

# NANO-CLEAR® NCI FOR STRUCTURAL & ARCHITECTURAL HARDSCAPE PROTECTION

- Industry Award Winning, Eco-Friendly Coatings Guaranteed to Extend the Service Life of Valuable Assets
- Unmatched Durability, Even in the Harshest Environments

(For Oxidized or Newly Painted Surfaces)



**Assero** Coating Technologies

### **Assero** Coating Technologies Inc.

Delivering Progressive | Collaborative | Eco-innovative / Eco-responsible | Sustainable | Proven Technology



## STRUCTURAL / ARCHITECTURAL HARDSCAPE MARKETS

Industrial asset owners commonly apply protective coatings over metal surfaces to mitigate the damaging effects from various environmental factors, to maintain optimal performance, and to extend asset service life thereby increasing profitability. However, conventional industrial coatings "alone" are still very susceptible to:

- Corrosion
- Rain Erosion
- UV Degradation
- Weathering
- Moisture / Water Intrusion
- · Acid Rain / Chemical Damage
- Scratch / Abrasion / Chip Damage
- Normal Wear & Tear

### What is needed?

- A combined basecoat clearcoat system with a multifunctional clearcoat that protects surfaces more thoroughly than any existing technology.
- A permanent surface coating that enhances and extends 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 6,360 Hour Salt Spray Testing
- Extreme Abrasion Resistance
   Only 8.4 mg Loss after 1000 Cycles, 1 kg
- Low VOC
   1.25 lbs / Gal (150 g / L)
- 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
   Recoat Cycle by 10+ Years

### What Makes Nano-Clear® Unique?

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

Nano-Clear<sup>®</sup> NCI is manufactured using proprietary 3D nano-structured polymers (*not* nano-particles) which results in extreme crosslink density.

NCI dramatically improves corrosion, weathering, abrasion, scratching, chipping, marring, chemical & UV resistance and reduces surface maintenance. NCI penetrates deep into the pores of freshly painted or highly oxidized paints to enhance color, improve gloss, and significantly increase surface hardness.

Nano-Clear<sup>®</sup> is a one-component, humidity cured, highly cross-linked, polyurethane/polyurea, hybrid nanocoating.

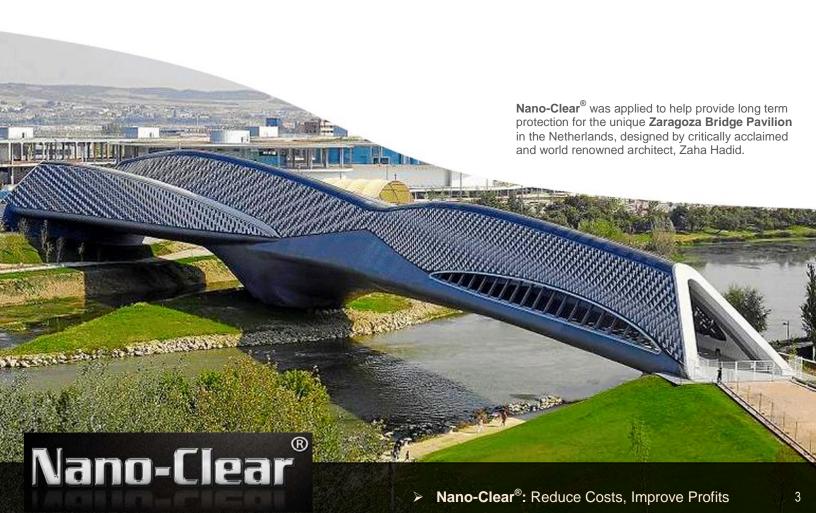
With this exceptionally high crosslink density, we have the test data to prove that NCI is the world's best all-around clearcoat for resistance to scratches, chips, abrasion, chemicals, weathering, and more. Please see the back cover for test results or visit www.assero.co/tests.

### **AMAZING FLEXIBILITY!**



#### Before / After

- √ Nano-Clear<sup>®</sup> has both remarkably high surface hardness and flexibility.
- ✓ Steel panel coated with Nano-Clear®, bends in-half without cracking or any other failure to the coating.



### Why is Crosslink Density So Important?

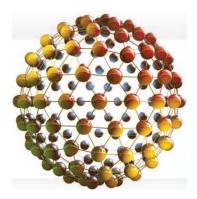
Coatings contain "building blocks" with functional groups. The chemical reaction of these groups during curing forms a network. In most traditional polymers, the network is a linear chain of molecules with low crosslink density.

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.

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



Linear chain of molecules



3D molecular architecture



Application of Nano-Clear® to the Kit Bond Bridge in Kansas City, Missouri



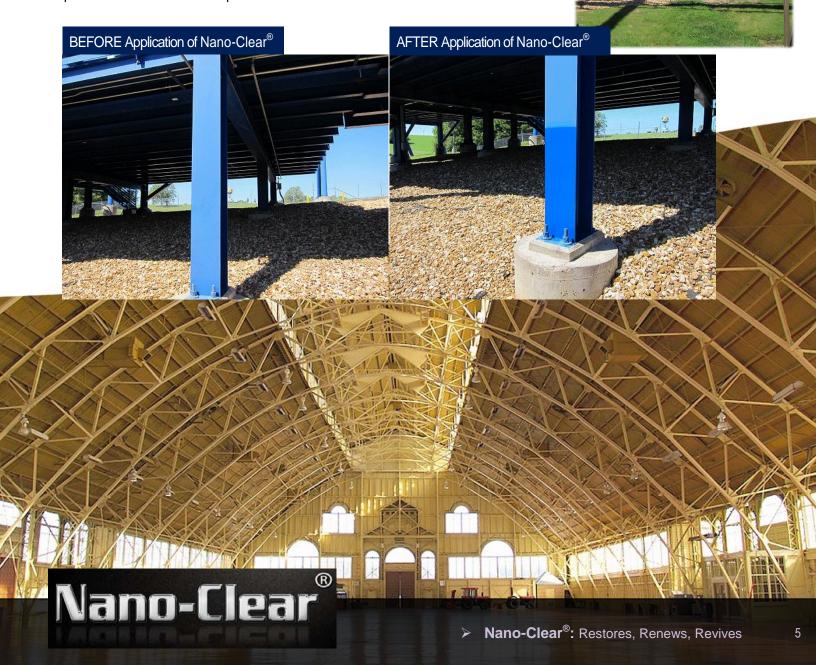
## **Unrivaled Performance Enhancement for Newly Painted** or Highly Oxidized Coatings

For decades, conventional coating systems have relied on numerous variations of the same linear chain polymers as noted above. As a result, in order to properly protect equipment, it's necessary for industrial customers to perform frequent, costly, labour intensive maintenance cycles every 6 months to 5 years which includes surface preparation & repair, and then repaint & recoat using the same *conventional* technology.

Nano-Clear® Coatings on the other hand, are designed from the bottom up with nano-structuring properties and no matter how badly oxidized your existing coating is, Nano-Clear® NCI for Structural & Architectural Hardscapes application will restore its color and provide unmatched surface protection.

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

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



## **How Does Nano-Clear<sup>®</sup> Enhance Color & Physical Properties?**

NCI has a low (200 cps) viscosity, so it penetrates deep into the smallest pores of newly painted of 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 (prior to applying NCI) with a coating such as a high-solids, two-component epoxy.

For additional details, please review the Nano-Clear® NCI Technical Data Sheet at: www.assero.co/resources.



The Hong Kong - Zhuhai - Macau Bridge had its cement guard rails coated with Nano-Clear<sup>®</sup>. This economically important, record-setting bridge (completed in 2018) is the longest sea crossing and the longest open-sea fixed link in the world.

### Where Can Nano-Clear® Be Used?

### On New or Highly Oxidized Coatings:

Nano-Clear® (NCI) has been engineered to be applied over 2K epoxies, 2K polyurethanes, powder coatings, polyesters, gel coats, e-coats, latexes, fibreglass, and anodized aluminum (to prevent filiform corrosion, etc.).

### For Structural & Architectural Hardscape Applications:

NCI is the premiere solution for a diverse range of applications:

- Oil & Gas Pipelines
- Oil Field Platforms, Pipes and Tubes
- Chemical, Oil and Gas Storage Tanks
- Pumps and Valves
- Cargo Ships / Ocean Going Vessels
- Lifeboats
- Locomotives, Tank & Chemical Railcars
- Drinking Water Pipelines
- Epoxy Coated Floors
- Shipping Containers
- Generators
- High & Low Voltage Utility Boxes

- Bridge Structures
- Mass Transit Vehicles & Equipment
- Emergency Response Vehicles & Equipment
- Concrete Warehouse Floors
- Painted & Concrete Building Structures
- Interior and Exterior Concrete / Wood Architectural Structures
- Agriculture, Construction, & Earth Moving Equipment
- Aircraft and Equipment
- Naval and Military Air,
   Ground & Marine Equipment
- And much more.



Problem: Warrington PCI Management's Royal Centre (Royal Bank Tower) located in downtown Vancouver, BC was facing an ongoing issue whereby the building's exterior concrete panels were leaching and depositing efflorescence onto the building's floor-to-ceiling windows due to the rains experienced in the Pacific Northwest. The damage severely compromised visibility and PCI was facing a \$30 million price tag to replace all windows, which still would not have solved the problem.

Solution - NCI: After acid washing the windows and pressure washing the precast concrete, NCI was applied to all sides of the building, and then the windows were coated. After 4+ years later, with a once / year maintenance wash, the concrete building façade still looks great! They're saving money, the tenants are happy, and more importantly, a \$30 M crisis was averted. See other Nano-Clear® case studies:

www.assero.co/resources

### **Industry Recognition**

Nano-Clear® has been recognized for its innovative engineering by:

- NACE MP 2019 / 2020 Corrosion Innovation of the Year Award NACE (the National Association of Corrosion Engineers) sets the standards for surface preparation, coating selection, coating application, painting contractor certification, and testing.
- Frost & Sullivan Technology Leadership Award 2020 Frost & Sullivan is the premiere business consulting firm to the Paints and Coatings Industry.
- PaintSquare Prestige Award 2020 (Top Product: Coatings for Steel) PaintSquare is the premier industry publication to the Paints & Coatings Industry.







## To arrange a Nano-Clear® application demonstration, contact **\ssero** at:

info@assero.co



### **ASSERO** COATING TECHNOLOGIES

Assero Coating Technologies delivers Exceptional Surface Protection™ which extends the useful service life of valuable assets that operate in harsh environments. Assero is built around an ethos of delivering eco-innovative / eco-responsible, sustainable, green chemistry solutions with a line of Protective Clearcoats that reduce damage to the environment.

### Nano-Clear® Third Party Test Results



Chemistry: 3D Nano-Structured Polyurethane / Polyurea Hybrid

### High Cross-Link 3D\*Molecules Inside\*

### **TABLE 1**

	TEST METHOD DETAILS			
	PRIMARY SPECIFICATIONS	TEST STANDARD	RESULTS	
1	VOC	ASTM D3960	1.25 lb / gal / -150 g/l	1
2	Recommended Dry Film Thickness (DFT)	ASTM D5796	1.0 mil - 2.5 mils ( / 50.4 µm to 63.5 µm)	2
3	Coverage: 1 US Gal / 3.8 Ltr.	Nanovere Inhouse	1,122ft <sup>2</sup> @1.0 mil	3
4	Specular Gloss: @ 20º / 60º	ASTM D523	86.0/92.2	4
	IN SERVICE PHYSICAL DAMAGE RESISTANCE	TEST STANDARD	RESULTS	
5	Abrasion Resistance by Taber: CS-17, 1 kg, 1,000 cycles	ASTM D4060	8.4 mg loss	5
6	Coating Hardness by Pencil Test: Scratch	ASTM D3363	4H	6
7	Coating Hardness by Pencil Test: Scratch	SASO 2833	2500 gm	7
8	Coating Hardness by Pencil Test: Gouge	ASTM D3363	5H	8
9	Coating Hardness by Pendulum Damping: Persoz	ASTM D4366	>250 oscillations	9
10	Coating Rapid Deformation by Impact: 18°C Direct in./lbs.	ASTM D2794	50 Pass / 60 Fail	10
11	Coating Rapid Deformation by Impact: 18°C Reverse in./lbs.	ASTM D2794	10 Pass / 20 Fail	11
12	Coating Rapid Deformation: Impact Strength	ASTM D2794	145 kg - cm	12
13	Impact Resistance: Single or Multi-coat Systems	SASO ISO 3248	1kg-160cm	13
14	Chip Resistance of Coatings: 23°C / 73.4°F @ 2.0 mils DFT	ASTM D3170	7A	14
15	Chip Resistance of Coatings: -29°C / -9.4°F @ 2.0 mils DFT	ASTM D3170	7B	15
16	Abrasion Resistance by Falling Abrasion: 100 liters	ASTM D968	Pass	16
17	Mar Resistance of Organic Coatings	ASTM D5178	5.0 kg	17
18	Flexibility - Conical Mandrel Bend	ATSM D522	1/4" Pass	18
19	Flexibility - Cylindrical Mandrel Bend	ASTM D522	Zero (0) - T	19
13				
13	ENVIRONMENTAL RESISTANCE	TEST STANDARD	RESULTS	
•		TEST STANDARD SAE J1960	RESULTS 100% Gloss Retention	20
20	Controlled Xenon Arc-Lamp-Exposure Resistance: 4,000 hrs	SAE J1960 ASTMG155		
•	Controlled Xenon Arc-Lamp-Exposure Resistance: 4,000 hrs Fluorescent UV-Condensation Exposure: QUV 313 > 1,500 hrs	SAE J1960 ASTM G155 ASTM D4587	100% Gloss Retention	21
20 21 22	Controlled Xenon Arc-Lamp-Exposure Resistance: 4,000 hrs  Fluorescent UV-Condensation Exposure: QUV 313 > 1,500 hrs  Water Immersion Resistance: 240hrs @50°C / 122°F	SAE J1960 ASTMG155 ASTM D4587 ISO 2812-2	100% Gloss Retention 99% Gloss Retention 100% Gloss Retention Pass	21 22
20	Controlled Xenon Arc-Lamp-Exposure Resistance: 4,000 hrs  Fluorescent UV-Condensation Exposure: QUV 313 > 1,500 hrs  Water Immersion Resistance: 240 hrs @50°C / 122°F  Humidity Testing: @100% RH, 100°F / 37.8°C -240 hrs	SAE J1960 ASTMG155 ASTM D4587 ISO 2812-2 ASTMD1735-02	100% Gloss Retention 99% Gloss Retention 100% Gloss Retention	21 22 23
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20 21 22 23	Controlled Xenon Arc-Lamp-Exposure Resistance: 4,000 hrs  Fluorescent UV-Condensation Exposure: QUV 313 > 1,500 hrs  Water Immerson Resistance: 240hrs @50°C / 122°F  Humidity Testing: @100°R H, 100°F / 37.8°C -240 hrs  Corrosion Resistance: PASS 240hrs @50°C / 122°F  Salt Spray Fog: 6,360 hrs	SAE J1960 ASTMG155 ASTM D4587 ISO 2812-2 ASTMD1735-02	100% Gloss Retention 99% Gloss Retention 100% Gloss Retention Pass No loss of adhesion - No change	21 22 23 24 25
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20 21 22 23 24 25 26 27 28 29 30 31 32 33	Controlled Xenon Arc-Lamp-Exposure Resistance: 4,000 hrs  Fluorescent UV-Condensation Exposure: QUV 313 > 1,500 hrs  Water Immersion Resistance: 240 hrs @50°C / 122°F  Humidity Testing: @100% RH, 100°F / 37.8°C -240 hrs  Corrosion Resistance: PASS 240 hrs @50°C / 122°F  Salt Spray Fog: 6,360 hrs  Thermal Shock Test for Adhesion: Heat: @ 100°F / 37.8°C for 3 hrs, Freeze for 3 hrs, Steam Blast for 30 Sec  CHEMICAL RESISTANCE  Effect of Household Chemicals on Clear & Pigmented Coatings: 10% Sulfuric Acid  Effect of Household Chemicals on Clear & Pigmented Coatings: 10% Hydrochloric Acid  Effect of Household Chemicals on Clear & Pigmented Coatings: 10% Sodium Hydroxide  Effect of Household Chemicals on Clear & Pigmented Coatings: 10% Ammonium Hydroxide  Effect of Household Chemicals on Clear & Pigmented Coatings: 18proppyl Alcohol  Effect of Household Chemicals on Clear & Pigmented Coatings: 18proppyl Alcohol  Effect of Household Chemicals on Clear & Pigmented Coatings: Nylene  Immersion Testing of Industrial Protective Coatings: Skyldrol® 500Fluid	SAE J1960 ASTMG155 ASTM D4587 ISO 2812-2 ASTMD1735-02 JIS H8502 ASTM B117 / 2018 GM9525P TEST STANDARD ASTM D 1308	100% Gloss Retention 99% Gloss Retention 100% Gloss Retention Pass No loss of adhesion - No change Pass No corrosion points - Approved No loss of adhesion - No Change  RESULTS No effect	21 22 23 24 25 26 27 28 29 30 31 32 33
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### **TABLE 2**

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	DMA (Dynamic Mech	nanical Analysis)							
	SAMPLE PANEL TESTED	E' @ 23°C/73.4°F	MPA	XLD	(Kmols/cc)	Tg (ºC)	Based on historic	al data XLD has a 95%	confidence interval of ~ +/- 0.5
6	Nano-Clear® (NCI)	2110			2.17	57.7	Based on historica	al data Tg has a 95% co	onfidence interval of ~ +/- 2.5
	UNIAXIAL EXTENSION	(INSTRON)					•		
	SAMPLE PANEL	YOUNG'S MODULUS	YIE	LD	YIELD	STRESS @	STRAIN @	TOUGHNESS	

 SAMPLE PANEL TESTED
 YOUNG'S MODULUS STRAIN % MPa
 YIELD STRESS % MPa
 STRESS % BREAK % BREAK % MPa
 TOUGHNESS MPa

 Nano-Clear® (NCI)
 1506
 4.59
 51.6
 52.7
 52.4
 5.09

 95% \*CI +/ 35
 0.14
 1.6
 1.3
 1.5
 0.59

\*Confidence Intervals based on 5 tests of this sample

- Q. What is DMA?
- A. Dynamic Mechanical Analysis is performed by a Dynamic Mechanical Analyzer.
- Q. What does a DMA do?
- A. DMA measures the mechanical/rheological (crosslink density; XLD) properties of a material as a function of time, frequency, temperature, stress, and strain.

NOTE: The *Dynamic Mechanical Analyzer* used for **Table 2** tests, was a **TA Instrument Q800** unit.



### **TABLE 3**

	T	EST METHO	D DETAILS		TES	T STANDARD			
	The Japanese Industrial Standard is a quantitative antimicrobial surface test method that tests for antimicrobial activity and efficacy				non-GLP Modified JIS Z 2801Study				
	Test Microorganism	Contact Time	Test Substrate	Replicate	CFU/Carrier	Average CFU/Carrier	Percent (%) Reduction Compared to 24 Hour Control	Log10 Reduction Compared to 24 Hour Control	
		Time	Control	1	3.30E+05				
39		Zero	Glass	2	2.60E+05	2.80E+05	N/A	N/A	
	E. coli	2010	Substrate	3	2.50E+05				
	ATCC 8739		Control	1	3.70E+05				
40			Glass	2	3.80E+05	3.97+05	N/A	N/A	
		24	Substrate	3	4.40E+05				
	S. aureus	Hours	Nano-Clear®	1	1.63E+02				
41	ATCC 6538		NCI 4.0	2	1.48E+02	4.87E+02	99.9993%	5.59	
			NCI 4.0	3	1.15E+03				
			Nano-Clear®	1	3.03E+01				
42			Nano-Clear	2	6.00E+00	1.53E+01	99.99998%	6.87	
			1401 3.0	3	9.50E+00				

#### **TABLE 4**

ANTI-ICE SCREENING	3		
TEST SAMPLE INFO	T-PANEL (4" X 12")	NUMBER OF	SCOPE OF
INFO	SUBSTRATE	PANELS TESTED	TESTING
Control	Aluminum	2	Contact angle - ice de-bond (shedding)
NCI +NCFP@5%	Aluminum	1	Contact angle - ice de-bond (shedding)
VX-SC	Aluminum	1	Contact angle - ice de-bond (shedding)
VX+SC+5% Fluoropolymer	Aluminum	2	Contact angle - ice de-bond (shedding)
NCI+NCIM@30%+NCFP@5%	Aluminum	2	Contact angle - ice de-bond (shedding)

SERIE

#### **ICE / FROST BUILD TESTING**

- Test sample panels were attached to the evapcooler's fins along with thermo-couplers.
- 2. Freezer door propped open by .5" for an 1 hour.
- 3. Two pans of 40°C tap water (500 grams) was added and the freezer door was then closed shut.
- 4. The closed freezer was run for 16 hours and monitored using a picolog with thermocouplers and a computer.
- **5.** After 16 hours of run time the amount of ice/frost generated on the test panels was evaluated.

	CONTACT ANGLE TEST RESULTS							
TEST SERIES 1	TEST SAMPLE INFO	CONTACT ANGLE						
43	Control	43.12°						
44	NCI +NCFP@5%	102.41°						
45	VX-SC	103.15°						
46	VX+SC+5% Fluoropolymer	98.535°						
47	NCI+NCIM@30%+NCFP@5%	101.07°						

	ICE DE-BOND (SHEDDING) TEST RESULTS									
S	TEST SAMPLE INFO	ICE DE-BOND (SHEDDING) TIME IN SECONDS								
48	Control	58s								
49	NCI +NCFP@5%	32s								
50	VX-SC	49s								
51	VX+SC+5% Fluoropolymer	47s								
52	NCI+NCIM@30%+NCFP@5%	40.5s								

### **TABLE 5**

	SCRATCH TESTING PARAMETERS - ASTM D7027									
	SCRATCH MODE	MAX. LOAD (N)	SCRATCH LENGTH (MM)	SCRATCH SPEED (mm/sec)	LOADING RATE (N/min)	PRE/POST SCAN LOAD (N)	SCRATCH TRACKS PER SAMPLE	SCRATCH TIP TYPE	TIP MATERIAL	SCRATCH TIP RADIUS (µM)
I	Progressive	100	2	2	200	1	3	Sphero-conical	Diamond	20

56

### TEST REQUIREMENTS

- 1. Room temperature micro-scratch experiment using a micro-scratch technique.
- The goal is to study and compare coating adhesion, strength / scratch resistance of the coatings through progressive scratch tests.
- The testing procedures follow a modified ASTM D7027 standard to scratch polymeric thin coatings with a diamond tip.

#### SYSTEM EMPLOYED FOR TESTING

- 1. An Anton Parr Revtest (Macro) Scratch System.
- 2. The system was calibrated on 04/30/2021.
- A 100 µm radius diamond spherical tip was employed for the scratch measurements.
- 4. The system and the scratch tip were validated on a TiN reference sample before the experiments were conducted on the Assero supplied samples conducted as a blind test (X vs Y)

	COMPARISON FAILURE ROO	LC1	OPTIC			
	TEST 1 SAMPLES			DATA 1	DATA 2	STD DEV
53	Х*	38.393	38.032	37.962	38.129	0.231
54	Υ**	43.622	42.386	45.551	43.853	1.595

NOTE: X\* (submitted sample) Nano-Clear® Gel-coated fiberglass unsanded pre-application

<b>FAILURE HEATE</b>	COMPARISON OF CRITICAL LOADS OF FAILURE HEATED 8 HOURS @ 50°C-COOLED OVERNIGHT					
TEST 2 SAMPLES	DATA 1	DATA 2	DATA 3	MEAN	STD DEV	
Χ*	38.486	32.869	35.433	35.929	3.336	
Υ**	1.532	0.374				

\*\*Y (submitted sample) BASF DC92 sanded Gel-coated fibreglass pre-application

#### Why Micro-Scratch Testing?

"Data from the nano-scratch test also proved best for determining how well the coating responded to physical assault based on its crosslink density, the measure of how tightly the polymer components are bound together," \*Sung said.

"With this molecular-level understanding, clearcoat formulas can be improved so that they yield materials dense enough to be scratch resistant and resilient but not so hard that they cannot be worked with easily."

"The researchers concluded that to get the truest evaluation of clearcoat performance, the nano-, micro- and macro-scratch tests should be conducted in conjunction with the current industry standard methods." \*Li-Piin Sung NIST research Physicist

### **TABLE 6**

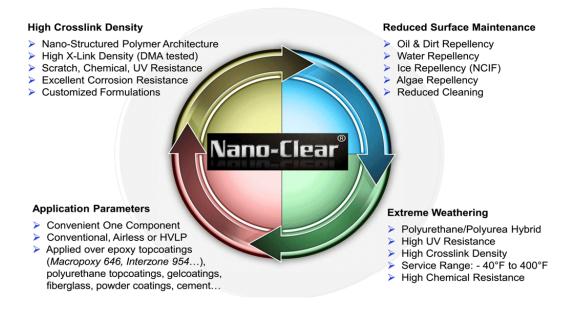
	TEST METHOD DETAILS	1		
	OPTICAL PROPERTIES	TEST STANDARD	CONVENTIONAL CARC RESULTS	NCI SuperCARC (NCI +MAT) RESULTS
57	Specular Gloss: @ 20° - 60° - 85	ASTM D534	0.7 - 3.6 - 7.4	0.6 - 1.3 - 7.8
8	Calculating color differences from instrumentally color measured color coordinates:  L-, a-, b-	ASTM D2244	66.66 - 6.02 - 20.71	66.66 - 6.02 - 20.71
59	Measurement of spectral absorptance, reflectance, and transmittance: IR signature	ASTM E-903	PASS	PASS
	PHYSICAL PROPERTIES	TEST STANDARD	CONVENTIONAL CARC RESULTS	NCI SuperCARC (NCI +MAT) RESULTS
60	Rating Adhesion by Tape Test	ASTM D3359	5B	5B
31	Rating Film Hardness by Pencil Test	ASTM D3363	2B	>6H
	CHEMICAL AND PHYSICAL DAMAGE RESISTANCE	TEST STANDARD	CONVENTIONAL CARC RESULTS	NCI SuperCARC (NCI +MAT) RESULTS
62	Acid Spot Resistance	MIL-DTL-53039E Sec 4.6.24	No Effect	No Effect
63 64	MEK Resistance Double rubs to substrate Double rubs to start of coating Dissolution	ASTM D4752	>200 20	>1,500 >1,500
65 66 67	Water Immersion Testing: Visual Observation Pencil Hardness Adhesion	MIL-DTL-53039 Sec 4.6.24	No Effect 4B 5B	No Effect >6H 5B

#### **INTRODUCING A NEW APPROACH TO CARC**

"The effectiveness of US military forces is highly dependent on the readiness (and safety) of the equipment and vehicles they use. Spray-applied coatings are used for many types of equipment, components and vehicles including aircraft, ground vehicles, water-borne vessels and ordnance. Improved......quality therefore results in reduced cost and readiness." Lea Ann Schellhorn, lowa Waste Reduction Center, Cedar Fall - Spray Technique Analysis and Research for Defense (STAR4D)



### **Multi-Functional Nanocoatings with Remarkable Properties**





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