper Plating 化學銅	YES 是		
		Hard Nickel Plating 硬化鎳	YES 是		
	Composite Electroless Plating 複合無電解 電鍍	EN/PTFE 聚四氟乙烯	YES 是		
		EN/SiC 碳化矽	YES 是		
		EN/Diamond 鑽石	YES 是		
Anodic Oxidation 陽極氧化	General Anodic Oxidation 一般陽極氧 化	General anodizing treatment (6μ ~15μ) 一般陽極處理	YES 是	1. Al alloys 鋁合金 2. Die-Casted Aluminum alloys: ADC5, ADC6 (limited color choice) 壓鑄鋁合金: ADC5, ADC6 (顏色選擇有限)	1. Oxidation resistance 抗氧化性 2. Corrosion resistance 耐腐蝕性 3. Coloring 著色 4. Surface hardening 表面硬化 5. Surface wearability 表面耐磨性
		Half-hard anodizing treatment (20μ ~30μ) 半硬陽處理	YES 是		
		Hard anodizing treatment (30μ ~50μ) 硬陽處理	YES 是		
		Extra hard anodizing treatment (more than 50μ) 超硬陽處理	YES 是		
		Doutone anodizing 雙色陽極	YES 是		
		Single bright stain anodizing 單色亮霧陽極	YES 是		
		Doutone bright stain anodizing 雙色亮霧陽極	YES 是		

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Anodic Oxidation 陽極氧化	General Anodic Oxidation 一般陽極氧化	Anodizing pattern protective 包電陽極	YES 是	1. Al alloys 鋁合金 2. Die-Casted Aluminum alloys: ADC5, ADC6 (limited color choice) 壓鑄鋁合金: ADC5, ADC6 (顏色選擇有限)	1. Oxidation resistance 抗氧化性 2. Corrosion resistance 耐腐蝕性 3. Coloring 著色 4. Surface hardening 表面硬化 5. Surface wearability 表面耐磨性
		Dyeing treatment of anodize 陽極染色處理	YES 是		
	Micro-arc Oxidation (MAO) Plasma Electrolytic Oxidation (PEO) 微弧氧化處理	-	YES 是		1. Enhance the wear, thermal, and corrosion resistance. 提高耐磨、耐熱、耐腐蝕性 2. Visual appearance of industrial components used in the defense, aerospace. 國防、航空航天所使用的工業零件的視覺外觀
Vacuum Plating 真空電鍍	General Plating 一般鍍膜	PVD (Physical vapor deposition) 真空濺鍍	YES 是	1. Plastics 塑膠 2. Metals 金屬 3. Glass 玻璃 4. Urethanes 聚氨酯 5. Fiberglass 玻璃纖維 6. Ceramic 陶瓷 7. SLA's 光固化樹脂 8. Paper products 紙製品	1. Close control of coating thickness and composition. 嚴格控制塗層厚度和成分 2. Uniform deposits without buildup at sharp discontinuities. 沉積物均勻，在尖銳的不連續處不會堆積 3. High coating rate. 鍍膜率高 4. Low coating costs in volume production. 批量生產時塗層成本低 5. Long life of equipment since few moving parts. 由於零件移動較少，設備壽命較長
		VM (Vacuum metalization) 真空鍍膜	YES 是		
		NCVM (Non-Conductive Vacuum metallization) 非導電性真空鍍膜	YES 是		
		In-mold (IMD, In Mold Decoration) 模內裝飾技術	YES 是		
	Plastic Plating 塑膠鍍膜	Plastic plating 塑膠鍍膜	YES 是	Plastics 塑膠	1. Scratch resistant 耐刮擦 2. Bendable 可彎曲 3. Anti-decolour 防褪色
		TPU plastic vacuum-electroplating TPU 鍍膜	YES 是		
	Titanium Nitride Plating 氮化鈦鍍膜	TiCN coating 氮化鈦鍍膜	YES 是	1. Titanium 鈦 2. Stainless steel 不銹鋼 3. Glass 玻璃 4. Steel 鋼鐵 5. Plastic 塑膠	1. Hard (harder than carbide, 3X hard chrome) 堅硬 (比碳化物硬，比硬鉻硬3倍) 2. Extremely strong adhesion 附著力極強 3. Broad range of thicknesses 厚度範圍廣 4. Uniform coating with no buildup on edges 塗層均勻，邊緣無積垢 5. High Temperature tolerant 耐高溫 6. Electrically conductive and non-oxidizing 導電、不氧化 7. Non-toxic and Environmentally friendly process 無毒環保工藝 8. Resistant to most chemicals 耐大多數化學品 9. Low fatigue: very high compressive stress 低疲勞：非常高的壓縮應力
		CrN coating 氮化鉻鍍膜	YES 是		
		DLC 鍍膜 (奈米類鑽膜, 類鑽石膜, 類鑽碳膜)	YES 是		
		S-DLC 薄膜 (奈米類鑽膜, 類鑽石, 類鑽碳)	YES 是		
		TiAlCrN coating 氮化鋁鉻鈦鍍膜	YES 是		
		AlCrN coating 氮化鋁鉻鍍膜	YES 是		
		TiAlN coating 氮化鋁鈦鍍膜	YES 是		
TiX coating 耐溫鈦鍍膜		YES 是			
Tacon coating 鍍膜	YES 是				
Surface coloring 表面染色	Painting 噴塗	Powder Coating 粉體烤漆	YES 是	1. Metal Parts 金屬零件 2. Plastic Parts 塑膠件	Anti-rust and color decoration functions 防鏽及色彩裝飾功能
		Liquid Coating 液體烤漆	YES 是		

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Surface coloring 表面染色	Painting 噴塗	Electrostatic Coating 靜電塗裝	YES 是	1. Metal Parts 金屬零件 2. Plastic Parts 塑膠件	Anti-rust and color decoration functions 防鏽及色彩裝飾功能
		Electrostatic Liquid Coating 靜電液體塗裝	YES 是		
		Soft-touch Painting 柔軟觸感噴塗	YES 是		
		UV painting (UV Oil) 紫外線噴塗	YES 是		
	Plating 電鍍	Electro-Deposition (ED coating) 電著漆處理	YES 是	Metal Parts 金屬零件	1. Anti-rust function. No flow mark cosmetic failure, in comparison with painting 防鏽功能。與噴漆相比。沒有流痕外觀缺陷 2. Color on the surface can be unified 表面顏色可以統一 3. With fine permeability, therefore coating layer could be completely applied onto the surface 具有良好的滲透性。因此塗層可以完全附著在表面上 4. Coating layer can be controlled easily 塗層層數易於控制 5. Environmental friendly contents without lead 環保無鉛成分
		Nanoparticle of E.D 奈米顆粒的電著處理	YES 是		
Dyeing treatment (ex: Black Oxide) 染色處理 (例如：黑色氧化物)		YES 是			
Decorative Treatment 裝飾性表面處理	Laser engraving (Laser etching) 雷射雕刻 (雷射)	YES 是	1. Stainless Steel 不銹鋼 2. Silicone & Rubber 矽膠和橡膠 3. Aluminum alloys 鋁合金 4. Plastic 塑膠 5. Any other metal parts 任何其他金屬部件		
	Screen printing 網版印刷	YES 是	Screen printing - is arguably the most versatile of all printing processes. It can be used to print on a wide variety of substrates, including paper, paperboard, plastics, glass, metals, fabrics, nylon, cotton, PCB and many other materials. The advantage of screenprinting over other print processes is that the press can print on substrates of any shape, thickness and size. 網版印刷 - 可說是所有印刷過程中用途最廣泛的。它可用在多種基材上進行列印。包括紙張、紙板、塑膠、玻璃、金屬、織物、尼龍、棉花、印刷電路板和許多其他材料 網版印刷相對於其他印刷製程的優點在於印刷機可以在任何形狀、厚度和尺寸的基材上進行印刷		
	Vibrating Finishing 振動研磨	YES 是	1. Aluminum 鋁 2. Stainless Steel 不銹鋼 3. Copper 銅 4. Steel 鋼鐵 5. Brass 黃銅 6. Titanium 鈦 7. Sterling Silver 純銀 8. Spring Steel 彈簧鋼 9. Bronze 青銅	1. Less wear on your component making them more durable and increasing power output 減少零件磨損。使其更耐用並提高功率輸出 2. Cost effective and non-labour intensive 成本效益高且非勞力密集 3. A smoother surface makes your component run cooler, faster and longer 更光滑的表面使零件運作溫度更低、速度更快、時間更久 4. Produces an accurate, controllable and uniform standard of finish-super finishing to 0.03 ra 產生精確、可控、統一的光潔度標準 - 超精加工至 0.03 ra	

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Decorative Treatment 裝飾性表面處理	Polishing 拋光	YES 是	1. Aluminum 鋁 2. Stainless Steel 不銹鋼 3. Copper 銅 4. Steel 鋼鐵 5. Acrylic 壓克力 (丙烯酸) 6. Brass 黃銅 7. Titanium 鈦 8. Sterling Silver 純銀 9. Bronze 青銅 10. Glass 玻璃	
	Hair line (Wire drawing) 拉絲 (拉髮絲)	YES 是	1. Stainless (SUS303, SUS304) 不銹鋼 2. Aluminum alloys 鋁合金	
	Transfer Printing (Pad Printing) 移印	YES 是	1. Plastic 塑膠 2. Metal 金屬 3. Glass 玻璃 4. Ceramics 陶瓷 5. Leather 皮革 6. Bakelite 電木 (酚醛樹脂)	
	Pre-printed Plating 先印後鍍	YES 是	After forming the object, the font, the graphic is printed on the object in a printed process, and finally through the plating surface treatment to form the plating layer. 物體形成後，透過印刷過程將字體、圖形印刷在物體上，最後透過電鍍表面處理形成電鍍層	
	Diamond Cut 鑽石切割	YES 是	Diamond cutting - creates a mirror-like effect. It highlights logos and the luster of the metal. When diamond cutting is carried out along the edges, it creates a unique and stylish look. 鑽石切割 - 產生鏡面效果。它突出了徽標和金屬的光澤。當沿著邊緣進行鑽石切割時，會創造出獨特而時尚的外觀	
	Sand Blast - Thin Sand (Ceramic beads ; Glass beads) - Thick Sand 噴砂 - 細砂 (陶瓷珠 ; 玻璃珠) - 厚沙	YES 是	1. Stainless Steel 不銹鋼 2. Copper 銅 3. Aluminum alloys 鋁合金 4. Plastic 塑膠	1. In addition to rust, deburring, deoxidation. 防鏽、去毛邊和去氧化 2. Surface treatment can change the finish of the metal surface to achieve decorative effect. 表面處理可以改變金屬表面的光澤，達到裝飾效果