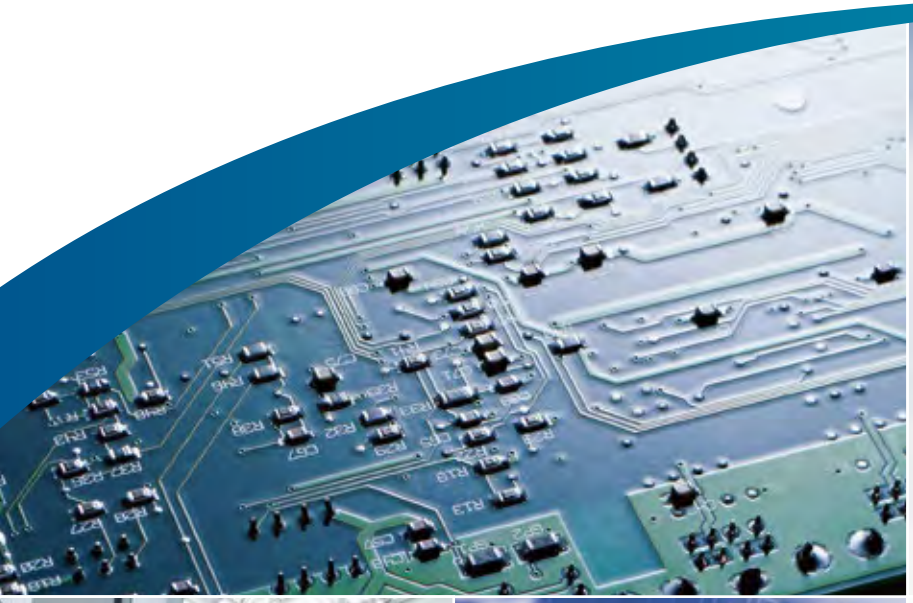
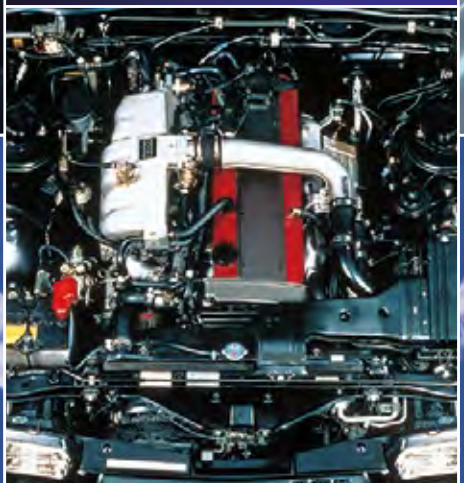
Silicone Pressure Sensitive Adhesives

Shin-Etsu Silicone





Silicone Pressure Sensitive Adhesives (PSA) have excellent properties in heat and cold resistance, electrical insulating properties and excellent reliability. Tapes using silicone PSA have good removability and have good adhesion to a wide variety of surfaces. So silicone PSA can be applied for various kinds of tapes and protective films.

Pressure Sensitive Adhesives

Application	Cure system	Product name	Viscosity 25°C Pa·s	Solid content %	Solvent	Catalyst	Amt. of catalyst to add weight %	Crosslinker	Amt. of crosslinker to add weight %	
Adhesive tape	Peroxide	**KR-100**	100	60	Toluene/xylene	BPO*, other	1 to 2	—	—	
		KR-101-10	100	60	Toluene/xylene	BPO*, other	1 to 2	—	—	
		KR-130	100	60	Toluene	BPO*, other	1 to 2	—	—	
	Addition	**KR-3700**	30	60	Toluene	CAT-PL-50T	0.5	—	—	
		KR-3701	30	60	Toluene	CAT-PL-50T	0.5	—	—	
		X-40-3237	150	60	Toluene	CAT-PL-50T	0.5	X-92-122C	0.3	
		X-40-3240	20	60	Toluene	CAT-PL-50T	1	X-92-122C	0.5	
		X-40-3291-1	120	60	Toluene	CAT-PL-50T	0.5	X-92-122C	0.5	
Protective film	Addition	**KR-3704**	100	60	Toluene	CAT-PL-50T	0.5	—	—	
		X-40-3323	3	30	Toluene	CAT-PL-50T	0.25	—	—	
		X-40-3270-1	100	60	Toluene	CAT-PL-50T	0.5	X-92-226	5.0	
		X-40-3306	15	30	Toluene	CAT-PL-50T	0.2	—	—	

*Benzoyl peroxide •Adhesion: Backing: Polyimide film, 25 μm thick / Substrate: stainless steel panel •Holding power: 25×25 mm, 1 kg, *1 200°C/1h, *2 250°C/1 h •Ball tack: Slope: 30°

Adhesion modifiers

Application	Product name	Viscosity 25°C mm^2/s	Solid content %	Solvent	
Additive	**X-92-128**	2	30	Toluene	
	X-41-3003	10	60	Toluene	

Primers

Cure system	Product name	Viscosity 25°C mm^2/s	Solid content %	Solvent	Catalyst	
Condensation	**KR-3006A**	150	10	Toluene	CAT-PS-8S	
Addition	**X-40-3501**	100	30	Petrolum naphtha	CAT-PL-50T	

Release agents

Cure system	Product name	Viscosity 25°C mm^2/s	Solid content %	Catalyst	
Addition	**X-70-201S**	4	15	CAT-PL-50T	
—	**FS Thinner**	—	—	—	

Adhesive

Cure system	Product name	Viscosity 25°C Pa·s	Solid content %	Solvent	Catalyst	
Condensation	**KR-105**	0.8	70	Toluene/xylene	CAT-PS-8S	

Special features

- **Outstanding heat & cold resistance**
- **Good removability and reworkability**
- **Outstanding water & chemical resistance**
- **Adherence to silicone rubber & fluoroelastomers**
- **Excellent wetting with various substrates**
- **Addition-cure silicone PSA cure at lower temperatures compared to peroxide-cure silicone PSA**

Application examples

- Heat-resistant adhesive tapes & labels
- Masking tapes (heat resistant, solder, plating, painting)
- Protective films
- Adhesive tapes for silicone, polyolefin & fluoroelastomer substrates
- Adhesive tapes for silicone rubber
- Splicing tapes for silicone release liner
- Electrical insulation tapes
- Tapes for fire-resistant electric wire coatings

	Adhesion (adhesive thickness) N/25 mm (μm)	Holding power mm	Ball tack No.	Features, Applications	Packaging
	7.6 (40)	0.5*1	38	High tack, strong adhesion	1 kg (can), 18 kg (can), 180 kg (drum)
	6.8 (40)	0.1*1	34	High holding power, high heat resistance	1 kg (can), 18 kg (can), 180 kg (drum)
	6.8 (40)	0.1*1	38	High tack, reduced low-molecular-weight siloxane	1 kg (can), 18 kg (can), 180 kg (drum)
	8.7 (30)	0.02*2	38	Strong adhesion, easy release from fluoro silicone release liner	1 kg (can), 18 kg (can), 180 kg (drum)
	7.5 (30)	0.05*1	42	High tack, suitable for splicing tape	1 kg (can), 18 kg (can), 180 kg (drum)
	4.5 (30)	0.02*1	30	Medium adhesion, good adhesion when heated	1 kg (can), 18 kg (can), 180 kg (drum)
	6.6 (30)	0.02*2	38	Medium adhesion, little or no residue left on substrate after heating	1 kg (can), 18 kg (can)
	4.7 (30)	0.1*1	28	Adhesive for use on silicone rubber. High adhesion to silicone rubber	1 kg (can), 18 kg (can), 180 kg (drum)
	0.08 (30)	0.01*1	2	Low adhesion, adhesion can be controlled when used together with KR-3700	1 kg (can), 18 kg (can), 180 kg (drum)
	0.08 (30)	0.01*1	2	Low content viscosity of KR-3704, easy to work with	1 kg (can), 17 kg (can), 170 kg (drum)
	0.15 (30)	0.01*2	4	Low adhesion, heat resistant, adhesion can be controlled when used together with KR-3700	1 kg (can), 18 kg (can), 180 kg (drum)
	0.02 (30)	0.01*2	—	Very adhesion, no primer necessary	1 kg (can), 18 kg (can), 170 kg (drum)

(Not specified values)

	Features, Applications	Packaging
	For improving adhesion	1 kg (can), 16 kg (can)
	For improving adhesion to silicone rubber	1 kg (can), 16 kg (can)

(Not specified values)

	Amt. of catalyst to add weight %	Anchorage additive	Amt. to add weight %	Features, Applications	Packaging
	0.5	KR-3006BT	1	For addition-cure PSA, for peroxide-cure PSA	1 kg (can), 15 kg (can)
	0.5	—	—	For addition-cure PSA, specially designed for inline coating	1 kg (can), 12 kg (can)

(Not specified values)

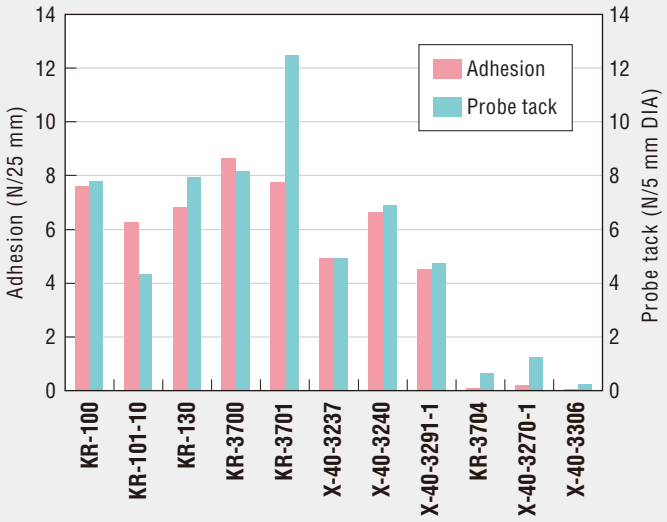
	Amt. of catalyst to add weight %	Features, Applications	Packaging
	0.5	Release agent for silicone PSA, easy-release type	1 kg (can), 20 kg (can)
	—	Diluent	1 kg (can), 20 kg (can), 250 kg (drum)

(Not specified values)

	Amt. of catalyst to add weight %	Features, Applications	Packaging
	3	Adhesive for silicone rubber	1 kg (can), 18 kg (can)

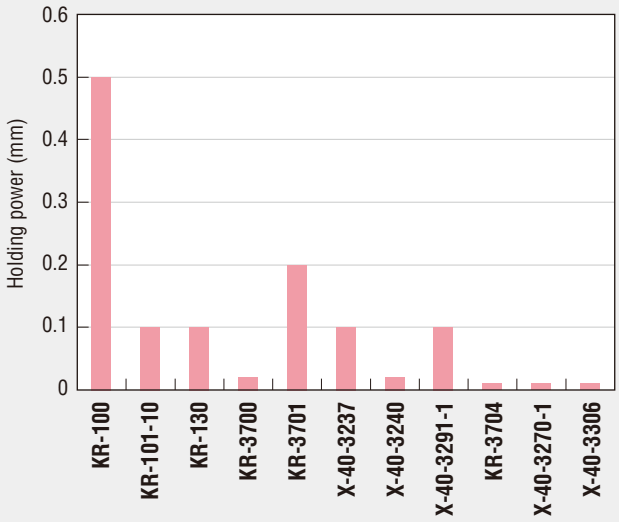
(Not specified values)

Adhesion and probe tack



Backing: polyimide film, 25 µm thick; PSA thickness: 30 µm, 40 µm (KR-100, KR-101-10, KR-130).
Substrate: stainless steel panel. Probe tack: contact pressure: 20 g/cm², probe speed: 1 cm/sec., contact time: 1 sec. Measured at room temperature (23–25°C).

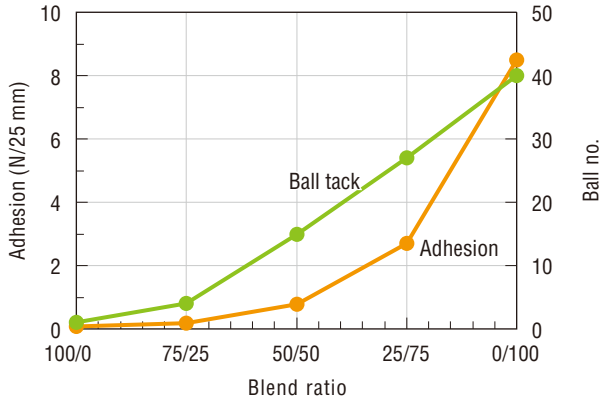
Holding power



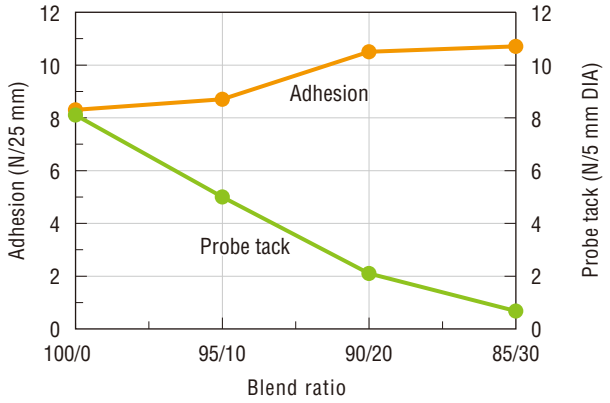
Backing: polyimide film, 25 µm thick; PSA thickness: 30 µm, 40 µm (KR-100, KR-101-10, KR-130).
Substrate: stainless steel panel. Laminated area: 25×25 mm, Load: 1 kg
Temp./Time: 250°C/1 h, 200°C/1 h (KR-100, KR-101-10, KR-130, KR-3701, X-40-3291-1).

Modifying adhesion & tack by blend ratio

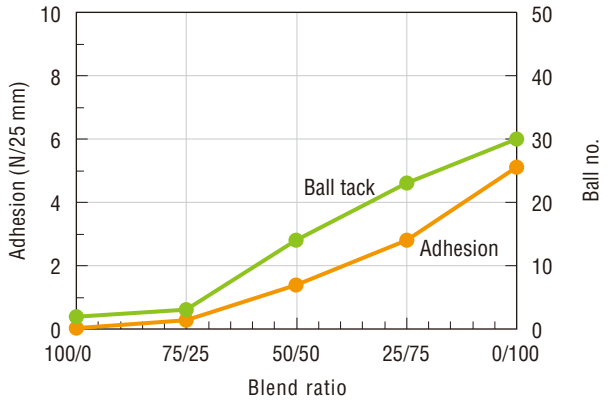
KR-3704/KR-3700



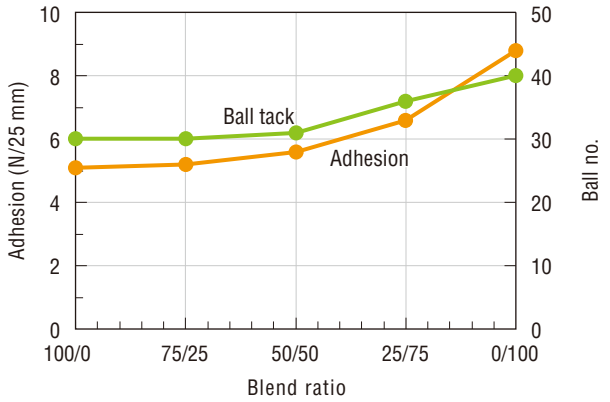
KR-3700/X-92-128



KR-3704/X-40-3237



X-40-3237/KR-3700



Backing: polyimide film, 25 µm thick; PSA thickness 30 µm.
Adhesion: Substrate: stainless steel panel. Ball tack: 30° slope. Probe tack: contact pressure: 20 g/cm², probe speed: 1 cm/sec., contact time: 1 sec.
Measured at room temperature (23–25°C).

Instructions for use

PSA

Peroxide-cure types (KR-100, KR-101-10, KR-130)

1. Dilute the PSA using toluene or other solvent, add organic peroxide (BPO, other), and mix thoroughly to a uniform consistency. After application to the backing, dry at 70–90°C to remove the solvent, then heat to 160–200°C for 2–5 min. to cure.

Addition-cure types (KR-3700, KR-3701, KR-3704, X-40-3306)

1. Dilute the PSA using toluene or other solvent, add platinum catalyst CAT-PL-50T, and mix thoroughly to a uniform consistency.
2. After application to the backing, heat to 100–130°C for 1–3 min. to cure.

Addition-cure types (X-40-3240, X-40-3291-1, X-40-3237, X-40-3270-1)

1. Dilute the PSA using toluene or other solvent, add crosslinking agent X-92-122C or X-92-226, and mix thoroughly to a uniform consistency.
2. Add platinum catalyst CAT-PL-50T, and mix thoroughly to a uniform consistency.
3. After application to the backing, heat to 100–130°C for 1–3 min. to cure.

Precautions

Never mix X-92-122C or X-92-226 together only with CAT-PL-50T. This will cause a reaction which releases hydrogen gas and generates heat, and there is a danger that the solvent could ignite.

Primers (use to improve anchorage to the backing)

KR-3006A

1. Using organic solvent (toluene, heptane, hexane, etc.), dilute to a concentration that allows for easy application.
2. Add 1 part KR-3006BT to 100 parts KR-3006A and mix thoroughly to a uniform consistency.
3. Add catalyst CAT-PL-8S (0.5 parts) and mix thoroughly to a uniform consistency.
4. Apply to the backing such that the amount will be roughly 0.1–1.0 g/m^2 (when dried), then heat to 80–100°C for 30 sec. to 1 min. to cure.
5. Apply PSA.

X-40-3501

1. Dilute X-40-3501 (100 parts) with organic solvent (Recommended: n-hexane/MEK = 5/5), add platinum catalyst CAT-PL-50T (0.5 parts), and mix thoroughly to a uniform consistency.
2. Apply to the backing such that the amount will be roughly 0.3–0.6 g/m2 (when dried), then heat to 100–120°C for 30 sec. to 1 min. to cure.
3. After treating backing with primer, apply PSA as quickly as possible. (If the backing film is simply rolled up, the primer may migrate to the other side. For this reason, inline application of PSA is recommended.)

Release Agents

X-70-201S

1. Dilute X-70-201S (100 parts) with a fluorine-containing solvent (Recommended: FS Thinner (produced by Shin-Etsu Chemical)), add platinum catalyst CAT-PL-50T (0.5 parts), and mix thoroughly to a uniform consistency.
2. Apply to the substrate such that the amount will be roughly 0.3–1.0 g/m^2 (when dried), then heat to 150°C for 1 min. to cure.

Adhesive for Silicone Rubber

KR-105

1. Wipe the intended surface well with acetone, methanol or other solvent to clean it.
2. Add catalyst CAT-PL-8S (3 parts) to KR-105 (100 parts) and mix thor-oughly to a uniform consistency. (Generally, after adding the catalyst, the adhesive will be usable up to 5–6 hours (2–3 hours in summer.)
3. Apply a roughly 0.1–0.3 mm layer of adhesive to both surfaces to be adhered, let dry for 20–60 min., then mate the surfaces.
4. After bonding and allowing to stand for 24 hours, a moderate level of adhesive strength is achieved. (Maximum adhesive strength is reached after about 1 week.)

■ Handling precautions

- Addition-cure products may not cure properly if they become contaminated by “catalyst poisons” such as tin compounds, amine compounds, phosphorus compounds or sulfur compounds, so take care to avoid contamination by these substances.
- Store container tightly closed in a cool dark place, avoiding high temperatures and direct sunlight.

■ Safety and hygiene

1. Many of these PSA and the crosslinking agents and catalysts used with them contain flammable organic solvents (toluene, xylene, petro-lum naphtha), and so must be kept away from sources of ignition. Also, under the UN classification system, products containing these organic solvents are classified as Flammable Liquids. Be sure to handle these products in accordance with applicable laws governing transport, storage, etc.
2. Inhalation of organic solvents can be toxic, so be sure to handle these products in areas provided with ventilation equipment (localized ventilation, general ventilation). If adequate ventilation cannot be provided, be sure to wear a respirator mask designed to filter organic gases.
3. Always wear protective gear (goggles, gloves) when using these products to prevent contact with skin and mucous membranes. In case of contact, wash immediately with soap and water or a neutral detergent, then rinse thoroughly with running water. In case of eye contact, flush immediately with clean water for at least 15 minutes and then seek medical attention.
4. Do not mix X-92-122C together only with CAT-PL-50T, as the resulting reaction will generate heat and ignite the solvent.
5. Keep out of reach of children.
6. Please read the Safety Data Sheets (SDS) for these prod-ucts before use. SDS can be obtained from our Sales Department.

UN Hazard Classification

UN classification	UN No.	Product name
Class 3 (Flammable Liquids)	UN1866	**KR-100, KR-101-10, KR-130, KR-3700 KR-3701, X-40-3237, X-40-3240 X-40-3291-1, KR-3704, X-40-3323 X-40-3270-1, X-40-3306, X-92-128 X-41-3003, KR-3006A, X-40-3501, KR-105**
	UN1294	**CAT-PL-50T**
	UN1993	**FS Thinner**
Class 6 (Toxic Materials and Infectious Substances)	UN2788	**CAT-PS-8S**
Not covered	—	**X-70-201S, X-92-122C**

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