

**Q:** What are the proper surface preparation methods when adding a paint system to galvanized steel (known as a duplex system)?

**A:** In order to apply paint systems over galvanized coatings correctly, it is necessary to know the general characteristics of the hot-dip galvanizing process so one can determine the best method of surface preparation. Effective protection by a duplex system is only possible if long-term inter-coat adhesion is obtained with a paint or powder material that will not react chemically with the zinc substrate. Inadequate preparation of the zinc surface, prior to the application of a compatible paint or powder coating is the main cause for premature failure of any duplex system.

There are two main types of surface preparation for duplex coating systems: chemical pretreatment and mechanical pretreatment. All pre-treatments of hot-dip galvanized surfaces are best carried out immediately after galvanizing and before the surface can become contaminated by oil, grease, or dirt. The main chemical pretreatment methods are cold etching and phosphating, hot phosphating, wash primers, solvent cleaning, acid or base surface cleaning, and outdoor weathering. The main mechanical pretreatment methods are sweep blasting and scouring with abrasive paper.



*Peeling paint from untreated galvanized pole*



*Sand blasting pre-treatment*

The preferred chemical cleaning or pretreatment methods generally use an aqueous alkaline solution with a pH of 11 to 12. Solutions of 2% to 5% by weight of one or more of the following chemicals are used: sodium hydroxide, sodium metasilicate, sodium orthosilicate, trisodium phosphate, sodium nitrate, and / or sodium carbonate. Mixtures of these products are accompanied by small percentages of emulsifying and chelating agents, breaking down the organic contaminants on the zinc surface.

The preferred method after chemical cleaning for large items or items consisting of various configurations is the mechanical pretreatment method known as sweep blasting. This should only be done by individuals that have been trained in the aspects of sweep blasting galvanized items to ensure that the coating thickness is only decreased by a minute amount. This reduction of the galvanized coating thickness will then only influence the corrosion resistance by a small amount. In addition, the proper particle size and material, blast pressure, stand-off distance, and the proper oil and moisture traps must be used when sweep blasting.