

Silicone impression materials for high-precision moldmaking

SIM Series

Shin-Etsu's SIM Series products are silicone (PDMS) impression materials developed for accurate molding of highly detailed 3D structures with submicron features. These products vary in hardness and curing speed, so users can select the right material for their application. After curing, these materials have excellent rubber characteristics and can also be used as high transparency, high strength molded rubber parts. Additionally, with their characteristic of transmittance over a wide spectrum from visible light to near ultraviolet, these materials are also ideal for applications where good optical characteristics are required.

1 Features

■ High transfer performance

Addition-cure technology produces no byproducts. This enables precise molding with little shrinkage. What is more, the cured material's heat resistance means it can be used for moldmaking in high temperature conditions.

■ Easy to use

After mixing the main component and curing agent, just pour onto the master to create the impression material.

■ Good flowability

Good flowability after mixing. The material penetrates to finely detailed areas of the master for more accurate molding.

■ Low contamination

Low levels of residual low-molecular-weight siloxane mean much less risk of secondary contamination by the impression material.

■ Low water absorption

The polymer itself does not hydrolyze, so the impression material can be stored for prolonged periods.

■ Heat- and chemical-resistant

Good heat resistance and chemical resistance.

■ High transparency

High transmittance of wavelengths to near-UV.

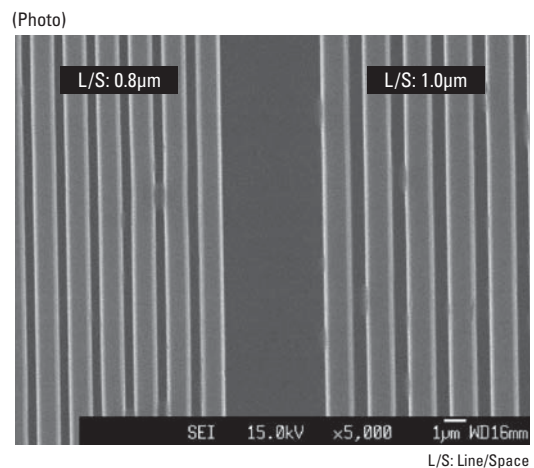
■ Gas permeable

Good permeability of oxygen and other gases.

3 Applications

Use as material for nanoimprint lithography and printing blankets, and molding material when the application demands good optical properties.

4 SEM imagery showing transfer from master



2 Typical properties

Item	Type	Standard cure type		Rapid cure type
		Standard hardness	Low hardness	
Main component name		SIM-260	SIM-240	SIM-360
Main component appearance		Colorless, transparent	Colorless, transparent	Colorless, transparent
Main component viscosity 23°C	mPa·s	7,000	7,000	7,000
Curing agent name		CAT-260	CAT-240	CAT-360
Main component/curing agent Specific gravity		10/1	10/1	10/1
Working time 23°C	min	>24h	>24h	100
Standard curing conditions		150°C×30min		
Hardness Durometer A		60	40	58
Elongation at break	%	100	160	100
Tensile strength	MPa	7.8	6.3	7.8
Density 23°C	g/cm ³	1.02	1.02	1.02
Low-molecular-weight siloxane content ΣD ₃ -D ₂₀	ppm	<200	<200	<200

(Not specified values)

5 Usage precautions

Because these products are addition-cure silicones, it is important to do a “curing check” prior to actual use.

- 1) Check: Apply a small amount of the mixed liquid to the master and frame material, to make sure the product will cure under standard curing conditions.
- 2) Corrective step: If the cure is faulty, try applying Shin-Etsu Barrier Coat No. 6 to the molding surfaces. If this treatment does not solve the problem, you may want to consider using different mold materials.
- 3) Cure-inhibiting substances and specific examples: substances which contain sulfur, phosphorus, nitrogen compounds, water, and organometallic salts
 - Organic rubbers (natural rubber, chloroprene rubber, nitrile rubber, EPDM, etc.)
 - Soft PVC, amine-curing epoxy resins, isocyanate-terminated urethane resins, rubber clay, oil clay
 - Condensation-cure silicone RTV rubbers, adhesive tape adhesives, polyester paints, waxes
 - Solder flux, pine resin

6 Storage and handling precautions

- 1) Store in a cool, dark place. Use product soon after first opening.
- 2) Avoid skin contact with the main component and curing agent. In case of skin contact, wipe off excess with a cloth (etc.) and wash exposed area with soap and water.
- 3) Barrier Coat products contain solvents and should be kept away from flame and other ignition sources. When using these products, provide adequate ventilation and take care not to inhale fumes.
- 4) Please read the Material Safety Data Sheet (MSDS) before use. MSDS can be obtained from our Sales Department.

7 Packaging

Main component: 1kg (poly containers), 100g (glass jars)

Curing agent: 100g (glass jars), 10g (glass jars)

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