

Powder Coat Paint vs Liquid Paint

The advantages of powder coating over wet paint are many, and they generally fall under five categories:

Chemistry - When superior performance is required, powder coating as a finishing process can replace traditional wet painting with improved performance. Powder coatings are based on polymer resins, combined with pigments, leveling agents, additives, flow agents and curatives. In most applications, the powder coating is via a process called Electrostatic Spray Deposition (ESD) onto a metal substrate. The powder coated part is then cured in an oven which initiates the chemical reaction to produce long molecular chains that result in high cross-link density of the coating layer. These molecular chains are very resistant to breakdown. The cross-link density of the powder coating provides for a more durable finish over liquid in the areas of impact, moisture, and chemical resistance, ultraviolet light stability, heat and other extreme weather conditions.

In addition, Powder Coatings are typically applied at 50-150 microns (2-6 mils) which gives powder an edge over liquid as a barrier for corrosion properties, gouge hardness, chip resistance and overall durability. It is difficult to apply liquid coatings at heavy film thicknesses unless you do multiple passes through the painting process. Application of heavy films with liquid paint will cause runs, sags, and solvent pop on the finished surface after the curing process. Powder Coatings can provide much better edge coverage than liquid coatings. Edges are often a weak spot for corrosion to start and can be a major problem where long term durability is expected especially with wire goods, expanded metals, and parts with sharp edges or complex geometries.

Performance – Powder coatings are more durable and more resistant to corrosion, chemicals and weather than liquid coatings. Powder coated surfaces are more resistant to chipping, scratching and other such wear due to the thermal bonding process during curing. Unlike wet paint, powders also don't run or drip, providing a more uniform coating than liquid paint. Moreover, the vibrancy of the color of a powder-coated part tends to stay bright and fresh longer than its wet-painted counterpart. The result of using powder coating is that the product will have the most attractive, durable, high-quality finish available.

Operational Costs – Powder coatings are traditionally cheaper and can cover more area than most other organic finishes, translating to lower material costs than wet painting processes. Because they lend themselves well to automation, powder coatings can also reduce costs related to operational labor, as minimal operator

training and supervision are required for a powder line. Compared to wet paint processes, operational cost savings using powder coatings can also be realized in greater first pass material transfer efficiency, reclaim capability of overspray material, less waste produced, lower energy costs, reduced disposal costs and less rework due to lower reject rates.

Safety – Solvent based wet paint is flammable and full of volatile organic compounds (VOCs). These chemicals can be hazardous to plant/shop personnel if not handled properly. Powder coatings, on the other hand, are generally VOC-free materials and contain no solvents, meaning they do not involve the potentially harmful chemicals typically found in a wet spray project. Although powder coating materials can combust in a very narrow concentration of powder and air, their lack of solvents or VOCs means almost none of the short-term and long-term health or fire workplace threats associated with wet painting.

Environmental – VOCs in the wet painting process are also among industrial pollution concerns. Because powder coatings contain no solvents and emit negligible, if any, polluting VOCs into the atmosphere, they are more environmentally friendly than their wet paint counterparts. Moreover, powder coating is a clean process: powder overspray can be retrieved and reused, and unused powder can be reclaimed and returned to a hopper for recirculation through the system, with negligible waste. Plus, most powder coating materials are considered landfill/ non-hazardous materials. Powder coatings meet all Environmental Protection Agency requirements for air and water pollution control.

Please note that cleaning and pretreating the substrate is critically important in using either liquid or powder paint to get the ultimate performance properties.