

Nano-Clear[®]



Nano-Clear[®] NCI for Industrial Applications

Extend Newly Painted or Existing Paint by 10+ Years

Achieve Unmatched Topcoat **Durability**



Nano-Clear®

Industrial Market

Industrial asset owners commonly apply protective topcoatings over steel surfaces to mitigate the effects of environmental exposure to the sun including oxidation, chemical attack damage, corrosion and desire for better appearance. Conventional industrial coatings "alone" are currently very susceptible to;

- UV degradation
- weathering
- acid rain
- water damage
- corrosion
- normal use

What is needed?

An improved surface coating that protects industrial assets more thoroughly than any existing technology. A permanent surface coating that will enhance and extend the surface life of freshly painted or highly oxidized paint by 10+ years.

Nano-Clear NCI

Nano-Clear NCI dramatically improves **surface protection** and **brand image** while significantly reducing surface maintenance expenses.



- **Extreme Corrosion Resistance**
No Rust After 4000 Hour Salt Spray Testing
- **Extreme Abrasion Resistance**
Only 8.4mg loss after 1000 cycles, 1kg
- **Weatherproof Gloss**
99% Gloss Retention after 4000 Hours. Xenon WOM
- **1K Coating, Ambient (Humidity) Cured**
Dry-To-Handle in 4 hours; Return to Service in 24 hours
- **Reduce Re-Paint Cycle by 2X - 3X**
As Documented in Production Case Studies
- **Improve Brand Appearance**
Achieve Deeper Colors & Dramatically Higher Gloss
- **Achieve Lower Operating Costs**
By Reducing Maintenance Time & Extending Your Recoat Cycle By 10 Years...

Guaranteed!



What Makes NCI Unique?

Nano-Engineering (not nano-particles) Creates Exceptional Crosslink Density

Nano-Clear® NCI is manufactured using proprietary 3D nanostructured polymers - producing extreme crosslink density.

NCI provides extreme corrosion resistance, abrasion, chemical & UV resistance and reduced surface maintenance. NCI penetrates deep into the pores of freshly painted or highly oxidized paints to enhance color, improve gloss, dramatically increase surface hardness, improve chemical and long-term UV resistance.

Nano-Clear is a one-component humidity cured / highly cross-linked polyurethane/ polyurea hybrid nanocoating.

With this exceptionally high crosslink density, we have the test data to prove that NCI is the world's best all-around clearcoat for resistance to scratches, chips, abrasion, chemicals, weathering, and more. Please see the back cover for test results or <http://www.nanocoatings.com>.



BMW validated Nano-Clear coating to have the highest gloss levels and DOI of any clear coating system they had ever tested.



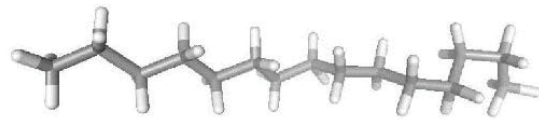
Before

Even with its remarkably high surface hardness (4H), NCI stays flexible. This iron-phosphated steel panel, painted with Macropoxy® 646 Epoxy and then coated with NCI, bends in-half without cracking or any other failure to the coat. Call 810-227-0077 for technical questions.



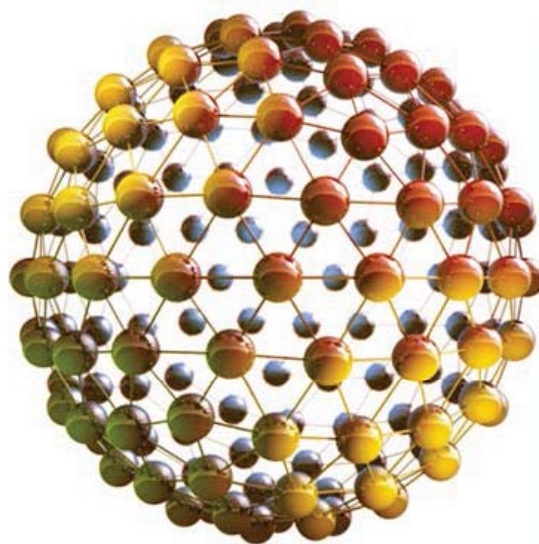
Why is Crosslink Density So Important?

Coatings contain "building blocks" with functional groups. The chemical reaction of these groups during curing forms a network. In most traditional polymers, the network is a linear chain of molecules with low crosslink density.



Linear chain of molecules

Conversely, we "nano-structured" our clearcoat to have a 3D molecular architecture. The 3D polymer network has an exponentially higher number of crosslinked sites. The result is a tightly knit mesh with unprecedented DMA density.



3D molecular architecture

High crosslink density provides highly functional surface properties, including unmatched corrosion resistance, scratch resistance, chemical resistance and UV durability. It also means low surface energy, repelling water (hydrophobic) and aiding in the release of ice, dirt, brake dust, and even concrete dust.



10 month field trial without Nano-Clear NCI



10 month field trial with Nano-Clear NCI

Even sticky concrete dust releases easily from Nano-Clear NCI

Unrivalled Performance Enhancement for Newly Painted or Highly Oxidized Coatings

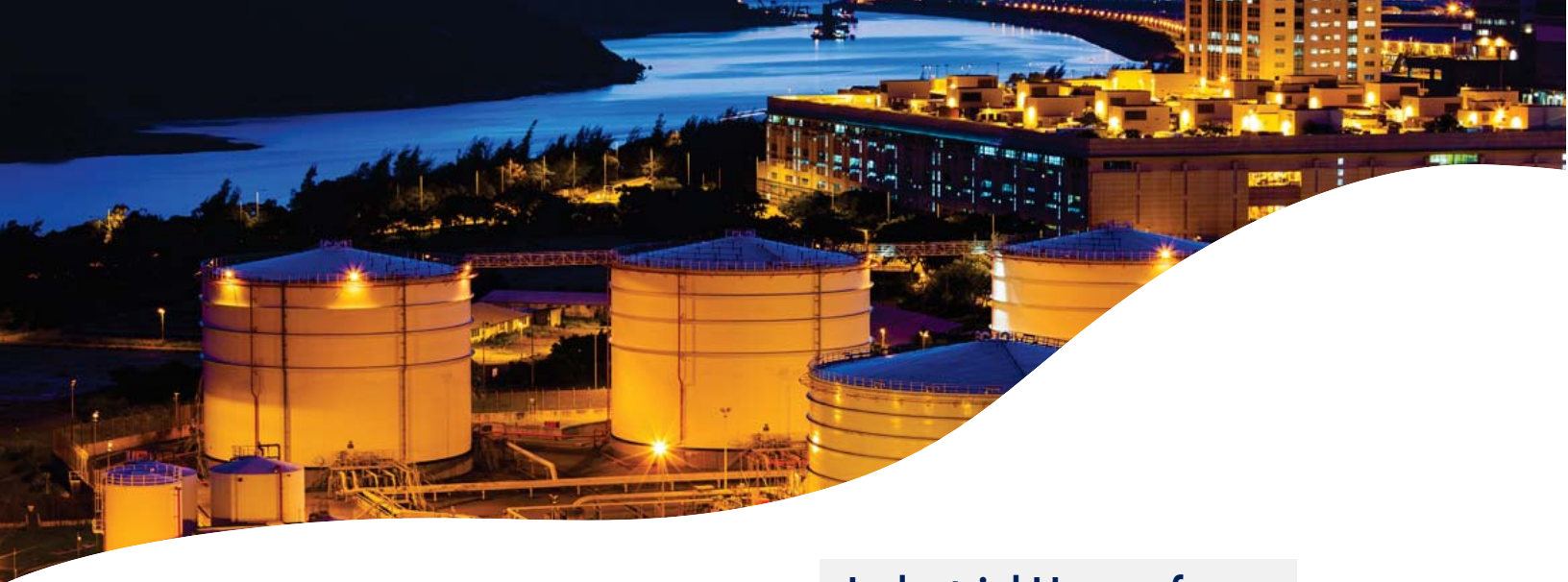
For the last 30+ years, coating chemistries have been variations on the same (linear chain) polymer themes. As a result, industrial customers are on an endless treadmill: Painting, then watching the subsequent oxidization, loss of gloss, corrosion, and paint failure... requiring, in turn, labor-intensive surface prep and repainting with the same conventional coating technology.

Put simply: NCI restores the color, gloss, surface hardness and extends the surface life of conventional coatings by 10 years.

No matter how badly oxidized your existing coating is, Nano-Clear Industrial will restore its color and provide unmatched surface protection, backed by a full 10-year warranty.

Nano-Clear NCI is also designed to be applied directly over freshly coated surfaces including 2K epoxies, 2K polyurethanes and powder coatings.





How Does NCI Enhance Color & Physical Properties?

NCI has a low (200 cps) viscosity, so it penetrates deep into the smallest pores of newly painted or oxidized coatings, **turning the white, chalked layers transparent**, allowing the original underlying color to show through while fortifying/hardening the surface.

Humidity-cured at ambient temperatures, NCI quickly hardens and fortifies the painted surface, "locking-in" color and preventing future chalking with its long-term UV absorbers.

Please note: NCI must be applied over the existing coating system before the coating has deteriorated into a powdered, peeled and/or eroding state. *NCI is not a rust converter.* Rust or peeling paints must be removed and repainted first with a coating such as a high solids, two-component epoxies, prior to applying NCI.

For additional details please review the Nano-Clear NCI Technical Data Sheet <http://www.nanocoatings.com/ncitds.pdf>

Industrial Users of Nano-Clear NCI



ODEBRECHT
Oil & Gas

CASE
CONSTRUCTION

TOSHIBA
Leading Innovation >>>



STERLING CRANE



Where Could You Use NCI?

On New or Highly Oxidized Coatings:

e.g., 2K epoxies, 2K polyurethanes, powder coatings, polyesters, gel coats, e-coats, latexes, fiberglass, and anodized aluminum (to prevent filiform corrosion, etc.).

For Industrial Equipment: e.g., rail tank cars, fuel tanks, heavy duty equipment, earth moving equipment, ships, fleet vehicles, plant floors, painted building structures, light posts, transformer housings, pumps, valves, lifeboats, oil platforms, pipelines, shipping containers, etc.



Problem: Leading soda pop company owns a global fleet of distribution trucks in need of paint restoration.

Solution: NCI is used to dramatically improve the overall image of this leading soda brand, while reducing the re-paint cycle and reducing fleet maintenance. See other Nano-Clear case studies <http://www.nanocoatings.com/casestudies>

Call Nanovere at **810-227-0077** to arrange a Nano-Clear NCI application demonstration

info@nanocoatings.com



Nano-Clear® NCI Coating Specifications

Recommended Uses: On Highly Oxidized Paints or Freshly Painted Surfaces

Chemistry: Nano-Structured Polyurethane / Polyurea Hybrid

| PROPERTY/TEST | TEST METHOD | RESULTS | TESTING SOURCE |
|---|--|---|---|
| Crosslink Density | DMA (Dynamic Mechanical Analysis) | 2.17 (X10 ³ mol/m ³) | Nippon Paint |
| VOC | ASTM D3960 | 1.25 lb/gal (150 g/l) | Nanovere |
| Recommended Dry Film Thickness | ASTM D5796 | 1 mil to 2 mils | Nanovere |
| Coverage | Nanovere | 1122 sq ft/gal (at 1 mil) | Nanovere |
| Gloss 20° / 60° | ASTM D523 | 86.0 / 92.2 | Stonebridge Technical Services |
| ABUSE RESISTANCE | | | |
| Abrasion Resistance (CS-17, 1 kg, 1000 cycles) | ASTM D4060 | 8.4 mg loss | Nippon Paint |
| Pencil Hardness, Scratch | ASTM D3363 | 4H | Stonebridge |
| Scratch Hardness | SASO 2833 | 2500 gm | Saudi Standards, Metrology, & Quality Organization (SASO) |
| Pencil Hardness, Gouge | ASTM D3363 | 5H | Stonebridge |
| Pendulum Hardness (Persoz) | ASTM D4366 | > 250 oscillations | Nippon Paint |
| Impact Resistance 18°C Direct in/lbs | ASTM D2794 | 50 Pass / 60 Fail | Stonebridge |
| Impact Resistance 18°C Reverse in/lbs | ASTM D2794 | 10 Pass / 20 Fail | Stonebridge |
| Impact Resistance | SASO ISO 3248 | 1 kg - 160 cm | SASO |
| Impact Strength | ASTM D2794 | 145 kg-cm | SASO |
| Chip Resistance 23°C (2 mils) | ASTM D3170 | 7A | Stonebridge |
| Chip Resistance -29°C (2 mils) | ASTM D3170 | 7B | Stonebridge |
| Falling Sand Abrasion 100 liters | ASTM D968 | Pass | Stonebridge |
| Mar Resistance | ASTM D5178 | 5.0 kg | SASO |
| ENVIRONMENTAL RESISTANCE | | | |
| Xenon WOM Resistance 4000 hrs | SAE J1960 | 100% Gloss Retention | Stonebridge |
| | ASTM G155 | 99% Gloss Retention | Nippon Paint |
| QUV 313, >1500 hrs | ASTM D4587 | 100% Gloss Retention | Nippon Paint |
| Water Immersion Test 240 hrs @ 50°C | ISO 2812-2 | Pass | Nippon Paint |
| Salt Spray, 4000 hrs | SASO ISO 11997 | Excellent | SASO |
| Humidity, 100% RH, 100°F, 240 hrs | ASTM D 1735-02 | No loss of adhesion. No change. | American Racing Custom Wheels |
| CASS 240 hrs @ 50°C | JIS H8502-7 | Pass | Nippon Paint |
| Thermal Shock (100°F 3 hrs, Freeze 3 hrs, Steam Blast 30 sec) | GM9525P | No loss of adhesion. No Change. | American Racing Custom Wheels |
| CHEMICAL RESISTANCE | | | |
| 10% Sulfuric Acid | ASTM D 1308 | No effect | Stonebridge |
| 10% Hydrochloric Acid | ASTM D 1308 | No effect | Stonebridge |
| 10% Sodium Hydroxide | ASTM D 1308 | No effect | Stonebridge |
| 10% Ammonium Hydroxide | ASTM D 1308 | No effect | Stonebridge |
| Isopropyl Alcohol | ASTM D 1308 | No effect | Stonebridge |
| Xylene | ASTM D 1308 | No effect | Stonebridge |
| Skydrol® 500 Fluid | ASTM D6943-A | No effect | Stonebridge |
| MEK Resistance | ASTM 4752 | 1500 double rubs | Stonebridge |
| ADHESION, FLEXIBILITY & CLEANING | | | |
| Adhesion, Direct to Metal | ASTM D4541 | 3 Mpa | SASO |
| Adhesion, Cross Cut | SASO ISO 2409 | Rating 10 | SASO |
| Flexibility, 1mm Mandrel | SASO 2833 | Passed (Very Good) | SASO |
| Flexibility, Cylindrical Mandrel | SASO ISO 1519 | 3 mm Passed (Excellent) | SASO |
| Flammability: Fire Retardant & Flame Spread | ASTM E84 / BS476 | Class 1 (Excellent) | SASO |
| De-Icing Aid | Coated equipment frozen in 20 ft freezer | It was possible to flake off ice bits and melting was faster. | Schlumberger |
| Self-Cleaning Properties | | Oil & Dirt Release; Hydrophobic, Brake-Dust Release | Nippon Paint |
| APPLICATION HIGHLIGHTS | | | |
| Pot Life | 1 Component (1K) | Relative Humidity | 20% to 80% |
| Viscosity | 200 cps | Dry Time: Dust Free @ 68-72°F | 30 minutes |
| Spray Applicators | HVLP, Conventional or Airless | Dry-To-Handle @ 68-72°F | 4 hours |
| Wipe-On Application | ShurLine® Deck Pad | Recommended for small areas | Yes |
| Application Temp | 40°F to 90°F | | |
| Operating (Service) Temp | -40°F to 250°F | | |



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