

# Nano Ceramic Coating

n-cercoat\_03

**Water Repellent | Dust Repellent | UV Protection | Scratch & Abrasion Resistant | Transparent | Anti-Bacterial | Anti-Corrosive |**

Innovation **C**enter for **A**ppplied **N**anotechnology - **I-Can Nano™**

## NANO CERAMIC COATING

Based on *Chemical Nanotechnology*, the synthesized product contains specially modified *Functional Nano Particles* that are specially linked into a Silicon Matrix in a Solvent Base. Self-organizing Nano components form an invisible layer on the surface with Excellent Water/Dust Repellent & Anti-bacterial properties. n-cercoat is high performance multifunctional coating with many key functional properties combined together in one coating solution.

### Benefits and Advantages

- ✿ Water repellent (hydrophobic) and Dirt repellent (oleo phobic).
- ✿ UV Resistance
- ✿ Anti-Bacterial / algae/ foul
- ✿ Scratch Resistance
- ✿ Anti-sticking
- ✿ Anti-corrosive
- ✿ Easy Clean
- ✿ Abrasion Resistant
- ✿ The water rolls-off the surface forming a Brushing Effect (Self-Cleaning Effect). No dampness on the surface.
- ✿ Transparent
- ✿ Easy application through Spray, Brush, etc.
- ✿ Material curing at atmospheric temperature.
- ✿ Stable at varying Temperatures.
- ✿ Low Cleaning and Maintenance Cost.
- ✿ Ecologically beneficial and biologically safe.
- ✿ Retains the quality of Surface.



### Areas of Application

- ✿ Ceramic wall tiles
- ✿ Ceramic sanitary wares
- ✿ Ceramic bath wares
- ✿ Ceramic Wash Basins
- ✿ Ceramic Commode/ Urinals



### Application Instructions

The product must be used as delivered (The material must not be diluted further).

#### Cleaning of the Surface

- ✿ It must be ensured that the Surface is free of all loose particles/ Dust etc.
- ✿ Before application the Ceramic Surface must be clean and completely dry.
- ✿ This coating should be applied as topcoat over ceramic surfaces.

### Application of Coating Solution

- ✿ The material can be applied on the surface by either Spray, Brush, Roller, Sponge, Tissue paper etc.
- ✿ It should be ensured that the material is adequately applied until the surface is saturated (This may vary best on efficiency of applicator. On an average, a liter of the coating material should be sufficient for about 700 Sq Ft.).



### Test of Coating

- ✿ The Coating takes about 3 Hrs to completely set.
- ✿ After 3 hours wipe out the surface with a tissue paper and polish the surface till it becomes completely dry.
- ✿ Once coated the performance can be tested by pouring some water on the coated tiles. If properly coated, the water should form droplets and roll-off.

### BIS Standard test

On the tiles we tested the chemical resistance as per the recommendation of BIS standard and even more than the recommended values. And we found the tiles showed no deterioration on their coated surface as well as the water repellency was retained. The table below shows the details of the chemical resistance tests performed on the tiles according to BIS standard.

### Chemical Resistance Tests

Name of Chemical	Strength	BIS Standard		Our Test	
		Time	Temp	Time	Temp
Acetic Acid	10%	16 hrs	100 Deg C	72 hrs	100 deg C
Citric Acid	10%	16 hrs.	100 Deg C	72 hrs	100 deg C
Detergent	----	48 hrs	60 Deg C	72 hrs	100 deg C
Hydrochloric Acid	50%	48 hrs	25 - 35 Deg C	72 hrs	35 deg C
Sodium Hydroxide	5%	½ hrs	60 Deg C	24 hrs	100 deg C
Sodium Stearate	0.15%	48 hrs	60 Deg C	72 hrs	100 deg C
Sulphuric Acid	3%	16 hrs	100 Deg C	72 hrs	100 deg C

### BIS standard stain chemical test

According to BIS standard stain chemical tests were performed on the tiles. The following stain chemical tests were done:

1. 0.5% Methyl Blue Soln.
2. 10% Sodium Hypochlorite
3. 3% Hydrogen Peroxide
4. Amyl Acetate
5. Carbon Tetrachloride
6. Iodine with ethanol

**No stain observed on the coated ceramic tiles.**

### Other Tests

Test	Result
Contact Angle of water droplets	118 <sup>0</sup>
Thickness of coating (Dektak Profilometer)	53 <sup>0</sup> A
Abrasion Resistance	Improved
Cold Test Keep the coated ceramic tiles at -20°C for 2 Hrs.	Pass
Bake Test Keep the coated ceramic tiles at 130°C for 2 Hrs.	Pass
Anti-bacterial Test	No bacteria growth observed
Humidity Test Keep the coated ceramic tiles at 50°C & 99.99% RH for 360hrs	Pass
Salt Spray Keep the coated tiles at 5% NaCl salt chamber for 360 hrs.	Pass
Water immersion test Immerse the coated ceramic tiles in water for 360hrs at room temperature.	Pass
Boil Test Boil the coated ceramic tiles at 100°C for 2 Hrs.	Pass
Temperature withstand ability	Above 300 <sup>0</sup>
Scratch Resistance	Improved
Contact angle post abrasion test	No significant change
UV Radiation Test Keep the coated ceramic tiles in 2 sun intensity for 100 Hrs.	Pass
Acid Test (pH=1) & Alkaline Test (pH=11)	Pass

### Why Nano Ceramic Coating from I-Can Nano™?

- Performance of I-Can™ n-cercoat\_03 is robust due to effects of INORGANIC NANO PARTICLES incorporated in non-polymer based matrix i.e. it is a dispersion of functionalized nano-particles in a solvent base. This solvent acts as carrier in spreading across the applied surface. Over the curing period (2 to 3 hrs.) nano-particles self-assemble across the surface and bonds with the surface. The solvent evaporates over the curing period leaving only INORGANIC NANO PARTICLES that forms a uniform thin layer of 50 - 60 nm over the surface by forming bond with silica of ceramic surface. For this scientific reason, life of the coating would be very long. I-Can Nano™ has developed the technology to combine many properties into one nano-particle. Each such nano-particle exhibits property of water/dirt repellency, UV protection, anti-bacterial, anti-corrosion etc.
- I-Can™ n-cercoat\_03 is optically neutral i.e. completely transparent and while applied over ceramic surface, the color of ceramic surface remains unaltered and due to UV protection, ceramic surface does not fade away over a period of time.
- Coating contains functionalized nano silver that imparts total bacteria-free surface and so it is anti-foul & anti-algae.
- Because of anti-sticking surface dirt does not stick on the surface. It is easy clean and remains stain-free.
- Surface becomes anti-corrosive and highly resistant to acidic & alkaline solutions.
- High resistance to scratches & abrasion.

### Why I-Can Nano™?

I-Can Nano™ has indigenously developed robust process technology to manufacture high quality & pure nano-materials with very wide range and also has developed the technology for manufacture of novel coating. This ensures robust performance of the nano ceramic coating.

I-Can Nano™ is brainchild of Dr. Arup Chatterjee, a internationally reputed expert Chemical Nanotechnologist from IIT-Mumbai, having one US patent on Fuel Cell electrode and one Indian patent on super-capacitor at his credit. He has indigenously synthesized nano material of several metals/non-metals/oxides/compounds and also nano-alloys. Nano material synthesized by him has already entered into diverse application segments like paints, coatings, catalysts, filters/membranes, energy conservation/storage, cancer research etc.

Nanotechnology is an emerging technology on manipulation of materials at atomic level to achieve targeted property. This technology finds application in almost every discipline of science/engg., life sciences, physics, chemistry, biology etc. Impact of Nanotechnology has been estimated to be 1 trillion US dollar by 2015 (Courtesy: National Science Foundation, USA). It is being said "the next big thing, is really small".

Innovation Center for Applied Nanotechnology - I-CanNano™

22A Hemchandra Mukherjee Road, Barisha, Kolkata - 700 008, Ph. : +91 33 64520110, M: +91 9321025697,

[info@ican-nano.com](mailto:info@ican-nano.com)/[ican.nano@gmail.com](mailto:ican.nano@gmail.com) ; <http://ican-nano.blogspot.com>; [www.ican-nano.com](http://www.ican-nano.com)