Nano-Clear Property Overview

Nano-Clear Presentation
Dynamic Mechanical Analysis
Nano-Clear Test Data

The automotive industry commonly applies high performance "clear topcoatings'" over painted surfaces to mitigate the negative effects of environmental exposure (acid rain, harsh UV rays, car washing, stone chips...). Automotive OEM clear coatings are well known to provide long-term surface protection against the environment when applied over painted surfaces. The industrial paint market currently relies on pigmented coatings alone without the use of a high performance clear coating. What is needed is a high performance clear coating designed to dramatically extend the surface life of industrial painted surfaces.

Nano-Clear® is designed to dramatically enhance and extend the surface life of New or In-Service painted assets by 10+ years. Organizations have invested billions of dollars to protect high-value assets from corrosion, scratching, chipping, chemical attack and weathering. Many of these assets were painted using inferior paint materials not designed to withstand long-term weathering and use. Organizations have various options when these painted assets degrade:

1. Do nothing and allow the paint weathering cycle to continue (resulting in decreased corrosion, chemical and UV resistance).
2. Replace the existing paint system using the same conventional systems (epoxy, polyurethane or powder coating).
3. **Extend the life of painted assets by 10+ years using Nano-Clear® as a topcoating over conventional paint systems.**

Conventional industrial paint systems including epoxies provide good corrosion resistance and initial surface hardness, but unfortunately fall short in long-term UV resistance and weathering. Two-component polyurethanes provide good UV resistance and weathering, but typically cost much more than epoxy or polyester topcoats. Unfortunately conventional paint systems like topcoats and epoxies begin the oxidization process or “chalking” from weathering within 6 months from application. This surface chalking phenomenon is actually degraded paint that resides on the surface from UV exposure and weathering.

Nano-Clear Coatings penetrate deep into the smallest pores within newly painted or in-service painted assets to form a highly cross-link dense / hard coat surface. Nano-Clear Coatings provide dramatically longer surface protection over conventional automotive, marine, aerospace and industrial paints including epoxies and polyurethanes. How can we make this claim? Nano-Clear Coatings provide dramatically higher crosslink density over conventional one-component and two-component coating systems. Nano-Clear Coatings prevent UV degradation of the substrate by absorbing harmful UV rays.

What is crosslink density and why is it important in coatings? Crosslink density is defined as the concentration of chemical bonds within a polymer. Higher concentrations of chemical bonds within a polymer improve physical properties. Conversely, lower concentrations of chemical bonds within a polymer decrease physical properties. Increasing crosslink density increases material hardness, chemical resistance and long-term UV resistance.

How does crosslink density relate to a coatings longevity? High crosslink dense coatings provide increased molecular bonds. Increased molecular bonds are more difficult to break down by chemical attack, surface scratching and UV degradation from sunlight exposure. Highly crosslinked coatings provide increased physical performance and increased longevity as compared to lower crosslinked coating systems.

How is Nano-Clear Different? Nano-Clear Coatings are manufactured using proprietary 3D nanostructured polymers. These 3D nano-scale molecular networks form the polymer backbone of all Nano-Clear Coating Systems. Dynamic Mechanical Thermal Analysis (DMTA) is utilized to calculate the "crosslink density" of coating polymers. Nano-Clear Coatings provide extreme crosslink density as measured using DMTA, including remarkable surface hardness, chemical resistance, extreme UV resistance.