

Hybrid cleaner coater

-an innovative 2-in-1 cleaning and coating surface preparation method-

A "**cleaner coater**" is a chemical or technology that cleans metal surfaces and applies an adherent, thin pretreatment coating to enhance paint adhesion and corrosion resistance. By combining *cleaning* and *coating* into one step, it saves energy and water, making metal pretreatment more efficient for industries like automotive and appliances.

Main actions provided by cleaner coater: 1) Cleaning Action: The chemical formulation lifts and removes contaminants such as machining fluids, drawing compounds, and light rust. 2) Coating Deposition: Simultaneously, it forms a conversion coating (often iron phosphate or nanotechnology-based) that creates a uniform, durable layer on the metal surface.

Common Types of cleaner coat. 1) Traditional: Iron phosphate cleaner-coater; 2) nano-zirconium oxide-based cleaner-coater

Ecosil developed "cleaner coater" formulas as a response to a call from car refinish industry which has been seeking a pretreatment product that enables streamlining the current process. Prior to painting, a typical surface preparation process used in the car refinish industry contains 3 steps: 1) abrasive blasting to remove old paint, 2) solvent-cleaning 3) pretreatment (or wash priming).

The hybrid cleaner coat developed by Ecosil are phosphate free, heavy metal free and can reduce the surface preparation process down to 2 or even 1 step:

1) 2-step water-based hybrid cleaner coater. A SILSBOND product was modified to enhance its cleaning action while still retaining its adhesion promotion action. Figure 1 presents the coated cold rolled steel (CRS) panels after 500 h salt spray test (SST). Prior to coating, these oily CRS panels were DIRECTLY immersed in a diluted SILSBOND cleaner coater solution for 60 sec and then rinsed with city water. After 500 h of SST, the SILSBOND cleaner coater in Figure 1(a) shows very good corrosion resistance with small amount of paint loss in the "X" scribes, comparable to the regular SILSBOND pretreatment (Figure 1(b)). A traditional cleaner-coater in Figure (c) shows much more paint loss than the SILSBOND cleaner coater. Iron-phosphate pretreatment (Figure 1(d)) gives the worst performance.

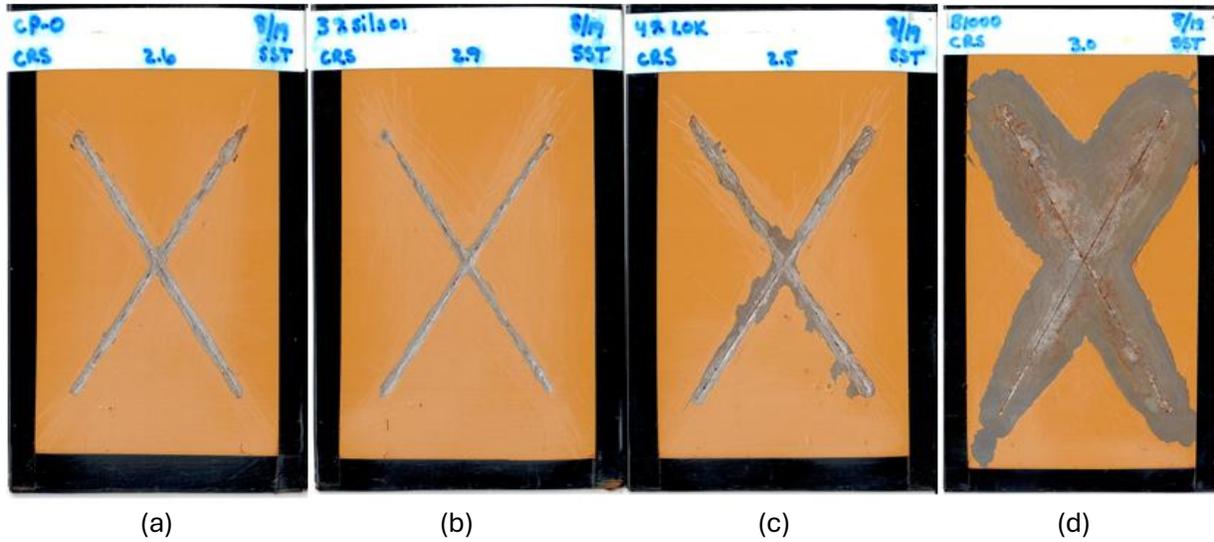


Figure 1. 500h SST test results for polyester powder coated CRS panels; (a) 2-step water-based SILSBOND cleaner-coater, (b) SILSBOND pretreatment (5 steps), (c) commercial cleaner-coater and (d) iron phosphated (Bonderite B1000)

2) 1-step solvent-based hybrid cleaner coater. A SILSBOND concentrate was directly diluted with an organic solvent. Oily CRS panels were immersed in the above solution for 60 sec and then dried in the ambient. After that, the CRS panels were coated with an epoxy primer. Figure 2 shows the test panels after 168-hr salt spray test. The one cleaned/pretreated with the SILSBOND cleaner coater (Figure 2(a)) exhibits no paint loss in the scribe, while the cleaned only panel (Figure 2(b)) has massive paint loss on the entire panel surface.

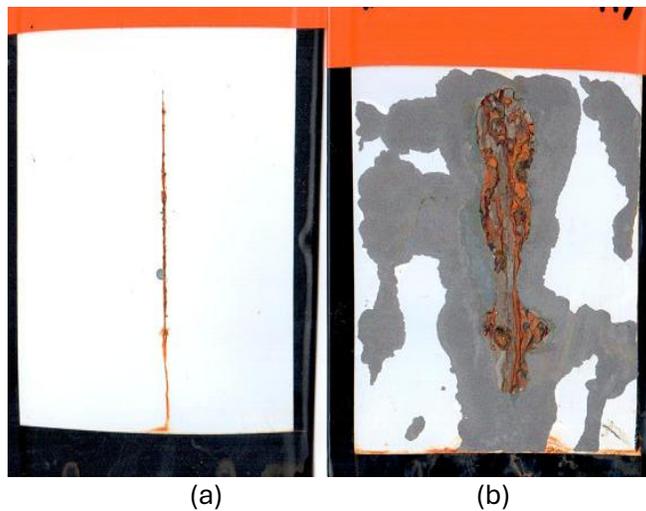


Figure 2. 168 h salt spray test results for epoxy painted CRS panels; (a) 1-step solvent-based SILSBOND cleaner-coater and (b) cleaned only