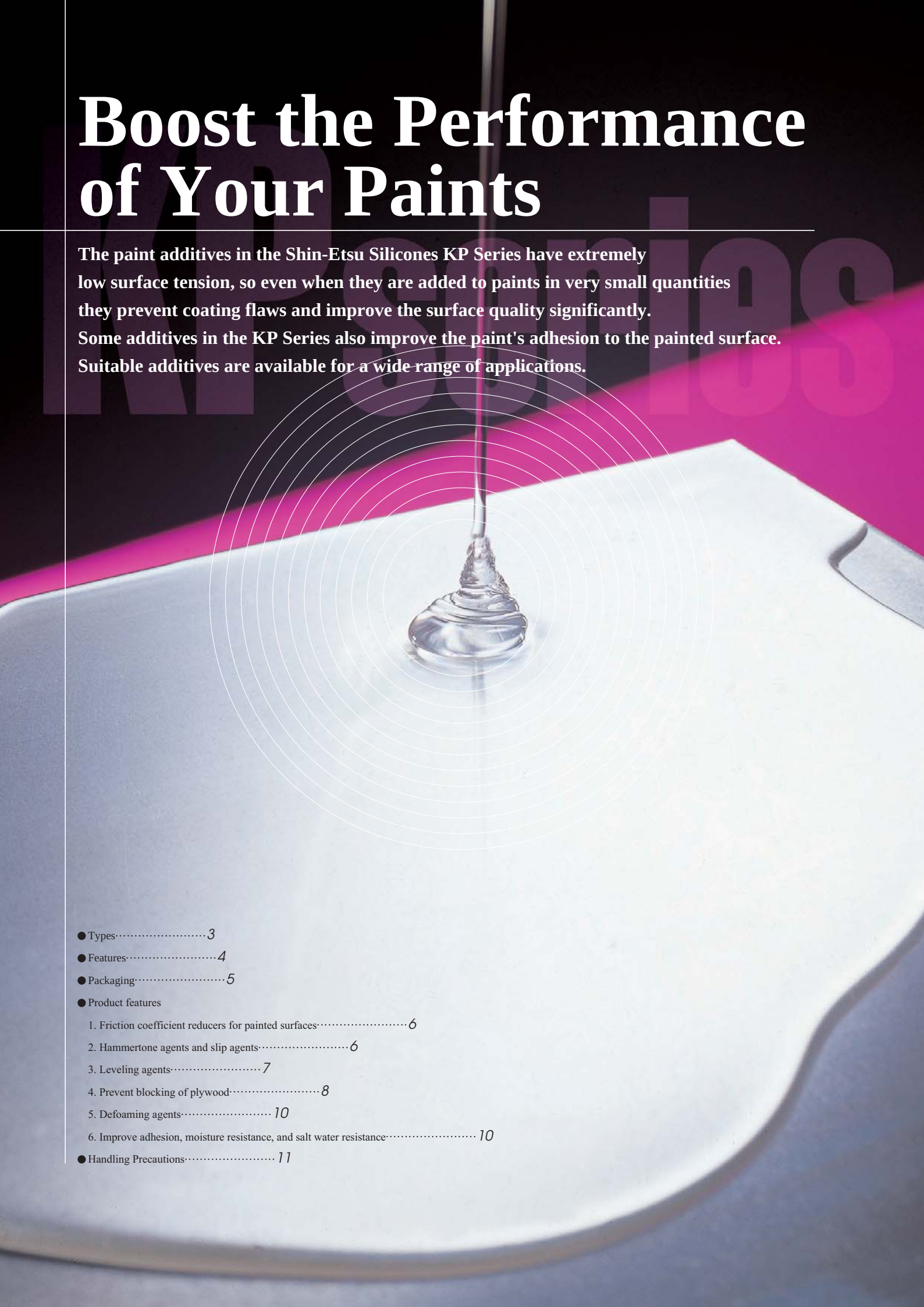
Shin-Etsu Silicone

# 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.**



# Paint additives

## Types

| Application | Name | Key feature | Page |
|---|---|---|---|
| Friction coefficient reducers for painted surfaces | KP-301 | Good compatibility and recoating properties. | 6 |
| | KP-306 | Product formulated as a measure against platinum catalyst poisoning. | 6 |
| | KP-109 | Good slickness. | 6 |
| Hammertone agents and slip agents | KP-310 | General purpose. | 6 |
| | KP-310B | Forms vivid hammertone finishes. | 6 |
| Leveling agents | KP-323 | Good anti-mottling and antiblocking effect. Suitable for solvent-based and UV paints. | 7 |
| | KP-326 | Good anti-mottling effect and recoating properties. Has defoaming effect. | 7 |
| | KP-341 | Good anti-mottling effect and prevents orange peel. Suitable for solvent-based and UV paints. | 7 |
| | KP-104 | Especially suitable for water solution paints. | 7 |
| | KP-110 | Especially suitable for water emulsion paints. | 7 |
| | KP-112 | Good anti-mottling effect and prevents orange peel. Suitable for solvent-based and UV paints. | 7 |
| Prevent blocking of plywood (for water-based and emulsion paints) | KP-360A | General purpose. | 8 |
| | KP-361 | Good slickness. | 8 |
| Prevent blocking of plywood (for oil-based paints) | KP-354 | Good compatibility and slickness. | 8 |
| | KP-355 | Waxy consistency, good compatibility. | 8 |
| | KP-356 | General purpose. | 8 |
| | KP-357 | Good compatibility and durability. | 8 |
| | KP-358 | Good durability. | 8 |
| | KP-359 | Good slickness, compatibility, and durability. | 9 |
| | KP-362 | Good characteristics for carton coating. | 9 |
| | KP-365 | For cellulose paints. | 9 |
| | KP-366 | Good slickness and durability. | 9 |
| | KP-368 | Good slickness. | 9 |
| | KP-369 | Product formulated as a measure against platinum catalyst poisoning. | 9 |
| Defoaming agents | KP-330 | Suitable for solvent based paints, good leveling and recoating properties. | 10 |
| | KP-650 | For water-based paints. Good recoating properties. | 10 |
| | KP-651 | For solvent-based paints. Good defoaming properties. Can also be used as a defoamer. | 10 |
| Improve adhesion, moisture resistance, and salt water resistance | KP-390 | Contains amino groups. | 10 |
| | KP-391 | Contains mercapto groups. | 10 |
| | KP-392 | Contains epoxy groups. | 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.

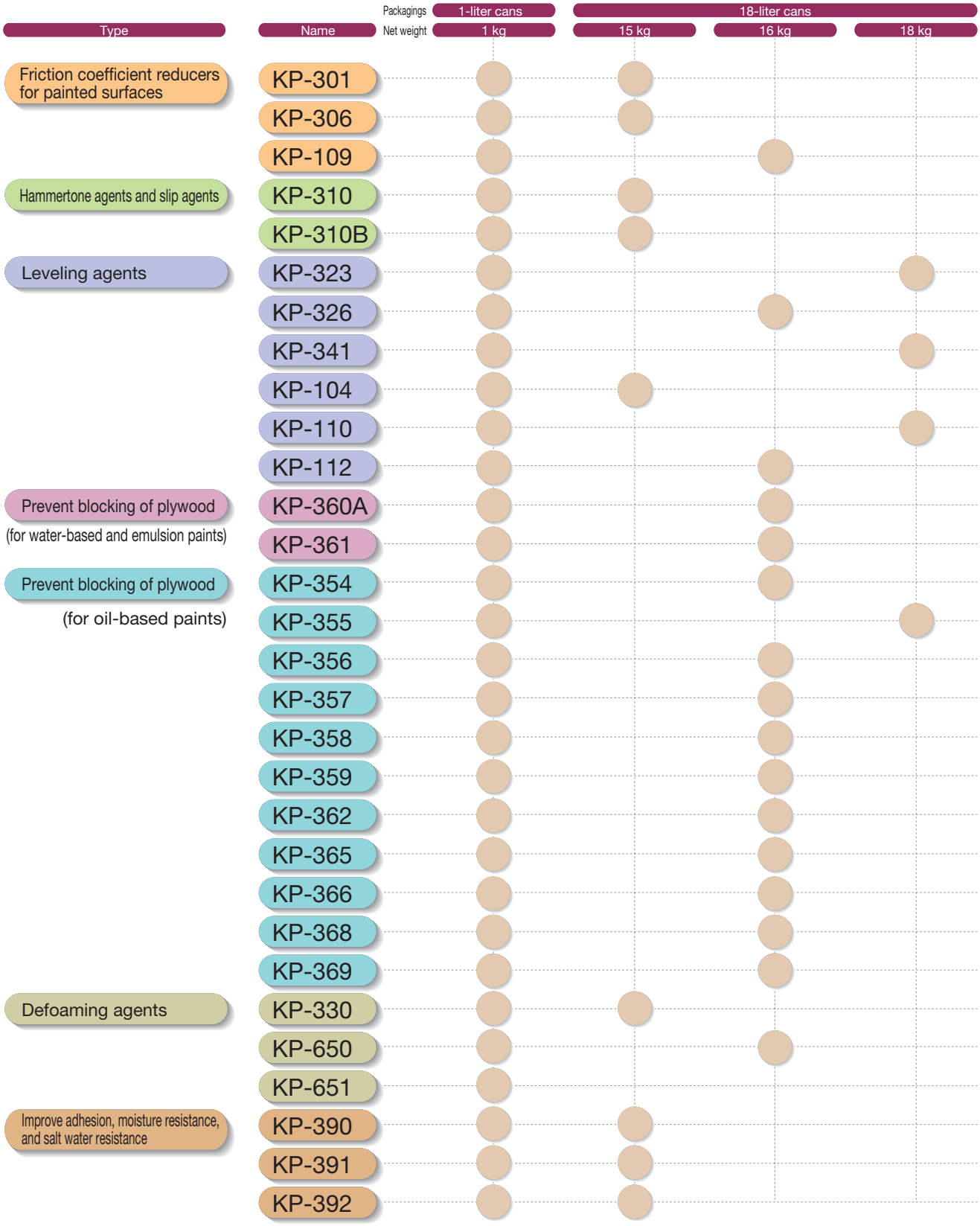
Silicone reduces paint foaming.

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.

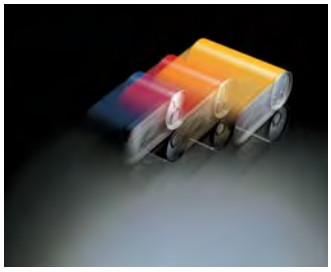
# Packaging


Packagings
1-liter cans
18-liter cans
Type
Name
Net weight
1 kg
15 kg
16 kg
18 kg
Friction coefficient reducers for painted surfaces
KP-301
KP-306
KP-109
Hammertone agents and slip agents
KP-310
KP-310B
Leveling agents
KP-323
KP-326
KP-341
KP-104
KP-110
KP-112
Prevent blocking of plywood
(for water-based and emulsion paints)
KP-360A
KP-361
Prevent blocking of plywood
(for oil-based paints)
KP-354
KP-355
KP-356
KP-357
KP-358
KP-359
KP-362
KP-365
KP-366
KP-368
KP-369
Defoaming agents
KP-330
KP-650
KP-651
Improve adhesion, moisture resistance, and salt water resistance
KP-390
KP-391
KP-392

# Friction coefficient reducers for painted surfaces

KP-301
KP-306
KP-109

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. KP-306 also reduces the poisoning of platinum catalysts in exhaust gas combustion devices.



Applications to can paints

## General properties

| Name | KP-301 | KP-306 | KP-109 |
|---|---|---|---|
| Appearance | Colorless transparent liquid | Colorless transparent liquid | Colorless to brown transparent liquid |
| Viscosity 25°C mm²/s | 1.0 | 1.7 | 80 |
| Specific gravity 25°C | 0.88 | 0.88 | 0.97 |
| Solvent | Toluene | Xylene | PGM* |
| Active ingredients (%) | 10 | 10 | 50 |
| Standard added amount (wt%) | 0.05 - 1.0 | 0.05 - 1.0 | 0.01 - 0.2 |

* PGM: Propylene glycol monomethyl ether

(Not specified values)

# Hammertone agents and slip agents

KP-310
KP-310B

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 KP-310B. These hammertone agents are also excellent slip agents for PVC imitation leather and various types of plastic.

## General properties

| Name | KP-310 | KP-310B |
|---|---|---|
| Appearance | Colorless transparent liquid | Colorless transparent liquid |
| Viscosity 25°C mm²/s | 70 | 150 |
| Specific gravity 25°C | 0.87 | 0.87 |
| Solvent | Toluene | Xylene |
| Active ingredients (%) | 10 | 10 |
| Standard added amount (wt%) | 0.05 - 1.0 | 0.1 - 1.0 |

(Not specified values)

# Leveling agents

KP-323
KP-326
KP-341
KP-104
KP-110
KP-112

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. KP-104 and KP-110 are for use with water-based paints. KP-326 is quite effective when used in very small amounts, and addictive migration will be minimal.

## General properties

| Name | KP-323 | KP-326 | KP-341 | KP-104 | KP-110 | KP-112 |
|---|---|---|---|---|---|---|
| Appearance | Colorless transparent liquid | Colorless to pale yellow transparent liquid | Pale yellow to light brown liquid | Pale yellow to yellow transparent liquid | Colorless to light brown transparent liquid | Colorless to pale yellow transparent liquid |
| Viscosity 25°C mm²/s | 160 | 8.0 | 750 | 15 | 20 | 900 |
| Specific gravity 25°C | 1.03 | 1.01 | 1.03 | 0.98 | 1.01 | 1.05 |
| Solvent | — | Toluene | — | PGM* | — | — |
| Active ingredients (%) | 100 | 50 | 100 | 30 | 100 | 100 |
| Standard added amount (wt%) | 0.01 - 2.0 | 0.001 - 0.1 | 0.01 - 2.0 | 0.1 - 5.0 | 0.1 - 2.0 | 0.01 - 2.0 |

* PGM: Propylene glycol monomethyl ether

(Not specified values)

Applied to automotive paints

# Prevent blocking of plywood

KP-360A
KP-361
KP-354
KP-355
KP-356
KP-357
KP-358
KP-359
KP-362
KP-365
KP-366
KP-368
KP-369

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. KP-360A, and KP-361 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 | KP-360A | KP-361 |
|---|---|---|
| Appearance | Light brown transparent liquid | Light brown transparent liquid |
| Viscosity 25°C mm²/s | 20 | 30 |
| Specific gravity 25°C | 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
(Not specified values)

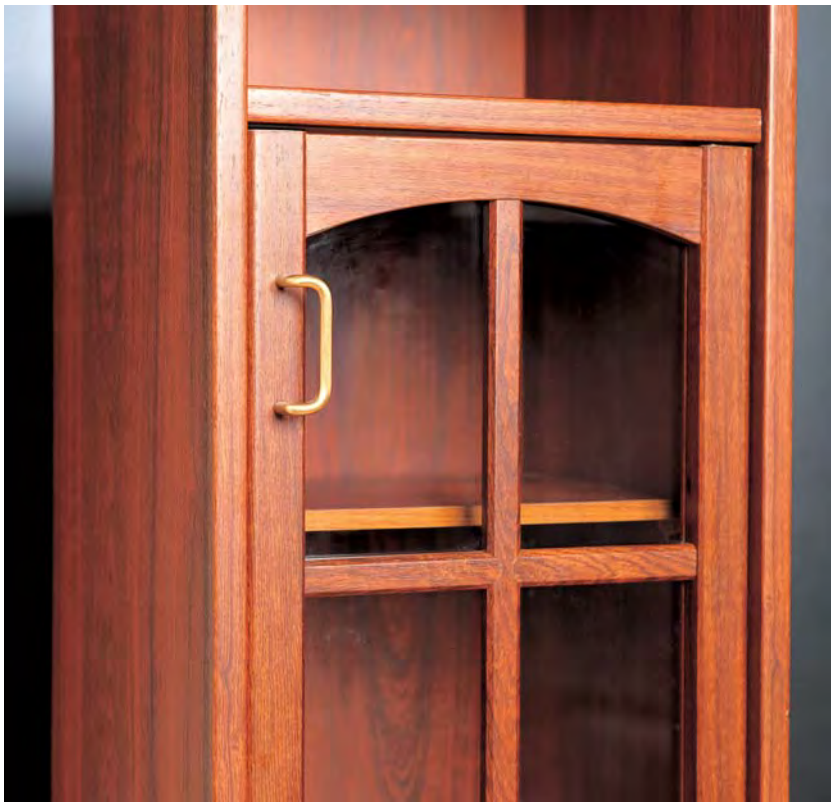
## General properties (for oil-based paints)

| Name | KP-354 | KP-355 | KP-356 | KP-357 | KP-358 |
|---|---|---|---|---|---|
| Appearance | Colorless transparent liquid | White, waxy consistency | Colorless transparent liquid | Colorless transparent liquid | Colorless transparent liquid |
| Viscosity 25°C mm²/s | 1.5 | — | 45 | 40 | 55 |
| Specific gravity 25°C | 0.93 | — | 0.97 | 0.96 | 0.98 |
| Refractive index 25°C | 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 | KP-354 | KP-355 | KP-356 | KP-357 | KP-358 |
|---|---|---|---|---|---|
| Amino-alkyd | ○ | ○ | ○ | ○ | ◎ |
| Urethane | ○ | ○ | ○ | ○ | × |
| Acryl | ○ | △ | ○ | ○ | ○ |
| DAP, polyester | △ | △ | △ | △ | ◎ |
| Cellulose | △ | △ | △ | △ | △ |

◎: Very effective ○: Moderately effective △: Somewhat effective ×: Not effective



Application to plywood paints

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

| | KP-359 | KP-362 | KP-365 | KP-366 | KP-368 | KP-369 |
|---|---|---|---|---|---|---|
| | Colorless transparent liquid | Colorless transparent liquid | Colorless transparent liquid | Colorless transparent liquid | Colorless transparent liquid | Colorless transparent liquid |
| | 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 |

(Not specified values)

| | KP-359 | KP-362 | KP-365 | KP-366 | KP-368 | KP-369 |
|---|---|---|---|---|---|---|
| | ○ | ◎ | △ | ◎ | ○ | ○ |
| | ◎ | ○ | △ | ◎ | ◎ | ◎ |
| | ○ | ○ | △ | ○ | ○ | ○ |
| | △ | ○ | △ | ○ | ○ | ○ |
| | △ | △ | ◎ | △ | △ | △ |

# Defoaming agents

KP-330
KP-650
KP-651

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. KP-650 is for use with water-based and emulsion paints. Also KP-330 is used as an excellent leveling agent.

## General properties

| Name | KP-330 | KP-650 | KP-651 |
|---|---|---|---|
| Appearance | Pale yellow transparent liquid | Milky white liquid | Colorless transparent liquid |
| Viscosity 25°C mm²/s | 2.5 | 1500 | 2.0 |
| Specific gravity 25°C | 0.88 | 1.01 | 1.38 |
| Solvent | Toluene | (Water) (Emulsion) | m-Xylene hexafluoride |
| Active ingredients (%) | 10 | 55 | 7.7 |
| Standard added amount (wt%) | 0.001 - 0.5 | 0.01 - 0.1 | 0.001 - 0.5 |
| Multicoat properties | ○ | ○ | × |

○ : good × : bad

(Not specified values)

# Improve adhesion, moisture resistance, and salt water resistance

KP-390
KP-391
KP-392

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

## General properties

| Name | KP-390 | KP-391 | KP-392 |
|---|---|---|---|
| Organic functional groups | Amino group | Mercapto group | Epoxy group |
| Appearance | Colorless to light yellow transparent liquid | Colorless to light yellow transparent liquid | Colorless to light yellow transparent liquid |
| Viscosity 25°C mm²/s | 6.0 | 2.0 | 25 |
| Specific gravity 25°C | 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 |

(Not specified values)

# Handling Precautions

## 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 (5-25°C), dark location.

## Safety and hygiene

1) When handling these products, wear protective equipment to avoid contact with skin or eyes. In case of skin contact, wipe off immediately with a dry cloth and then wash thoroughly with soap and water. In case of accidental eye contact, immediately flush with water for at least 15 minutes and then seek medical attention.
2) Do not use products that contain solvents near flames or in high-temperature locations. 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.
3) Be sure to read the Material Safety Data Sheets (MSDS) for these products before use. MSDS are available from the Shin-Etsu Sales Department.

## UN hazard classification

| | |
|---|---|
| 1866 | KP-301, KP-306, KP-109, KP-310, KP-310B, KP-326, KP-104, KP-360A, KP-361, KP-354, KP-365, KP-330, KP-651, |
| 3082 | KP-110 |
| 1993 | KP-390, KP-391, KP-392 |
| Non | KP-323, KP-341, KP-112, KP-355, KP-356, KP-357, KP-358, KP-359, KP-362, KP-366, KP-368, KP-369, KP-650 |

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