Simriz for Semiconductor Applications

Simrit offers a complete line of Simriz compounds to service most semiconductor sealing requirements. Simrit is known and respected throughout the semiconductor industry for supplying quality seals of high purity and precision for both wet- and dry-process applications.

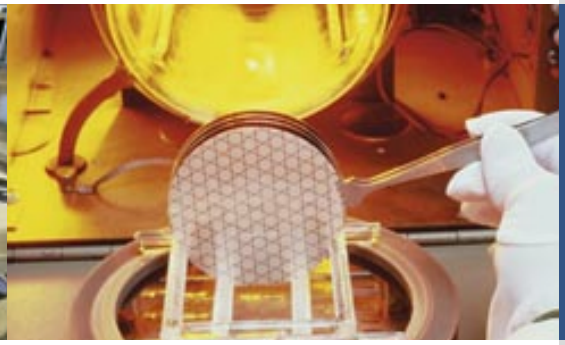
Recommendations for Semiconductor Sealing with Simriz Compounds

Process Environment	Simriz Compound					
	486	487	488	489	495	499
Plasma Etching/Ashing	■	—	■	—	—	—
Plasma Gas Deposition HDPCVD/PECVD	■	—	■	■	—	■
High Temperature (to +300°C)	—	■	■	—	—	—
Wet Etching	—	■	—	■	■	■

■ **Recommended compound** ■ **Alternate**

Physical Properties of Simriz Compounds for Semiconductor Sealing

Material Property	Simriz Compound					
	486	487	488	489	495	499
Color	white	black	white	clear	black	clear
Hardness, Shore A	75	75	70	69	80	75
Temperature Range	–7 to +230°C +20 to 446°F	–6 to +300°C +21 to 570°F	–6 to +300°C +21 to 570°F	–6 to +280°C +21 to 540°F	–7 to +230°C +20 to 446°F	–6 to +280°C +21 to 540°F
Tensile Strength (psi)	2620	2720	2920	1960	2600	2650
Elongation, %	190	170	190	235	160	200
Compression Set, %	25% 70 hrs. at 200°C	26% 70 hrs. at 275°C	28% 70 hrs. at 275°C	20% 70 hrs. at 250°C	23% 70 hrs. at 200°C	13% 70 hrs. at 200°C



Simriz Compound Descriptions for Semiconductor Applications

Simriz 486 (white)—specifically developed to be a cost-effective, high-performance compound for semiconductor applications. Simriz 486 exhibits excellent plasma resistance and low particulation in a wide range of plasma environments.

Recommended applications: CVD, APCVD, HPCVD, PCVDE, RPCVD, SACVD, plasma etching (oxide and metal), ashing, metalization (PVD, evaporation, sputtering), and ion implant.

Simrit 487 (black)—compounded expressly for high-temperature applications and provides excellent chemical resistance and low extractables in a variety of wet and dry environments.

Recommended applications: wet etching, stripping, copper plating, wafer cleaning, and rinsing.

Simriz 488 (white)—specifically developed for high-temperature applications, Simriz 488 demonstrates superior plasma resistance and minimum particulation in an extensive field of plasma environments.

Recommended applications: LPCVD, CVD, APCVD, HDPCVD, RPCVD, SACVD, plasma etching (oxide and metal), ashing, metalization (PVD, evaporation, sputtering), ion implant, RTP, oxidation, diffusion, and lamp anneal.

Simriz 489 (clear)—compounded particularly for high-temperature plasma applications and demonstrates excellent chemical compatibility in wet environments.

Simriz 489 offers good plasma resistance and the lowest particulation and extractables in contact with a wide assortment of plasmas, acids, and solvents.

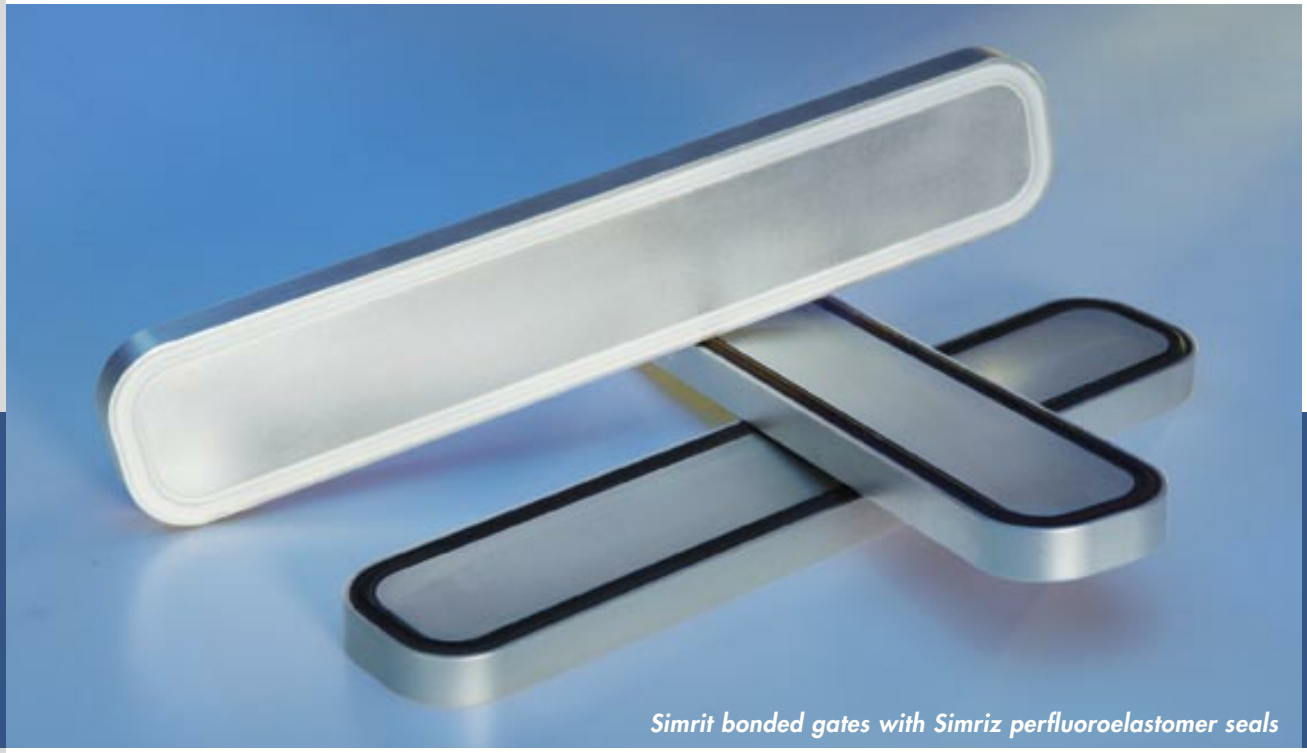
Recommended applications: LPCVD, CVD, APCVD, HDPCVD, RPCVD, SACVD, plasma etching (oxide and metal), ashing, metalization (PVD, evaporation, sputtering), ion implant, RTP, oxidation, diffusion, and lamp anneal.

Simriz 495 (black)—a cost-effective, high-performance compound for applications in wet chemistries. Simriz 495 provides reliable acid resistance and low extractables.

Recommended applications: wet etching, stripping, copper plating, wafer cleaning, and rinsing.

Simriz 499 (clear)—specifically developed to combine plasma resistance, broad chemical resistance, and ultra-low trace metals with reduced adhesion to aluminum and other metal surfaces for use in valves and doors.

Recommended applications: Decomposition, LPCVD, CVD, APCVD, HDPCVD, PECVD, RPCVD, SACVD, plasma etching (oxide and metal), ashing, metalization (PVD, evaporation, sputtering), ion implant, RTP, oxidation, and lamp anneal.



Simrit bonded gates with Simriz perfluoroelastomer seals

Semiconductor Parts Numbering System

AS568 Sizes

AS568 Part Numbers: **AS568-214CD486**

- SAE Standard
- AS568 Dash Size
- Cleaning and Packaging Designator (see table)
- Compound Number

ISO 3601 Metric Sizes

ISO 3601 Part Numbers: **MA0095CD486**

- Metric Standard
- Cross-Section Code (see table below)
- O-ring ID, millimeter tenths (i.e., 009.5 mm)
- Cleaning and Packaging Designator (see table)
- Compound Number

JIS B 2401 Sizes

JIS B 2401 Part Numbers: **JIS G-235CD486**

- Japanese Industrial Standard
- JIS Dash Size
- Cleaning and Packaging Designator (see table)
- Compound Number

Non-Standard Sizes

Simrit Part Numbers: **PF02375-157CD486**

- Non-Standard
- O-ring ID in thousandths (i.e., = 2.375" ID)
- O-ring cross-section in thousandths (i.e., = 0.157" cross-section)
- Cleaning and Packaging Designator (see table)
- Compound Number

Cleaning and Packaging Designators: **CD**

First letter indicates cleaning
- C = Clean in clean room with IPA + Heptane
- W = Clean in clean room with HCL + DIW and IPA + Heptane
- N = No special cleaning needed

Second letter indicates packaging
- D = Double bag, inner bag to be clean room quality
- S = Single blue Simrit bag
- B = Bulk packaging per special customer instructions

Metric Cross-Section Code (ISO metric sizes only)					
Size CS	A	B	C	D	E
Millimeters	1.80	2.65	3.55	5.30	7.00
Inches	0.071	0.104	0.140	0.209	0.276

The Simrit advantage starts with our super-premium base polymers and our ability to maintain exceptional cleanliness throughout the manufacturing process. Our materials start out clean and stay that way. The purity of our seals is paramount, as evidenced by our dedicated Class 1000 clean room manufacturing and Class 10 cleaning and packaging facilities.

Simrit Semiconductor Sealing Applications

Sealing solutions for all areas of semiconductor fabrication, in both wet and dry applications:

PROCESS	REQUIREMENTS	RECOMMENDED SEAL MATERIALS
Crystal Growth and Wafer Preparation	High temperature resistance and low outgassing	High-Temperature Silicone, Fluoroelastomer, Simriz® Perfluoroelastomer
LPCVD/Oxidation: Nitride, Oxide, and Polysilicon	High temperature resistance	Simriz Perfluoroelastomer
Epitaxial Silicon	High temperature, purity	High-Temperature Silicone, Fluoroelastomer, Simriz perfluoroelastomer
CVD: Oxide, Nitride, Tungsten, Titanium Nitride, Aluminum, and Copper	Plasma resistance, purity and low outgassing	Fluoroelastomer, Specialty Viton®, Superior™, Simriz Perfluoroelastomer
PVD	Low outgassing and good physical properties	Fluoroelastomer, Specialty Viton, Superior,
Lithography	Solvent resistance	Fluoroelastomer, Specialty Viton, Superior, Ethylene Propylene (EPDM), Simriz Perfluoroelastomer
Wet Etching: Metal, Oxide, Polysilicon, and Silicone Nitrides	Acid resistance and low extractables	Fluoroelastomer, Specialty Viton, Superior, Simriz Perfluoroelastomer
Dry Plasma Etching: Metal, Oxide, Polysilicon, and Silicon Nitrides	Plasma resistance, low contaminant	Fluoroelastomer, Specialty Viton, Superior, Simriz Perfluoroelastomer
Resist Stripping	Good chemical compatibility	Fluoroelastomer, AFLAS®, Specialty Viton, Superior, Ethylene Propylene (EPDM), Simriz Perfluoroelastomer
Photoresist Removal-Ashing	Plasma resistance	Fluoroelastomer, Specialty Viton, Superior, Silicone, Fluorosilicone, Simriz Perfluoroelastomer
Cleaning/Rinsing/Drying	Chemical resistance and low extractables	Fluoroelastomer, Specialty Viton, Superior, Ethylene Propylene (EPDM), Simriz Perfluoroelastomer
Diffusion, Annealing, Rapid Thermal Processing (RTP)	High temperature resistance	High-Temperature Silicone, Fluoroelastomer, Simriz Perfluoroelastomer

Viton is a registered trademark of DuPont. AFLAS is a registered trademark of Asahi Glass Company

Simrit Services

Our valued clients receive the kinds of benefits that only a global technology company can provide. In fact, our network of distributors is selected specifically for their knowledge of both sealing and the semiconductor industry. We base our designs on an understanding of the industry's requirements, enabling us to not only provide the best solutions, but also to avoid costly mistakes.

Example of an FEA stress analysis diagram.

For example, FEA allows us to design parts with computer modeling to simulate stress levels under actual conditions. This highly effective tool can optimize seal performance, and in the rare event that a part has actually failed in an application, we use advanced analysis techniques to determine how and why it failed and design a solution accordingly. We can do this with a competitor's product as well as our own.

Simrit parts are readily available from our global stocking locations, and all Simrit products and services are accessible online through our comprehensive website at **www.simrit.com**, which provides ordering, support and on-site seal training, downloadable catalogs with size listings and material compatibility, industry overviews, and much more.

Simrit Semiconductor Seals

Simrit is proud to provide the very best quality, most reliable sealing products available. Our real-time inventory and short manufacturing lead times ensure the fastest possible delivery. To learn more about Simrit's sealing solutions for the semiconductor industry, please call us at **1-866-2SIMRIT** or visit **www.simrit.com**.

O-Rings

Developed from **Simriz**® perfluoroelastomer materials, Simrit O-rings provide Six Sigma level sealing solutions with many sizes readily available from stock. **Simriz** O-rings are offered in nine different **Simriz** compounds, each delivering additional properties to meet specific application requirements.

Look to **Superior**™ materials, always available via clean-room manufacturing and packaging, to bridge the gap between fluoroelastomers and perfluoroelastomers.

Material Compounds and Recommendations

There are a number of specially formulated **Simriz** perfluoroelastomer compounds designed for specific applications.

PROCESS ENVIRONMENT	SIMRIZ 486	SIMRIZ 487	SIMRIZ 488	SIMRIZ 489	SIMRIZ 495
Plasma Etching/Ashing	Recommended	–	Recommended	–	–
Plasma Gas Deposition HDPCVD/PECVD	Recommended	–	Recommended	Alternate	–
High Temperature (up to 300°C)	–	Recommended	Recommended	–	–
Wet Etching	–	Recommended	–	Alternate	Recommended