

# PDMS-based Hybrid Materials

## Thermosetting silicone resin material

The PDMS hybrid material, Yamamura's original material, is a thermosetting condensation polymerization type silicone resin with an inorganic Si-O bond as its main backbone and no C-C bond in its structure, resulting in a high heat resistance temperature and no yellowing or cloudiness when exposed to UV light or heat. Therefore, there is no decrease in transmittance or change in characteristics. Furthermore, by using special raw materials, the volatilization of low-molecular-weight siloxane, which has been a problem with conventional silicone-based materials, is reduced to a very small amount. We can also design custom compositions to meet your desired properties.



### ● Features

#### High UV Transmittance

Compared to conventional silicone-based resins, it achieves high transmittance in the UV region. It also has excellent UV resistance and is resistant to changes such as yellowing.

#### Excellent heat resistance

Heat resistance temperature: Max 250°C (cleared 1000h)  
Also clears general cycle tests (-55 ⇄ +125°C) for electronic components.

#### Flexibility High flex resistance

Since it remains flexible even after curing, it can be used to bond materials with differing coefficients of thermal expansion. It can also be used as an elastic material due to its excellent bending resistance.

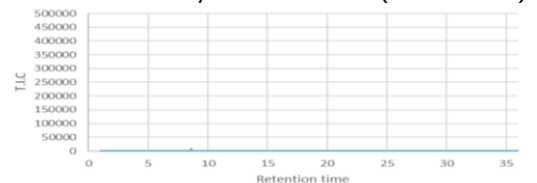
#### Adhesion

Hybrid materials bond to functional groups present on the surface of the adherend during curing, making it possible to bond to a wide variety of materials. In addition, since the bonded surface interface is protected, corrosion due to moisture is less likely to occur.

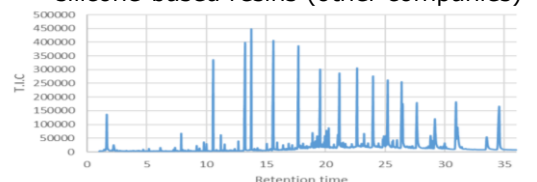
#### ◆ Generation of low molecular weight siloxane

In general silicone resin materials, volatilization of low-molecular-weight siloxane is an issue. Yamamura has reduced the generation of low-molecular-weight siloxane in hybrid materials to an extremely low level (less than 10 ppm) by refining at the raw material level.

PDMS-based hybrid materials (Yamamura)



silicone-based resins (other companies)



#### Contact Information

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## Thermosetting silicone resin material

Yamamura Photonics has prepared representative part numbers with different characteristics. Please consider the product number that best suits your application.

### 《High Transmittance Type (visible light to UV-A)》

#### ■ HE59N

HE59N is a high transmittance resin material developed for UV-LEDs in the UV-A to 400 nm range. In addition to its high light resistance, HE59N has a high adhesive strength unique to hybrid materials, and it adheres firmly to packages, etc., thus providing corrosion protection.

		HE59N		
Viscosity (Tuning fork type )	Pa·s	7.2		
Mixing ratio (Main : Cure agent)	Wt%	100:5		
Curing conditions	-	80°C×30min → 200°C3h		
Characteristics of cured product	Elastic modulus	Mpa	0.8	
	Elongations	%	350	
	Transmittance (on silica glass)	@300nm	89.2%	
		@400nm	92.0%	
	Hardness	shoreE	52	

### 《High Transmittance Type (UV-B to UV-C)》

#### ■ HE81F, HE84F, HE86F

HE81F, HE84F, and HE86F are resin materials developed to achieve high transmittance in the deep UV region and improved UV resistance. It can be used as an adhesive for lens materials and UV packages.

		HE81F		HE84F		HE86F		
Viscosity (Tuning fork type )	Pa·s	21		13.3		17.4		
Mixing ratio (Main : Cure agent)	Wt%	100:5		100:10		100:10		
Curing conditions	-	80°C×30min → 200°C3h		100°C×15min⇒250°C×3h				
Characteristics of cured product	Elastic modulus	Mpa	0.8	1.3		1.5		
	Elongations	%	350	140		120		
	Transmittance	@265nm	92.0%		91.1%		90.2%	
		@280nm	92.5%		92.0%		91.2%	
	Hardness	shoreE	52		59		65	

### 《High Heat Resistance Type》

#### ■ HP36UPN-1

HP36UPN-1 is a high heat-resistant resin material developed as a base material for functional sheets; it has heat resistance of 200-250°C and can be used as a base resin for heat-dissipating sheets, etc. by adding ceramic filler.

		HP36UPN-1	
Viscosity (Tuning fork type )	Pa·s	7.1	
Curing conditions	-	80°C×30min → 200°C3h	
Characteristics of cured product	Hardness	shoreE	32
	Volume resistance (60 sec)	×10 <sup>16</sup> Ω/cm	500v: 2.32 1000v: 4.44
		Dielectric constant	100Hz
	1kHz		3.65
	Dielectric strength	kV/mm	DC: ≥70kV AC: ≥5kV

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