DuralBond FAQ

1. What is DuralBond?

DuralBond technology is based on CHOOSE NanoTech's rich experience in photoelectron semiconductor industry. It transforms a solid-state glass material into a transparent fluid type. When it interacts with the humidity of the air, the material reverts to a solid-state.

DuralBond is a powerful coating for industrial applications. Its nano molecular matrix structure greatly increases the coated surface's hardness and gives it an anti-scratch capability.

The hardness grade can reach up to a high hardness scale of 9H depending on the coated material. It gives the surface a lotus effect – the coated surface becomes hydrophobic and self-cleaning. It also protects the surface from corrosion from acid, base and saline.

2. What exactly is "hydrophobic" or "oleophobic"?

Hydrophilic and hydrophobic describes the tendency of a material in absorbing or repelling water. Hydrophilic materials are 'water loving'. They tend to absorb water. Hydrophobic materials are 'water hating'. They tend to repel water. Oleophobic materials, on the other hand, tend to repel oil.

The hydrophobic effect is observed when nonpolar substances aggregate in an aqueous solution and push away water molecules. This means that water cannot easily adhere to or dissolve into a hydrophobic surface. Water naturally will form spherical droplets on such surfaces.

Hydrophobicity of a surface can be measured by its contact angle with a water droplet. The higher the contact angle the higher the hydrophobicity of the

surface. Contact angles of more than 90 degrees indicates that the surface is hydrophobic. Angles of less than 90 degrees thus indicates a hydrophilic surface.

Hydrophobicity can be found in nature such as lotus and taro leaves and on wings of some insects, hence the term ‘lotus effect’. The lotus leaves have micro papillae which are tiny projections of around 10 to 20 micrometers. This creates a contact angle of 170 degrees. This means only 0.6% of the water droplet is on contact with the leaf surface. Therefore, any vibration will cause the droplet to easily slide off the surface providing a self-cleaning effect.

3. What effects can DuralBond achieve?

DuralBond provides a treated surface the following effects:

- Anti-grafitti
- Easier fingerprint removal
- Self cleaning effect
- Weather proofing
- Anti corrosion/oxidation – resist saline, acid/base and UV corrosion. So the surface can be washed with common detergent.

DuralBond works up to a temperature of 750°C making it the finest industrial coating in the market today.

4. How long does the DuralBond coating last?

When fully cured, DuralBond becomes a permanent glass-like coating. Only physical abrasions will wear off the coating.

5. How to prolong the DuralBond effect in the best condition?

We recommend a maintenance coating every 2 to 3 months to keep the DuralBond effect at optimal levels.

6. Is DuralBond vulnerable to heat?

DuralBond works up to 750°C which is sufficient for most industrial conditions and weather conditions. But it is not a fire-proof material. So do not expose it directly to fire.

7. What substrate is DuralBond suitable for?

DuralBond series of products works across a wide range of substrates commonly found in industrial applications such as,

- metal
- stone
- wood
- non-absorptive leather

8. How does DuralBond achieve its anti-scratch effect?

DuralBond will form a glass film on the coated surface that is resistant to scratch up to a hardness scale of 9H.

9. Will it still work if the coating wears out over time?

When completely cured, DuralBond cannot be removed with common chemical solvents. Like glass, it can only be removed by machine polishing. In

fact, DuralBond has the longest life-cycle compared to similar products in the market. However, if the coating is gone, say, through wear and tear, its protective qualities won't work anymore.

10. What is the color of DuralBond?

DuralBond is colorless. It comes as a liquid and forms a colorless and transparent glass film on the coated surface. The transmittance of DuralBond is outstanding.

Here is a study showing DuralBond does not affect the transmittance and overall output of solar power system efficiency :

Module ID	Voc(V)	Isc(A)	Vpm(V)	Ipm(A)	Pm(W)	Grade	
151P606021094828	38.11	9.15	30.74	8.58	263.77	A	Non-Coat
149P606022016128	38.24	8.99	30.9	8.49	262.46	A	Non-Coat
151P606021094828	38.16	8.91	30.79	8.36	257.55	A	Treated
149P606022016128	38.34	8.99	30.96	8.4	261.22	A	Treated

11. How much area can 1ml of DuralBond cover?

In standard HVLP usage 1ml of DuralBond can be applied up to an area of 30cm by 30cm, or 0.09m^2. A 1 litre bottle of DuralBond can cover an area of up to 100m^2.

This data is based on application of DuralBond on a flat metal plate. Consumption could vary based on the unevenness of the surface and absorbency of the substrate.

12. How long does it take for DuralBond to cure?

DBX and DBA, the two DuralBond products designed for industrial application, have curing profiles as follows:

		DBX	DBA
Air Cure	Surface Dry	25℃, **1-2 hours**	25℃, **8 hours**
	Full Dry	25℃, **3-5 days**	25℃, **3-5 days**
Thermal Cure (Oven)		130°C, **30 minutes**	130°C, **30 minutes**
		200 °C, **10 minutes**	200 °C, **10 minutes**

13. What is the shelf life and storage requirements of DuralBond?

DuralBond shelf life is 18 months if it is kept in a sealed packaging and stored away from any exposure to the sun in a cool, dry environment with temperatures under 25°C.

Once opened, please seal the bottle to avoid further contact with air during storage. Do not pour unused DuralBond back into the bottle. It will cure once exposed to air.

14. Is DuralBond vulnerable to UV?

DuralBond is stable even with long exposure to UV radiation. For best results please follow the maintenance instruction of original manufacturer.

15. Is DuralBond vulnerable to chemicals?

DuralBond is able to withstand most chemicals. For best results, please follow the maintenance instruction from original manufacturer.

16. Is DuralBond vulnerable to acid and alkaline?

DuralBond passed both SGS acid-resistance and alkaline-resistance tests.

17. <u>Can DuralBond prevent oxidation or corrosion?</u>

DuralBond forms a thin glass film on the substrate surface and cuts out substrate's contact with air preventing any oxidization or corrosion.

18. <u>How is DuralBond applied?</u>

This table shows the different methods of DuralBond application:

		DBX	DBA
Application	**Wiping**	X	V
	Brushing	V	V
	Dipping	V (Clean Room Required)	V (Clean Room Required)
	Spraying	V (Clean Room Required)	V (Clean Room Required)

19. <u>Is DuralBond conductive?</u>

When DuralBond is fully cured, it becomes a glass film. Therefore it is non-conductive.

20. <u>How does DuralBond react to crude (natural and organic oils)?</u>

DuralBond is not affected by crude.

21. Does DuralBond prevent powder accumulation on metal walls?

Yes, DuralBond makes powder adhesion harder on metal walls. Any powder accumulated on the wall is also easily washed away.

22. Is DuralBond toxic?

No. DuralBond is made up of non-toxic ingredients that passed European Union REACH regulations.

23. Is DuralBond resistant to graffiti?

Yes, DuralBond is capable of anti-graffiti. When fully cured, DuralBond is hydrophobic and will keep the graffiti off the surface. Grafitti is also easily cleaned off.

24. How many tests have DuralBond undergone?

DuralBond has achieved certifications for the following tests.

I.	European Union REACH regulation	
II.	Pencil Hardness(JIS 5400)	9H (SGS HV-12-00681X)
III.	Alkali Resistance (JIS 5400)	PASS(SGS HV-11-00656XA)
IV.	Acid Resistance (JIS 5400)	PASS (SGS HV-11-00656XA)
V.	Salt Resistance (JIS 5400)	PASS (SGS HV-11-00656XA)

25. What is the difference between DBX and DBA?

DuralBond X (DBX) cures faster than DuralBond Air (DBA).

DBX cures faster; and you will not have the time to revise the results. It is suitable for outdoor application by brushing.

DBA cures slower; and you can revise the result within 20 seconds upon coating to correct the application if needed.

26. Does DuralBond make all substrates as hard as 9H?

No. This depends on the material you are coating. DuralBond can increase the hardness level of the surface by 2 to 3 pencil hardness. If the material to be coated is of 4H hardness level, then DuralBond can increase its hardness to around 6 to 7H.

27. How does DuralBond "easy-to-clean effects" work?

When DuralBond is fully cured, it forms a glass-like coating with a 9H pencil hardness over the substrate giving it superior anti-scratch capability. The glass-coating also lowers the surface energy of the substrate. This makes fluids, dirt and stains harder to adhere to the surface; and for those that stick onto the coated surface, they can be easily removed with minimal effort.

28. What is the film thickness of DuralBond?

DBX: Up to 30μm (micrometers)
DBA: Up to 20μm

29. What is the science behind the curing of DuralBond?

The solid-state glass transforms into fluid glass. When the fluid glass comes into contact with moisture in the air, it turns back to solid-state glass. It forms a thin transparent glass barrier that protects the surface.

DuralBond is CHOOSE NanoTech product designed for industrial application.

30. What industrial applications are DuralBond suitable for?

DuralBond can be applied in varying industries. It is widely used on building, public art pieces, marine equipment, interior design work and green energy sector.

31. Is DuralBond suitable for DIY projects?

DuralBond is not recommended for DIY projects. This is to prevent any irreversible situations. CHOOSE NanoTech has separate products designed for the DIY market. Please contact our sales department for further details.

32. How can the DBA applicators and accessories be maintained for multiple usage?

The DBA applicators are meant to be used multiple times. Please wash them with water or alcohol immediately after use to avoid any curing of DBA on them. However, the suede microfiber is only suitable for one time use.

33. Can DuralBond be applied in multiple layers? If so, how do you do it?

DBX cannot be applied by wiping whilst DBA can be applied by wiping. DBA can be added layer by layer to increase the film thickness and hardness. You have to wait for 40 minutes between applications for adequate curing of each layer. When you finish the last layer, you will need to give 72 hours for full curing.

34. <u>What is the most important thing to note when applying DuralBond?</u>

It is critical that the substrate surface must be very clean. It will make the coating last longer. Ensure that your working environment is bright so that DuralBond can be applied with precision.

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