

Held inside **Highly-functional Material Week**

14th PLASTIC JAPAN

— High-performance Plastic Expo —

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Shin-Etsu Silicone Products Guide

Silicones Making Resins **Highly Functional**

Components of
Resins and Coatings

Base
Resins

Apply on the substrate as resin itself.

Improve other resins
and impart them with
the properties of silicones.

Additives

Modify the surface conditions of coatings.

Pigments & Fillers

Modify the surface of fillers
to improve coating performance.

4 Usage

Usage ① Silicone Based Resins

Usage ② Resin Hybridization Agents

Usage ③ Surface Modifiers for Coating

Usage ④ Surface Modifiers
for Pigments & Fillers

Highly Functional Silicone Rubbers

Silicone Rubbers for Molding

Liquid Silicone Rubbers

Thermal Interface Materials

ShinEtsu

Shin-Etsu Silicone

Silicones Making Resins Highly Functional

Resin compositions are mainly composed of "Base Resins," "Additives," and "Pigments & Fillers."
Shin-Etsu Silicone has the following four uses and products for these three components to enhance the functionality of various resins.
This catalog also includes silicone rubber for molding, liquid silicone rubber, and thermal interface materials.

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Product Name	Excellent Properties
Usage ① Silicone Based Resins Apply on the substrate as resin itself.	
P3 Highly Reactive Water-Repellent Coating Agent X-24-9894B	PFAS Free Water Repellency
P4 Anti-fog Coating Agent Hygroscopic Type X-12-1402A Hydrophilic Type X-12-1427-30	Anti-fogging Property Slip Property Scratch Resistance Water Based Hydrophilic anti-fouling
P5 Solvent-Based Water Repellent for Textiles X-62-4595 / X-62-4595PF	Water Repellency
P6 Completely PFAS-Free Silicone Emulsions for Oil- and Water-Repellent Treatments X-52-8509L / X-52-8536	PFAS Free Oil Resistance Water Resistance
P7 Silicone Resins & Oligomers P8 Product Introduction: Coatings Applications	We have renewed the catalog of Silicone Resins & Oligomers. Catalog Download ※Japanese only
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P9 Silicone Resins & Oligomers Product Introduction: Molding Applications	Flame Retardancy High Transparency
P10 PFAS-Free Anti-Fouling Additives for Acrylic Paints X-26-5084	PFAS Free Water and Oil Repellency
P11 PFAS-Free UV-Curable Anti-Fouling Additive KfV-1000A / KfV-1001A	PFAS Free Water and Oil Repellency Slip Property

Product Name	Excellent / Imparting Properties
Usage ③ Surface Modifiers for Coating Modify the surface conditions of coatings.	
P12 Silicone Powder	Stress Relief Impact Resistance Surface Slipperiness Abrasion Resistance Flexibility (Feeling) Light Diffusivity Mattiness
Usage ④ Surface Modifiers for Pigments & Fillers Modify the surface of fillers to improve coating performance.	
P13 Reference Exhibit: Amino Modified Organopolysiloxane Powder X-88-491A	Adhesion Strength Improvement
Silicone Rubber for Molding	
P14 No Post Cure Silicone Rubber Compound KNP-5xx-U Series	High Productivity LMW Si Reduction Labor Saving Process cost reduction Energy Saving Suitable for injection molding
P15 No Post Cure LIMS (Liquid Injection Molding System) KE-2017, KE-2019, KEG-2003H Series	LMW Si Reduction Oil Bleed Low Compression Set Process Shortening FDA-BFR Compliance No Burrs Runner-less
P16 Reference Exhibit: Thermoplastic Silicone	Recyclable High hardness High strength High elongation High transparency Colorable Suitable for injection molding
Liquid Silicone Rubber	
P17 Liquid Silicone Rubber for 3D Printers KED-5000G / P3™ Silicone 25A Gray	3D Print Material
Thermal Interface Materials	
P18 Thermal Interface Gap Filler SDP Series / Gel Grease	Heat Dissipation Misalignment Resistance Stress Relaxation



Water
Repellency



PFAS
Free

Highly Reactive Water-Repellent Coating Agent

Product Usage

Silicone Based Resins

X-24-9894B

Contact → Sales and Marketing Department II
Phone : +81-3-6812-2407

■ Features and Benefits

- 1) X-24-9894B can be used as a water-repellent and water-slippy coating agent.
- 2) This is a silicone-based water repellent that offers **high reactivity (initial performance) and high durability through the introduction of a special structure.**
- 3) Apply X-24-9894B directly by wiping onto inorganic substrates such as glass and then wipe it off, a water-repellent thin film can be obtained.
- 4) **PFAS-Free product.**

■ General Properties

Parameter	Product name	X-24-9894B
Viscosity	mm/s ²	2
Active ingredient	wt%	6
Solvent		Isododecane

(Not specified values)

■ Test Data

【 Test method 】 X-24-9894B was applied to the polished substrate and wiped off.
Then after drying at room temperature for 12 hours, water droplets were applied to the test piece for measurement.
Applying heat or using a catalyst can shorten the time required for water repellency to appear. Example of catalyst: use a cloth dampened with acid for wiping.

Water droplet volume: Water contact angle = 2 μ L, Water fall angle = 20 μ L

Parameter	Water repellency	Water slip property
Product name	Water contact angle	Water fall angle
X-24-9894B	105 ° 	5 °

(Not specified values)

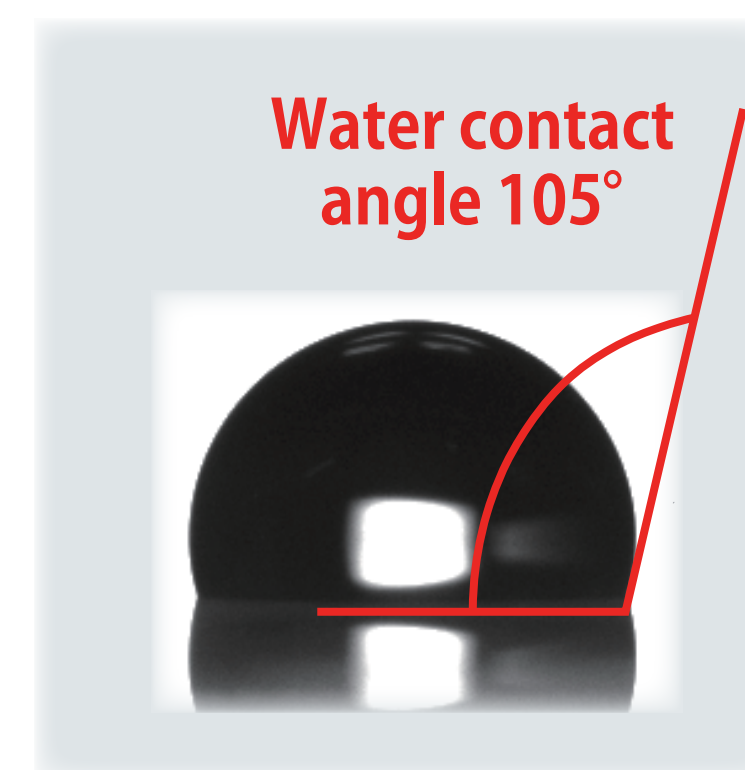
Durability Test
85 °C / 85% RH
for 7 Days



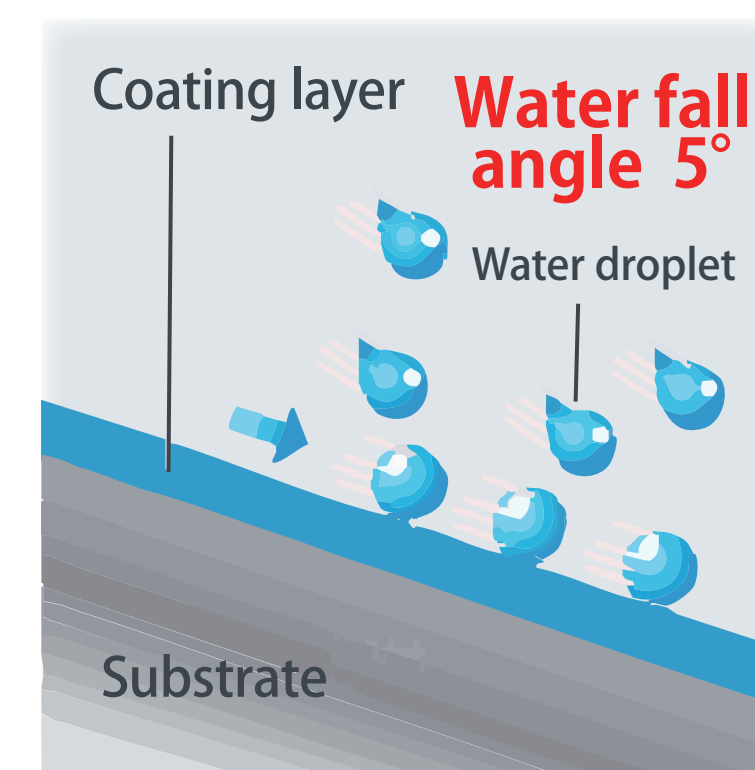
Water repellency	Water slip property
Water contact angle	Water fall angle
105 ° 	5 °

(Not specified values)

■ Excellent Water Repellency



■ Excellent Water Slip Property



※ Contact angle = The higher the value, the better.
Fall angle = The lower the value, the better.



Anti-fog Coating Agent

Product Usage

Silicone Based Resins

Contact → Sales and Marketing Department II
Phone : +81-3-6812-2407

Hygroscopic Type X-12-1402A

■ Features and Benefits

- Excellent water resistance and long-lasting anti-fog performance.
- Coating provides good **slip, hardness, and scratch resistance**.
- Prevents formation of water films, maintaining clear visibility.
Also, it does not freeze.

■ Applications

- Anti-fog treatment for transparent resins (e.g., **polycarbonate**) and **glass**.

■ General Properties

Product name	Active ingredient wt%	Solvent	Appearance at 25° C	Viscosity at 25°C mm ² /s	Standard curing conditios
X-12-1402A	35	PGME	Pale yellow liquid	70	120 °C × 30 min (Recommended film thickness 10 - 20 μm) (Not specified values)

■ Anti-fog Coating Evaluation Results

Substrate: polycarbonate, film thickness : 13 μm. Scratch resistance: paper wiper / 1 kg / 1,000 reciprocations.

Anti-fog Agent	X-12-1402A	X-12-1372A (Our existing products)	Untreated
Initial anti-fog property			
Time until fogging Exposed to 40° C steam	50 s	60 s	0 s
Surface pencil hardness	H	HB	HB
Scratch resistance	Good (No damage)	Very poor (Peeling)	Poor (Scratched)

Hydrophilic Type X-12-1427-30

■ Features and Benefits

- Unlike conventional surfactant-based hydrophilizers, it adheres to inorganic substrates such as glass and offers excellent **water resistance**.
- **Water-based** material.
- **Hydrophilization can be achieved by simply coating at room temperature and air-drying.**
- Hydrophilization is possible with **nanometer-thick films**.

■ Applications

- Hydrophilization of **inorganic substrates such as glass**; imparting anti-fog and hydrophilic antifouling properties.

■ General Properties

Product name	Active ingredient wt%	Solvent	Appearance at 25° C	Viscosity at 25°C mm ² /s	Standard curing conditios
X-12-1427-30	30	Water	Pale yellow liquid	11	25°C×24 h or 55°C×2 h (Recommended film thickness 10 - 20 nm) (Not specified values)

■ Anti-fog Coating Evaluation Results

Substrate: Polished glass plate. Wiped on after diluting X-12-1427-30 to 5 wt%; dried 55°C × 2 h; film thickness: 10 nm.

Anti-fog Agent	X-12-1427-30	Surfactant-based products made by other companies	Untreated
Initial anti-fog property			
2 μL water contact angle	2	10	50
Anti-fog after 24 h water immersion			
2 μL water contact angle	2	40	50



Water Repellency

Solvent-Based Water Repellent for Textiles

Product Usage

Silicone Based Resins

X-62-4595 / X-62-4595PF

Contact → Sales and Marketing Department II
Phone : +81-3-6812-2407

■ Features & Benefits

- 1) Provides water repellency by drying after dip-coating.
- 2) Applicable to a wide range of fabrics such as cotton and polyester.

■ How to use

- 1) Dilute active ingredient with IPA or hydrocarbon solvents to achieve approximately 0.5-5% and dip the fabric, then dry.
- 2) Dry at 150°C for a few minutes or at room temperature for several tens of minutes.

■ General Properties

Product name	Active ingredient wt%	Solvent	Appearance	Viscosity mPa·s, 25°C
X-62-4595	50	IPA	Pale yellow transparent liquid	20
X-62-4595PF	50	Isoparaffin	Pale yellow transparent liquid	10

(Not specified values)

■ Water Repellency Demonstration



Water repellency:
Grade 1
Untreated fabric



Water repellency:
Grade ≥ 4
Treated fabric

Treatment conditions : Using polyester base fabric, dip into treatment bath diluted to 1% active ingredient, squeeze out, leave for 30 min, then heat-treat at 105°C for 2 min.

Water repellency evaluation : Spray test according to JIS L 1092. Water repellency grade is improved from 1 to 4 after the treatment.



Completely PFAS-Free Silicone Emulsions for Oil- and Water-Repellent Treatments

Product Usage

Silicone Based Resins

X-52-8509L / X-52-8536

Contact → Sales and Marketing Department II
Phone : +81-3-6812-2407

■ Features & Benefits

- 1) Four-component silicone emulsions that are completely PFAS-free, providing oil- and water-repellency to paper.
- 2) Performance is achieved at low coating weights.
- 3) Exhibits oil resistance even against hot oils above 100°C.
- 4) Applicable for both impregnation (penetration) and surface coating.

■ Applications

Burger wrap paper, baking paper

■ General Properties

Product name	X-52-8509L	X-52-8536
Parameter		
Appearance※	White milky emulsion	White milky emulsion
Viscosity※	50 to 80	50 to 80
pH※	5 to 6	5 to 6
Oil resistance	Excellent	Good
Water resistance	Good	Good
Release properties	Slightly poor	Excellent

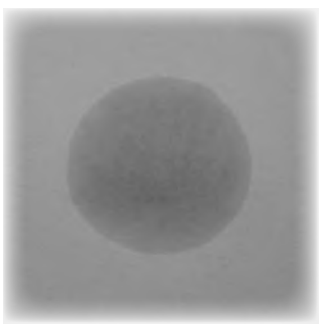
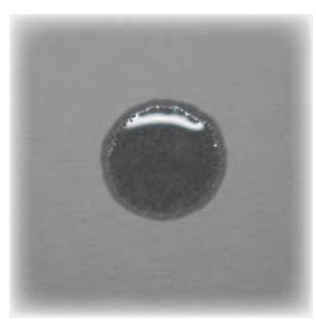
※Values for 10% solids after mixing the four components

(Not specified values)

■ Oil & Water Resistance

Substrate : Filter paper

- 1) Dip into 5 wt% aqueous solution, then wring using a wringer.
- 2) Heat treatment at 120°C for 3 min.
- 3) Apply drops of water and canola oil.

Conditions	Water	Oil	Result
Blank			Instant penetration
X-52-8509L			Shows oil- and water-resistance for more than 1 day

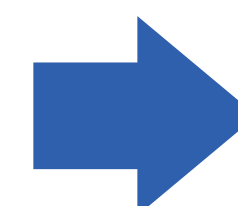
■ Bread Release Test

Ingredients: eggs, sugar, strong wheat flour, baking powder

- 1) Pour bread dough into trays lined with oil-resistant paper.
- 2) Heat in an oven at 220°C for 8 min.
- 3) After cooling at room temperature for 10 min, remove the dough.



Peeling off



X-52-8536 Coated paper



Other companies' oil-resistant paper



Substrate : MF paper (40 g/m²) Coating method: 10% solution applied with bar coater No.12
Curing conditions : 150°C × 30 s Coating weight: approx. 1.1 g/m²

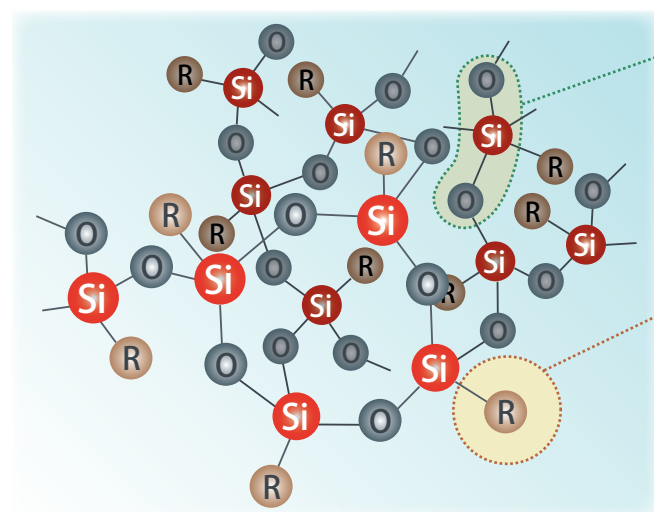
Silicone Resins & Oligomers

Silicone Based Resins

Resin Hybridization Agetns

Contact → Sales and Marketing Department II
Phone : +81-3-6812-2407

Structure and Features of Silicone Resins & Oligomers



Features of siloxane backbone

- High bond energy (106 kcal/mol): resistant to thermal and photolytic degradation. Approximately 25% higher bond energy than C-C bonds.

Features of organic functional groups

- Reactive functional groups: alkoxy, silanol, acrylic, epoxy, etc.
- Non-reactive functional groups: Methyl group: hydrophobicity, Phenyl group: resin compatibility, heat resistance

Excellent Properties

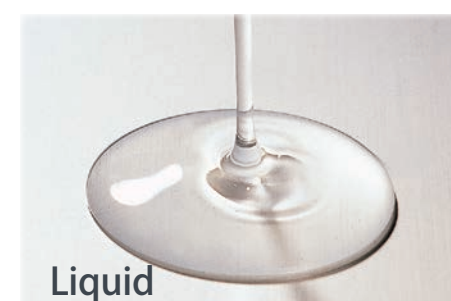
Silicone resins and oligomers provide heat resistance, weatherability, high hardness, electrical insulation, water repellency, and flame retardancy. They are used in harsh environments in which conventional organic resins lack sufficient durability.

Usage

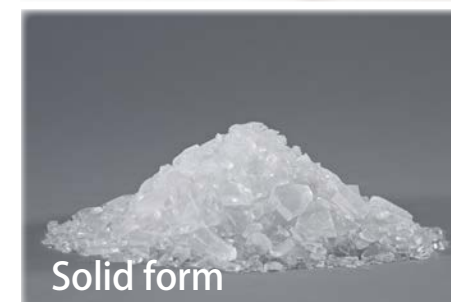
Silicone resins and oligomers can be used not only as base resins but also as modifiers for other organic resins (hereinafter referred to as "resin hybridization agents").

In addition, resin hybridization agents can be used either as synthetic raw materials or via cold blending (simply mixed at room temperature).

Appearance



Liquid



Solid form

Product Lineup

Generation	3rd Generation	2nd Generation	1st Generation
Product	KRW Series	Silicone Oligomers	Silicone Resins
Solvent	Water	Solvent-free	TX (toluene, xylene) solvent system
Curing System	Heat cure, room-temperature cure	Room-temperature cure, UV cure	Heat cure
Merits	① Faster cure than 1st gen ② Lower cure temperature than 1st gen (80°C is possible.) ③ No organic solvents ④ No emulsifiers ⑤ Room-temperature curable ⑥ One-component (no curing catalyst required)	① Solvent-free (100% silicone) ② Forms high-hardness films ③ Options with excellent anti fouling properties	① Fast cure ② One-component (no curing catalyst required)
Demerits	① Takes time to cure (several days) ^{※1}	① Takes time to cure (several days) ^{※2} ② Two-component (curing catalyst required) ^{※3} ③ High hardness ⇒ prone to cracking ^{※4}	① Uses TX solvents ^{※5} ② High cure temperature (≥180°C) ^{※6}

※1 Cure time can be shortened by using a curing catalyst.

※2 Fast-curing grades are available.

※3 One-component grades are available.

※4 Grades balancing high hardness and crack resistance are available.

※5 Solid and solvent-free grades are available.

※6 Lacquer grades are available.

Applications

① Coating applications (applied to substrates), mainly for thermoset resins



Architectural / Building-material coatings

Heavy-duty anticorrosion coatings

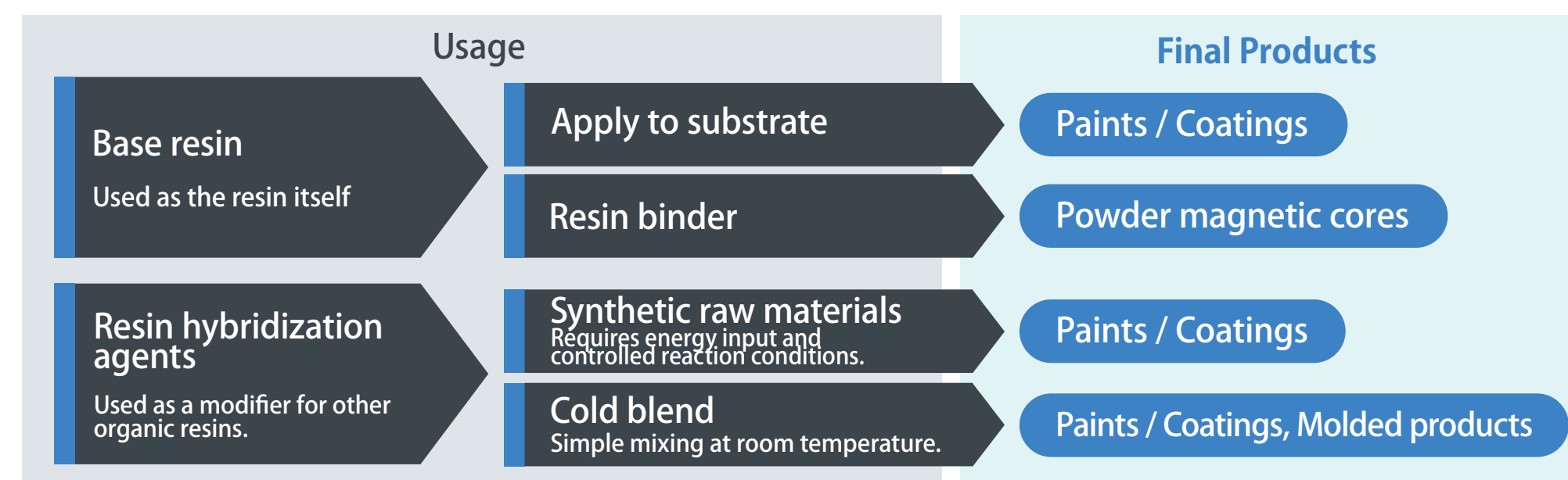
Adhesives and pressure-sensitive adhesives

② Molding applications, mainly for thermoplastics



Molded products

Powder magnetic cores



Silicone Resins & Oligomers

Product Introduction: Coatings Applications

Silicone Based Resins

Resin Hybridization Agetns

Contact → Sales and Marketing Department II
Phone : +81-3-6812-2407

■ When Used as the Main Component / Binder

Generation	3rd Generation	2nd Generation	1st Generation
Product	KRW Series	Silicone Oligomers	Silicone Resins
Solvent	Water	Solvent-free	TX (toluene, xylene) solvent system
Curing System	Heat cure, room temperature cure	Room temperature cure, UV cure	Heat cure
Representative Products (Features)	KRW-6000 (High hardness) KRW-6001 (Crack resistance) KRW-6002 (Compatibility)	KR-4000G (Anti-fouling properties) KR-4000GE (Water based type of KR-4000G) X-88-2003A (High hardness, Anti-fouling properties) X-48-1500, X-48-1600 (Fast cure, high hardness, flex resistance) X-40-9312 (High hardness, crack resistance) X-88-1004, X-88-1007 (High adhesion) X-40-9300, X-40-9301 (Fast cure, alkali resistance) X-88-2019A (for urethane substrates) X-48-1407 (for PC substrates) X-48-5031 (UV cure type)	KR-220L (Solid form) KR-242A (Methyl type standard) X-48-1250-H (Suitable for lacquer application) KR-311 (Phenyl type standard) ES-1023 (Epoxy type standard) KR-5230 (Polyester resin type) X-48-1030D (Weak solvent) X-41-1610 (Weak solvent epoxy type) X-40-2756 (Weak solvent, addition cure type)

■ Recommended Products by Use Case

- ◎ Heat resistant applications : X-48-1030D
- ◎ Weather resistant applications : KRW-6000 Series, X-40-9312
- ◎ Anti-fouling, water repellent applications : X-88-2003A, KR-4000G, KR-4000GE
- ◎ Electrical insulation applications : X-40-2756, X-48-1250-H

■ When Used as Additives / Resin Modifiers

For Water System

Heat Resistance
Weather Resistance
KRW-6002
(Good compatibility)

Weather Resistance
X-48-1901
(Containing hydroxyl group)

For Solvent System

Stress Relaxation,
Suppression of
Cure Shrinkage

Cyclic Siloxane Series
(Containing cyclic epoxy groups and acrylic groups)

Adhesion

Type AR Oligomer
(Containing alkoxy groups and various reactive functional groups)

Weather Resistance

X-48-1801
(Containing isocyanate group)
X-48-1904S
(Containing hydroxyl group)

High Hardness
Crack Resistance
X-40-2761
(UV cure type)

Anti-Fouling
Properties
X-48-1903L
(Containing hydroxyl group)

■ Recommended Products by Use Case

- ◎ Heat resistant applications : KRW-6002
- ◎ Weather resistant applications : KRW-6002, X-48-1801, X-48-1901
- ◎ Anti-fouling applications : X-48-1903L
- ◎ Film and sealing material applications : Cyclic Siloxane Series, X-40-2761
- ◎ Adhesive applications : Type AR oligomer



Silicone Resins & Oligomers

Product Introduction: Molding Applications

Product Usage

Resin Hybridization Agents

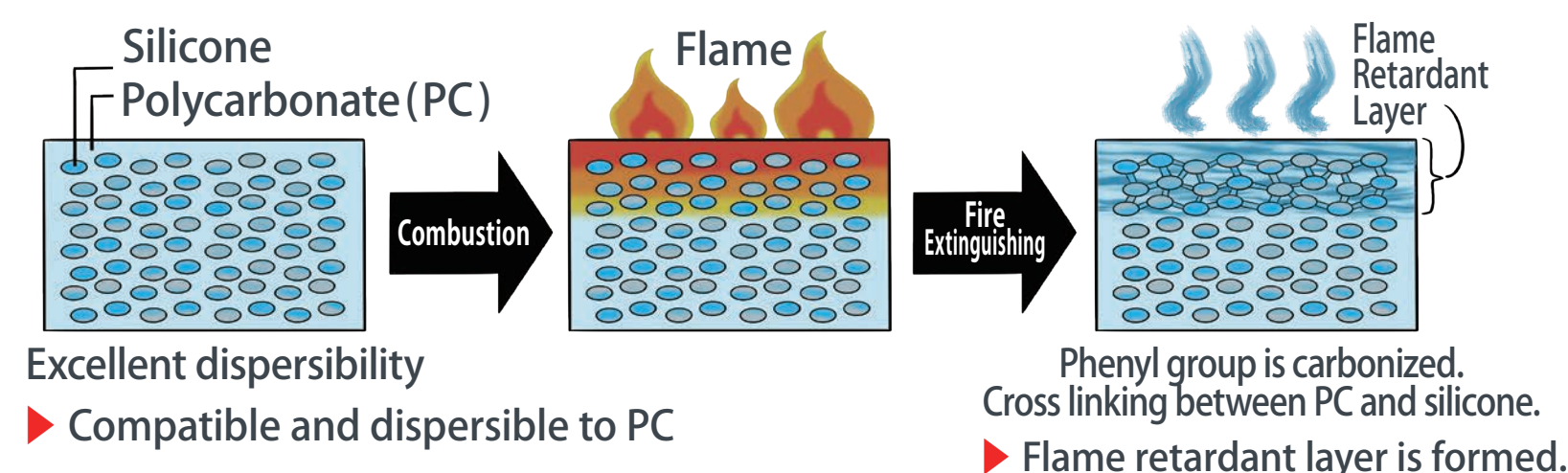
Silicone-Based Flame Retardants for Polycarbonate

Contact → Sales and Marketing Department II
Phone : +81-3-6812-2407

■ Features and Benefits

- These silicones exhibit flame retardancy when used in combination with a sulfonate.
- Formulated without fluorine additives, it achieves UL94 V-0 flame retardancy while maintaining transparency.
- Compared to other flame retardants, the addition amount is small and it is less likely to decompose due to heat, making it possible to design recyclable resins.

■ Estimated Flame Retardant Mechanism



■ General Properties

Product name		KR-2710	KR-2720	X-48-2480H
Item				
Structure		Straight chain	Branch	Branch
Appearance		Colorless transparent liquid	Colorless transparent liquid	White flake
Active ingredient	%	100	100	100
Softening point	°C	-	-	85
Refractive index		1.52	1.44	1.57*
Viscosity	mm ² /s	50	7	-
Transparency when adding to PC		Transparent	Opaque	Opaque

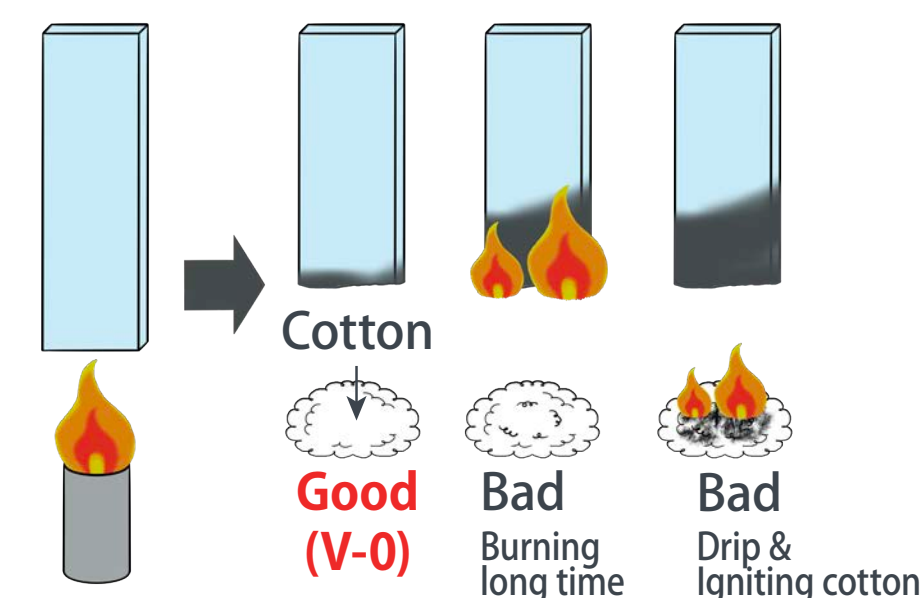
* Estimated value

(Not specified values)

■ Features of KR-2720 and X-48-2480H

- Compared to the conventional product (KR-2710), the burning time can be shortened, and dripping can be suppressed without adding PTFE.
- Liquid type KR-2720 and the solid type X-48-2480H are in our product lineup.
- The KR-2720 exhibits UL-94 V-0 flame retardant performance using silicone alone (without the combined use of sulfonate).

■ UL94 Flammability Test (Image Diagram)



■ Mixing Examples and Flame Retardant Test Results

* The unit is in mass units.

Component	Product name	Test Piece1	Test Piece2	Test Piece3
PC	NOVAREX M-7027U* ¹ (MVR 2.9)	90	90	90
	TARFLON FN-2200* ² (MVR 12)	10	10	10
Silicone	KR-2710	1.0	-	-
	KR-2720	-	1.0	-
	X-48-2480H	-	-	2.0
Additive	KSS-FR* ³ (Non-fluorinated char catalyst)	0.2	0.2	0.2
	Total of antioxidant* ⁴ and release agent* ⁵	0.15	0.15	0.15
1.6mm Test specimen appearance		Transparent	Opaque	Slightly cloudy white
UL-94 Flammability Test (1.6mm thickness)	Flaming combustion duration (total of 5 pieces)	48	30	27
	Drip number	0/5	0/5	0/5
	Flammability Evaluation	V-0	V-0	V-0

*¹ Made by Mitsubishi Engineering-Plastics Corporation *² Made by Idemitsu Kosan Co.,Ltd

*³ Made by Arichem LLC *⁴ ADK STAB PEP-36, AO-50 made by ADEKA corporation is used.

*⁵ RIKESTER EW-440A made by Riken Vitamin Co., Ltd. is used.

(Not specified values)

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PFAS-Free Anti-Fouling Additives for Acrylic Paints

Product Usage

Resin Hybridization Agents

X-26-5084

Contact → Sales and Marketing Department I
Phone : +81-3-6812-2406

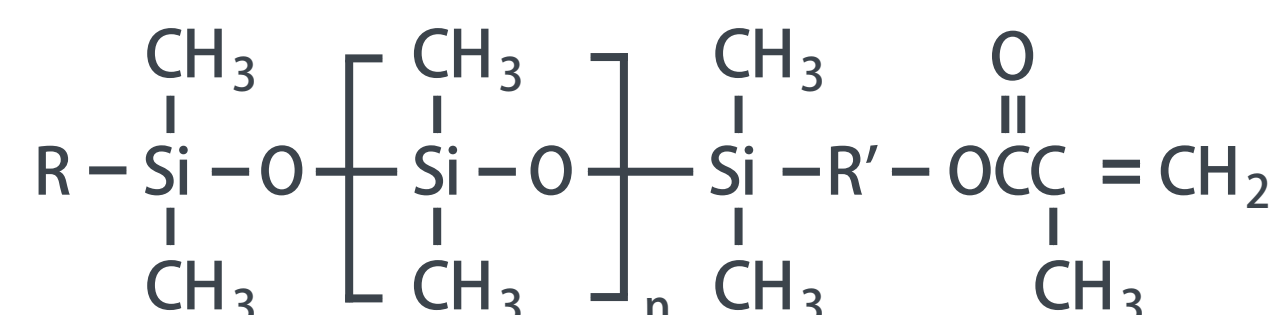
■ Features and Benefits

- By incorporating X-26-5084, the water repellency and oil repellency of the acrylic resin are greatly improved.

■ Applications

- Water-repellent and oil-repellent agent for acrylic resin

■ Chemical Structure



■ General Properties

Parameter	Product name	X-26-5084
Appearance		Colorless transparent liquid
Viscosity at 25°C	mm ² /s	60
Specific gravity at 25°C		0.97
Refractive index at 25°C		1.405
Functional Group Equivalent	g/mol	4,500

(Not specified values)

■ Test Data

Making copolymerization film of methacrylic monomers

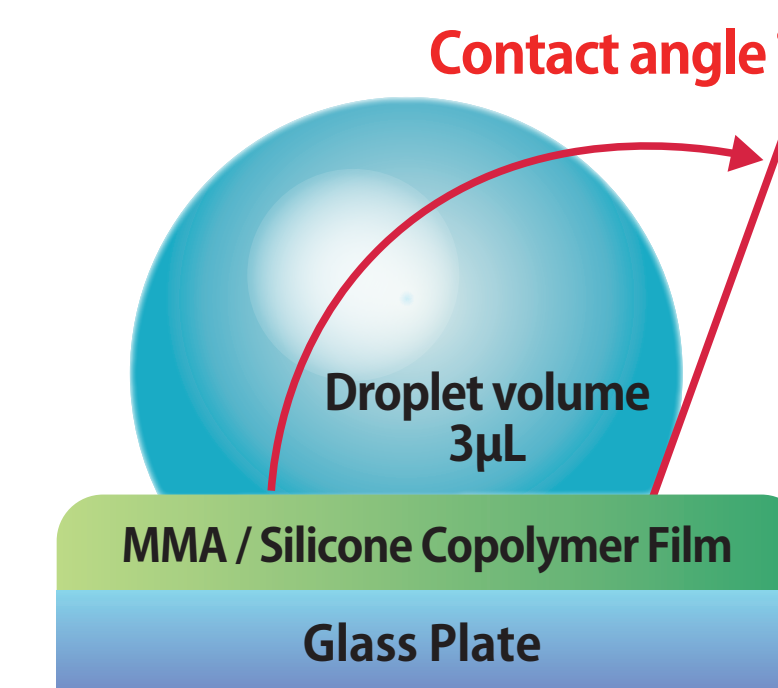
【 Formulation 】

Composition	Parts by weight
MMA	70
X-26-5084	30
Solvent	100
Polymerization initiator	1

【 Test Method 】

- The acrylic composition is solution polymerized.
- Polymerization liquid is applied to a glass plate (film thickness after drying : 3μm)
- Add 3 μL of water and oleic acid and measure the contact angle

【 Contact Angle Image 】



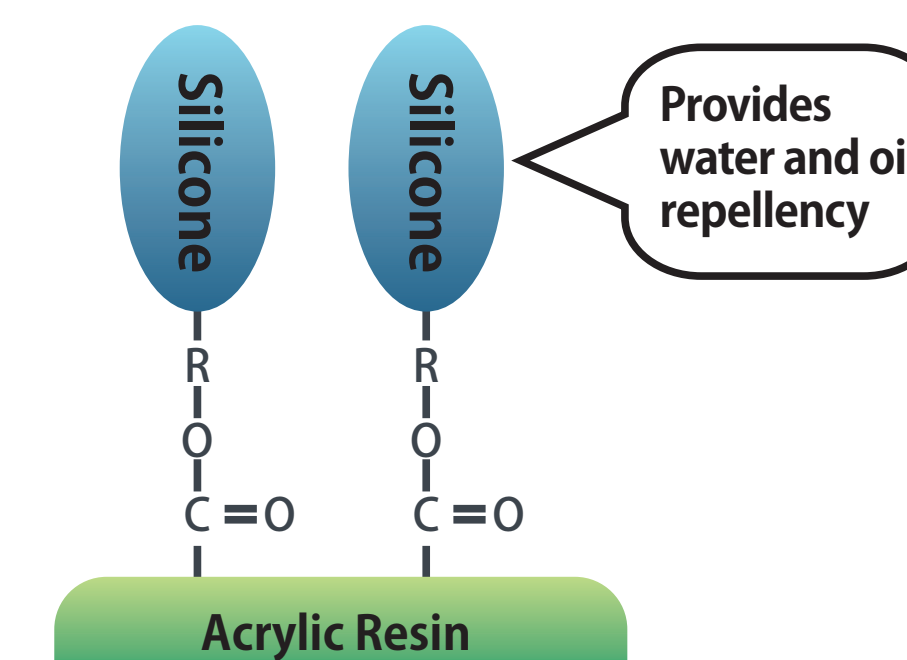
【 Test Results 】

Parameter	Silicone content	Contained	Not Contained
Appearance		Colorless transparent	Colorless transparent
Water Contact Angle※ °		101	69
Oleic Acid Contact Angle※ °		32	7

※ The higher the value, the better the performance.

(Not specified values)

■ Resin Modification Model





PFAS-Free UV-Curable Anti-Fouling Additive

Product Usage

Resin Hybridization Agents

KFV-1000A / KFV-1001A

Contact → Sales and Marketing Department I
Phone : +81-3-6812-2406

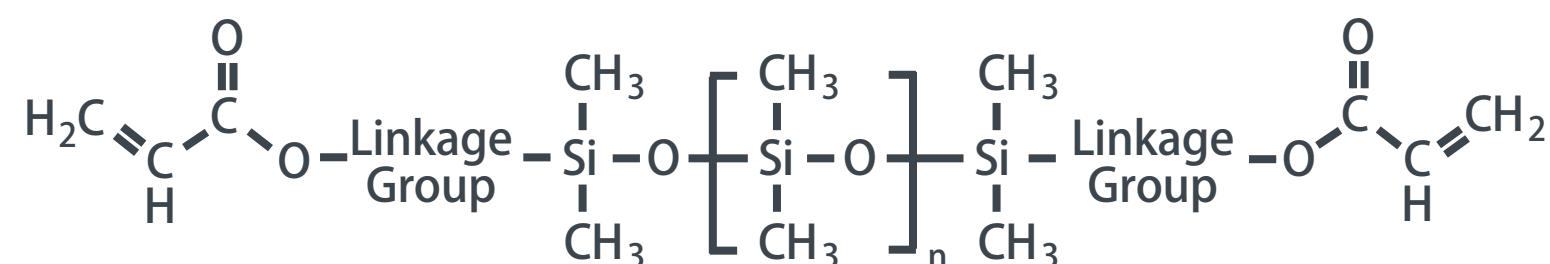
■ Features and Benefits

- Applicable to UV-radical curing coatings.
- More compatible with acrylic monomers and resins than conventional acrylic-modified silicone fluids, due to the high polarity of the linkage groups.
- Excellent UV-curing properties, requiring only a small amount of irradiation to cure.
- Enhancing lasting water and oil repellency

■ Applications

- Water- and oil-repellent and slip agents for acrylic resins and radical-curing resin

■ Chemical Structure



■ Properties and Product Position

Item	Reference	KFV-1000A	KFV-1001A
Solubility	±	+	+
UV curability	±	+	++

※ ++ : Excellent + : Good ± : Relatively poor

■ Test Data

Addition to acrylic monomer-based UV coating agents.

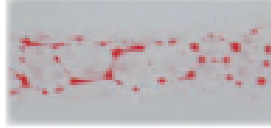
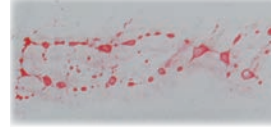
【Formulation】

Composition	Parts by weight
Multi functional acrylic monomer	100
Silicone	2
Photoinitiator	2

【Test Method】

- 1.The composition liquid is applied to PMMA substrates (film thickness 8μm).
2. UV irradiation under nitrogen atmosphere (UV-LED(365 nm); 1400 mJ/cm²)
3. Various tests are conducted

【Test Results】

Item		Blank	After silicone addition		
			Reference	KFV-1000A	KFV-1001A
Appearance	Transparency	+	±	+	+
	Smoothness	+	-	+	+
Contact angle [※]	Water	40	97	96	95
	Oleic Acid	15	49	51	51
Permanent marker cissing					

※ The higher the value, the better the performance.
+ : Good ± : Relatively poor - : Poor

(Not specified values)

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Silicone Powder

Product Usage

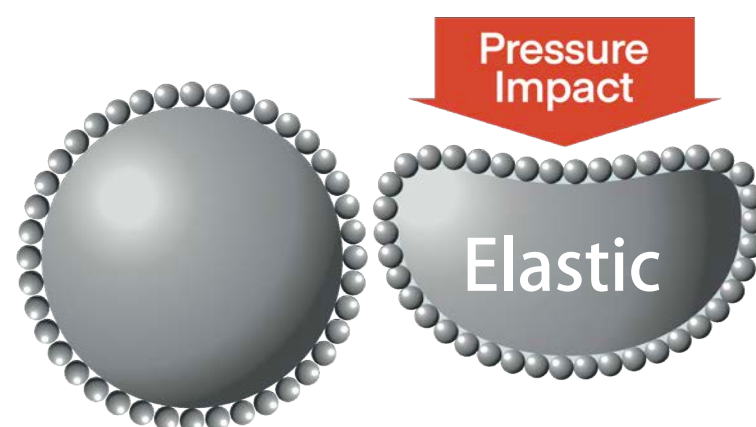
Resin Hybridization Agents

Surface Modifiers for Coating

Contact → Sales and Marketing Department II
Phone : +81-3-6812-2407

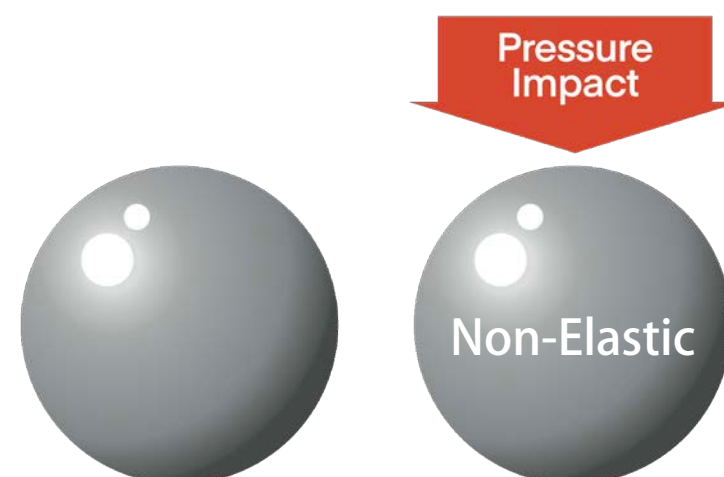
3 Types of Products

Hybrid Silicone Powder



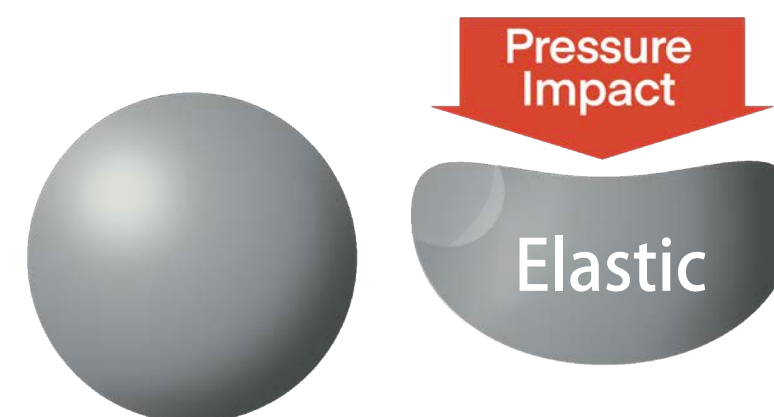
Composition:
Silicone rubber spherical powders coated with silicone resin

Silicone Resin Powder



Composition:
Spherical powders having the three-demensional reticular structure of the formula $(CH_3SiO_{3/2})_n$

Silicone Rubber Powder



Composition:
Spherical powders having the structure of crosslinked linear dimethylpolysiloxane

How to Use

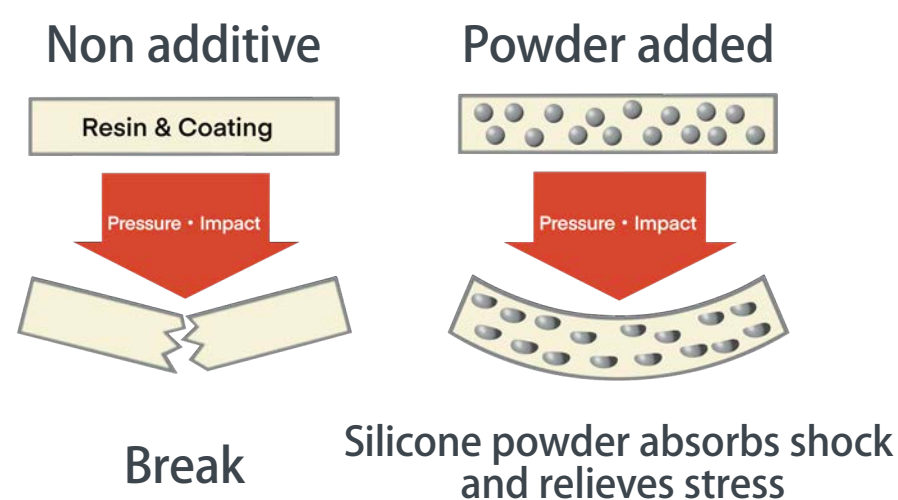
- Used by adding to resins, coating agents, etc.
- Recommended addition amount (estimate): 1~10wt%

Applications

- For synthetic resin:
It improves impact resistance and abrasion resistance and adds light diffusivity, etc.
- For paints, inks and coatings:
It improves surface slipperiness, flexibility (feeling) and matte properties, etc.

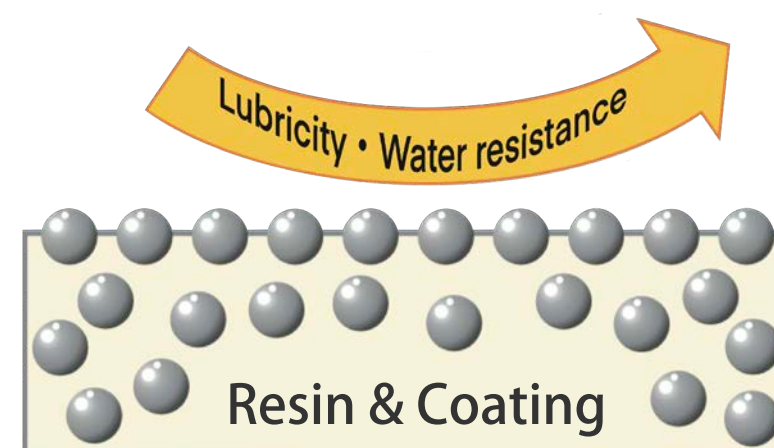
Enhanced Properties

Stress Relaxation Impact Resistance



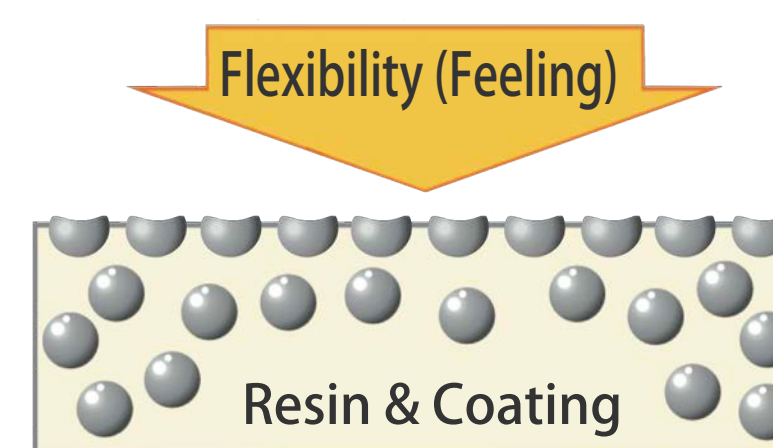
Hybrid Silicone Powder	++
Silicone Resin Powder	±
Silicone Rubber Powder	++

Surface Slipperiness Abrasion Resistance



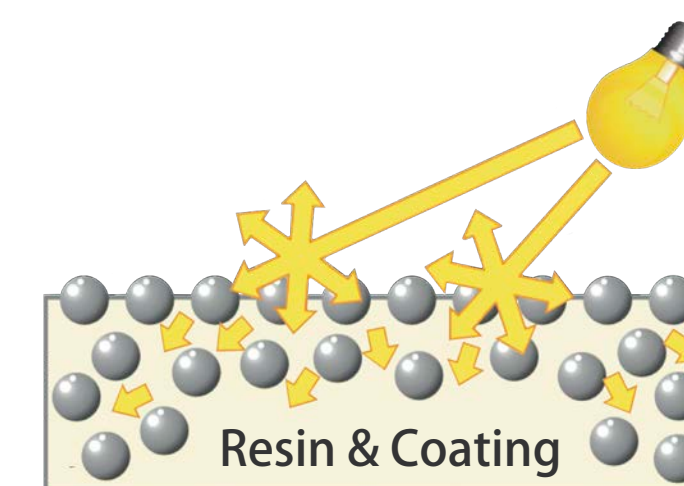
Hybrid Silicone Powder	++
Silicone Resin Powder	++
Silicone Rubber Powder	+

Flexibility (Feeling)



Hybrid Silicone Powder	++
Silicone Resin Powder	-
Silicone Rubber Powder	++

Light Diffusivity Matte Property



Hybrid Silicone Powder	++
Silicone Resin Powder	++
Silicone Rubber Powder	++



Adhesion
Strength
Improvement

Reference Exhibit: Amino Modified Organopolysiloxane Powder

Product Usage

Resin Hybridization Agents

Surface Modifiers
for Pigment & Fillers

X-88-491A

Contact → Sales and Marketing Department II
Phone : +81-3-6812-2407

■ Features and Benefits

- Due to the presence of primary amino and silanol groups in its structure, it can bond with various organic and inorganic materials.
- Classified as a non-hazardous (designated combustible) material under Japan's Fire Service Act, it provides superior safety.
- This is an environmentally friendly product that does not emit VOCs.

■ Applications

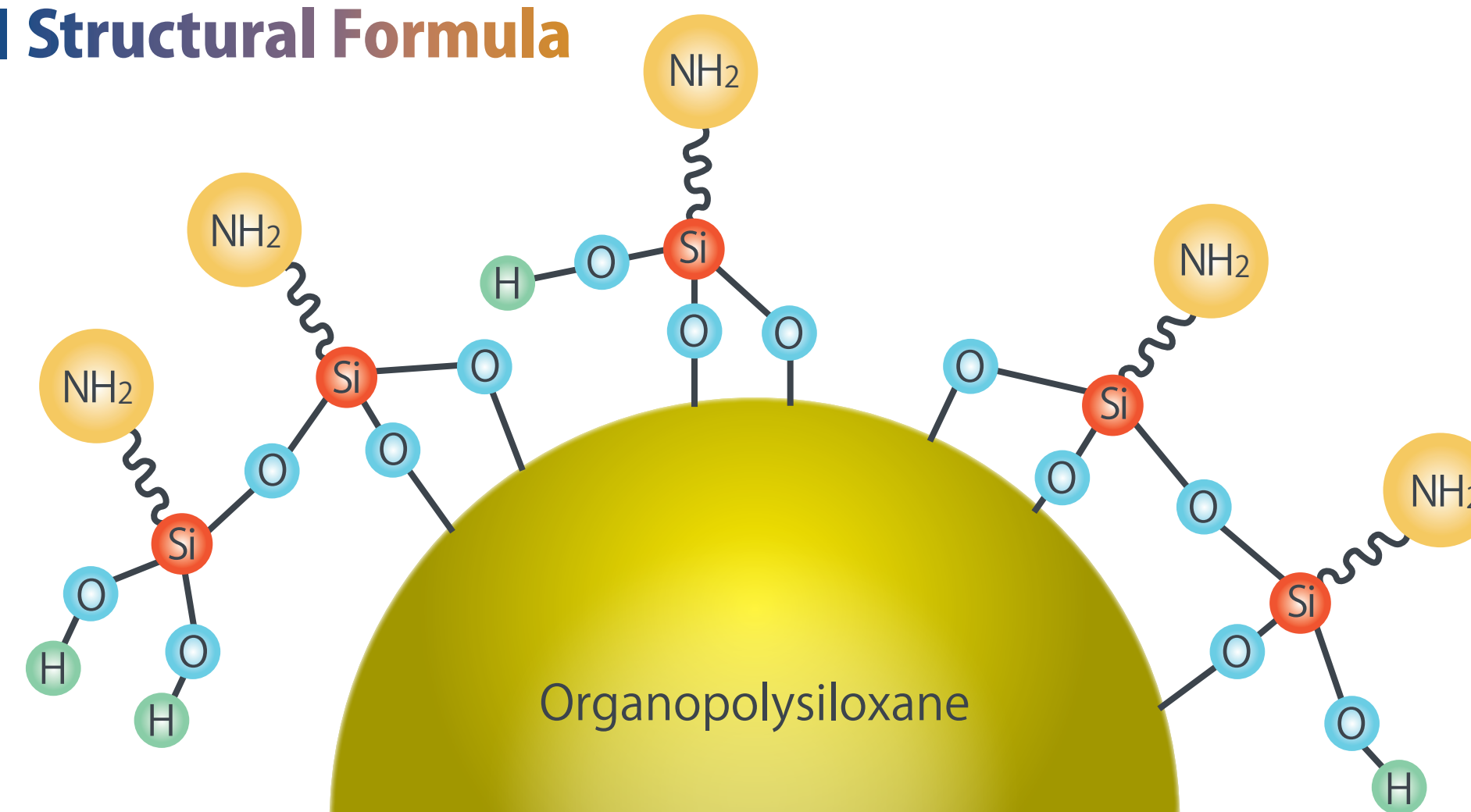
- Resin additive (improves adhesion and strength)
Applicable resins : Epoxy, Acrylic, Polycarbonate, Urethane, Nylon, Phenolic, Furan, Polyimide, Melamine and others

■ General Properties

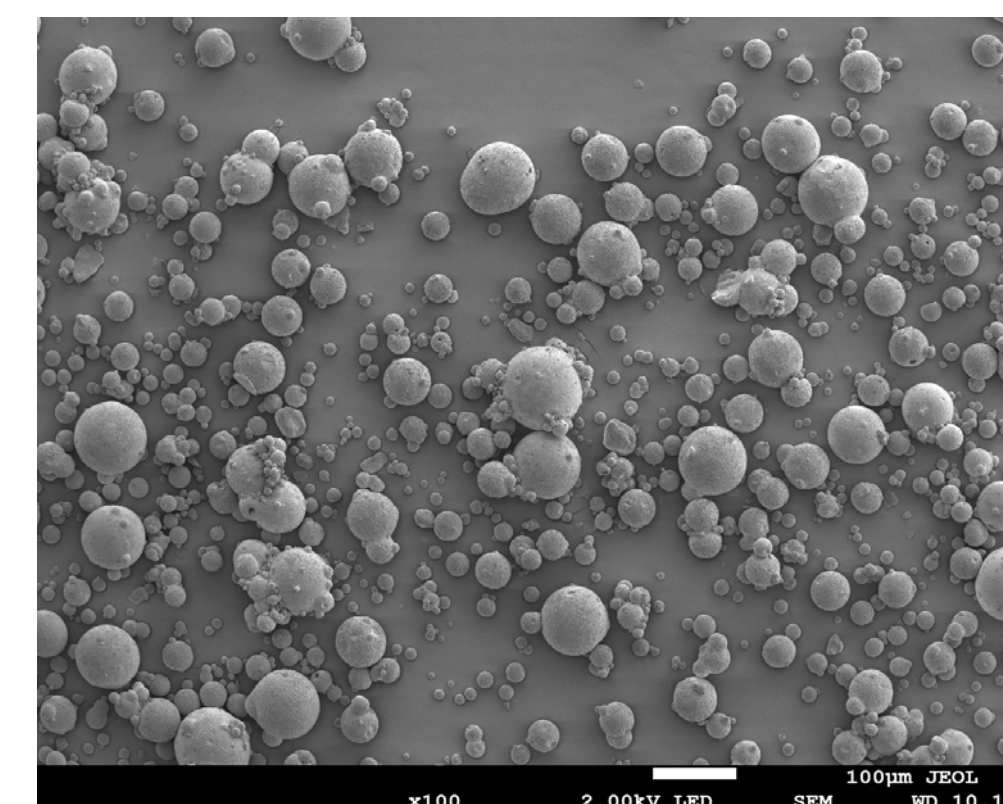
Product Name		X-88-491A
Parameter		
Active ingredients	%	>99
Appearance		White solid
Particle size	μm	30~150
Melting point		N / A
Flash point	°C	>100 (Closed Cup)
Amine value	KOH mg/g	488

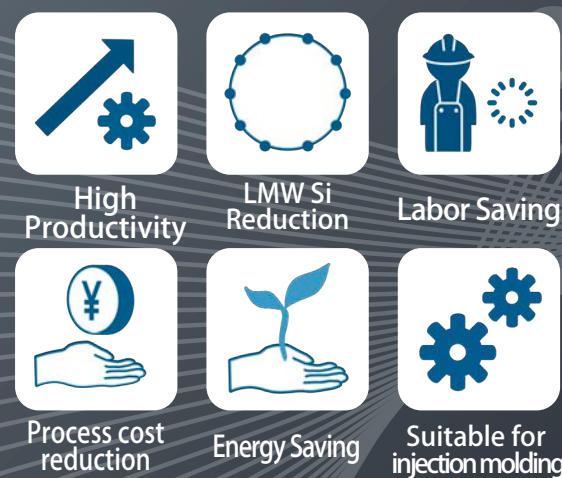
(Not specified values)

■ Structural Formula



■ SEM Image





No Post Cure Silicone Rubber Compound

Molding Silicone Rubber

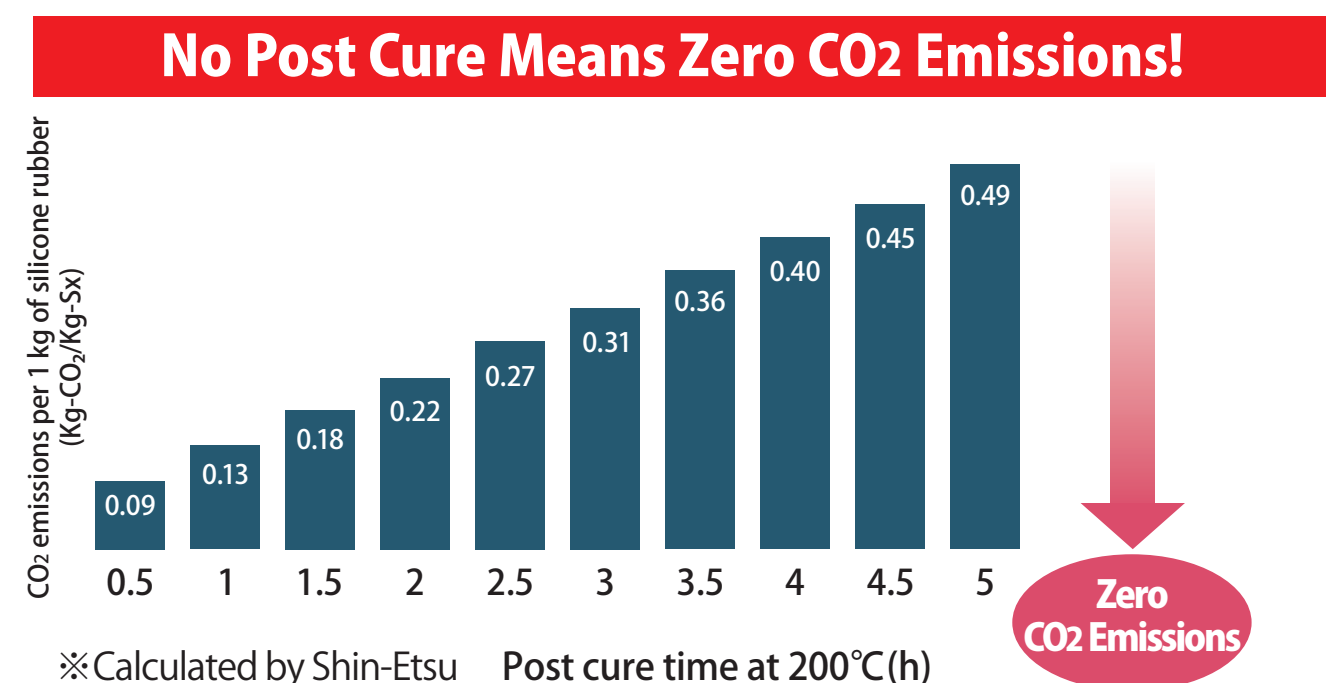
KNP-5xx-U series

Contact → Sales and Marketing Department III
Phone : +81-3-6812-2408

■ Benefits of No Post Cure Silicone Rubber

Product Parameter	Silicone rubber requiring post curing	No post cure silicone rubber KNP series
Primary cure	(Ex) 120°C × 10 min	(Ex) 120°C × 10 min
Post cure	(Ex) 200°C × 4 h	None
Production process	Normal ±	Shortened ++
Operator workload	Normal ±	Reduced ++
Quality stability	Normal ±	Stabilized ++
Possibility of foreign material adhesion	Available ±	Reduced ++
Power consumption	Normal ±	Reduced ++
Dryer installation	Required ±	Not required ++
Regular cleaning & maintenance	Required ±	Not required ++
Space optimization	Not allowed ±	Available ++
CO ₂ emissions	Normal ±	Reduced ++
Environmental impact	Normal ±	Reduced ++

■ CO₂ emissions from post-vulcanization



■ General Properties

Type	For addition cure				BfR Correspondence※1	For peroxide cure	
Product Name Parameter	KNP-541-U	KNP-551-U	KNP-561-U	KNP-571-U	KNP-5461-U	KNP-551P-U	KNP-561P-U
Plasticity	150	230	370	400	220	170	230
Vulcanizing Agent / Amount added	X-93-1893A/ 0.5 phr (Catalyst paste)					X-93-1910/ 1.0 phr (Organic peroxide paste)	
	X-93-1893B/ 2 phr (Vulcanizing agent + control agent paste)					-	
	-	-	-	X-93-1918/ 1.0 phr (Curing agent paste)	-	-	
Molding conditions	Press at 120°C for 10 min.					Press at 165°C for 10 min.	
Density at 23°C g/cm ³	1.09	1.14	1.19	1.18	1.15	1.10	1.14
Hardness Durometer A	41	50	61	69	57	50	59
Tensile strength MPa	7.1	10.6	11.2	11.3	9.6	6.3	10.0
Elongation at break %	550	610	660	360	660	380	410
Reference value							
Rebound Resilience %	71	60	54	59	60	76	69
Compression set permanent deformation 150°C × 22h %	21	25	42	29	27	9	10
LMW siloxane content※2 ΣD ₃ ~D ₈ ppm	350>						

※1 BfR Heat Loss : 0.5%>

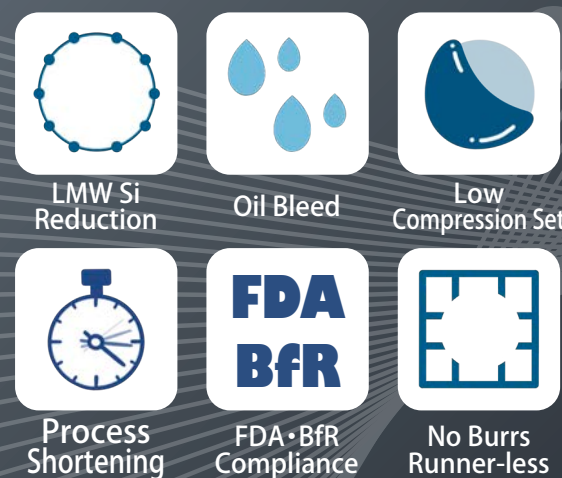
※2 LMW = Low molecular weight
The amount of low molecular weight siloxane is measured on the cured products.

(Not specified values)

■ Application Examples

- All kinds of molded silicone rubber products, including automotive and electronic components and tubing.





No Post Cure LIMS (Liquid Injection Molding System)

Product Usage

Silicone Rubbers for Molding

KE-2017 Series, KE-2019 Series, KEG-2003H Series

Contact → Sales and Marketing Department III
Phone : +81-3-6812-2408

■ Features and Benefits

- Since the amount of low molecular weight (LMW) siloxane is reduced, post cure using a dryer is not required.
- Oil-bleed type, low compression set type, FDA, BfR compliant type available
- Improved mold contamination during molding, less fluctuation in shrinkage rate

■ Application Examples

- Waterproof seals for wire harnesses, gaskets, packing, O-rings, food contact products, etc.

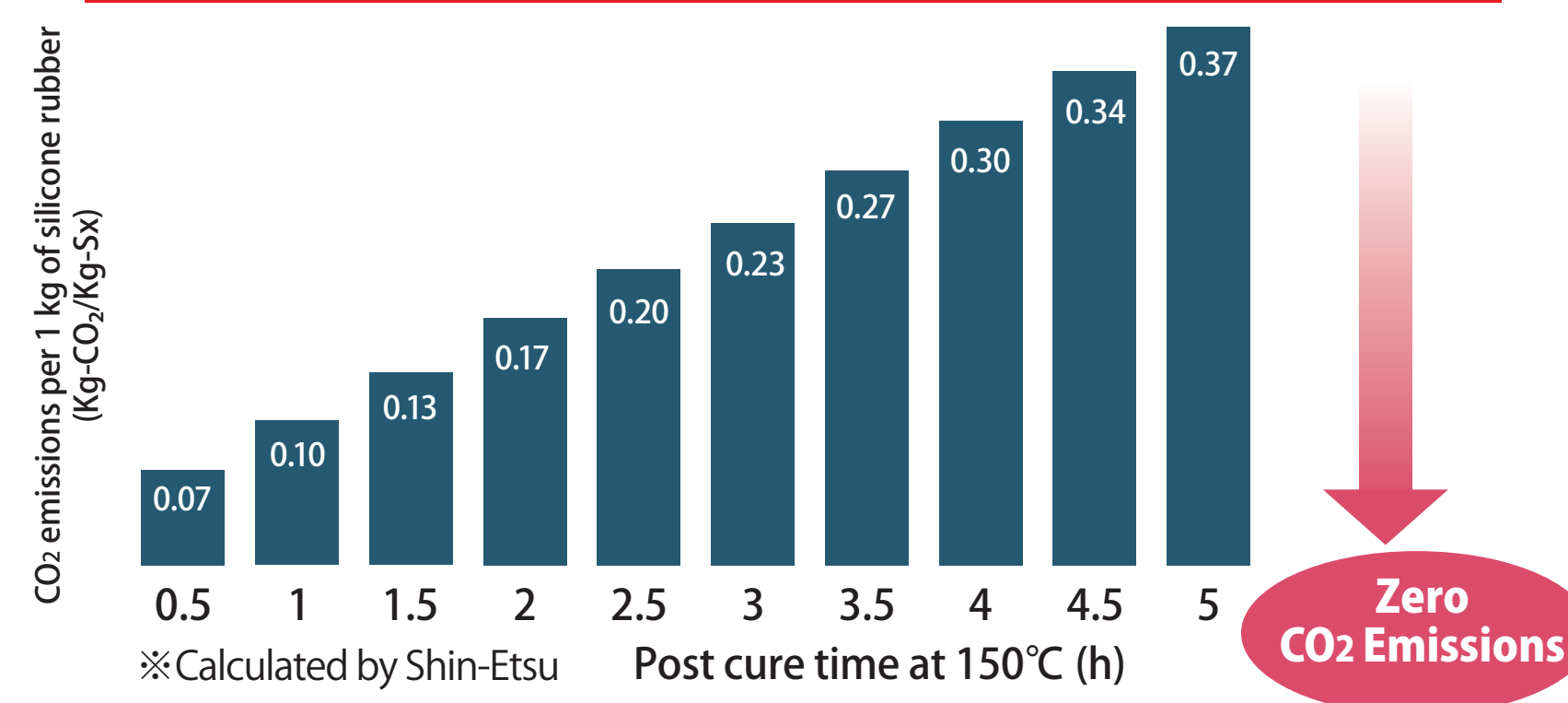
■ General Properties

Type		Oil Bleed	Low Compression Set	Compliance with Food Standards(FDA, BfR)
Product Name		KE-2017-40-A/B	KE-2019-40-A/B	KEG-2003H-40-A/B
Parameter				
Appearance		Translucent	Translucent	Translucent
Viscosity (A/B)	Pa·s	1,790/1,550	327/334	900/960
Curing speed at 130°C (MDR)	T10	35	31	23
	T90	76	78	45
Standard curing conditions	Primary cure	150°C×10min	150°C×10min	150°C×5min
	Post cure	Not required	Not required	Not required
Hardness Durometer A		43	40	41
Density at 23°C	g/cm ³	1.14	1.12	1.13
Linear shrinkage at 150°C	%	2.4	2.5	2.5
Tensile strength	MPa	9.0	9.5	9.1
Elongation at break	%	620	670	830
Tear strength Angle piece	kN/m	34	31	36 ※ ¹
Compression set 150°C×70h	%	18	14	15 ※ ²
LMW siloxane content ΣD ₃ ~D ₈	ppm	350>	350>	350>
Rubber hardness lineup Durometer A		20~50	30~60	30~70

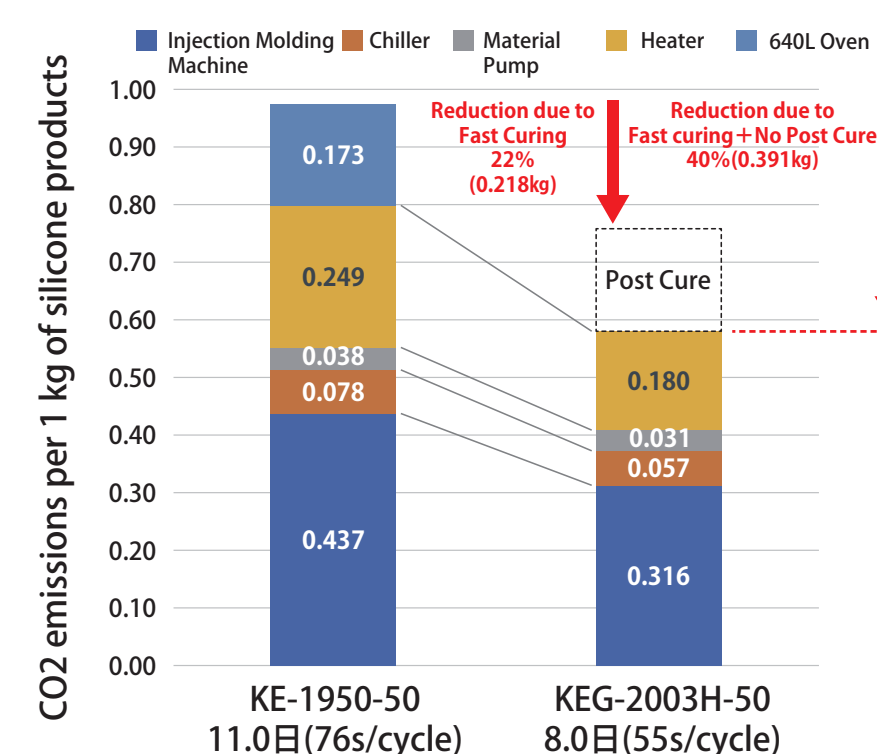
※¹ Crescent ※² Curing conditions: 150°C×15min, test conditions 120°C×22h (Not specified values)

■ CO₂ Emissions from Post Cure

No Post Cure Means Zero CO₂ Emissions!



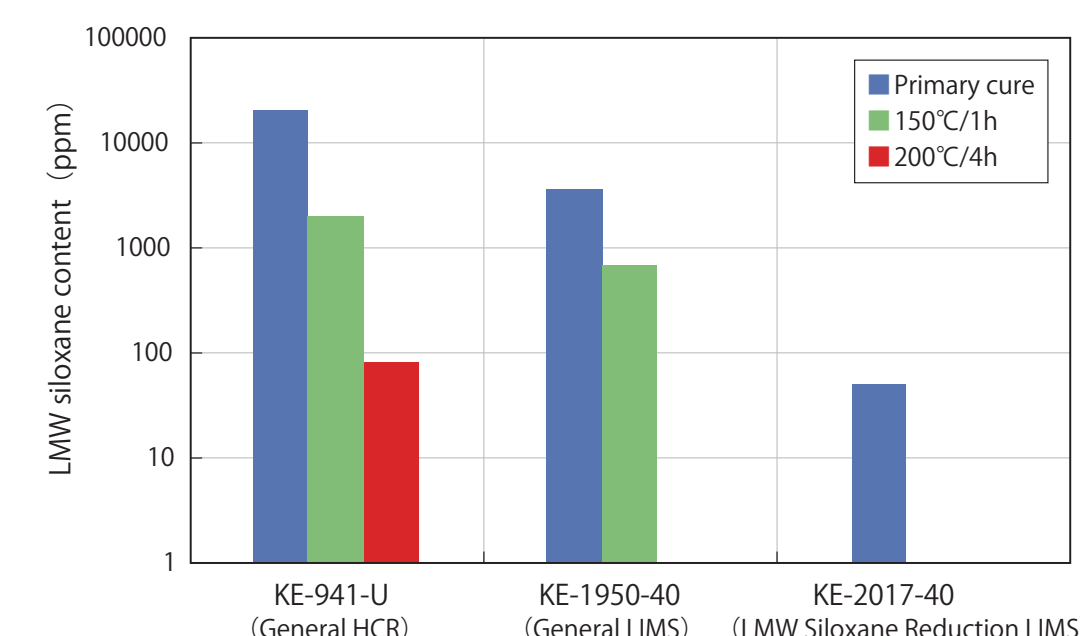
■ CO₂ Emissions Per kg of Product during LIMS Molding (Convert electricity consumption into CO₂)



※ Calculated by Shin-Etsu

■ Comparative Data on LMW Siloxane Content by Solvent Extraction Method

It reduces the amount of low molecular weight (LMW) siloxane, lowers the risk of contact failure, and shortens the production process.



※ Not specified values

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Reference Exhibit: Thermoplastic Silicone

Product Usage

Silicone Rubbers for Molding

Contact → Sales and Marketing Department III
Phone : +81-3-6812-2408

■ Features & Benefits

- 1) Thermoplastic — reformable and recyclable.
- 2) High hardness (Durometer A : >80, >60), with high strength and high elongation.
- 3) Highly transparent and easily colorable.
- 4) Excellent processability — compatible with injection molding as conventional plastics.
- 5) Contains no crosslinking points — can also be formulated into solvent-type (coating) products.

■ Applications

Smartphone covers, wearable device straps, various attachable sports accessories, coatings for industrial equipment, etc.



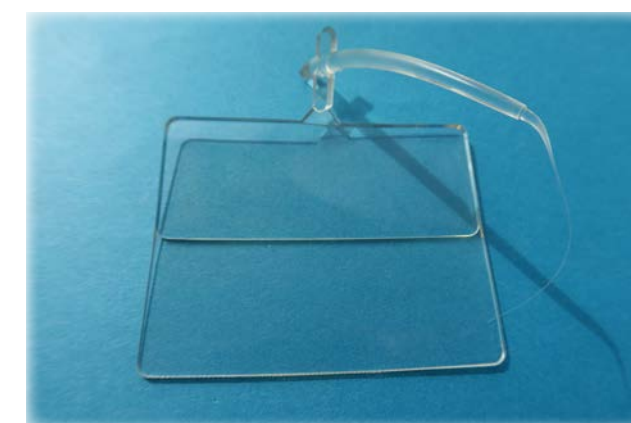
※ Note: Image generated by AI.

■ General Properties (Hardness 80 Type / 60 Type)

Type	Hardness		Tensile strength MPa	Elongation at break %	Tear strength crescent KN/m
	Durometer A	Shore D			
Hardness 80	82	26	20	850	32
Hardness 60	62	17	15	900	26

(Not specified values)

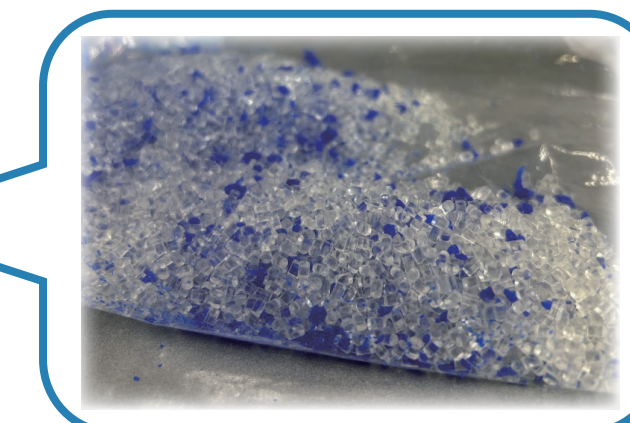
■ Appearance



Transparent sheet
(injection molded)

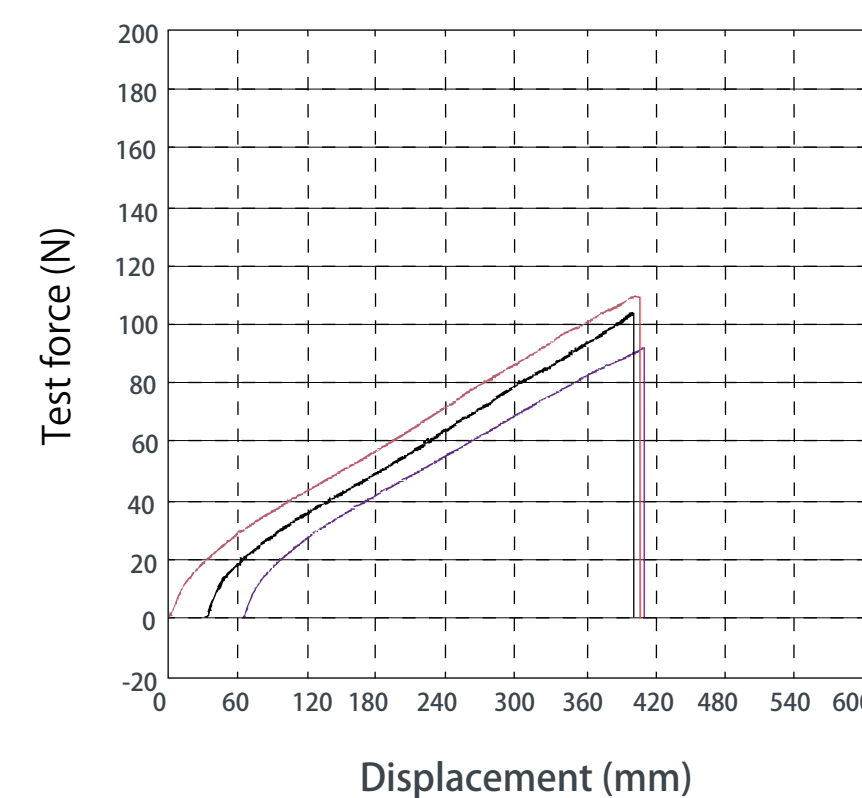


Blue sheet
(injection molded)

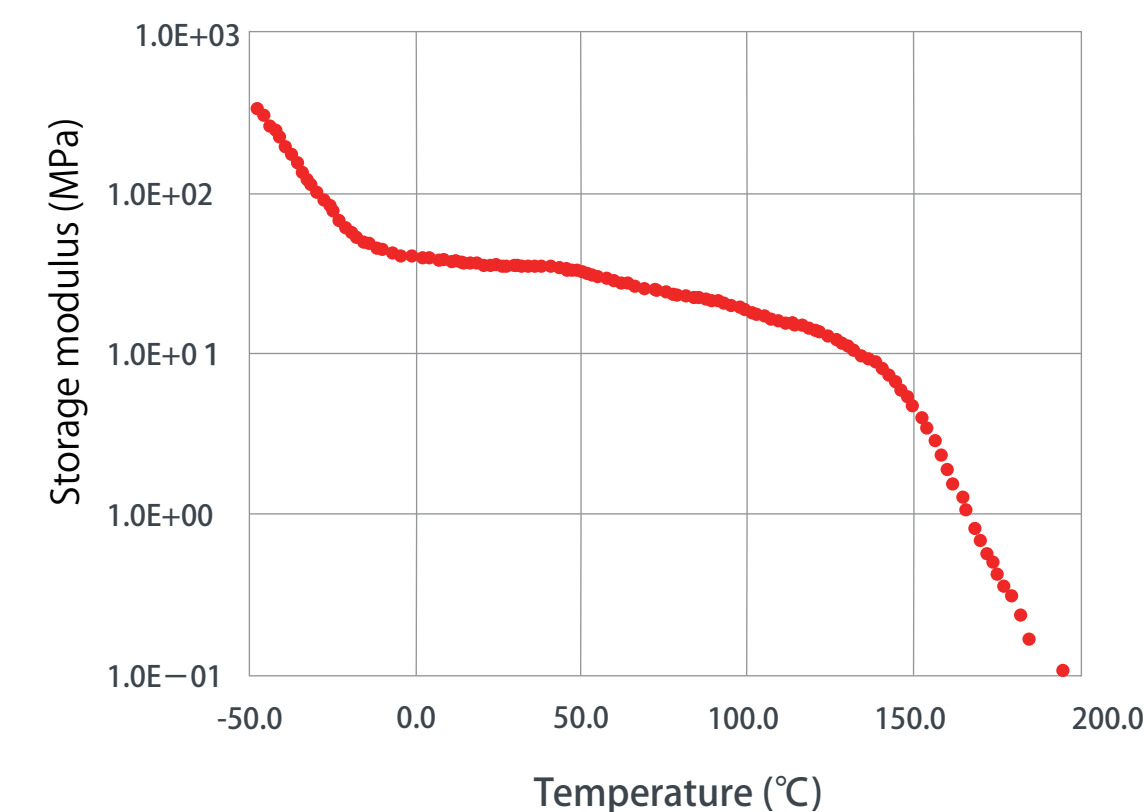


Masterbatch —
colorable using small
amounts of color pellets

■ Stress–Strain Curve



■ Modulus Temperature Dependence





3D Print
Material

Liquid Silicone Rubber for 3D Printers

Product Usage

Liquid Silicone Rubbers

Contact → KED-5000G
Sales and Marketing Department IV
Phone : +81-3-6812-2410

KED-5000G / P3™ Silicone 25A Gray

Contact → P3™ Silicone 25A Gray
Stratasys Japan Co., Ltd. Phone. +81-3-5542-0042

■ Features and Benefits

- Compatible with vat photopolymerization :
SLA, DLP, and LCD systems
- Cure with 365 nm / 385 nm / 405 nm UV light sources
- High elasticity
- Low odor
- Heat resistance up to 150°C

■ Applications

- Hollow structures and elaborate silicone molded parts

■ General Properties

Product name	KED-5000G	P3™ Silicone 25A Gray※1
Parameter		
Appearance	Gray	Gray
Viscosity 25°C Pa・s	1.6	17.0
Hardness Durometer A	49	25
Tensile strength MPa	6.2	5.4
Elongation at break %	256	672
Tear strength kN/m	20	16

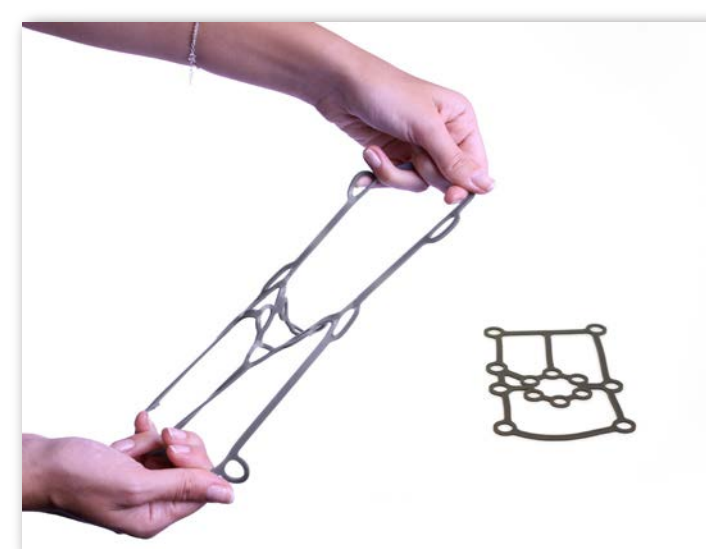
(Not specified values)

※ Properties measured after printing on a Origin Two (DLP method 3D printer made by Stratasys Ltd.) followed by IPA washing, additional UV post-cure, and conditioning at 85°C / 85% RH for 24 h.

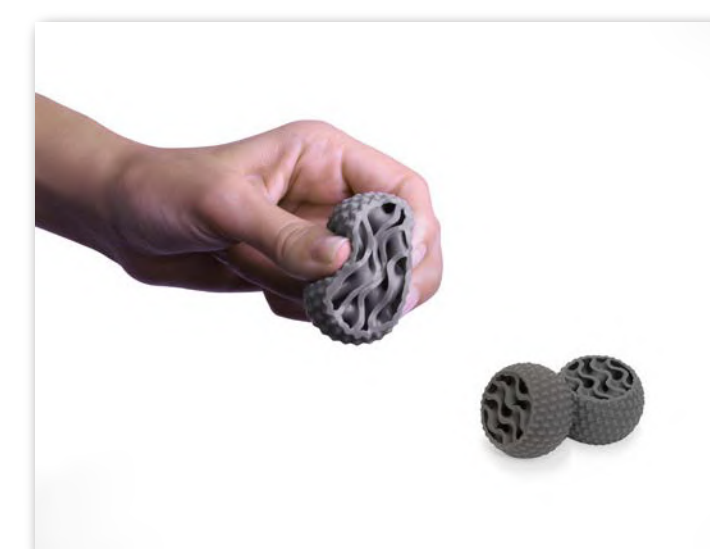
※1 P3™ Silicone 25A Gray is the product of Stratasys Ltd.

■ Molding Examples

Enables fabrication of structures that are difficult to produce with molding



Gasket



Gyroid sphere



A mold for coins with intricate patterns

■ Heat resistance of P3™ Silicone 25A Gray (initial / 150° C)

Conditions	Initial	150°C × 500 h	150°C × 1,000h
Parameter			
Hardness Durometer A	25	26	27
Tensile strength MPa	5.4	4.7	5.1
Elongation at break %	672	311	304
Tear strength kN/m	16	14	15

(Not specified values)



Thermal Interface Gap Filler

Product Usage

Thermal Interface Materials

SDP Series / Gel Grease

Contact → Sales and Marketing Department IV
Phone : +81-3-6812-2410

■ Features and Applicable Parts

- It has excellent misalignment resistance and will not occur misalignment even if applied thickly or placed vertically.

SDP Series :

Two-component Room Temperature Addition Cure Type

- Areas where stress relief is required using the cushioning properties of the material
- Areas with unevenness (excellent conformability)
- Parts that require reworkability

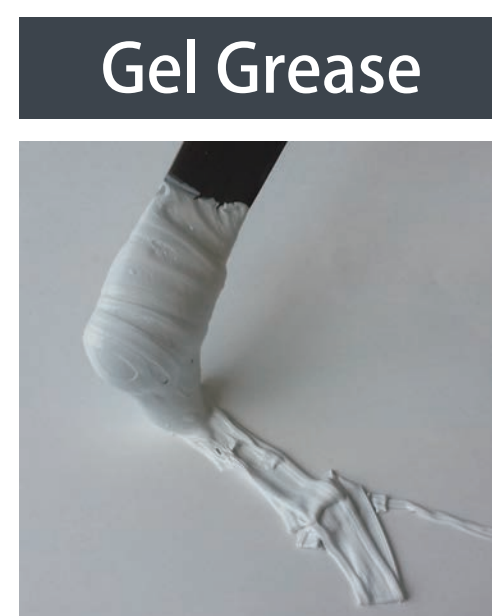
Gel Grease : One-component Non-curing Type

- It does not require curing and can be applied to surfaces of various shapes.

■ Consistency



Before curing : Grease-like and wet well to the substrate surface



Soft grease

■ General Properties

SDP Series : Two-component Room Temperature Addition Cure Type

Product name		SDP-5040-A/B	SDP-6560-A/B	SDP-8070-A/B	SDP-9550-A/B	SDP-X160-A/B	SDP-X-360-A/B
Parameter							
Thermal conductivity W/m · K		5.1	6.5	8.0	9.5	11.2	13.1
Before curing	Appearance	A : Grayish white B : Pink	A : Grayish white B : Pink	A : Grayish white B : Pink	A : Gray B : Pale white	A : Gray B : Pale pink	A : Gray B : Pale pink
	Mixed viscosity at 25℃ Pa · s	169	284	201	320	210	360
	Workable time at 25℃ h	4	4	4	4	4	4
	Specific gravity	A : 3.25 / B : 3.26	A / B : 3.20	A / B : 3.14	A / B : 3.05	A / B : 2.80	A / B : 2.84
	Standard curing conditions	25℃×24h					
After curing	Hardness Shore OO	42	61	69	54	64	61
	Dielectric breakdown strength kV/mm	21	20	16	14	15	15
	Flame resistance UL94	V-0	V-0	V-0 equivalent	V-0	V-0 equivalent	V-0 equivalent

(Not specified values)

Gel Grease : One-component Non-curing Type

Product name		CLG-3500	CLG-4500	CLG-10000	CLG-12000	G-800	X-23-8197
Parameter							
Thermal conductivity	W/m · K	3.5	4.8	10.4	12.1	4.0	6.0
Appearance		White	White	Grayish white	Grayish white	White	White
Specific gravity		3.1	3.2	3.4	3.3	4.4	3.3
Viscosity at 25°C	Pa · s	250	550	N/A	N/A	170	400
Dielectric breakdown strength	kV/mm	8.9	4.7	6.8	6.8	3.2	8.8

(Not specified values)

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Memo

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The Development and Manufacture of Shin-Etsu Silicones are based on the following registered international quality and environmental management standards.



Gunma Complex	ISO 9001	ISO 14001
	(JQA-0004	JQA-E-0002)
Naoetsu Plant	ISO 9001	ISO 14001
	(JQA-0018	JQA-E-0064)
Takefu Plant	ISO 9001	ISO 14001
	(JQA-0479	JQA-EM0298)