

# Primers for Silicone Rubber (HCR, LIMS)



# The possibility of composite molding expands further by silicone rubber.

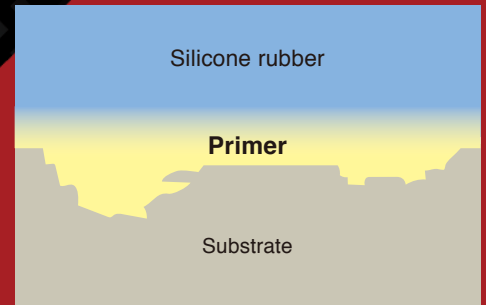
When composite product is made by using silicone rubber, choosing the optimal primer is essential for more efficient molding and higher quality products. Shin-Etsu Silicone offers a variety of primers for silicone rubber that meet the needs of all fields. You can choose the most suitable primer depending on the substrate and molding conditions.

## What is a primer?

A primer is an undercoat material in order to bond unvulcanized silicone rubber to substrates such as synthetic resins and metals. It serves the following roles by applying to the surface of the substrate.

- Improving adhesion between silicone rubber and substrate
- Stabilization of the substrate surface

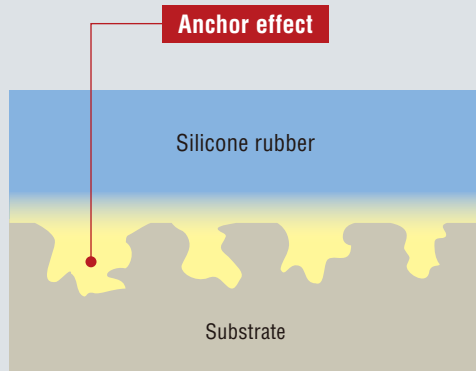
## Primer effect



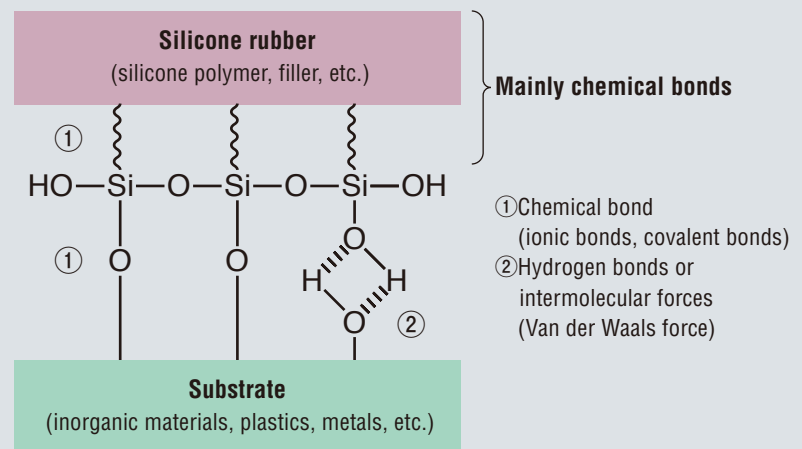
## Bonding image

The adhesive strength is improved by forming a uniform primer coating.

### [Physical bonding]



### [Chemical bonding]



## Recommended primers

Substrate \ Type of silicone rubber	Peroxide curing HCR	Addition curing HCR	Fluorosilicone rubber	LIMS
Synthetic resin (PA, PET, PBT, etc.)	PRIMER-NO.4 PRIMER-NO.33 PRIMER-NO.34T X-33-156-20	PRIMER-NO.4 PRIMER-NO.31-A/B X-33-156-20	PRIMER-Z	PRIMER-NO.30T-A/B PRIMER-NO.31-A/B PRIMER-NO.35-A/B X-33-156-20 X-33-173-A/B PRIMER-NO.36-A/B X-33-528
Metals, Glass (SUS, Fe, etc.)	PRIMER-NO.4 PRIMER-NO.33 PRIMER-NO.34T PRIMER-C-2	PRIMER-NO.4 PRIMER-NO.31-A/B	PRIMER-Z	PRIMER-NO.4 PRIMER-NO.31-A/B PRIMER-NO.32-A/B PRIMER-NO.35-A/B PRIMER-C-2

## Product List

Product name		PRIMER- NO.30T-A/B	PRIMER- NO.31-A/B	PRIMER- NO.32-A/B	PRIMER- NO.33	PRIMER- NO.34T	PRIMER- NO.35-A/B
Parameter							
Appearance		A:Colorless transparent B:Colorless transparent	A:Reddish brown B:Colorless transparent	A:Reddish brown B:Colorless transparent	Reddish brown	Milky white transluc	A:Reddish brown B:Colorless transparent
Adhesive component		Rubber-based	Rubber-based	Rubber-based	Rubber-based	Rubber-based	Rubber-based
Solvent		A: Toluene, n-Heptane, Ethyl acetate B: n-Heptane	A: Toluene, n-Heptane, Ethyl acetate B: n-Heptane, Ethyl acetate	A: Toluene, n-Heptane, Ethyl acetate B: n-Heptane, Ethyl acetate	Toluene, IPA	Toluene, IPA	A: Toluene, n-Heptane, Ethyl acetate B: n-Heptane, Ethyl acetate
Mixing ratio		100:100	100:100	100:100	One component	One component	100:100
Hardening standard	Drying	Room temp.*×10-30min + 150°C×10-30min	Room temp.*×10-30min + 150°C×10-30min	Room temp.*×10-30min + 150°C×10-30min	Room temp.*×10-30min + 150°C×10-30min	Room temp.*×10-30min + 150°C×10-30min	Room temp.*×10-30min + 150°C×10-30min
	Baking						
Recom- mended substrate	Resin	✓	✓		✓	✓	✓
	Metallic/Glass			✓	✓	✓	✓
Recommended rubber for adhesion	Peroxide cured HCR				✓	✓	
	Addition curing HCR		✓				
	Fluorosilicone rubber						
	LIMS	✓	✓	✓			✓

\* Temperature: 25°C Humidity: 45-65%

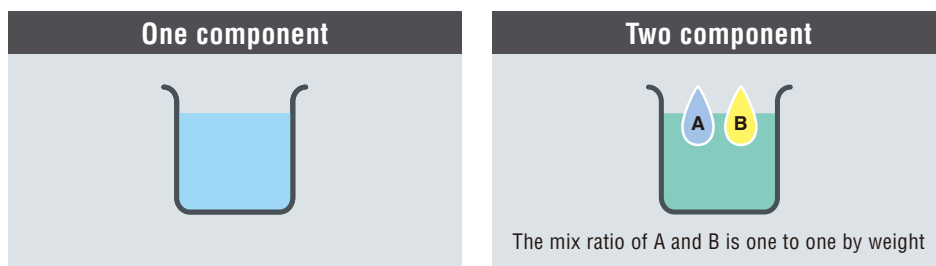
(Not specified values)

Product name		PRIMER- NO.4	PRIMER-C-2	PRIMER-Z	X-33-156-20	X-33-173-A/B	PRIMER- NO.36-A/B	X-33-528
Parameter								
Appearance		Colorless transparent	Colorless transparent	Milky white translucent	Transparent orange	A: Pale yellow transparent B: Colorless transparent	A: Pale yellow transparent B: Colorless transparent	Pale yellow transparent
Adhesive component		Silane-based	Silane-based	Silane-based	Silane-based	Silane-based	Silane-based	Silane-based
Solvent		n-Heptane	Toluene	Ethyl acetate	n-Heptane	n-Heptane	n-Heptane	n-Heptane
Mixing ratio		One component	One component	One component	One component	100:100	100:100	One component
Hardening standard	Drying	Room temp.* × 10-30 min	Room temp.* × 10-30 min	Room temp.* × 10-30 min	Room temp.* × 10-30 min	Room temp.* × 10-30 min	Room temp.* × 10-30 min	Room temp.* × 10-30 min
	Baking							
Recom- mended substrate	Resin	✓		✓	✓	✓	✓	✓
	Metallic/Glass	✓	✓	✓				
Recommended rubber for adhesion	Peroxide cured HCR	✓	✓		✓			
	Addition curing HCR	✓	✓		✓			
	Fluorosilicone rubber			✓				
	LIMS	✓	✓		✓	✓	✓	✓

\* Temperature: 25°C Humidity: 45-65%

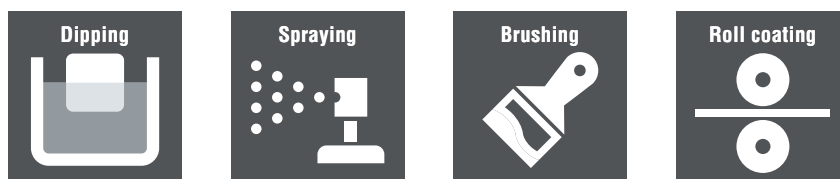
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## Prepare the primer.



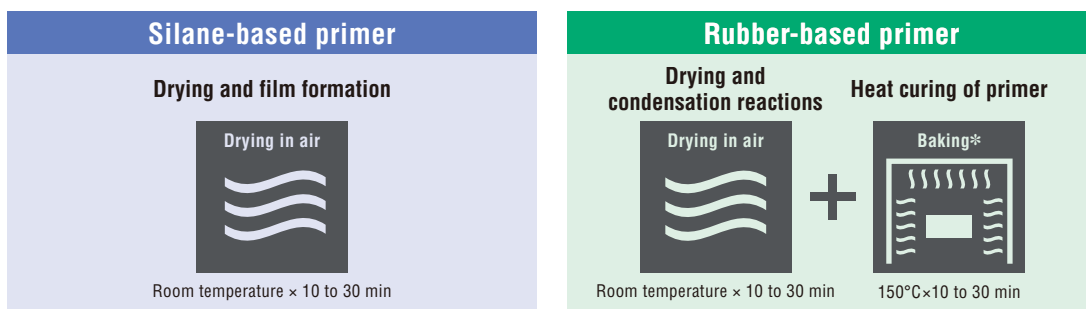
1

## Primer treatment



2

## Drying



\* Heat and cure under specified conditions in an oven, etc.

3

## Silicone rubber curing (adhesion)

### Usage example

#### Silane-based primer

##### How to use X-33-173-A/B

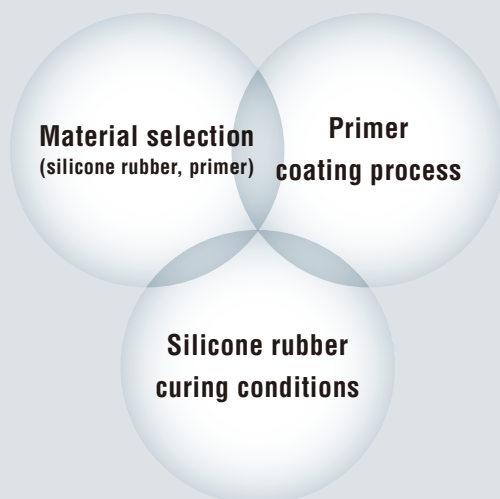
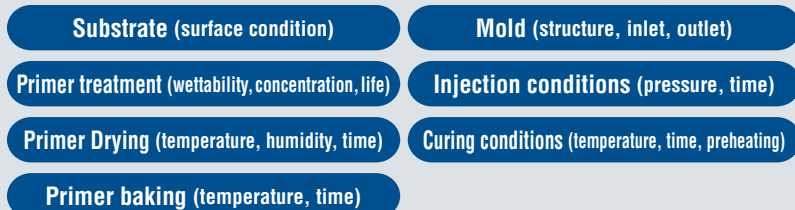
1. Weigh A and B equally and mix thoroughly. As a guideline, use within 8 hours after mixing.
  2. Apply to substrate by dipping, spraying, brushing, etc. For spraying, dilute with ethyl acetate, n-heptane.
  3. This product must be dried at room temperature for 30 minutes after application. Primers react with moisture in the air and require longer drying times at low humidity (30%RH or less). In some cases, after drying in air, baking at 80 to 120°C improves the adhesive strength.
- As a general rule, usage time after primer treatment should not exceed 12 hours. Performance may be degraded after 12 hours or more.
  - The appearance of A may change to pale yellow, orange and reddish brown with time even under sealed storage conditions, and white precipitate may be formed in some cases. Quality is not a problem. However, if the application process causes problems in use, it is recommended to use simple filtration with gauze, etc.
  - After use, seal the container and store in a cool, dark place.
  - Since n-heptane is used for both A and B, be careful of the use environment such as ventilation.

#### Rubber-based primer

##### How to use PRIMER-NO.32-A/B

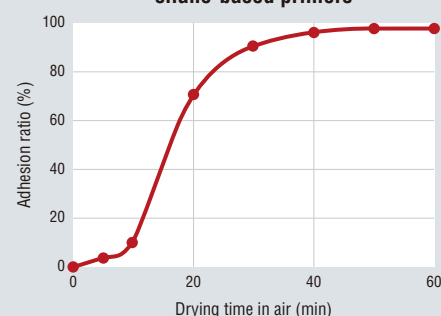
1. Weigh A and B equally and mix thoroughly. Shake A well before mixing. As a guideline, use within 12 hours after mixing.
  2. Apply to substrate by dipping, spraying, brushing, etc. For spraying, dilute with ethyl acetate, n-heptane.
  3. It's a baking type, so leave it at room temperature for about 30 minutes after applying, then bake it at 150°C for 20 minutes. Leaving at room temperature is a process of reacting with moisture in the air to form a film and volatilizing the solvent, and therefore, in a dry atmosphere (30%RH or less), the drying time should be extended as appropriate. The baking conditions may also vary depending on the type of silicone rubber, the molding method, and the curing conditions, so please check as necessary.
- As a general rule, usage time after primer treatment should not exceed 12 hours. Performance may be degraded after 12 hours or more.
  - After use, seal the container and store in a cool, dark place.
  - Since ethyl acetate, n-heptane and toluene are used as solvents for both A and B, be careful of the use environment such as ventilation.

## Factors affecting adhesion

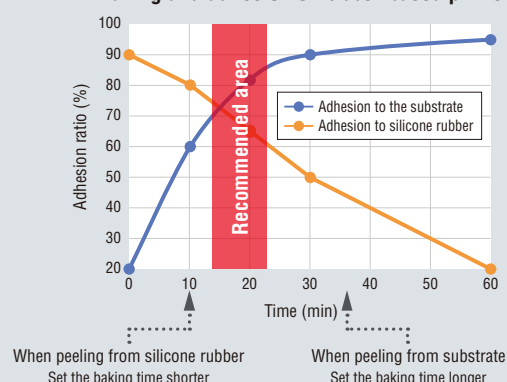


## Drying, baking and adhesion

### Drying and adhesion force of silane-based primers



### Baking and adhesion of rubber-based primers



## Handling precautions/packaging

### ■ Handling precautions

1. Allow to dry thoroughly after primer application. It may take some time in low humidity environments such as winter.
2. After use, seal the container and store it in a cool, dark place, avoiding exposure to humidity. Do not store the opened can for a long period, and use it up quickly.
3. Do not apply to the substrate in a high temperature condition. Be careful not to volatilize the active ingredient together with the solvent.
4. After drying the primer, do not leave it for a long time, and work within 24 hours should be used as a guideline.
5. Working in a flexible PVC like greenhouse may cause curing inhibition.
6. These products contain solvents, so be careful when handling it.

### ■ Safety and hygiene

1. These products cause serious eye irritation and may cause skin irritation. When handling the products, be sure to avoid contact with the skin and mucous membranes by wearing protective glasses and protective gloves. In case of skin contact, immediately wipe off with dry cloth and then flush thoroughly with running water. In case of accidental eye contact, flush immediately with plenty of clean water for at least 15 minutes and then seek medical attention. Contact lens wearers must take special care. If the products get into the eye, the contact lens may become stuck to the eye.
2. In a confined space with poor ventilation, please wear a protective mask. It is recommended to provide local ventilation. If vapors are inhaled and victims feel uncomfortable, move immediately to an area with fresh air.
3. Keep out of the reach of children.

4. Please read the Safety Data Sheet (SDS) before use. SDS can be obtained from our sales Department.

### ■ Packaging

Product name	Representative packaging	
	0.1 kg can	0.8 kg can
PRIMER-C-2	✓	
PRIMER-NO.30T-A/B	A:✓ B:✓	A:✓ B:✓
PRIMER-NO.31-A/B	A:✓ B:✓	A:✓ B:✓
PRIMER-NO.32-A/B	A:✓ B:✓	A:✓ B:✓
PRIMER-NO.33	✓	✓
PRIMER-NO.34T	✓	
PRIMER-NO.35-A/B	A:✓ B:✓	A:✓ B:✓
PRIMER-NO.4	✓	
PRIMER-Z	✓	
X-33-156-20	✓	✓
X-33-173-A/B	A:✓ B:✓	A:✓ B:✓
PRIMER-NO.36-A/B		A:✓ B:✓
X-33-528		✓

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