




Shin-Etsu Silicone

Paint additives



Boost the Performance of Your Paints

The paint additives in the Shin-Etsu Silicones KP Series have extremely low surface tension, so even when they are added to paints in very small quantities they prevent coating flaws and improve the surface quality significantly. Some additives in the KP Series also improve the paint's adhesion to the painted surface. Suitable additives are available for a wide range of applications.



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Paint additives

Types

| Application | Name | Key feature | Page | |
|--|--|--|-----------------------|---|
| Friction coefficient reducers for painted surfaces | KP301 | Good solubility and multicoat properties. | 6 | |
| | KP302 | General-purpose. | 6 | |
| | KP306 | Prevents platinum catalyst poisoning. | 6 | |
| Hammertone agent | KP310 | General-purpose. | 6 | |
| | KP310B | Forms a clear hammertone. | 6 | |
| Leveling agent | KP321 | Good multicoat and slip properties. | 7 | |
| | KP323 | Good mottling and blocking prevention. | 7 | |
| | KP324 | Good multicoat properties. | 7 | |
| | KP326 | Good mottling prevention. Defoaming effect. | 7 | |
| | KP340 | Good mottling and orange peel prevention. | 7 | |
| | KP341 | Good mottling and orange peel prevention. Good multicoat properties. | 7 | |
| | Antiblocking agent for plywood (for water-based paints) | KP360A | General-purpose. | 8 |
| | | KP361 | Good slip properties. | 8 |
| KP354 | | Good solubility and slip properties. | 8 | |
| Antiblocking agent for plywood (for oil-based paints) | KP355 | Waxy consistency. Good solubility. | 8 | |
| | KP356 | General-purpose. | 8 | |
| | KP357 | Good solubility and durability. | 8 | |
| | KP358 | Good durability. | 8 | |
| | KP359 | Good slip properties, solubility, and durability. | 9 | |
| | KP362 | Good compatibility with curtain coaters. | 9 | |
| | KP365 | For cellulose-based paints. | 9 | |
| | KP366 | Good slip properties and durability. | 9 | |
| | KP368 | Good slip properties. | 9 | |
| | KP369 | Prevents platinum catalyst poisoning. | 9 | |
| Defoamer | KP330 | Good multicoat properties. | 10 | |
| | KP331 | General-purpose. | 10 | |
| | KS508 | Good paintability. | 10 | |
| Adhesion, moisture, and salt water resistance improver | KP390 | Contains amino group. | 10 | |
| | KP391 | Contains mercapto group. | 10 | |
| | KP392 | Contains epoxy group. | 10 | |

Effective even in small quantities.

The KP Series paint additives have the following outstanding properties even when used in small quantities.

Reduced friction coefficient (i.e., better slip properties) of painted surface.

Silicone migrates easily to the painted surface, so it is able to impart its main property, smoothness, to the paint.

Forms a hammertone.*

Silicone that has a high molecular weight forms convection cells on the painted surface, resulting in a hammertone.

*Hammertone: A tortoiseshell pattern formed by aluminum powder added to the paint.



An attractive hammertone pattern

Prevents floating and flooding.

Silicone disperses evenly inside the paint film and across the painted surface, so it prevents convection caused by the drying of the paint.

Prevents blocking.

Dimethyl silicone fluid has functional groups that react with paint resins, so it improves the solubility with the paint, boosts the paint's durability, and prevents blocking.

Reduces foaming.

Silicone reduces paint foaming.



Silicone defoamers: Effective even in small quantities

Boosts resistance to moisture and salt water.

Silicone includes functional groups that bond to inorganic substances, metal surfaces, and to paint vehicles, so it improves the paint's adhesion and boosts the salt water resistance.

Paint additive containers

| Type | Name | Containers | | | |
|--|--------|------------------------------------|-------|-----------------------------------|---|
| | | 1-liter cans Net weight 1 kg | 15 kg | 18-liter cans 16 kg 18 kg | |
| Friction coefficient reducers for painted surfaces | KP301 | ● | ● | | |
| | KP302 | ● | | ● | |
| | KP306 | ● | ● | | |
| Hammertone agent | KP310 | ● | ● | | |
| | KP310B | ● | ● | | |
| Leveling agent | KP321 | ● | ● | | |
| | KP323 | ● | | | ● |
| | KP324 | ● | ● | | |
| | KP326 | ● | | ● | |
| | KP340 | ● | ● | | |
| | KP341 | ● | | | ● |
| | KP360A | ● | | ● | |
| | KP361 | ● | | ● | |
| Antiblocking agent for plywood (for water-based paints) | KP354 | ● | | ● | |
| | KP355 | ● | | | ● |
| | KP356 | ● | | ● | |
| | KP357 | ● | | ● | |
| | KP358 | ● | | ● | |
| | KP359 | ● | | ● | |
| | KP362 | ● | | ● | |
| | KP365 | ● | | ● | |
| | KP366 | ● | | ● | |
| | KP368 | ● | | ● | |
| Antiblocking agent for plywood (for oil-based paints) | KP369 | ● | | ● | |
| | KP330 | ● | ● | | |
| | KP331 | ● | ● | | |
| | KS508 | ● | | ● | |
| Defoamer | KP390 | ● | ● | | |
| | KP391 | ● | ● | | |
| | KP392 | ● | ● | | |
| Adhesion, moisture, and salt water resistance improver | KP390 | ● | ● | | |
| | KP391 | ● | ● | | |
| | KP392 | ● | ● | | |

Friction coefficient reducers for painted surfaces

KP301

KP302

KP306

Friction coefficient reducers improve the slip properties of the painted surface by lowering the friction coefficient. As a result, they protect painted surfaces from scratches and smudges and allow the paint to appear smooth and attractive for long periods of time. They also prevent beading and improve the multicoat properties. KP306 also reduces the poisoning of platinum catalysts in exhaust gas combustion devices.



Applications to can paints

General properties

| Name | | KP301 | KP302 | KP306 |
|-----------------------|----------------------------|------------|-------------------------|-------------------------|
| | | Appearance | Clear transparent fluid | Clear transparent fluid |
| Viscosity | 25 mm ² /s{cSt} | 1.0 | 1.5 | 1.7 |
| Specific gravity, | 25 | 0.88 | 0.88 | 0.88 |
| Solvent | | Toluene | Xylene | Xylene |
| Active ingredients | (%) | 10 | 10 | 10 |
| Standard added amount | (wt%) | 0.05 ~ 1.0 | 0.05 ~ 1.0 | 0.05 ~ 1.0 |

Hammertone agents

KP310

KP310B

Hammertone agents use convection to form cells on the paint film, resulting in a beautiful tortoiseshell pattern in the paint. They are especially effective when fine aluminum powder or aluminum paste is used as a silver pigment in the paint. The hammertone effect is most distinct with KP310B. These hammertone agents are also excellent slip agents for PVC imitation leather and various types of plastic.

General properties

| Name | | KP310 | KP310B |
|-----------------------|----------------------------|------------|-------------------------|
| | | Appearance | Clear transparent fluid |
| Viscosity | 25 mm ² /s{cSt} | 70 | 150 |
| Specific gravity, | 25 | 0.87 | 0.87 |
| Solvent | | Toluene | Xylene |
| Active ingredients | (%) | 10 | 10 |
| Standard added amount | (wt%) | 0.05 ~ 1.0 | 0.1 ~ 1.0 |

Leveling agents

- KP321
- KP323
- KP324
- KP326
- KP340
- KP341

Flaws in painted films, such as flooding, floating, orange peel, and cratering, have many possible causes, including convection caused by evaporation of the solvent; the size, surface area, specific gravity, aggregation force, and dispersion of the pigment particles; and the surface tension and flow properties of the film. The addition of a small amount of silicone leveling agent to paint prevents convection and eliminates flaws in the painted film, resulting in attractive painted surfaces.

General properties

| Name | KP321 | KP323 | KP324 | KP326 | KP340 | KP341 |
|--------------------------------------|---|-------------------------|---|---|-------------------------|-----------------------------------|
| Appearance | Clear to light yellow transparent fluid | Clear transparent fluid | Clear to light yellow transparent fluid | Clear to light yellow transparent fluid | Clear transparent fluid | Light yellow to light brown fluid |
| Viscosity 25 mm ² /s{cSt} | 2.0 | 160 | 0.9 | 8.0 | 1.5 | 750 |
| Specific gravity, 25 | 0.87 | 1.03 | 0.89 | 1.01 | 0.87 | 1.03 |
| Solvent | Toluene | - | Toluene | Toluene | Toluene | - |
| Active ingredients (%) | 10 | 100 | 10 | 50 | 10 | 100 |
| Standard added amount (wt%) | 0.1 1.0 | 0.001 0.5 | 0.01 1.0 | 0.01 1.0 | 0.01 1.0 | 0.001 ~ 0.5 |



Applied to automotive paints

Antiblocking agents for plywood

KP360A

KP354

KP362

KP361

KP355

KP365

KP356

KP366

KP357

KP368

KP358

KP369

KP359

The surface of painted plywood can be damaged if adhesive tape is pulled off the surface or if two sheets of painted plywood become stuck together (this phenomenon is called "blocking"). The addition of a small amount of silicone antiblocking agent to a paint keeps the paint from being pulled off and also prevents blocking. KP316, KP360A, and KP361 are for use with water-based and emulsion paints. The other types are for oil-based paints.

General properties (for water-based and emulsion paints)

| | | Name | |
|-----------------------|----------------------------|-------------------------------|-------------------------------|
| | | KP360A | KP361 |
| Appearance | | Light brown transparent fluid | Light brown transparent fluid |
| Viscosity | 25 mm ² /s{cSt} | 20 | 30 |
| Specific gravity, | 25 | 0.89 | 0.89 |
| Solvent | | Isopropyl alcohol | Isopropyl alcohol |
| Active ingredients | (%) | 50 | 50 |
| Standard added amount | (wt%) | 0.1 ~ 1.0 | 0.1 ~ 1.0 |
| Slip properties | | | |
| Solubility | | | |

: Very effective : Moderately effective : Somewhat effective

General properties (for oil-based paints)

| | | Name | | | | |
|-----------------------|----------------------------|-------------------------|------------------------|-------------------------|-------------------------|-------------------------|
| | | KP354 | KP355 | KP356 | KP357 | KP358 |
| Appearance | | Clear transparent fluid | White waxy consistency | Clear transparent fluid | Clear transparent fluid | Clear transparent fluid |
| Viscosity | 25 mm ² /s{cSt} | 1.5 | | 45 | 40 | 55 |
| Specific gravity, | 25 | 0.93 | | 0.97 | 0.96 | 0.98 |
| Refractive index, | 25 | 1.420 | | 1.408 | 1.406 | 1.415 |
| Solvent | | Toluene | | | | |
| Active ingredients | (%) | 50 | 100 | 100 | 100 | 100 |
| Standard added amount | (wt%) | 0.5 ~ 2.0 | 0.1 ~ 1.0 | 0.1 ~ 1.0 | 0.1 ~ 0.5 | 0.2 ~ 0.5 |

Applicable paints

| Resin | Name | | | | |
|----------------|-------|-------|-------|-------|-------|
| | KP354 | KP355 | KP356 | KP357 | KP358 |
| Amino-alkyd | | | | | |
| Urethane | | | | | x |
| Acryl | | | | | |
| DAP, polyester | | | | | |
| Cellulose | | | | | |

: Very effective : Moderately effective : Somewhat effective x : Not effective



Application to plywood paints



Separation test with cellophane tape on plywood
(Left: Without silicone. Right: With silicone.)

| | KP359 | KP362 | KP365 | KP366 | KP368 | KP369 |
|--|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| | Clear transparent fluid | Clear transparent fluid | Clear transparent fluid | Clear transparent fluid | Clear transparent fluid | Clear transparent fluid |
| | 100 | 80 | 2.5 | 80 | 70 | 50 |
| | 0.97 | 0.98 | 0.88 | 0.97 | 0.97 | 0.97 |
| | 1.406 | 1.406 | 1.476 | 1.404 | 1.403 | 1.405 |
| | | | Toluene | | | |
| | 100 | 100 | 20 | 100 | 100 | 100 |
| | 0.1 ~ 1.0 | 0.01 ~ 0.5 | 0.01 ~ 1.0 | 0.1 ~ 1.0 | 1.0 ~ 2.0 | 0.1 ~ 1.0 |

| | KP359 | KP362 | KP365 | KP366 | KP368 | KP369 |
|--|-------|-------|-------|-------|-------|-------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

Defoamers

KP330

KP331

KS508

Foaming during paint manufacturing (such as during mixing or shaking), painting, or printing can cause pinholes, cratering, and uneven printing, resulting in lower productivity and inconsistent quality. The addition of small amounts of silicone defoamers can remove foam from paints. KS508 is for use with water-based and emulsion paints.

General properties

| Name | KP330 | KP331 | KS508 |
|--------------------------------------|--------------------------------|-------------------------|--------------------------|
| Appearance | Light yellow transparent fluid | Clear transparent fluid | Light yellow milky fluid |
| Viscosity 25 mm ² /s{cSt} | 2.5 | 1.5 | 2,000 |
| Specific gravity, 25 | 0.88 | 0.87 | 1.00 |
| Solvent | Toluene | Toluene | |
| Active ingredients (%) | 10 | 10 | 100 |
| Standard added amount (wt%) | 0.01 ~ 0.05 | 0.01 ~ 0.05 | 0.001 ~ 0.01 |
| Multicoat properties | | × | |

: good × : bad

Adhesion, moisture resistance, and salt water resistance improvers

KP390

KP391

KP392

When these agents are added to epoxy, phenol, alkyd, or urethane paints, they improve the paints' adhesion to glass and metal and boost the moisture and salt water resistance.

General properties

| Name | KP390 | KP391 | KP392 |
|--------------------------------------|---|---|---|
| Organic functional groups | Amino group | Mercapto group | Epoxy group |
| Appearance | Clear to light yellow transparent fluid | Clear to light yellow transparent fluid | Clear to light yellow transparent fluid |
| Viscosity 25 mm ² /s{cSt} | 6.0 | 2.0 | 25 |
| Specific gravity 25 | 0.91 | 0.91 | 0.92 |
| Solvent | n-Butanol | n-Butanol | n-Butanol |
| Active ingredients (%) | 50 | 50 | 50 |
| Standard added amount (wt%) | 1.0 ~ 4.0 | 1.0 ~ 4.0 | 1.0 ~ 4.0 |

Quality, Storage and Handling

- (1) Choose the additive that is best suited for your purposes.
- (2) Decide the amount of the additive based on the type and concentration of the paint and the degree of improvement that is needed. Conduct tests in advance based on the standard added amount. Decide the added amount carefully, because even a small amount of additive can have a large effect on the painted film.
- (3) The best time for adding these additives is at the end of the paint manufacturing process. Caution is necessary, because the effectiveness will vary depending on the type of paint.
- (4) After adding the additive to the paint, stir the paint in order to disperse the additive evenly. If the dispersion is inadequate, the additive may have an inconsistent effect and problems may result.
- (5) If regular paints are manufactured in equipment that has been used to manufacture paints that contain additives, then even a trace amount of residual additives can cause beading or other problems. Be sure to clean shared equipment thoroughly with cleanser or a solvent such as toluene.
- (6) When diluting paint additives, use an aromatic hydrocarbon such as toluene or xylene or a fatty hydrocarbon such as rubber solvent, mineral spirits, or petroleum ether.
- (7) Paint additives can be deteriorated by heat, light, acid, alkali, etc. To avoid damage to these products, keep their containers sealed tightly and store them in a cool, dark location.
- (8) Please contact our Sales Department for the Material Safety Data Sheet and read it carefully before using any of these products.

Safety

Paint additives may be covered by laws and regulations concerning safety, hygiene, and fire prevention. When using these products, be especially careful about the following.

- (1) When handling these products, wear protective equipment to avoid contact with skin or eyes. If skin contact occurs, wipe the skin with a rag or gauze and then rinse thoroughly with soap and water, and if eyes contact occurs immediately flush with water at least 15 minutes, call a physician.
Handle these products with adequate ventilation, and be careful to avoid inhaling the solvent vapor. If discomfort occurs as a result of inhalation, move the affected person to a well ventilated location.
- (2) Do not use products that contain solvents near flames or in high-temperature locations, and prepare a ground equipment properly to prevent static discharge.

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