

Specifications & Features	Electrostatic Powder Coating (喷塑/静电喷粉)	Liquid Painting (喷漆)	Hot-Dip Galvanizing / HDG (热镀锌)
Process Overview	Dry powder applied electrostatically, then heat-melted and cured in an oven.	Liquid paint sprayed and cured via solvent evaporation or low-temperature baking.	Steel is submerged into a bath of molten zinc (~450°C) to form a zinc-iron alloy.
Rust Protection Principle	Barrier Protection. Seals the steel substrate away from oxygen and moisture.	Barrier Protection. Acts as a physical seal (primer may offer minor chemical inhibition).	Barrier + Cathodic (Sacrificial) Protection. Zinc protects the steel actively as a sacrificial anode.
Coating / Layer Thickness	60 - 100 µm	40 - 70 µm (Primer + Topcoat)	60 - 85 µm+ (Depends on steel gauge)
Surface Hardness	≥ 2H (Pencil Hardness)	H - HB (Pencil Hardness)	Exceptional (Metallurgical alloy layers are harder than base steel)

Adhesion Strength	Grade 0 - 1 (Cross-cut test)	Grade 1 - 2 (Cross-cut test)	Metallurgical Bond (Cannot be peeled off)
Salt Spray Test (Reference)	240 - 500 Hours	24 - 72 Hours	N/A (Measured in decades of outdoor lifespan)
Estimated Lifespan	5 - 10+ Years (Indoors)	1 - 3 Years (Depending on wear)	20 - 50+ Years (Outdoors / Industrial)
Inner Wall Protection	None. Powder cannot reach inside tubes (prone to internal rusting).	None. Paint cannot reach inside tubes.	Excellent. Molten zinc flows through all hollow sections for 360° protection.
<i>(Tubing & Hollow parts)</i>			
Damage Behavior	Rust will spread beneath the coating, causing peeling and flaking over time.	Rust will spread beneath the paint, causing blistering.	Rust will NOT spread. Zinc acts as an anode and sacrifices itself to protect the exposed steel.
<i>(When scratched to bare metal)</i>			
Aesthetics & Finish	Excellent. Vibrant colors, smooth, matte, or textured finishes available.	Excellent. High gloss, customizable colors.	Industrial / Rough. Silver-gray spangle finish. Not meant for decorative purposes.
Initial Cost	Medium	Low	High

Ideal Application & Environments	Indoor / General Commercial: Warehouses, supermarkets, dry environments, or when corporate brand colors are required.	Low-Budget / Custom Shapes: Temporary usage, ultra-low budget, or oversized equipment that cannot fit into curing ovens.	Harsh / Outdoor / Heavy Industrial: Construction sites, coastal areas, cold storage, wet agriculture, and chemical handling.
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