



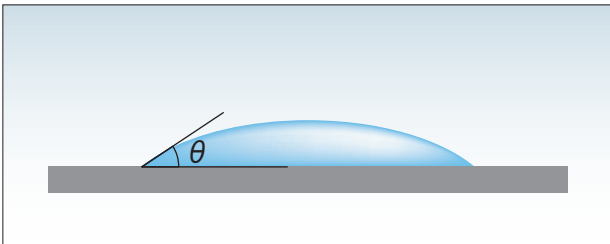
In recent years, there has been demand for aesthetics and protection of products in a wide variety of fields, such as automobiles, electronics, household appliances, as well as construction and civil engineering materials, and along with this, high functionality and added value are being added to products. At ThreeBond, we are developing highly performance coating agents that meet these market needs.

What is coating?

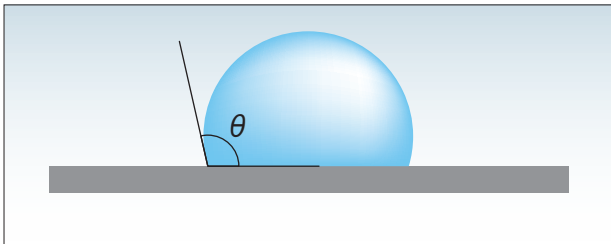
In general, coating is to protect the surface of a material and to add functionality. A variety of products you may be familiar with such as flooring, frying pans, bathrooms, umbrellas and cars are coated. By coating on a product surface, protective layer is formed and it makes possible to prevent damage due to abrasion and contact. The layer can provide various effects such as improving visibility, cutting UV rays, and preventing rust from salt damage by adding various functions to coating agent such as antifouling effect, water repellency and hydrophilicity to the coating agent,

Contact angles

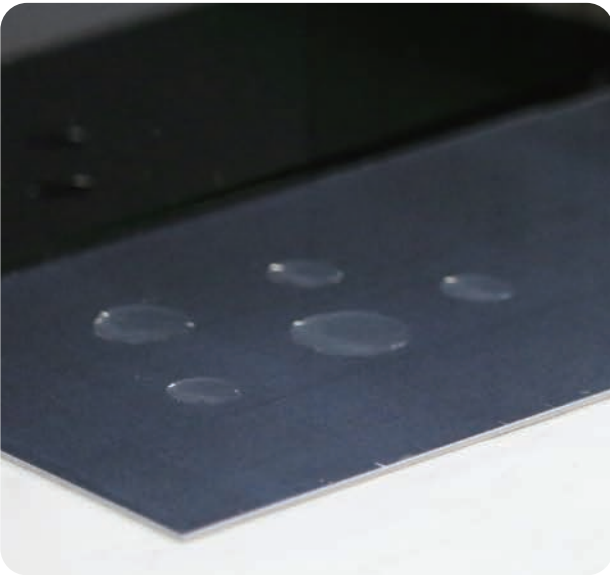
Contact angles are the numerical value of the ease with which a liquid wets and spreads on a solid surface. If that liquid is water, it is called the “water contact angle”. The smaller the water contact angle, the higher the hydrophilicity and it is easier to spread the water on a surface. The larger the angle, the more water resistant and the better the repulsion of water. For example, if the coating is hydrophilic it is more receptive to water, so the water easily spreads, penetrating between dirt and the coating to push dirt up to the surface and make it easier to remove. If the coating is water resistant, it repels the water, which then rolls across the surface of the coating, mixing with dirt so that it can be removed.



Hydrophilic Water contact angle: Under 90°



Water repellent Water contact angle: 90° or more



Hydrophilic coatings



Water repellent coatings

Application examples

- (1) Anti-soiling and water-repellent coating for structures
- (2) Anti-soiling coating for automobiles, construction equipment, agricultural equipment and coating facility
- (3) Anti-soiling coating for areas where cleaning solution, etc., adheres
- (4) Coating for train seat (Confirmed as flame resistance product by Railway Vehicle flammability testing)
- (5) Coating for seat of nursing-use wheelchairs, etc.
- (6) Anti-soiling and water-repellent coating for chairs, sofas and other furniture
- (7) Anti-soiling coating for shoes, glassware, ceramics and marble

Single-component water-repellent coating agent

This single-component water-resistant coating agent was mainly developed for use in industrial applications. Composed of a silane compound, it moisture-cures to create a water-repellent surface with the excellent durability of glass. This makes it easy to remove dirt that adheres to production line robots, etc.



Robot arm



Painting booth

Multi-purpose coating agent

This single-component, aerosol-type anti-fouling coating agent was developed primarily for general product use. Composed of a silazane compound, it can be used with a wide variety of materials, such as fabric, wood and leather. This makes it suitable for a wide range of applications such as train seats and furniture.



Train seats



Office furniture

Single-component water-repellent coating agent: ThreeBond 2907D

Overview

This single-component water-repellent coating agent cures at normal temperatures for excellent workability. Effectively repels water and dirt while boasting weather and abrasion resistance for a variety of applications. When a thick coating (about 100 μm) is applied, a stable, dry film is formed.

Test items	Unit	ThreeBond 2907D	Remark(s)
Appearance	-	Light yellow	-
Viscosity	mPa·s	1.5	BL adapter, 25°C
Specific gravity	-	0.83	25°C
Heating residue	%	27.0	-
Water contact angle	Degree	103 or more	SUS304
Drying time	Minutes	Less than 90	25°C at 55%RH

*Do not use for applications impacted by oil film (automobile glass, mirrors, etc.).



Industrial products



Adhesive



Chemical resistance

Adhesion test

ThreeBond 2907D has excellent adhesion and can be used for various adherend materials

Testing method

- (1) Samples applied ThreeBond 2907D uniformly with a brush to various test pieces.
- (2) Left for 12 hours at 25°C then the coating surface is cut into a 2 mm grid. (photo 1)
- (3) Tape is applied to the cut coated surface and finger pressure applied to ensure full adhesion before peeling the tape off.
- (4) The number of squares out of the original 100 cut that remain on the surface of the test piece are counted. (n=1)

Adherend	ThreeBond 2907D
SPCC-SD	◎
Aluminum (A1050P)	◎
SUS-304	◎
SUS-430	◎
Zinc plating	◎

Number of remaining squares
100: ◎ 80-99: ○ 30-79: △ 0-29: ×

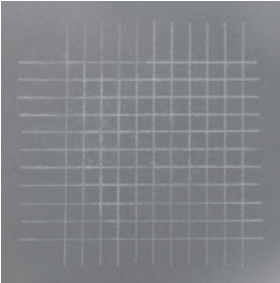


Photo 1:
Test piece to check adhesion

Flexibility test

ThreeBond 2907D is excellent in flexibility and forms a coating film that does not easily crack or peel off.

Testing method

Mandrel bending test

- (1) Apply to SUS304 (24 μm wet), dry and cure, wrap around around a φ25 mandrel 180 degrees, and check coating state.

Drying/curing conditions	ThreeBond 2907D	Conventional product
25°C x 1 day		
Test results	○ (no cracking/peeling)	× (cracking/peeling)
25°C x 7 days		
Test results	○ (no cracking/peeling)	× (peeling)

Chemical resistance test

ThreeBond 2907D is resistant to various chemicals.

Testing method

- (1) Apply to a glass plate, dry and cure at 25°C for 12 hours. (film thickness: 24 μm wet)
- (2) 3 drops of various chemicals are dropped on the coated surface and left at room temperature for 1 week. (photo 2)
- (3) Remove the droplets and check for cracks, breaks, or peeling on the coated surface. (n=3)

Chemical types	ThreeBond 2907D
Water (tap water)	○
NaCl (25%) solution	○
CaCl ₂ (35%) solution	○
NaOH (pH14)	×
HCl (pH1)	×
General cleaning solution	○
Cleansing oil	△
Cutting fluid	○
Long life coolant (SLLC: Toyota)	○
Engine oil (OW-20: Toyota)	○
ATF (WS: Toyota)	○
Brake fluid (Toyota 2500H-A)	×
Glycol type detergent	×
Detergent for cooking oil	○
n-hexane	○
Toluene	○
Xylene	○
Ethanol	△
Octanol	○



Photo 2:
Test piece for solvent resistance

○: no change △: no cracking/peeling, but liquid marks remain ×: cracking/peeling

Effect on coated surface

Type	Main ingredient (solid content)	Damage to coated surface
Oil	Long-oil alkyd resin	No
	Silicone/acrylic resin	No
	Enamel resin	No
	Unsaturated polyester resin	No
	Acrylic/nitrile cellulose resin	No
	Urethane resin	No
Water	Cathodic electrodeposition	No
	Acrylic resin	No
	Acrylic/urethane resin	No
	Silicone/acrylic/fluorine resin	No
	Styrene-acrylic acid ester copolymer	No

Testing method

Various coatings are applied to an SUS plate and dried. ThreeBond 2907D is applied only to half of the coated surface and check for damage (cracks, peeling) or color unevenness.

Test piece

SUS 304 (JIS G 4305: 0.8 x 70 x 150 mm)

Coating application method / drying time

Brush / 25°C x 3 days

Application method / curing conditions

Brush / 25°C x 3 days



Single-component water-resistant coating agent product video

Multi-purpose coating agent: ThreeBond 2907E

Overview

TheeBond 2907E is an antifouling agent composed of a silazane compound for use with fabric, wood and leather products. It boasts excellent resistance to wear and abrasion and has incredible workability because it is an aerosol-type. Despite being a glass-based coating agent, it forms a film that follows the fibers of materials. Anti-fouling effect can be exhibited without losing the texture of the original materials.

Test items	Unit	Characteristic value	Remark(s)
Appearance	-	Colorless	-
Specific gravity	-	0.96	Aerometer, 25°C
Non-volatile content	%	5.0	-


General products


Aerosol


Wear

Water absorption and abrasion resistance test piece (testing based on JIS L 0849)

Absorption is unchanged and water resistance is maintained after abrasion resistance test.

Test piece	Uncoated fabric	Coated fabric			
Number of times of rubbing (times)	0	0	3,700	7,300	11,000
Water (g)	0.17	0.01	0.02	0.02	0.02

Testing method

- (1) Gray denim (hereafter, test piece) and filter paper are subjected to 20°C at 65%RH for at least 24 hours.
- (2) The test piece is cut into 100 x 30 mm swatches and the weight of test pieces is measured.
- (3) Test pieces are placed on an acrylic plate and 0.5 ml of water is applied.
- (4) 10 seconds after dropping, filter paper (1) (100 mm x 50 mm) is placed on top, and put an acrylic plate on it. After applying a load of about 3.7 kgf for about 30 seconds, the weight of the test piece is measured.
- (5) The amount of water absorption is obtained from the difference between the original weight and the weight after the work of (4).
- (6) Using the friction fastness tester II specified in JIS L 0849, the test above was performed for 3,700, 7,300 and 11,000 abrasions to find the amount of water absorption.

Compatibility with various materials and durability testing

Test materials	ThreeBond 2907E	Competitor product A	Competitor product B	Competitor product C	Competitor product D
Cloth	○	○	○	○	○
Fabric	○	○	○	○	○
Leather	○	○	○	×	×
SUS	○ - △	×	△	×	×
Glass	○ - △	×	△	×	×
Mortar	○	×	△	△	×
Wood	○	○	○	○	△
Polycarbonate (PC)	△	×	×	△	×
Polypropylene (PP)	×	×	×	×	×
Acrylic	○ - △	×	△ - ×	△	×

○: Effective △: Initially effective, but not as durable as combinations marked with ○ ×: Not durable

Preventable stains

The following test materials were applied to the cloth on which ThreeBond 2907E was applied, and whether or not they were handled was confirmed by the following judgment criteria.

Test material	Water	Soy sauce	Sauce	Mirin	Salad dressing
Result	◎	◎	◎	◎	○~△

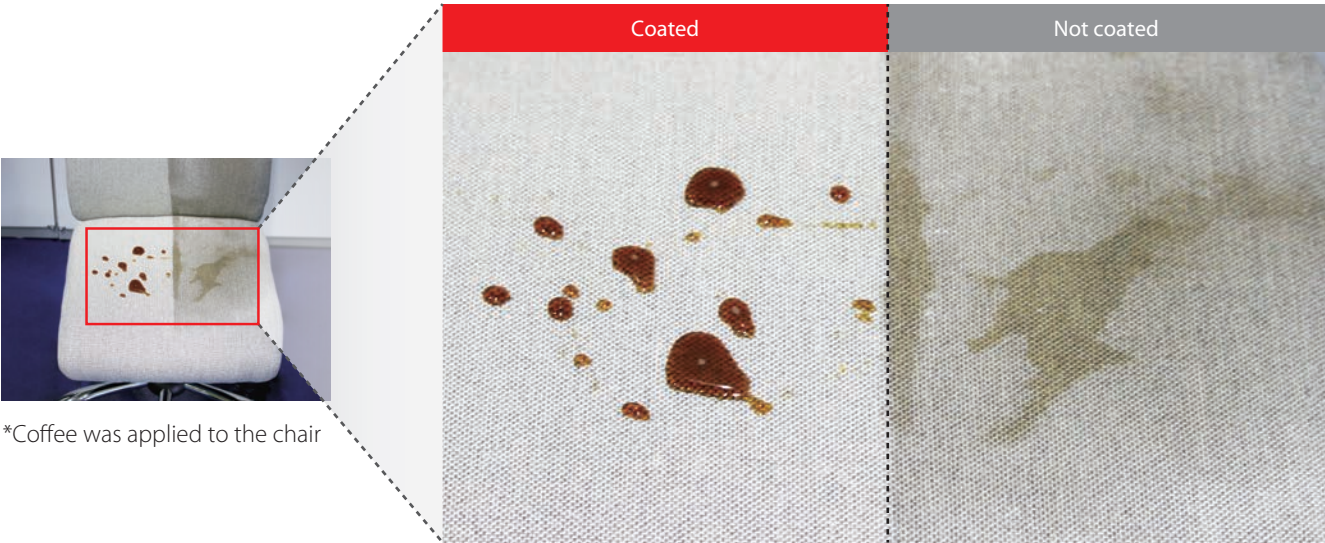
Test material	Ketchup	Mayonnaise	Coffee	Cleansing oil
Result	○~△	△	◎	△

Test material	Foundation	Sunscreen	Denim color transfer
Result	○	○	○

- ◎: No stains or marks after wiping away. Water resistance is maintained.
- : Stains or marks remained after wiping away, but these could be removed with water, etc. Water resistance is maintained.
- △: Stains remained after wiping away that were difficult to remove with water, etc. Water resistance was weakened.
(*Easy to remove compared to uncoated cloth)

Antifouling and water resistance: Comparison test

ThreeBond 2907E was coated on the half of the seat surface of the fabric chair, and the water repellency and antifouling property were compared.



*Coffee was applied to the chair



Multi-coating agent product video

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