

# **LIMS** (Liquid Injection Molding System): **SELECTIVE SELF-ADHESIVE LIQUID SILICONE** allows integral plastic molding without primers

Shin-Etsu Selective Self-adhesive Liquid Silicone offers good adhesion to thermoplastics without the need to apply primers. This Silicone bonds well to a variety of plastics but does not adhere to the metal surfaces of molds.

The short cycle times required for molding this Silicone, coupled with the ease with which the molding processes may be automated, leads to improved quality and productivity.

## **Major advantages**

- Provides integral molding system through co-injection molding or insert molding
- Suitable for use with complicated thermoplastic parts
- Shortened process time through the elimination of primer application
- Provides a safer working environment by eliminating the use of solvent based primers

## **Major applications**

- Automotive parts
- Electrical and electronic components
- Films and other industrial uses

# Selective Self-adhesive Liquid Silicone allows the fabricator to while at the same time improving product quality.

The new Shin-Etsu Selective Self-adhesive Liquid Silicone bonds well to a variety of plastics, including the following:

- Polycarbonate (PC)
- Polybutylene-terephthalate (PBT)
- Polyphenylene oxide (PPO)
- Polyamide resins (Nylon 66, Nylon 6)
- Polyphthalamide (PPA)

The adhesion obtained with each of these resins has proven resistant to degradation under a wide range of temperatures and humidity.

## Results of adhesion testing on various resins

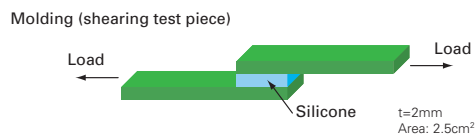
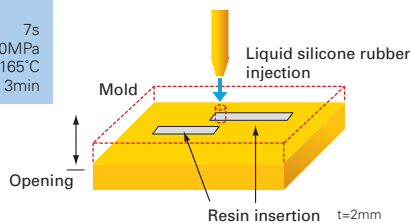
### Adhesion studies on a part using a previously molded insert:

Shin-Etsu Selective Self-adhesive Liquid Silicone adheres well to plastic inserts, yet shows very little adhesion to mold surfaces (chromed steel, etc.).

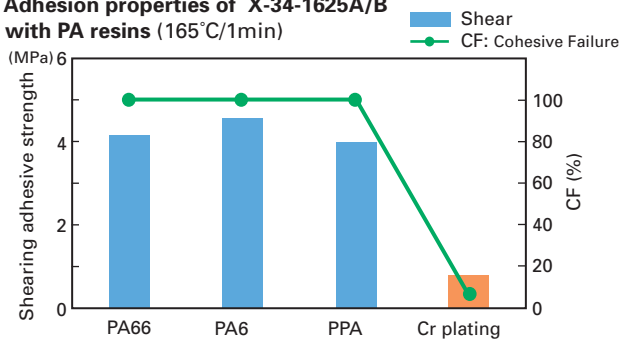
### Insert molding sketch

Molding conditions	
Injection time	7s
Injection pressure	20MPa
Molding temperature	120°C, 165°C
Curing time	1min, 3min

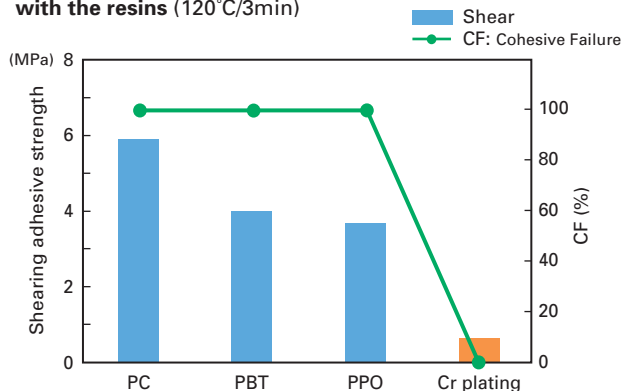
Mold: Chrome (Cr) plate  
Material: X-34-1625A/B  
KE-2090-50A/B  
(X-34-1547A/B)



### Adhesion properties of X-34-1625A/B with PA resins (165°C/1min)



### Adhesion properties of KE-2090-50A/B (X-34-1547A/B) with the resins (120°C/3min)

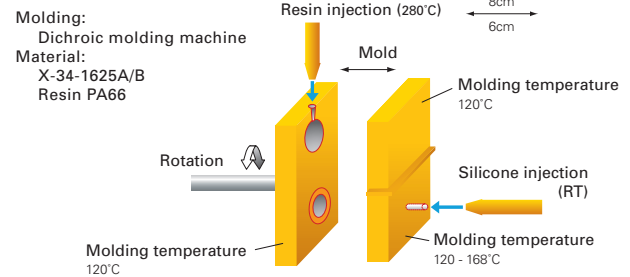


### Adhesion studies on a part made by co-injection molding:

A coaster was molded by using X-34-1625A/B and PA66 in a co-injection molding machine. Using a temperature of 160°C on the silicone side of the mold permitted molding times as short as 15 sec. Adhesion values were comparable to those obtained in the insert molding process. Other resins (PC, PBT) require lower molding temperatures (120°C).

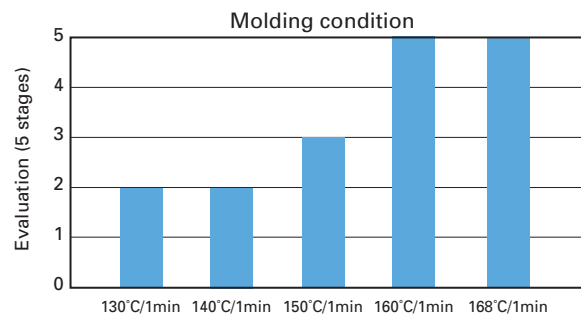
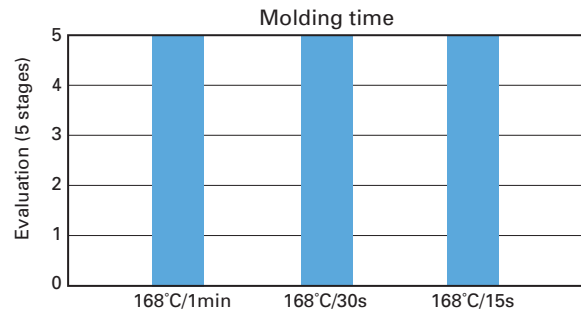
### Co-injection molding sketch

Molding conditions	
Molding temperature	120°C
Resin	120°C
Silicone	120 - 168°C
Curing time	15 - 60s



### Co-injection molding of X-34-1625A/B and PA66

Evaluation criteria: 5: Excellent(100% cohesive failure)  
4: Good(Partial cohesive failure) 3: Marginal 2: Poor 1: No adhesion



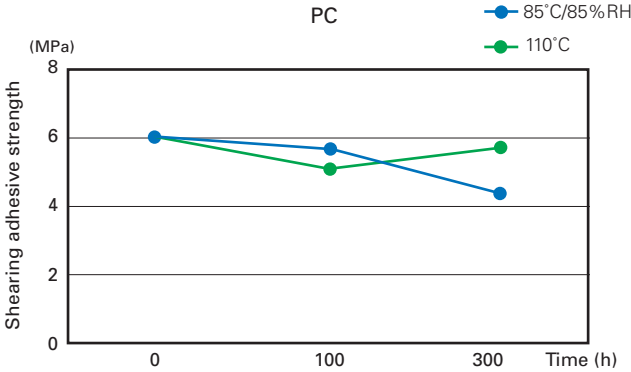
# shorten the time required for insert molding processes,

## High, durable adhesion

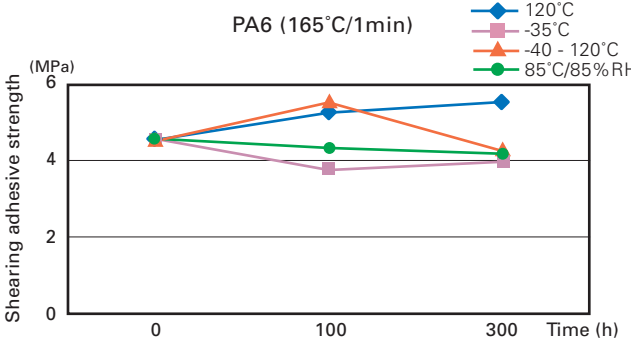
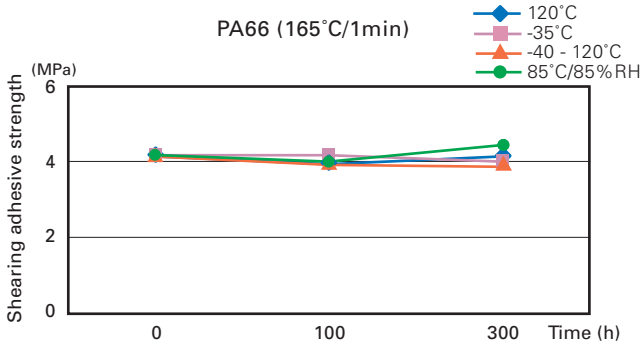
Selective Self-adhesive Liquid Silicone also exhibits resistance to temperature and humidity extremes. Bond strengths remained greater than 3 MPa in each of the following studies after 300 hours of aging:

- PC resin: Heat aging @ 110°C
  - Moisture resistance: 85°C/ 85% relative humidity
- PA resin: Heat aging @ 120°C
  - Moisture resistance: 85°C/ 85% relative humidity
  - Cold temperature aging: -35°C
  - Temperature cycling: -40°C to 120°C

### Adhesive endurance of KE-2090-50A/B (X-34-1547A/B) (120°C/1min)



### Adhesive endurance of X-34-1625A/B (- 300h)



### General properties

Items	Types		PC, PBT Resins				PA Resin
	Products		KE-2090-40A/B	KE-2090-50A/B	KE-2090-60A/B	KE-2030-70A/B	X-34-1625A/B
Viscosity	Pa-s	A	400	340	450	600	800
		B	700	800	700	600	850
Curing time*1	sec	T10	82	66	94	69	30
		T90	105	102	154	98	55
Specific gravity			1.11	1.12	1.12	1.13	1.09
Hardness	Durometer typeA*2		40	52	60	68	49
Elongation at break	%		630	420	240	230	450
Tensile strength	MPa		9.0	8.3	7.3	7.7	7.5

\*1 Rheometer condition: 120°C (X-34-1625A/B: 150°C) \*2 Cure condition: 120°C/10min

(Not specified values)

### Cautions in using Selective Self-adhesive Liquid Silicone

- Even among the same resin materials, some materials are not suited to addition reactions of silicone rubbers or cannot sufficiently exert adhesion depending on their method of polymerization, degree of refining and types of additive and resin. When designing, check the resin to be used in advance.
- In the situations where the resin surface is dirty, remove the dirt with a solvent or similar.
- As for polyamide resin, it is recommended to dry the resin before molding since it has high water absorption properties. Moreover, attention must be paid to the molding procedure and conditions in the situations where heat treatment and humidity conditioning are performed to acquire dimensional stability.
- The release properties may vary depending on the mold material and condition of the surface (plating), so be sure to test prior to use.

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