

**Product Overview**

# Reactive Adhesives & Sealants



# BASE POLYMERS IN REACTIVE ADHESIVES

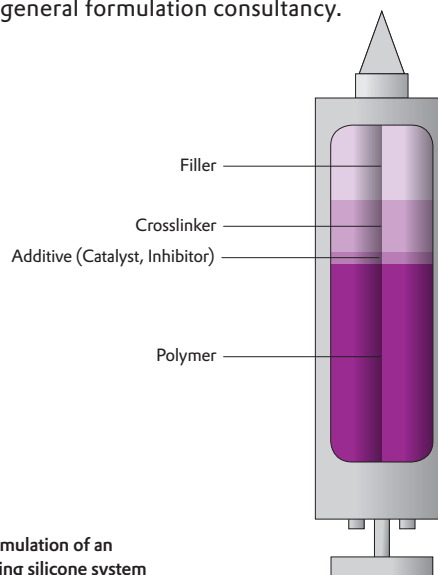
Are you looking for an exceptional performance or do you have unique application requirements that the existing mainstream ready-formulated solutions don't cater for?

With our broad range of condensation- and addition-curing silicones, as well as several silane-modified polymers to choose from you can create the formulation solution that best meets your needs. Within our portfolio you can find all the important

reactive components required to help you work with many common raw materials. This is just one way how we help to support your formulation development. The other way is through the expertise and know-how of our experienced team who can design individual formulations by utilizing a broad range of guide formulations, while also providing test experience and general formulation consultancy.

# ADDITION-CURING SILICONES

Addition-curing silicones provide a very common solution in many high-end applications like electronics, medical equipment, etc. due to their superior and unique properties. Our versatile additives toolbox enables the development of silicone formulations that offer an impressive range of varying properties to suit many different application demands.



Standard formulation of an addition-curing silicone system

## POLYMERS

	Chemical characterization	Density at 20°C [g/ml]	Vinyl content [mmol/g]	Appearance	Viscosity at 25°C [mPas]
Polymer VS 50	Vinyl-terminated polydimethyl siloxanes	approx. 1.0	0.60	clear, colorless	50
Polymer VS 100			0.40		100
Polymer VS 200			0.25		200
Polymer VS 500			0.14		500
Polymer VS 1.000			0.11		1,000
Polymer VS 2.000			0.08		2,000
Polymer VS 5.000			0.06		5,000
Polymer VS 10.000			0.05		10,000
Polymer VS 20.000			0.04		20,000
Polymer VS 65.000			0.03		65,000
Polymer VS 100.000			0.02		100,000
Polymer VS 165.000	0.015	165,000			
Polymer RV 100	Polydimethyl siloxanes, terminal + lateral vinyl groups	approx. 1.0	0.50	clear, colorless	100
Polymer RV 5.000			0.40		5,000
Polymer MV 2.000	Monovinyl-terminated polydimethyl siloxanes	approx. 1.0	0.06	clear, colorless	2,000

**VINYL-FUNCTIONAL QM RESIN COMPOUNDS**

Compounds used for the production of transparent, filler-free formulations with good mechanical properties or for improving mechanical properties or for flow behavior of filled systems

	Chemical characterization	Density at 20°C [g/ml]	Vinyl content [mmol/g]	Resin content [wt.-%]	Viscosity at 25°C [mPas]
VQM 903	Vinyl-functional QM resin + vinyl-functional silicone polymers	approx. 1.0	0.18	20	10,000
VQM 906			0.19	25	50,000
VQM 907			0.20	20	5,000
VQM 909			0.23	20	1,000
VQM 973			0.34	45	30,000
VQM 985			0.45	45	4,000

**CROSSLINKER**

Polydimethyl siloxanes comprising of SiH groups in the polymer chain to crosslink polyaddition silicones

	Chemical characterization	Density at 20°C [g/ml]	Appearance	SiH content [mmol/g]	Viscosity at 25°C [mPas]
Crosslinker 100	Polydimethyl siloxanes + SiH groups in the polymer chain	approx. 1.0	clear, colorless	7.80	45
Crosslinker 101				4.30	45
Crosslinker 110				3.80	100
Crosslinker 120				1.10	500
Crosslinker 122				1.80	200
Crosslinker 180				1.90	50
Crosslinker 190				16.00	20
Crosslinker 200	Polydimethyl siloxanes + SiH groups in the polymer chain	approx. 1.0		3.20	50
Crosslinker 210	+ terminal SiH groups			4.20	40

**MODIFIER**

Silicone plasticizer for addition-curing systems react as chain-extender for vinyl-functional silicones

	Chemical characterization	Density at 20°C [g/ml]	Appearance	SiH content [mmol/g]	Viscosity at 25°C [mPas]
Modifier 705	Polydimethyl siloxane + terminal SiH groups	approx. 1.0	clear, colorless	0.16	500
Modifier 715				3.40	3

**CATALYST**

Diluted solutions of a highly reactive platinum complex in different media

	Chemical characterization	Platinum content [wt.-%]	Appearance	Vinyl content [mmol/g]	Viscosity at 25°C [mPas]
Catalyst 510	Platinum + DVS complex in Polymer VS	0.5	yellowish, liquid	0.35	500
Catalyst 511		1.0		0.55	500
Catalyst 512		2.0		1.00	500
Catalyst 517	Platinum + DVS complex in DVS	2.0		10.80	5
Catalyst 540	Platinum + MVC complex in MVC	2.0		11.50	5

**INHIBITOR**

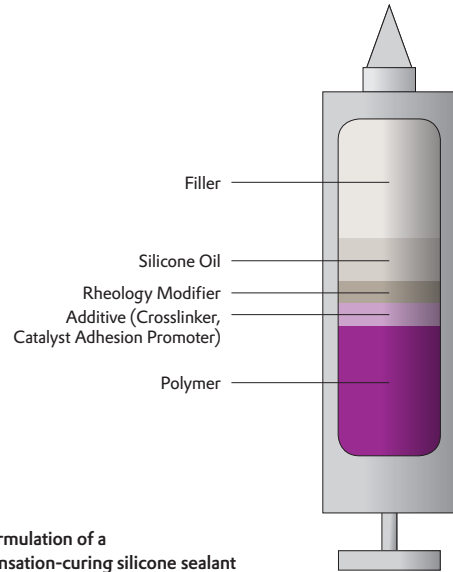
Inhibitors for adjusting the potlife of addition-curing silicones

	Chemical characterization	Volatility	Appearance	Vinyl content [mmol/g]	Viscosity at 25°C [mPas]
Inhibitor MVC	MVC pure	low	clear, colorless	11.70	4
Inhibitor DVS	DVS pure	medium	clear, colorless	10.70	4
Inhibitor 600	Alkinol	high	clear to slightly turbid, colorless	0.10	900

# CONDENSATION-CURING SILICONES

Silicones are a long-established technology and already used in many industries. Condensation-curing silicones are used for single-component formulations and are broadly used in the construction or other industries.

With our broad toolbox of products our customers can design their own bespoke formulations enabling them to differentiate themselves from their competitors. Now they don't just need to rely on using only the mainstream standard formulations as they can build on our guide formulations and our technical competency to develop the solutions they need.



Standard formulation of a filled condensation-curing silicone sealant

## POLYMERS

	Chemical characterization	Density at 20°C [g/ml]	Appearance	Viscosity at 25°C [mPas]
Polymer OH 0,1	Hydroxy-terminated polydimethyl siloxanes	approx. 1.0	clear, colorless	100
Polymer OH 1				1,000
Polymer OH 2				2,000
Polymer OH 3,5				3,500
Polymer OH 5				5,000
Polymer OH 20				20,000
Polymer OH 80				80,000
Polymer OH 300				400,000
Polymer OR 501	Hydroxy-terminated polydimethyl siloxanes	approx. 1.0	clear, colorless	50,000

## CROSSLINKER

*Oxime silane-based crosslinker for producing neutral moisture-curing silicone sealants*

	Chemical characterization	Density at 20°C [g/ml]	Appearance
Crosslinker OX 10	MOS	approx. 1.0	clear, colorless to yellowish
Crosslinker OX 20	VOS		
Crosslinker OX 32	VOS/TOS 65/35		yellowish to brownish*
Crosslinker OX 33	VOS/TOS 82/18		

\*Crystallization of TOS is possible at temperature below 45°C

## MODIFIER

*Reactive silicone plasticizer for condensation systems with „non-bleeding“ properties*

	Chemical characterization	Appearance	Viscosity at 25°C [mPas]
Modifier OH 650	Monofunctional polydimethyl siloxane	clear, colorless	50,000
Modifier OH 655			5,000

## CATALYST

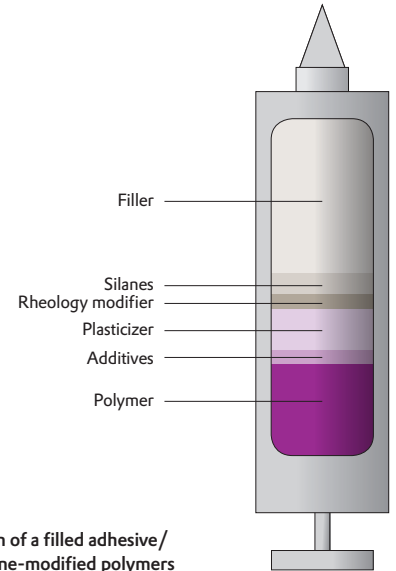
	Chemical characterization	Density at 20°C [g/ml]	Appearance	Typical dosage
Catalyst TD 18	Diocetyl tin dicarboxylate	approx. 1.0	colorless to yellow	0.05–2 %

# SILANE-MODIFIED POLYMERS

Many of today's modern adhesives and sealants are based on silane-modified polymers (known as SMPs). Formulations based on these polymers can offer attractive alternatives to more traditional polymers while still providing all the benefits of the more established polymers due to their excellent performance attributes including:

- Excellent durability
- Versatility with good resistance (UV, chemicals, thermal)
- Broad and universal adhesion to most substrates

Silane-modified polymers contain no isocyanates, can be formulated without using tin catalysts and without the loss of any methanol through evaporation. Our broad and unique portfolio provides you with a flexible base to create reactive systems for use in many different applications.



## POLYMERS

	Release of	Modulus of formulation	Polymer backbones	Plasticizer	Viscosity at 25°C [mPas]	Position of cross-linking groups
<b>Polymer ST 48</b>	Methanol	low-medium	PPG	DPHP	60,000	terminal
<b>Polymer ST 77</b>	Methanol	low-medium	PPG	Elatur® CH	40,000	terminal
<b>Polymer ST 61</b>	Methanol	high	PPG	none	35,000	terminal
<b>Polymer ST 61 LV</b>	Methanol	high	PPG	none	12,000	terminal
<b>Polymer ST 80</b>	Methanol	high	PPG	none	20,000	terminal
<b>Polymer ST 81</b>	Methanol	high	PPG	none	40,000	terminal
<b>TEGOPAC® Seal 100</b>	Ethanol	low-medium	PPG	none	55,000	lateral
<b>TEGOPAC® Bond 160</b>	Ethanol	medium	PPG	none	10,000	lateral
<b>TEGOPAC® Bond 170</b>	Ethanol	medium	PPG	none	30,000	lateral
<b>TEGOPAC® Bond 251</b>	Ethanol	medium	modified	none	30,000	lateral

## REACTIVE DILUENTS *To adjust viscosity of formulations and for development of "non-bleeding" formulations*

	Release of	Modulus of formulation	Polymer backbones	Plasticizer	Viscosity at 25°C [mPas]	Position of cross-linking groups
<b>TEGOPAC® RD 1</b>	Ethanol	reactive diluent	modified	none	1,000	lateral
<b>TEGOPAC® RD 2</b>	Ethanol	reactive diluent	modified	none	1,500	lateral
<b>TEGOPAC® RDS 1</b>	Ethanol	reactive diluent	PPG	none	300	lateral

## PLASTICISER *Non-reactive plasticizer for SMP-based systems*

	Chemical characterization	Density at 20°C [g/m³]	Viscosity at 25°C [mPas]	Appearance
<b>PLASTICISER 860</b>	Polyether	approx. 1.0	190–240	colorless, clear

## CATALYST / ADDITIVES

	Function	Chemical characterization	Density at 20°C [g/m³]	Appearance	Typical dosage level
<b>Catalyst TD 18</b>	Catalyst	Diocetyl tin dicarboxylate	approx. 1.0	colorless to yellow	0.05–0.4%
<b>TEGO® Antifoam D 3944</b>	Defoamer/deaerator	Polymeric mixture, 100% active content	approx. 0.9	turbid liquid	1–2%
<b>SURFYNOL® DF 178</b>	Defoamer/deaerator	Polysiloxane + acetylenic gemini, 100% active content	approx. 1.0	slightly hazy yellow	1–2%
<b>TEGOMER® DA 646</b>	Dispersant	Polyether, 100% active content	approx. 1.1	yellowish to red colored	1–2%
<b>CARBOWET® 103</b>	Dispersant	Alcohol ethoxylate, 100% active content	approx. 0.9	turbid liquid	1–2%
<b>CARBOWET® 106</b>	Dispersant	Alcohol ethoxylate, 100% active content	approx. 1.0	colorless to pale yellow	1–2%

**Europe | Middle East | Africa**

**Evonik Operations GmbH**  
Goldschmidtstraße 100  
45127 Essen  
Germany  
Phone +49 201 173-2665  
Fax +49 201 173-1990  
[www.evonik.com](http://www.evonik.com)

**Asia | Pacific**

**Evonik Specialty Chemicals Co., Ltd.**  
55, Chundong Road  
Xinzhuang Industry Park  
Shanghai, 201108  
PR China  
Phone +86 21 6119-1125  
Fax +86 21 6119-1406

**The Americas**

**Evonik Corporation**  
P.O. Box 34628  
Richmond, VA 23234  
USA  
Phone +1 804 727-0700  
Fax +1 804 727-0855

This information and any recommendations, technical or otherwise, are presented in good faith and believed to be correct as of the date prepared. Recipients of this information and recommendations must make their own determination as to its suitability for their purposes. In no event shall Evonik assume liability for damages or losses of any kind or nature that result from the use of or reliance upon this information and recommendations. EVONIK EXPRESSLY DISCLAIMS ANY REPRESENTATIONS AND WARRANTIES OF ANY KIND, WHETHER EXPRESS OR IMPLIED, AS TO THE ACCURACY, COMPLETENESS, NON-INFRINGEMENT, MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE (EVEN IF EVONIK IS AWARE OF SUCH PURPOSE) WITH RESPECT TO ANY INFORMATION AND RECOMMENDATIONS PROVIDED. Reference to any trade names used by other companies is neither a recommendation nor an endorsement of the corresponding product, and does not imply that similar products could not be used. Evonik reserves the right to make any changes to the information and/or recommendations at any time, without prior or subsequent notice.



[www.evonik.com/solutions-for-adhesives](http://www.evonik.com/solutions-for-adhesives)

Inv.-Nr.: 11-2020