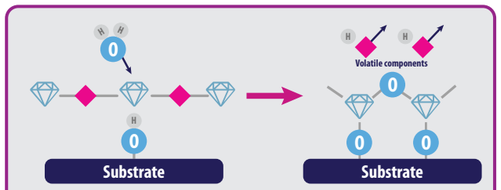



*Conversion of preceramic polymer in ceramic layer*

## Unique chemistry, Ceramization

The unique preceramic polymer technology in EXOCOAT Ceramic+ converts to a ceramic layer through reaction with moisture from the air. Moisture from the air hydrolyses the polymer which then internally reacts to form a metal oxide ceramic layer. While being covalently bound to the surface these ceramic layers account for very durable and resistant films.

## EXOCOAT Ceramic+ as component of ceramic car care finishes

EXOCOAT Ceramic+ can be used as standalone product or as resin in formulations to which other additives, co-resins or solvents can be added. These coatings can be tailored to achieve specific performance goals, such as a slippery or haptic feel or for superior scratch resistance. Simple dilution with butyl acetate or mineral spirits addresses safe consumer use.

**Ceramic coating formulations**

| | Consumer use | Glide effect | Scratch resistance | Flexibility (PC or PMMA) |
|---|---|---|---|---|
| **EXOCOAT Ceramic+** | 40 | 99 | 99 | 30 |
| Butylacetate | 59 | / | / | 50 |
| SB acrylic resin[1] | / | / | / | 10 |
| Aerosil® E92002 | / | / | 1 | / |
| High MW hydroxy-functional PDMS[3] | / | 1 | / | / |
| Ethylmethicone[4] | 1 | / | / | 10 |
| **Total** | 100 | 100 | 100 | 100 |

*[1]Paraloid B66 - [2] Fumed silica by Evonik - [3]YASIL OH20000, DOWSIL™ 1-9770 or BLUESIL FLD 48V20000 - [4] Silwax D02*

**EXOCOAT Ceramic+**
60% in butyl propionate
Density: 930 kg/m³
Clear colorless low viscous liquid



**Europe, Americas, Middle East and Africa**
Axcentive SARL
Chemin de Champouse
13320 Bouc Bel Air, France
+33 4 42 69 40 90

**Asia, India and Australasia**
Axcentive Asia Pte Ltd
13 Lorong 8 Toa Payoh,
#07-01 Braddell Tech Park
319261 Singapore
+65 6258 6338

info@axcentive.com www.axcentive.com



Arpeggio

# EXOCOAT Ceramic+

is a preceramic nano resin for car care finishes

# EXOCOAT Ceramic+ Car

## FOR CERAMIC CAR PROTECTION by Axcentive

**USP's Exocoat Ceramic+ based car care finish**

- Long lasting performance
- True ceramic coating, hard, dense and transparent
- Easy to clean with extreme water beading effect
- Dirt repellent, making cleaning easier
- Economical, need only 50ml per car
- For one component systems, easy to work with
- UV resistant
- Anti-scratch effect
- Thin film coating leaving substrate appearance unchanged
- Can be applied on any underlying paint system
- Revives dull coatings (e.g. Classic cars)

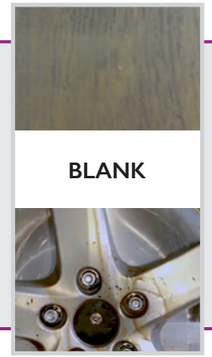
axcentive

# DURABLE & RESISTANT

EXOCOAT Ceramic+ is completely resistant to acids and alkaline liquids, bird droppings and severe weathering. Coatings based on EXOCOAT Ceramic+ were tested according to international standards comprising chemical, weather and mechanical resistance tests.

## Dirt Pickup Resistance

Comparative tests between bare and EXOCOAT Ceramic+ coated aluminum panels and wheels demonstrated a significant reduction in dirt pickup for the coated surfaces. The coating exhibited approximately 90% less dirt accumulation, highlighting its effectiveness in providing long-term resistance to dirt adhesion.




## Weather Resistance

The weather resistance of EXOCOAT Ceramic+ was tested under various conditions and on various substrates. EXOCOAT Ceramic+ was tested as a thin layer according to ISO 9227 a neutral salt spray test and ISO16474 weatherometer test, which are both accelerated weather tests involving moisture and (UV) light. EXOCOAT Ceramic+ was also subjected to a condensation test according to ISO6270-2.

| 2-micron EXOCOAT Ceramic+ layer | | | |
|---|---|---|---|
| Substrate | Saltspray ISO9227 (1000hrs) | Weathertest ISO16474 (1400hrs) | Condensation ISO6270-2 (1000hrs) |
| Aluminium 6061 | No Defect Scribe <0.5mm | No Defect ΔE = 0.17 | No Defect |
| Stainless Steel | No Defect Scribe <0.5mm | No Defect ΔE = 0.40 | No Defect |
| Precoated Steel | No Defect Scribe <0.5mm | No Defect ΔE = 0.51 | No Defect |

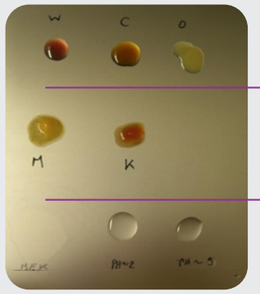
EXOCOAT Ceramic+ was subjected to 3000hrs QUV with minimal effects on the gloss.

| | |
|---|---|
| Gloss 3000hrs QUV before/after | 121/115 (95% retention) |
| Easy to clean test after 500hrs QUV | Above side wiped by cloth |

EXOCOAT Ceramic+
FOR CERAMIC CAR PROTECTION

## Chemical resistance

Chemical resistance of EXOCOAT Ceramic+ was tested as a thin layer coating on a metal sheet. Below chemicals were deposited on the EXOCOAT Ceramic+ coated panel and let to dry for 24hrs.




Wine | Coffee | Orange Juice

Mustard | Ketchup

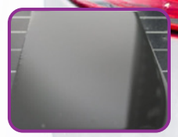
MEK | Acid (PH2) | Alkaline (PH12)

After 24hrs the plate was cleaned using rinsing by tap water for 1 min.

## Mechanical resistance

The mechanical resistance of EXOCOAT Ceramic+ was tested according to several abrasive tests among which the ISO 11998 with a nylon brush and a liquid based on water, silica sand and detergents.

3M Scotch Brite n°7448 Type S, 2.5g/L of sodium n-dodecylbenzenesulfonic in water



Test after 1000 abrasion cycles

| EXOCOAT Ceramic+ | |
|---|---|
| Layer | Approx. 1 micron layer |
| Substrate | Coated steel |
| **RESULTS** | |
| Abrasion Resistance ISO 11998 1000 cycles | no effect |
| Jeans scuffing 200 cycles | no effect |
| Pencil hardness | 7-8H |
| Scratch resistance ISO 1518 | >10N |

EXOCOAT Ceramic+ technology outperforms many existing market solutions across a wide range of properties, as detailed in the table below. EXOCOAT Ceramic+ is the only technology forming a durable covalent bond with the substrate.

| | Graphene wax | Carnauba wax | Polyethylene | Silicones | EXOCOAT Ceramic+ |
|---|---|---|---|---|---|
| Weather resistance | ✗ | ✗ | ✓ | ✗ | ✓ |
| Hardness | ✗ | ✗ | ✗ | ✗ | ✓ |
| Aesthetics | ✗ | ✓ | ✗ | ✗ | ✓ |
| Durability | ✗ | ✗ | ✗ | ✗ | ✓ |
| Water Repellence | ✓ | ✗ | ✗ | ✓ | ✓ |

# DURABLE & RESISTANT

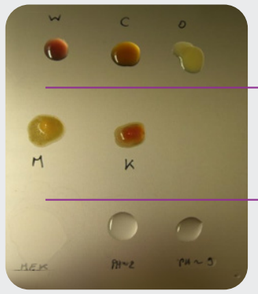
EXOCOAT Ceramic+ is completely resistant to acids and alkaline liquids, bird droppings and severe weathering. Coatings based on EXOCOAT Ceramic+ were tested according to international standards comprising chemical, weather and mechanical resistance tests.

## Dirt Pickup Resistance

Comparative tests between bare and EXOCOAT Ceramic+ coated aluminum panels and wheels demonstrated a significant reduction in dirt pickup for the coated surfaces. The coating exhibited approximately 90% less dirt accumulation, highlighting its effectiveness in providing long-term resistance to dirt adhesion.


## Chemical resistance

Chemical resistance of EXOCOAT Ceramic+ was tested as a thin layer coating on a metal sheet. Below chemicals were deposited on the EXOCOAT Ceramic+ coated panel and let to dry for 24hrs.




Wine | Coffee | Orange Juice

Mustard | Ketchup

MEK | Acid (PH2) | Alkaline (PH12)

After 24hrs the plate was cleaned using rinsing by tap water for 1 min.

## Weather Resistance

The weather resistance of EXOCOAT Ceramic+ was tested under various conditions and on various substrates. EXOCOAT Ceramic+ was tested as a thin layer according to ISO 9227 a neutral salt spray test and ISO16474 weatherometer test, which are both accelerated weather tests involving moisture and (UV) light. EXOCOAT Ceramic+ was also subjected to a condensation test according to ISO6270-2.

**2-micron EXOCOAT Ceramic+ layer**

| Substrate | Saltspray ISO9227 (1000hrs) | Weathertest ISO16474 (1400hrs) | Condensation ISO6270-2 (1000hrs) |
|---|---|---|---|
| Aluminium 6061 | No Defect Scribe <0.5mm | No Defect ΔE = 0.17 | No Defect |
| Stainless Steel | No Defect Scribe <0.5mm | No Defect ΔE = 0.40 | No Defect |
| Precoated Steel | No Defect Scribe <0.5mm | No Defect ΔE = 0.51 | No Defect |

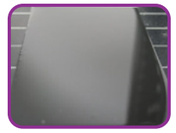
EXOCOAT Ceramic+ was subjected to 3000hrs QUV with minimal effects on the gloss.

| | |
|---|---|
| Gloss 3000hrs QUV before/after | 121/115 (95% retention) |
| Easy to clean test after 500hrs QUV | Above side wiped by cloth |

## Mechanical resistance

The mechanical resistance of EXOCOAT Ceramic+ was tested according to several abrasive tests among which the ISO 11998 with a nylon brush and a liquid based on water, silica sand and detergents.

3M Scotch Brite n°7448 Type S, 2.5g/L of sodium n-dodecylbenzenesulfonic in water



Test after 1000 abrasion cycles

**EXOCOAT Ceramic+**

| | |
|---|---|
| Layer | Approx. 1 micron layer |
| Substrate | Coated steel |
| **RESULTS** | |
| Abrasion Resistance ISO 11998 1000 cycles | no effect |
| Jeans scuffing 200 cycles | no effect |
| Pencil hardness | 7-8H |
| Scratch resistance ISO 1518 | >10N |

EXOCOAT Ceramic+ technology outperforms many existing market solutions across a wide range of properties, as detailed in the table below. EXOCOAT Ceramic+ is the only technology forming a durable covalent bond with the substrate.

| | Graphene wax | Carnauba wax | Polyethylene | Silicones | EXOCOAT Ceramic+ |
|---|---|---|---|---|---|
| Weather resistance | ✗ | ✗ | ✓ | ✗ | ✓ |
| Hardness | ✗ | ✗ | ✗ | ✗ | ✓ |
| Aesthetics | ✗ | ✓ | ✗ | ✗ | ✓ |
| Durability | ✗ | ✗ | ✗ | ✗ | ✓ |
| Water Repellence | ✓ | ✗ | ✗ | ✓ | ✓ |