

Nanovere Technologies, LLC



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<http://www.nanocoatings.com>



Introduction – Why Coatings Fail?

Painted surfaces exposed to the environment are highly susceptible to environmental damage including water, humidity, salts, ice, heat, dirt, smog, oils, chemical attack and acid precipitation. This damage is particularly so with regard to high-value assets including trans-ocean ships, chemical tank cars, offshore oil rigs, heavy duty machinery and fleet vehicles. These assets are exposed to the harshest of environments on a regular basis.

Painted surfaces are also subject to UV degradation due to long-term exposure to sunlight, and from loss-of-gloss from chemical attack or micro-scratching due to repeated surface cleaning. The above problems are, of course, well-known to those in industries whose assets are regularly exposed to the environment. The automotive industry, for example, commonly applies protective **clear top-coatings** over painted or pigmented surfaces to mitigate the negative effects of environmental exposure. Automotive OEM clear coatings provide the “**first-line-of-defense**” against the environment when applied over pigmented systems.

High value industrial assets such as bridges, ships, cranes, tank cars and heavy duty machinery utilize conventional one- or two-component pigmented epoxy coatings for metal protection. These epoxy based coatings have excellent adhesion to metal with good “initial” corrosion resistance and “initial” surface hardness. Unfortunately epoxy based coatings fall- short in areas of long-term UV and chemical resistance due to “**poor cross-link density**” (*linear chain molecules*).

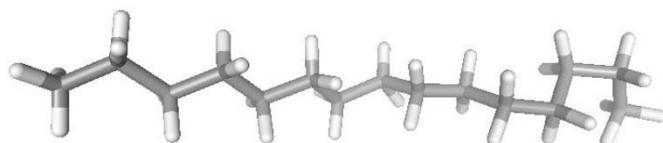
Epoxies along with other conventional low cross-link dense coatings like polyurethanes, are still quite susceptible to corrosion or surface damage as the result of UV degradation, weathering, and for that matter, normal use. *When these painted assets begin to degrade from the sun or chalk (due to poor cross-link density); the long-term corrosion resistance, chemical resistance, scratch resistance and clean-ability are “adversely impacted”.*

What is needed is a highly cross-linked “top-coating” that will dramatically extend the surface life of high value assets more thoroughly than existing coating technologies.

Nano-Clear Coatings were developed using proprietary **highly cross-linked 3D polymers** designed to dramatically extend the surface life of painted assets by 10+ years. Nano-Clear Coatings dramatically improve corrosion resistance, abrasion, chemical & UV resistance along with reduce surface maintenance of painted assets by 50%. Nano-Clear Coatings penetrate deep into the pores of paints to dramatically enhance the underlying color, increase gloss, surface hardness and dramatically extend long-term UV resistance.

Nano-Clear Difference

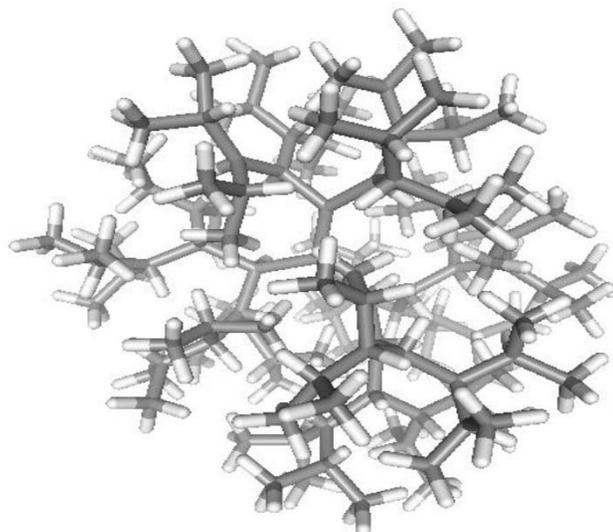
Conventional Coatings – Linear Chain Molecules



Conventional Coatings:

- **Poor Crosslink Density =**
- Poor long-term weathering
- Poor corrosion resistance
- Poor chemical resistance
- Poor scratch resistance

Nano-Clear Coatings – 3D Molecular Architecture



Nano-Clear Coating Benefits:

- **Extreme Crosslink Density =**
- Extreme long-term weathering
- Extreme corrosion resistance
- Extreme chemical resistance
- Extreme scratch resistance

Nano-Clear Coatings

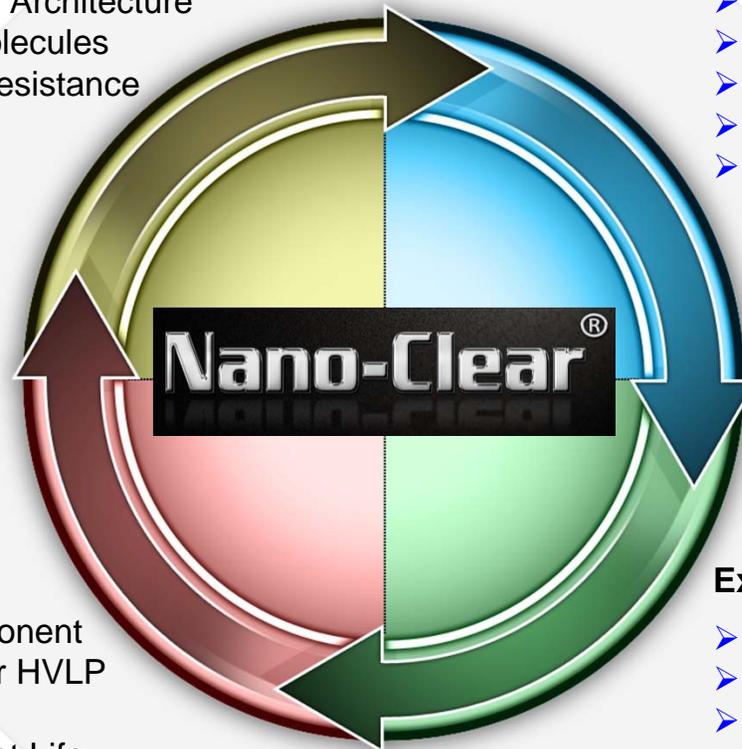
Multi-Functional Nanocoatings with Remarkable Properties

High Crosslink Density

- Nano-Structured Polymer Architecture
- High Density Polymer Molecules
- Scratch, Chemical, UV Resistance
- High Scratch Resistance
- Customized Additives

Reduced Surface Maintenance

- Oil & Dirt Repellency
- Water Repellency
- Ice Repellency
- Algae Repellency
- 50% Reduced Cleaning



Application Parameters

- Convenient One Component
- Conventional, Airless or HVLP
- Low Viscosity
- Enhance & Extend Paint Life
- Apply over 2K Epoxy, 2K Polyurethanes, Powder Coatings, Anodized Aluminum

Extreme Weathering

- Polyurethane/Polyurea Hybrid
- High UV Resistance
- High Crosslink Density
- Service Range: - 40°F to 400°F
- High Chemical Resistance

Nano-Clear Overview

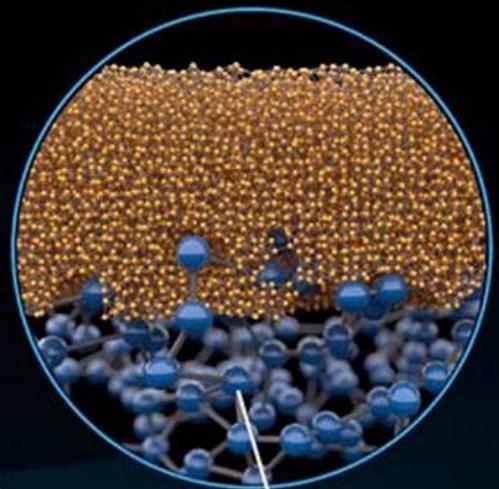
NCI Application

NANO-CLEAR NCI ENHANCES & EXTENDS THE SURFACE LIFE OF PAINT BY 10+ YEARS



UNTREATED SURFACE

COATED WITH NCI



PAINT (3 MIL)

NCI (2 MIL)

PRIMER (4 MIL)

SURFACE PREP

METAL SUBSTRATE

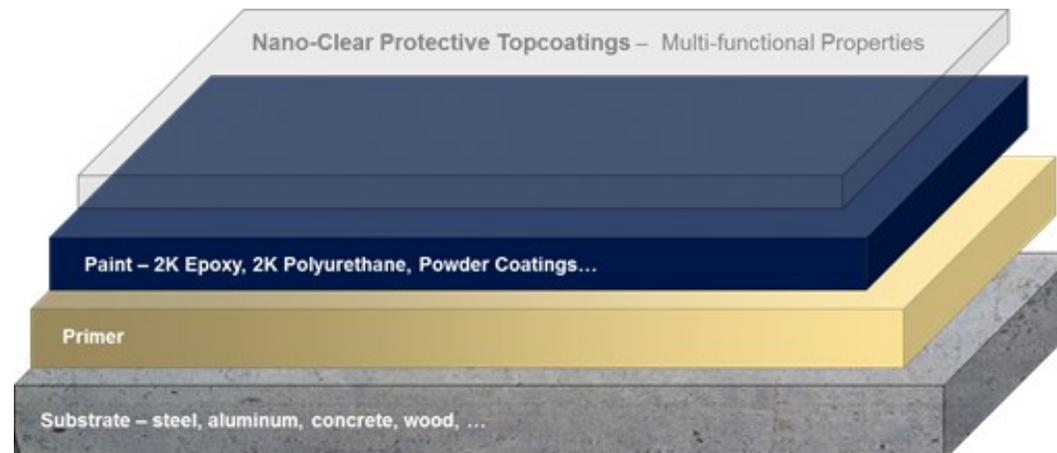
METAL SURFACE PREPARATION INCLUDES SAND BLASTING WITH PROPER CLEANING TO REMOVE SURFACE CONTAMINANTS

NCI FORMS A COVALENT BOND WITH PAINT MOLECULES TO ENSURE LONG-TERM ADHESION AND PERMANENCE

Nano-Clear Overview

Multi-Functional Surface Properties

- High gloss or flat finish 1K solvent borne clear coating
- Extends surface life of new or old paint with 10+ year performance
- Extend Re-Paint Lifecycle by 3X
- Reduce Surface Maintenance by 50%
- Extreme X-link density PU / Polyurea / Polysilane Hybrid Nanocoating
- **Multi-functional surface properties:**
 - Extreme scratch, chemical, corrosion and UV resistance
 - Applied directly over 2K epoxies, 2K PU's, powder coats, cement, wood, fiberglass
 - Can also be applied directly over surface treated aluminum (VV-200)
 - Functional Additives to impart additional "anti-xyz" surface properties
- **Functional Additives:** Accelerator, Matting, Surface Treatment, Fluoropolymer, Anti-Barnacle...
- **Conventional Application Parameters:** HVLP or Airless spray
 - Dust-free in 30 min.
 - Tack-free in 60 min.
 - Handle in 4 hr. (full cure in 24 hours).
- **Application Potential:** Industrial, Industrial Marine, O&G, Military & Fleet customers
- **Package Stability:** 2 years when stored at 4-22°C (39-72°F). High temp formulations marketed.



Nanovere Technologies

Nanovere focuses on the research, development and manufacturing of multi-functional nanocoatings and licensing of dendritic polymers.

*We specialize in solving complex coating issues with a focus on developing and introducing “**first-ever**” nanocoatings;*

- *1st One-component air cure nanocoating platform to exceed OEM Specs*
- *1st Matte Clear with 7H pencil hardness designed for over CARC Paint*
- *1st Powder Coating with 8H pencil hardness*
- *1st Highest Scratch Resistance for Auto OEM / Aftermarket*
- *1st Multi-functional Self-Cleaning Clear for Industrial Markets*
- *1st Polycarbonate & Glass Hard Coating with 10+ Year Performance*
- *1st Dendrimer polymer platform to be used within polyurethane coatings*

Nanovere is 1st to market “low-cost” highly functional dendrimers in coating systems globally. Vecdör PE Dendrimers dramatically improve cross-link density in conventional polymer and coating systems.

Nanovere has strategic partnerships with end-use customers, paint manufactures and polymer manufactures.

Nanovere has developed a complete platform of market-ready 3D nanostructured polymer based coating resins and multi-functional nanocoating formulations. Nano-Clear Coatings have been validated by third parties to be the most scratch, corrosion, chemical and UV resistant coatings in the marketplace today.



Core Competency

- Development of Multifunctional Nanocoatings
- Development of Multi-functional Dendritic Polymers
- Application Expertise, Joint Development & Problem Solving
- Focus on Core, Partner for Non-Core



Nano-Clear Case Studies

- **Sterling Crane:** <http://www.nanocoatings.com/sterlingpr.pdf>
- **General Dynamics:** <http://www.nanocoatings.com/gdreference.pdf>
- **Ferrosur Mexico:** <http://www.nanocoatings.com/ferrosur.pdf>
- **Horry Electric:** <http://www.nanocoatings.com/horryelectric.pdf>
- **Dow Chemical:** <http://www.nanocoatings.com/dow.pdf>
- **City of Sioux Falls:** <http://www.nanocoatings.com/csf.pdf>
- **City of Auburn Hills:** <http://www.nanocoatings.com/auburnhills.pdf>
- **UTLX Tank Car:** <http://www.nanocoatings.com/ncicase.pdf>
- **Missouri DOT:** <http://www.nanocoatings.com/modot.pdf>
- **UTC Aerospace:** <http://www.nanocoatings.com/utc.pdf>
- **Competitive Testing:** <http://www.nanocoatings.com/ncicompetitive.pdf>

Nano-Clear Resources

- **Nanovere History:** <http://www.nanocoatings.com/history>
- **Nano-Clear Overview:** <http://www.nanocoatings.com/technical>
- **Video Library:** <https://www.youtube.com/user/nanovere>
- **Technical Data Sheet:** <http://www.nanocoatings.com/ncitds.pdf>
- **Safety Data Sheet:** <http://www.nanocoatings.com/ncisds.pdf>
- **Application Process:** <http://www.nanocoatings.com/nciapplication.pdf>
- **Industrial Brochure:** <http://www.nanocoatings.com/ncibrochure.pdf>
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