

**Shin-Etsu Silicones
for
Personal Care**

Product Brochure

KP Series

KP-541·543·545·561P·562P·575

Silicone Acrylates for Personal Care

Shin-Etsu

Do you know the benefits of Silicone Acrylates?

KP products combine the benefits of acrylic resins with silicones. They are graft copolymers with an acrylic polymer backbone and dimethylpolysiloxane side chains.

Silicone Acrylates dissolved in volatile silicone or hydrocarbon carriers to form soft flexible films with excellent water and oil repellency.

What is the KP series?

KP-540 series products are ideal cosmetic ingredients. They are excellent film formers providing water repellency and long-lasting properties plus they impart a soft, smooth feel to skin.

KP-540 series products can be used as dispersing agents, dispersing powders in silicone fluids to improve formulation stability.

KP-540 series products are ideal coating and filmforming agents for cosmetics, such as eyeliner, mascara, nail enamel, etc.

KP-540 series products can be used in emulsion products to provide a protective film that has excellent spreadability and water repellency. Superior emulsion stability can be achieved when they are used in combination with polyether modified silicone surfactants.

KP-540 series

Silicone grafted acryl resins enhance the performance of the make-up products.

KP-541

KP-541 is a silicone acrylate designed for powder treatment. [Solvent: Isopropyl Alcohol]

■ The physical properties

Composition	Component A	Acrylates/Dimethicone Copolymer	60 %
	Component B	Isopropyl Alcohol	40 %
Appearance	Colorless, transparent – light yellow hazy fluid		
Viscosity at 25 °C	500 – 10,000 mPa·s		
pH	Neutral		
Heavy Metal	20 ppm max.		
Arsenic	2 ppm max.		

This brochure is not intended to serve as a certificate of quality guarantee, please contact our sales department for details.

KP-543

KP-543 is a silicone acrylate that can be used for nail enamel film former and anti tack agent. The addition needed is 3 to 4%. [Solvent: Butyl Acetate]

■ The physical properties

Composition	Component A	Acrylates/Dimethicone Copolymer	50 %
	Component B	Butyl Acetate	50 %
Appearance	Colorless, transparent – light yellow hazy fluid		
Viscosity at 25 °C	100 – 1,000 mm ² /s		
pH	Neutral		
Heavy Metal	20 ppm max.		
Arsenic	2 ppm max.		

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KP-545

KP-545 is a silicone acrylate designed for cosmetic formulation, but it can also be used as a powder dispersing agent. [Solvent: Cyclopentasiloxane KF-995]

■ The physical properties

Composition	Component A	Acrylates/Dimethicone Copolymer	30 %
	Component B	Cyclopentasiloxane	70 %
Appearance	Colorless, transparent – light yellow hazy fluid		
Viscosity at 25 °C	100 – 500 mm ² /s		
pH	Neutral		
Heavy Metal	20 ppm max.		
Arsenic	2 ppm max.		

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KP-575

Hydrophilic silicone acrylate provides an increased dispersability to the powders.

KP-575

KP-575 is a silicone acrylate designed for dispersant of inorganic powder. [Solvent: Cyclopentasiloxane KF-995]

■ The physical properties

Composition	Component A	Acrylates/Ethylhexyl Acrylate/ Dimethicone Methacrylate Copolymer	30 %
	Component B	Cyclopentasiloxane	70 %
Appearance	Colorless, transparent - light yellow hazy fluid		
Viscosity at 25 °C	10 – 50 mm ² /s		
pH	Neutral		
Heavy Metal	20 ppm max.		
Arsenic	2 ppm max.		

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Performance of nail enamel* containing KP-543

*main component is Nitrocellulose

Testing sample KP-543 and other raw materials are combined at 1 %, 3 %, 5 % of KP-543.
Each enamel is painted on a glass plate by wire bar (#20).

1. Tack free time

Measurements : Tack free time of each sample is measured by touching with cotton every one minute.

Results :	KP-543 wt%	Tack free time (min)
	0	11
	1	9
	3	9
	5	9

2. Water repellency

Measurements : Measure the contact angle of water on each sample.

Results :	KP-543 wt%	Contact angle degree (°)
	0	70
	1	99
	3	100
	5	100

3. Lubricity

Measurements : Measure the COF (Coefficient of friction) of each sample. (PET, 150 mm/min, 200 g pressure)

Results :	KP-543 wt%	COF (μ k)
	0	0.48
	1	0.25
	3	0.24
	5	0.21

Dispersibility of titanium dioxide

Powder : Fine grain titanium dioxide

Solvent : Cyclopentasiloxane (KF-995)

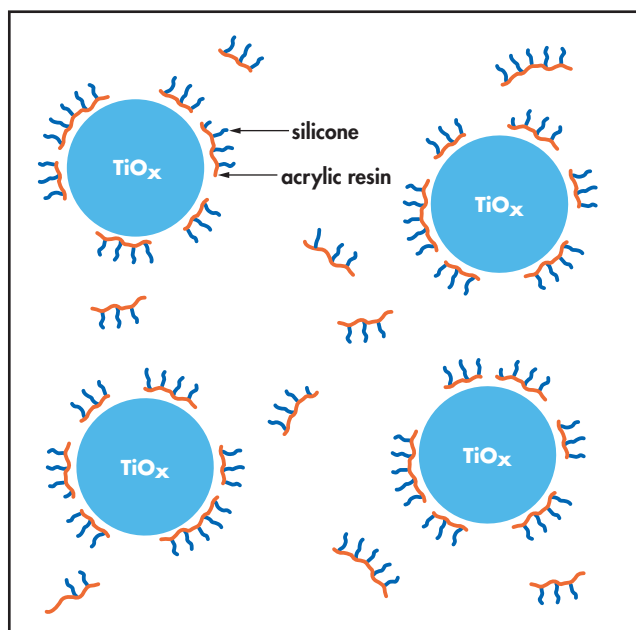
Dispersing agent : KP-545

Test method :

Mix KF-995 with KP-545, add 2 g of titanium dioxide, then put in a 30 ml sedimentary tube, disperse by ultrasound, observe without disturbing.

The resin portion of KP-545*	Sedimentary capacity (ml)	
	After 4 hours	After 68 hours
0	18.7	18.3
5	16.5	11.9
7.5	9.2	6.4
10	0	3.3
12.5	0	2.3
25	0	2.1
37.5	0	1.7
50	0	2.0

*100 powder weight : KP-545 resin weight



The physical properties of silicone acrylate film

	KP-541	KP-543	KP-545
Contact Angle, degree	103	98	103
Glass Transition Point, °C	50	20	50
Softening Point, °C	90	80	90

Solubility in cosmetic ingredients

Cosmetic Ingredients	KP-541	KP-543	KP-545	KP-561P	KP-562P
Water	I	I	I	I	I
Ethanol	S	P	S	I	I
Isopropyl Alcohol	S	S	S	I	I
Glycerin	I	P	I	I	I
Soft Liquid Isoparaffin	S	I	S	S	S
Liquid Isoparaffin	I	I	I	S	S
Squalane	I	I	I	S	S
Cetyl Isooctanate	S	I	S	S	S
Trioctanoin	S	I	S	S	S
Jojoba Oil	I	I	I	P	P
Oleic Acid	I	I	I	S	S
KF-995 (Cyclopentasiloxane)	S	I	S	S	S
DM-FLUID A-6cs (Dimethicone)	S	I	S	S	S
DM-FLUID A-10cs (Dimethicone)	I	I	I	S	S
F-5W-0-100cs (Diphenyl Dimethicone)	I	I	I	I	I
KF-54 (Diphenyl Dimethicone)	P	I	P	I	I
KF-56A (Diphenyl/Phenyl Trimethicone)	S	I	S	S	S

Resins of KP series/Cosmetic ingredients = 1/10 (weight ratio)

S : soluble P : partially soluble I : insoluble
(at room temperature)

KP-560P series

Silicone alkyl co-modified acryl polymers form smooth and glossy films.

KP-561P

KP-561P is a silicone acrylate paste.

■ The physical properties

Composition	Acrylates/Stearyl Acrylate/Dimethicone Methacrylate Copolymer	100 %
Appearance	Colorless – light yellow hazy solid	
Melting Point	25 – 35 °C	
pH	Neutral	
Heavy Metal	20 ppm max.	
Arsenic	2 ppm max.	

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KP-562P

KP-562P is a silicone acrylate wax.

■ The physical properties

Composition	Acrylates/Behenyl Acrylate/Dimethicone Methacrylate Copolymer	100 %
Appearance	Colorless – light yellow hazy solid	
Melting Point	45 – 55 °C	
pH	Neutral	
Heavy Metal	20 ppm max.	
Arsenic	2 ppm max.	

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Gloss degree of lipstick containing KP-561P

Testing sample formulations

	Sample A	Sample B	Sample C
Candelilla Wax	8.0 wt%	8.0 wt%	8.0 wt%
Polyethylene	8.0 wt%	8.0 wt%	8.0 wt%
KP-561P	15.0 wt%	–	–
Polyol Ester	–	15.0 wt%	–
Rosin Ester	–	–	15.0 wt%
Diphenyl Dimethicone	3.0 wt%	3.0 wt%	3.0 wt%
Isotridecyl Isononanoate	20.0 wt%	20.0 wt%	20.0 wt%
Glyceryl Isostearate	16.0 wt%	16.0 wt%	16.0 wt%
Polyglyceryl-2 Triisostearate	30.0 wt%	30.0 wt%	30.0 wt%
Pigment	q.s.	q.s.	q.s.

Testing method

Measure the gloss degree of each sample above painted on test paper by Gloss Meter VG-2000. (Gloss Meter VG-2000, Nihondenshoku Co., Ltd.)

Test results

	Sample A	Sample B	Sample C
Gloss degree	47	39	21

Applications

W/O Liquid foundation

1. KSG-210*	3.5 wt%
2. KSG-15*	5.0 wt%
3. KF-6028*	2.0 wt%
4. Quaternium-18 Hectorite	1.2 wt%
5. Triethylhexanoin	5.0 wt%
6. DM-FLUID A-6cs*	6.5 wt%
7. KF-995*	21.6 wt%
8. KP-575* (KP-545*)	1.5 wt%
9. Pigment (Treated Pigment)	10.0 wt%
10. Dipropylene Glycol	5.0 wt%
11. Sodium Citrate	0.2 wt%
12. Water	38.5 wt%

- Combine 1 – 5, a part of 6 and a part of 7 until uniformly dispersed.
- Add 9 to the rest of 6, the rest of 7 and 8, and mix with roller.
- Combine 10, 11 and 12 mix until dissolved.
- Add C to A with Stirring.
- Add B to D with Stirring.

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Lipstick

1. Candelilla Wax	8.0 wt%
2. Polyethylene	8.0 wt%
3. KP-561P*	15.0 wt%
4. KF-54*	3.0 wt%
5. Isotridecyl Isononanoate	20.0 wt%
6. Glyceryl Isostearate	16.0 wt%
7. Polyglyceryl-2 Triisostearate	30.0 wt%
8. Pigment	q.s.

A. Combine 1 – 6 and a part of 7 mix until dissolved. (at 90 °C)

B. Add 8 to the rest of 7 and mix with roller.

C. Add B to A. and dispersed.

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Nail enamel

1. Nitrocellulose	17.0 wt%
2. Phthalic Alkyd Resin	12.0 wt%
3. Toluenesulfonamide/Epoxy Resin	5.0 wt%
4. KP-543*	4.0 wt%
5. Acetyl Tributyl Citrate	5.0 wt%
6. Butyl Acetate	35.0 wt%
7. Ethyl Acetate	17.0 wt%
8. Isopropyl Alcohol	5.0 wt%
9. Stearalkonium Hextorite	q.s.
10. Pigment	q.s.

A. Add 2 and part of 5 to 10 then mix.

B. Add part of 1, part of 8 and 9 together to make a chip.

C. Mix and dissolve rest of 1,3,4 rest of 5,6 and 7 rest of 8.

D. Add A and B to C then disperse thoroughly.

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