

DOWSIL™ Advanced Silicone-Organic Hybrid Materials (developmental)

Combined benefits for improved performance

DOWSIL™ Advanced Silicone-Organic Hybrid Materials (developmental) offer a way to overcome the mechanical strength limitations of silicones, as well as to deliver better durability and environmental stability compared to organics – all while delivering high adhesion force on various substrates. These features make the products well-suited for consumer electronics assembly, coating, sealing and bonding applications.

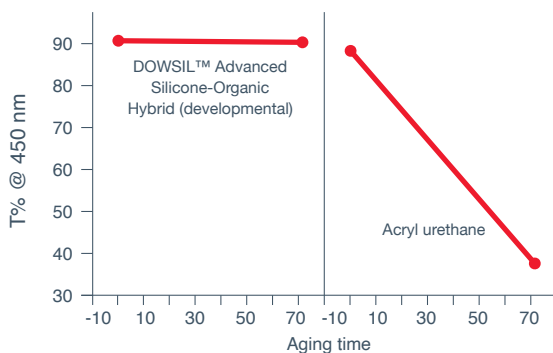
Key features & benefits

- Mechanical strength and toughness
- Optically clear
- Easy processability via UV-curable, heat-curable and UV/heat dual-curable formulations
- Great durability, reliability

Optically clear – non-yellowing

DOWSIL™ Advanced Silicone-Organic Hybrid Materials (developmental) are ultraclear and transparent for optical applications. They can be applied to glass with good adhesion and great optical performance.

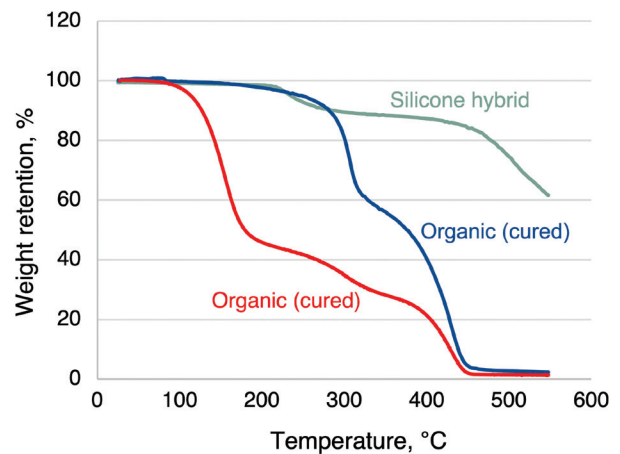
Yellowing after QUV aging



Reliability

DOWSIL™ Advanced Silicone-Organic Hybrid Materials (developmental) offer stable performance during environmental aging conditions. They are durable in UV exposure, high temperature and high humidity.

Weight loss at high temperature



Comparison of silicones, silicone hybrids and organics

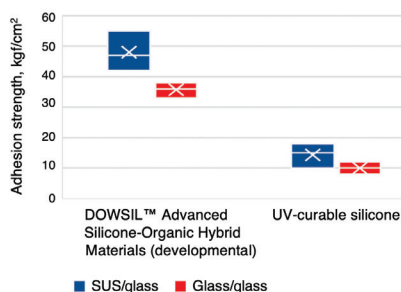
UV-curable DOWSIL™ Advanced Silicone-Organic Hybrid Materials (developmental) have higher adhesion strength than traditional silicone materials while also offering less water absorption and shrinkage than organics – which leads to greater durability and stability in processing conditions and electronic devices.

	Silicone	Silicone hybrid	Organic
Modulus	✗	○	✓
Adhesion strength	✗	○	✓
Shrinkage	✓	✓	✗
Coefficient of thermal expansion (CTE)	✗	○	✓
Water absorption	✓	✓	✗
Reliability	✓	○	✗

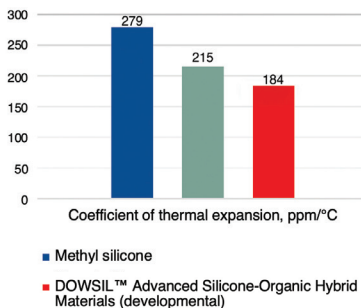
✓ Excellent ○ Good ✗ Poor

Comparison of silicones, silicone hybrids and organics (continued)

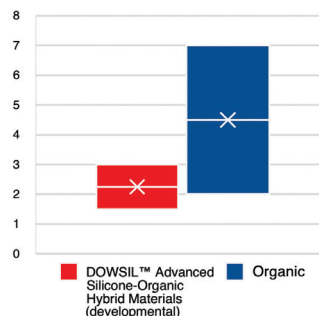
Lap shear strength



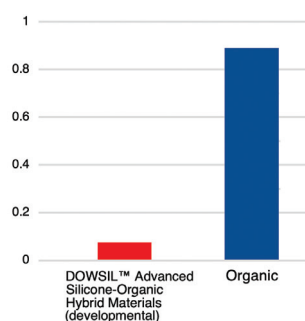
Coefficient of thermal expansion of silicone & epoxy



Shrinkage rate during cure, %



Water absorption rate, %



Tunability of silicone-hybrid materials

DOWSIL™ Advanced Silicone-Organic Hybrid Materials (developmental) can be adjusted to fit application needs. Viscosity, modulus, cure condition and color are all tunable attributes.

Property	Standard version	Dual-cure version	Low-modulus version	Low-viscosity version	Black version
Viscosity @ 5 rpm	0.1-50 Pa·s	3 Pa·s	3 Pa·s	0.1 Pa·s	3 Pa·s
Tensile strength	700-1600 psi	900 psi	700 psi	900 psi	900 psi
Hardness (Shore D)	40-85	75	45	75	75
Modulus @ 25°C	70-700 MPa	350 MPa	200 MPa	400 MPa	350 MPa
Coefficient of thermal expansion	130-180 ppm/°C	180 ppm/°C	190 ppm/°C	TBD	180 ppm/°C
Shrinkage rate during cure	2.3%	2.3%	2.1%	TBD	2.3%
Water absorption rate	0.09	0.10	0.09	TBD	0.10
Transmittance @ 550 nm (1 mm)	>90%	>90%	>90%	>90%	OD <4%
Adhesion strength	23-45 kgf/cm²	45 kgf/cm²	35 kgf/cm²	40 kgf/cm²	40 kgf/cm²
Thermal cycle ⁽¹⁾	PASS	PASS	PASS	PASS	PASS
Refractive index	1.50-1.53	1.50	1.52	1.50	TBD
Cure condition	Metal halide H bulb (preferred) LED @ 365 nm	UV/heat/dual	UV/heat/dual	UV/heat/dual	UV/heat/dual (heat preferred)
Shelf life	Room temp. for 6 months <0°C for 6 months	Room temp. for 6 months	<0°C for 6 months	<0°C for 6 months	<0°C for 6 months

Specification writers: These values are not intended for use in preparing specifications. Please contact your local Dow sales office before writing specifications on these products.

⁽¹⁾Conditions: -40-85°C; cycle time 1 hr; 240 cycles.

Available cure options

DOWSIL™ Advanced Silicone-Organic Hybrid Materials (developmental) can be cured in UV, heat or dual-cure conditions.

- UV cure can be applied to temperature-sensitive substances.
- Heat cure can be cured in 120 to 150°C conditions and is thermally stable.
- Dual cure allows for a secondary cure to enable curing of shadow areas.

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Learn more

We offer more than just an industry-leading portfolio of advanced silicone-based materials. As your dedicated innovation leader, we bring process and application experience, a network of technical specialists, a reliable global supply base, and world-class customer service.

To find out how we can support your applications or to learn more about developmental DOWSIL™ Advanced Silicone-Organic Hybrid Materials, contact us or visit [dow.com/displays](https://www.dow.com/displays) or [dow.com/electronics](https://www.dow.com/electronics).

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