

PRODUCT RANGE

# Silanes for the Rubber Industry



OUR SILANES FORM A STRONG LINK

A STRONG LINK FORMS UNBEATABLE STRENGTH.

With the use of the sulfur functional organosilanes, such as Si 69®, it is possible to improve reinforcement with silica in non-polar polymer compounds considerably. Bi-functional organosilanes react with the silica surface and the polymer during the mixing and vulcanization process, forming chemical crosslinks between two otherwise non-reacting materials. The benefit of silica to effectively improve the dynamic properties of the rubber, is now fully recognized thanks to these permanent chemical bonds. Nowadays the Silica/Silane-system is the benchmark for passenger car tire tread performance.

Creating that stable bonding is not the end of it, either. Silanes effectively help optimize rubberspecific properties to achieve very specific strengths, including:

- High tensile strength
- High abrasion resistance
- Low compression set
- Optimum dynamic properties
- Improved compound processing
- Reduced rolling resistance (less fuel consumption)

If you look for top ratings in tire labeling, Si 363® with its unique performance is the product to choose. More than 10 years after market introduction, it is still the benchmark for any other silane in the Green Tire business.

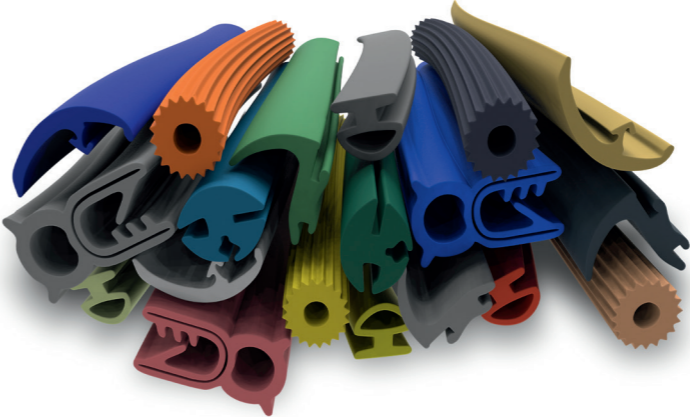
For the tire industry it is important to achieve lowest rolling resistance together with optimized abrasion properties. It is of utmost interest for the growing e-mobility, since Battery Electrical Vehicles need these properties even more than conventional cars.

YOU’VE COME TO THE RIGHT PLACE FOR THE RIGHT SOLUTION.

Our range covers liquid silanes, solid blends with carbon black as well as a line of white COUPSIL® types. The latter are precipitated silica that have been pre-reacted with silane.

The range offers numerous solutions specifically designed for mechanical rubber goods such as seals and gaskets, conveyor belts, drive belts, roller coatings, and hoses.

Our application engineers and technicians are there to answer any questions you may have, so don’t hesitate to call. On request, we will gladly send you detailed information on individual products, product samples as well as technical essays on application issues relevant to your processes.



RUBBER SILANES

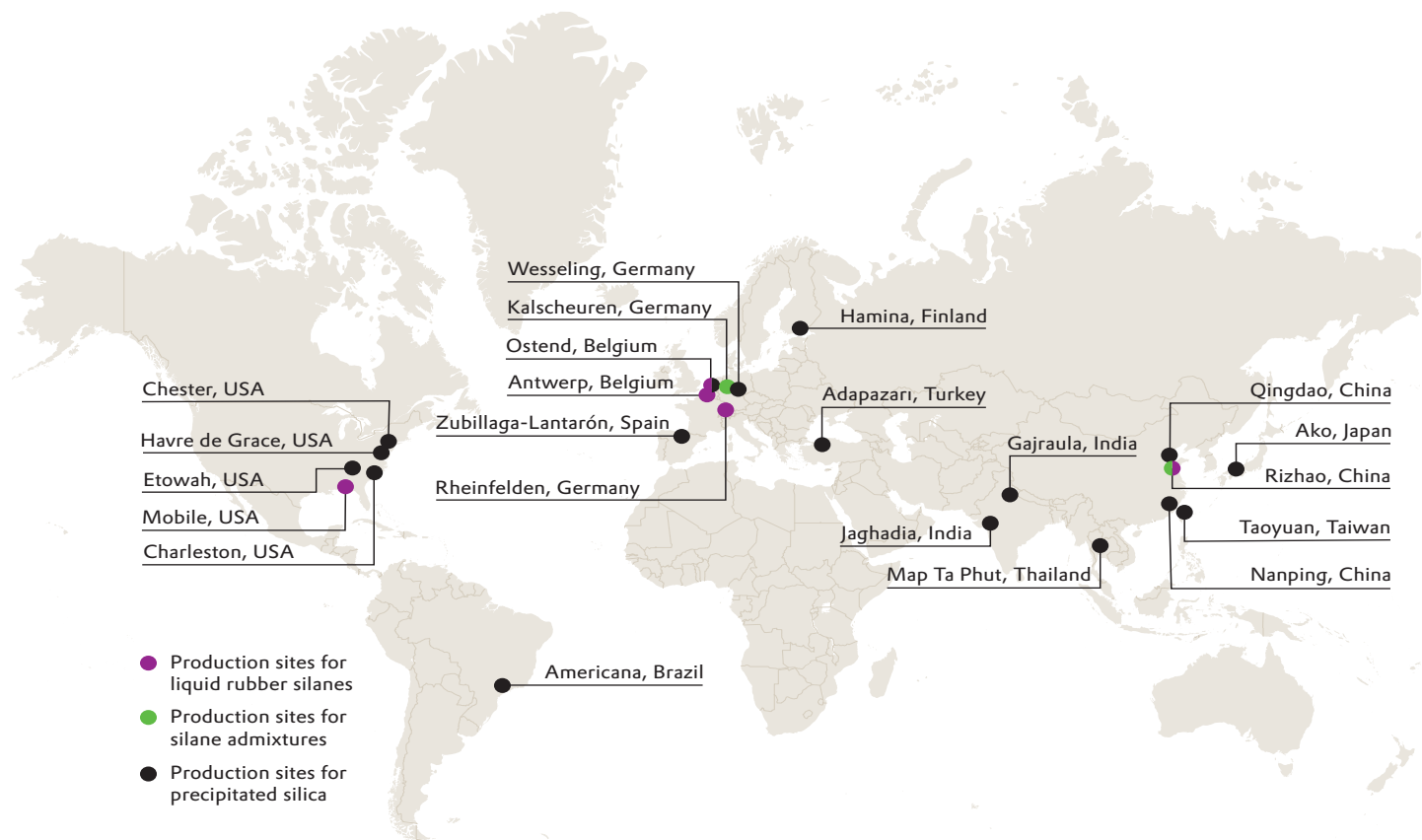
	Property	Designation/Components	Appearance	Average molecular mass	Density	Density	Sulfur content	Sulfur content	By-products, GC	Volatiles 2 h, 105 °C	Residue on ignition	Avg. Sulfur chain length, HPLC
	Unit				g / cm³	g / cm³	%	%	%	%	%	
	Test method (guidance)				DIN 51757	DIN 66137	Evonik method	ASTM D 6741	ASTM D 6843	ISO 787-2	ASTM D 6740	ASTM D 6844
Sulfur-functional silanes	Si 69®	bis(triethoxysilylpropyl)tetrasulfide	Liquid	532	1.10		22.5		≤ 3.5			3.70
	Si 75®	bis(triethoxysilylpropyl)disulfide	Liquid	486	1.03		15.3		≤ 3.0			2.35
	Si 266®	bis(triethoxysilylpropyl)disulfide	Liquid	480	1.03		14.4		≤ 3.0			2.15
	Si 264™	3-thiocyanatopropyltriethoxysilane	Liquid	263	1.00		12.1				23.0	
	Si 363®	Proprietary mercaptosilane	Liquid	988	0.99			3.3			6.1	
Silane admixtures	X 50-S®	Si 69®/Carbon Black	Black pellets	532*		1.40		11.3		≤ 2.0		3.70
	X 75-S®	Si 75®/Carbon Black	Black pellets	486*		1.30		7.7		max. 3.0		2.35
	X 266-S®	Si 266®/Carbon Black	Black pellets	480*		1.30		7.2		≤ 2.0		2.15

COUPSIL®

	Property	Appearance	Components	Sulfur content	Silane content	Volatiles	pH	Granular size (Ro-Tap) > 300 µm	Granular size (Ro-Tap) < 75 µm	Pour density	Tamped density
	Unit			%	%	%	%	%	%	g/l	g/l
	Test method (guidance)			NIR method	NIR method	NIR method	Evonik method	ISO 5794-1F	ISO 5794-1F	ASTM D 1513	ISO 787-11
COUPSIL®	COUPSIL® 8113	White powder	Si 69® / ULTRASIL® VN 3	2.60		3.5	6.6				220
	COUPSIL® 8113 GR	White granules	Si 69® / ULTRASIL® VN 3	2.60		3.5	6.6	≥ 80	≤ 10	310	
	COUPSIL® 6109	White powder	Si 69® / ULTRASIL® VN 2	2.00		3.5	7.2				220
	COUPSIL® VP 6411	White powder	Si 264™ / ULTRASIL® VN 2	1.15		≤ 7	7.2				220
	COUPSIL® VP 6508	White powder	Dynasylan® VTEO / ULTRASIL® VN 2		7.8	4.0	7.2				220

COFILL® 11

	Property		Appearance		Components		Resorcinol content		Residue on ignition		Granular size (Ro-Tap) > 300 μm		Granular size (Ro-Tap) < 75 μm	
	Unit						%		%		%		%	
	Test method (guidance)						Evonik method		Evonik method		ISO 5794-1F		ISO 5794-1F	
Resorcinol admixtures	COFILL® 11	Brownish powder	Resorcinol / Silica	50	45									* active ingredient



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