Additives for Adhesives & Dispersions

Portfolio overview

April 2020

EVONIK
Leading Beyond Chemistry

Interface & Performance – Our product portfolio for adhesives & sealants

TEGOPAC® Polymer ST	Silane-modified polymers	**Reactive Adhesives & Sealants**	**Water-based Adhesives & Sealants**	Defoamers	TEGO® Antifoam
Modifier OH Polymer OH Crosslinker	Condensation curing silicones			Dispersants	TEGOMER® ZetaSperse®
Polymer VS Catalyst Crosslinker VQM	Addition curing silicones			Wetting agents	SURFYNOL® TEGOPREN®
ALBIDUR® ALBIFLEX® ALBIPOX®	Reactive resin modifiers			Thickeners	TEGO® Rheo
TEGOMER®	Reactive siloxanes / UV curing silicones			Emulsifiers	TEGO® SHO TEGO® SMO REWOPOL®
NANOPOX® NANOCRYL®	Nanosilica concentrate		**Solvent-based Adhesives & Sealants**	Dispersants	TEGOMER® TEGOPREN®
TEGOMER® TEGOPREN® TEGO® Antifoam	Dispersants/Deaerators			Deaerators	TEGO® Antifoam

Binders & additives for adhesives & sealant applications

Dispersing agents for adhesive formulations

				Dispersion of					
Dispersing agent	Chemical base	delivered as	Ionogenity	Chalk	Talc	Glass or polymeric fiber	micronized filler	organic pigments	Application area
TEGOMER® DA 626	Polymeric nature	≥ 98% active concentrate	Nonionic	●	●		●	●	PUR, Epoxide, Vinyl ester, UP resins *
TEGOMER® DA 640	Polyether phosphate	30% active solution	Anionic	●	●				water-based systems
TEGOMER® DA 646	Modified Polyether	100% active concentrate	Nonionic			●	●		water-based systems, PUR, Epoxide, SMP
TEGOMER® DA 850	Polymeric nature	40% active solution	Nonionic	●	●			●	water-based systems
ZETASPERSE® 3100	Polymeric nature	40% active solution	Anionic	●	●		●	●	water-based systems
ZETASPERSE® 3600	Polymeric nature	52% active solution	Anionic	●	●		●	●	water-based systems
ZETASPERSE® 3800	Polymeric nature	40% active solution	Nonionic	●	●		●		water-based systems
CARBOWET® 103	Alcohol ethoxylate	100% active concentrate	Nonionic	●	●		●		SMP
CARBOWET® 106	Alcohol ethoxylate	100% active concentrate	Nonionic	●	●		●		SMP
TEGOPREN® 6875	Alkyl modified siloxane	100% active concentrate	Nonionic	●	●		●	●	Epoxide, Vinyl ester, UP resins *

● recommended

* unsaturated Polyester

TEGO® Antifoam D 3020 & SURFYNOL® AS 5000 can be used as dispersing agents for SMP-based (reactive) systems, too.

For moisture curing reactive adhesive & sealant formulations water-free additives (100% active substance) are needed!

Dispersing additives in different systems

Evaluation of different dispersing additives took place in

- Litex N 3415M (NBR-latex dispersion, colloidal dispersion of a carboxylated butadiene-acrylonitrile copolymer);
  applications: latex dipping, for pigment paste used in latex tank, carpet backing, etc.

- Litex T 56K20 (SBR-latex dispersion, aqueous dispersion of a carboxylated styrene-butadiene copolymer);
  applications: carpet backing, etc.

- AS 2040 (styrene-acrylic dispersion);
  applications: water-based construction sealants & adhesives, etc.

- TEGOPAC® Bond 170 & TEGOPAC® RD2 mixture (moisture curing system, SMP-based liquid formulation);
  applications: liquid membranes, flooring adhesives, etc.

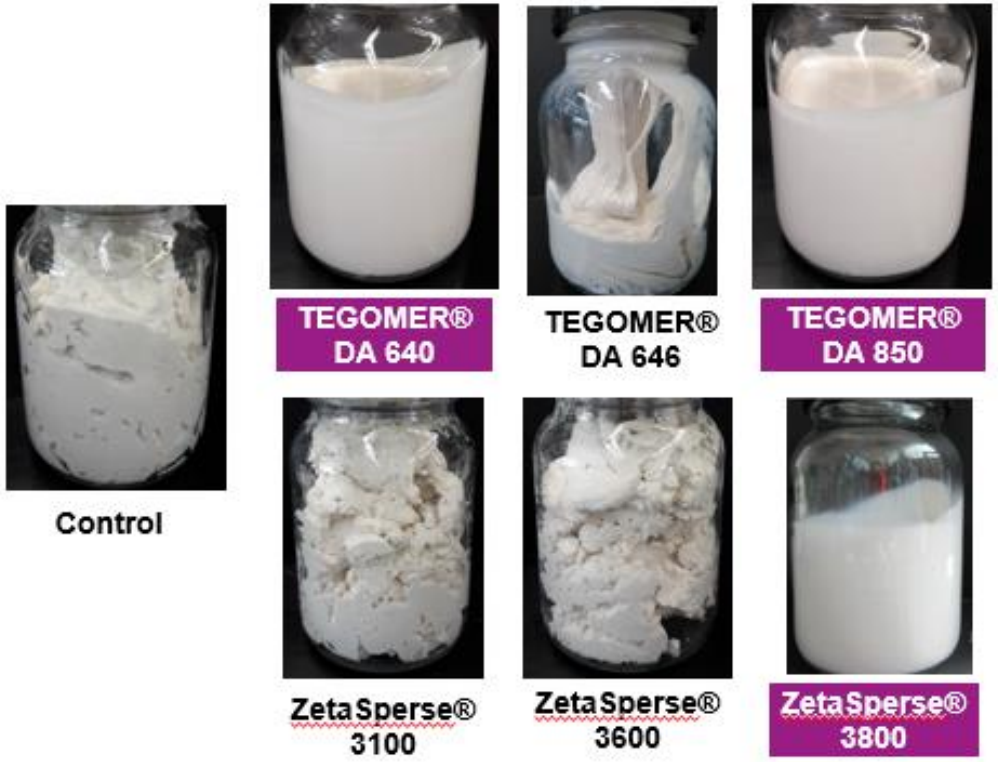
Dispersing additives in water-based formulations

	Active content	Litex N 3415 M	Litex N 3415 M	Litex T 56 K20	Litex T 56 K20	AS 2040
	(%)	(NBR-latex dispersion)	(NBR-latex dispersion)	(SBR-latex dispersion)	(SBR-latex dispersion)	(Styrene-acrylic dispersion)
		Ca(CO3) (66% Milicarb OG)	ATH (54% Apyral 40 CD)	Ca(CO3) (70% Milicarb OG)	ATH (60% Apyral 40 CD)	Ca(CO3) (60% Omyacarb 5 GU)
no additive		-	-	-	-	-
TEGOMER® DA 640	30	+	+	+	+	+
TEGOMER® DA 646	100	-	-	-	-	-
TEGOMER® DA 850	40	+	-	+	+	+
ZETASPERSE® 3100	40	-	-	+	+	+
ZETASPERSE® 3600	52	-	-	+	+	+
ZETASPERSE® 3800	40	+	-	+	+	+

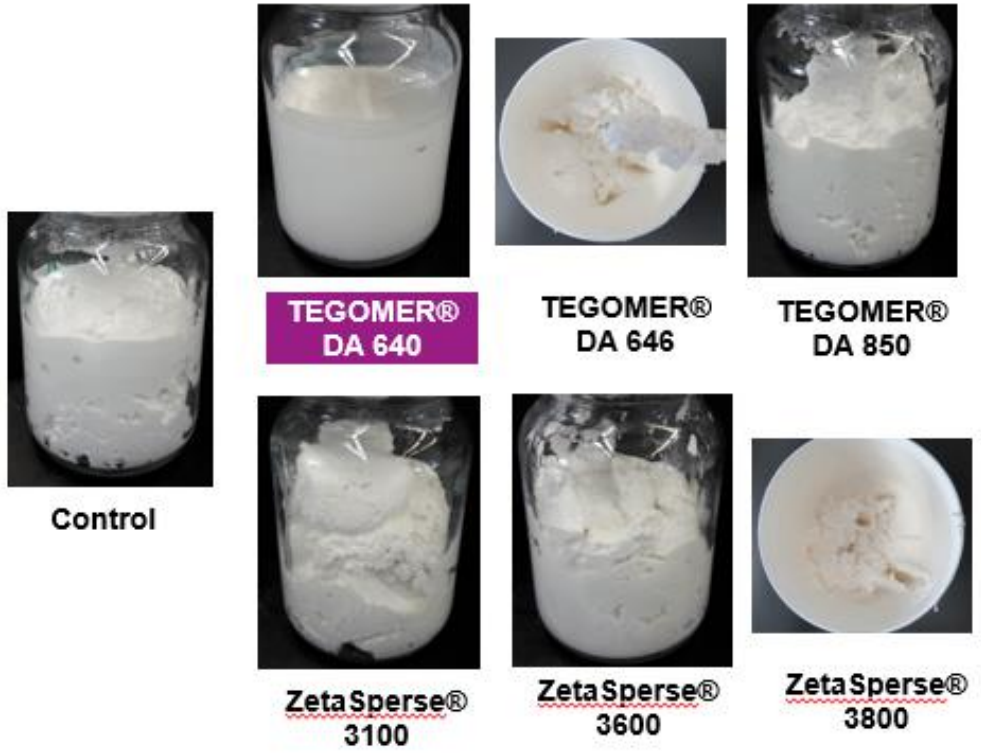
\+ good
\- bad

Litex N 3415M (NBR-latex dispersion): standard formulation, 2% AoP

Filler: $CaCO_3$ (66% Millicarb OG)



Filler: ATH (54% Apyral 40CD)



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Litex T 56K20 (SBR-latex dispersion): standard formulation, 2% AoP

Filler: $CaCO_3$ (70% Millicarb OG)

Filler: ATH (60% Apyral 40CD)

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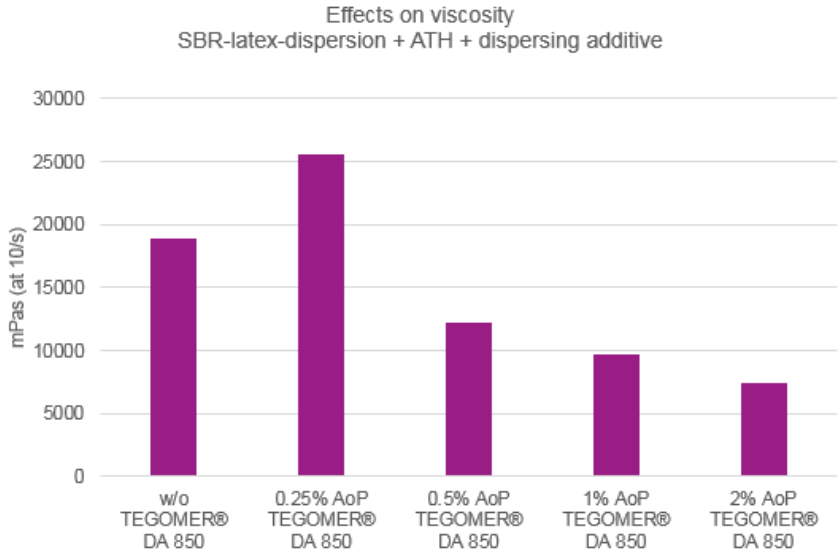
Dispersing additives - Effects on viscosity (water-based system)

Litex T 56K20 [g]	TEGOMER® DA 850 [g]	TEGOMER® DA 850 [% AoP]	Apyral 24 [g]	Viscosity [mPas] at 10/s
100	/	/	/	166
34	0	0,00	66	18900
33.58	0,42	0.25	66	25500
33.17	0,83	0.5	66	12200
32.34	1,66	1,00	66	9730
30.70	3,30	2,00	66	7460



Dispersing additives influence viscosity of a high filled system: with increasing quantity of a dispersing, viscosity will decrease.

Use of a dispersing additives allows customers to bring in more filler into a formulation:
→ a decrease of formulation costs is possible
→ improvement of mechanical properties is possible (e.g. higher strength, higher hardness)

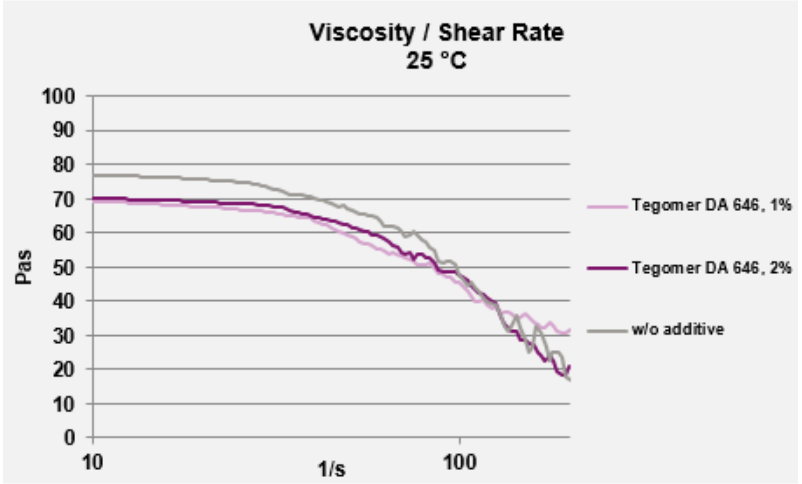
Typical amounts to be used: 0.5 – 2% active on pigment!

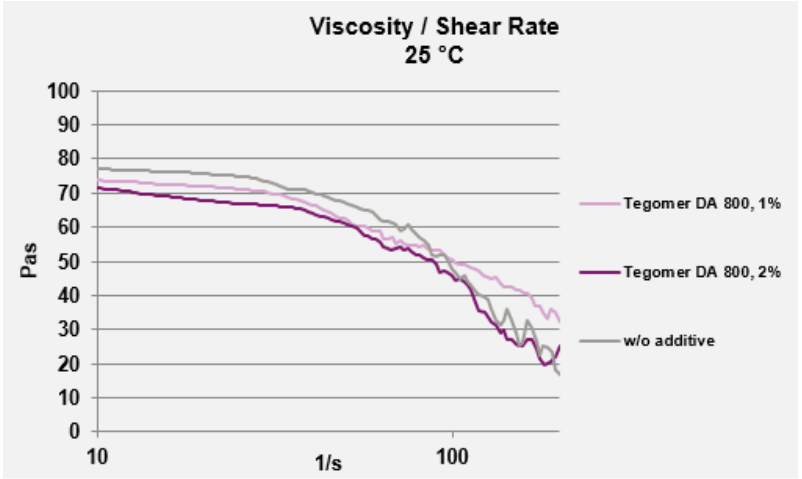
Dispersing additives in SMP-based formulations (reactive systems)

Test system:

SMP-based liquid formulation, highly filled (approx. 50% ATH (Apyral 40 CD)

Tegopac® Bond 170 / Tegopac® RD 2 [g]	Dispersing additive [g]	AoP * [%]	Apyral 40 CD [g]
25,9 / 18,6	0	0	50,65
25,9 / 18,6	0,51	1	50,65
25,9 / 18,6	1,01	2	50,65



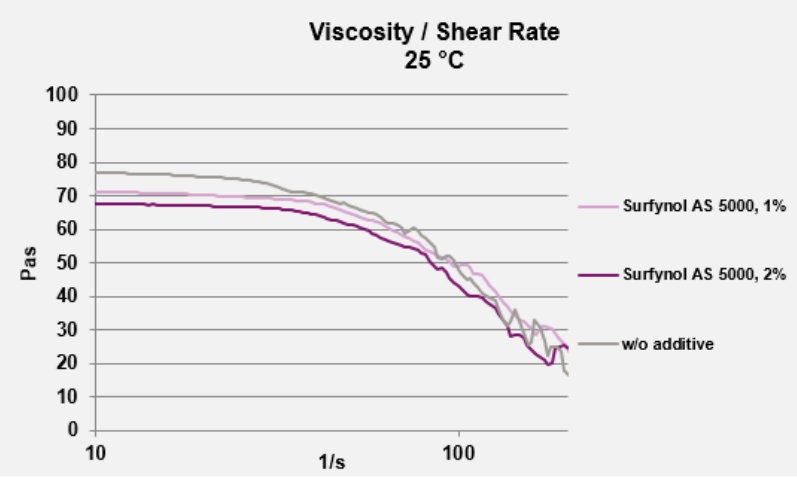


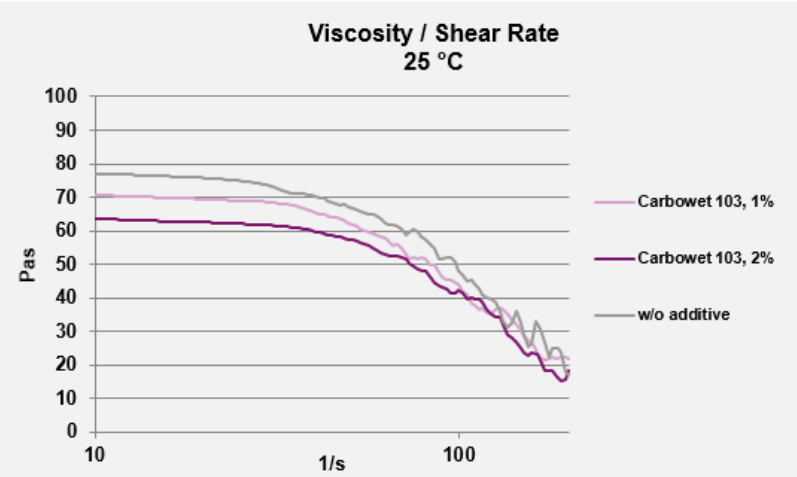
with TEGOMER® DA 646: small viscosity reduction already with 1% additive*; viscosity reduction with 1% and 2% additive* is similar

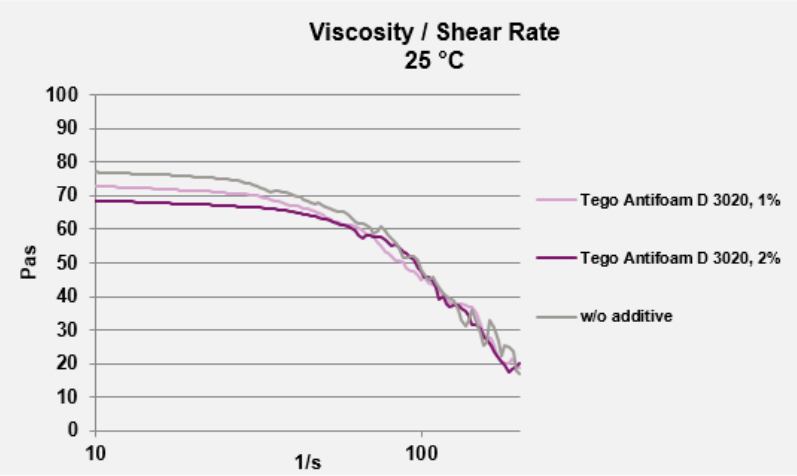
with TEGOMER® DA 800: no relevant viscosity reduction was detected with 1% additive*, small viscosity reduction with 2% additive*

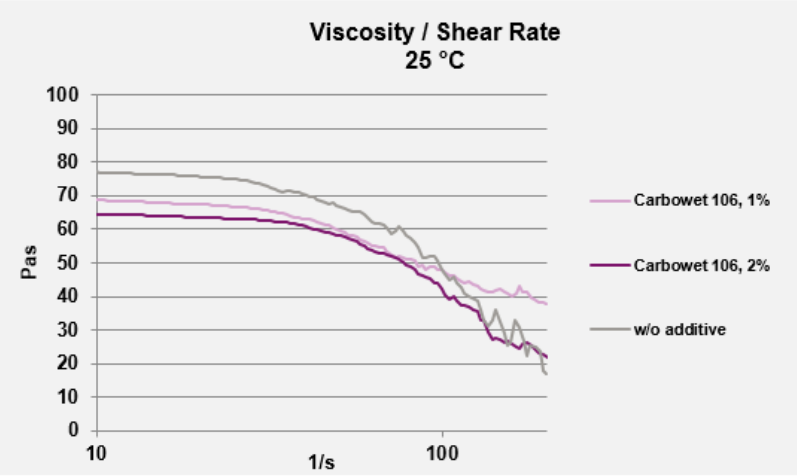
* = active on pigment/filler

Dispersing additives in SMP-based formulations (reactive systems)









Test system:

SMP-based liquid formulation, highly filled (approx. 50% ATH (Apyral 40 CD)

CARBOWET® 103 & CARBOWET® 106:

2% additive needed to reach good viscosity reduction; with 1% additive* only a small viscosity reduction detected

TEGO® Antifoam D 3020 & SURFYNOL® AS 5000 can be used as dispersing agents; 2% of additive* are needed to reach a viscosity reduction

* = active on pigment/filler

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