

ORGANOFUNCTIONAL SILANES – FOR POWERFUL CONNECTIONS

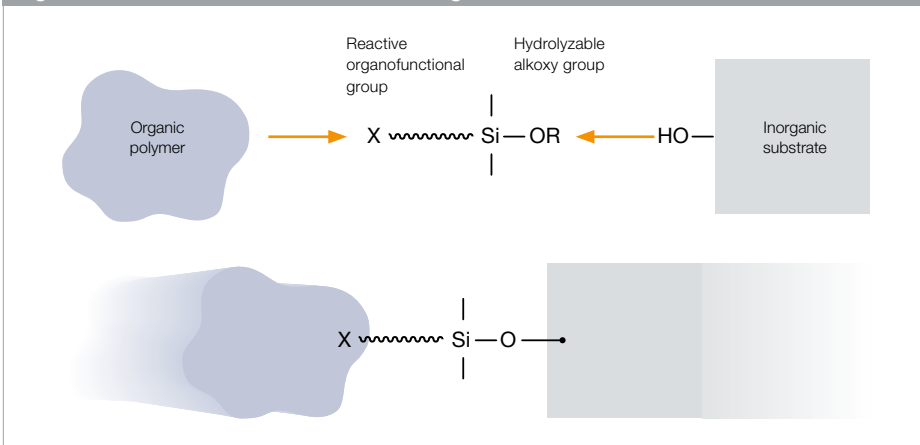
Organofunctional silanes are essential components in adhesive and sealant formulations based on silane-modified polymers (SMP).

Organofunctional silanes are hybrid compounds that combine the functionality of a reactive organic group and the inorganic functionality of an alkoxy silane in a single molecule. This special property means they can be used as molecular bridges between organic polymers and inorganic materials.

Organofunctional silanes fulfill various functions as they:

- Permit good adhesion to a variety of different substrates
- Ensure good storage stability for formulations and prevent premature curing
- Catalyze the curing reactions of WACKER's unique α -silane-modified polymer systems
- Improve the physical and mechanical properties of filled and reinforced formulations
- Enhance the resistance of the cured products to chemicals

Organofunctional Silanes as Molecular Bridges



Organofunctional silanes act as molecular bridges between organic polymers and inorganic materials.

Today, WACKER produces various organofunctional silanes, which are available under the trademark GENIOSIL®. The portfolio includes the established standard products and novel materials with special properties. For example, unique α -silanes with increased reactivity.

GENIOSIL® Silanes as Water Scavengers


The most commonly encountered water scavenger in silane-modified polymer formulations is vinyltrimethoxysilane. However, WACKER also offers other alternative choices such as the special α -silanes or the water scavenger GENIOSIL® XL 70 with a very high flash point and low odor characteristics. The amount of silane added will depend on the water content of the formulation constituents, e.g. the filler. Typically, about one percent by weight of the formulation is required.

GENIOSIL® Silanes as Adhesion Promoters

In order to enhance adhesion, organofunctional silanes migrate to the bond line interface and then build up a network between the substrate and the curing polymer network of the formulation. The most commonly used adhesion promoters are amino-, epoxy- and methacryloxysilanes.

GENIOSIL® Silanes as Catalysts for α -SMP

Thanks to their high reactivity, WACKER's α -silane-modified polymers don't require additional metal catalysts like tin. Traditional aminosilanes – which also act as adhesion promoters – can be used to initiate curing.

	Product Name	Chemical Name Specifics	Structural Formula	Mode of Function		
				Adhesion promoter	Water scavenger	Catalyst for α -SMP
Vinyl	GENIOSIL® XL 10	Vinyltrimethoxysilane: Standard grade	$(\text{CH}_3\text{O})_3\text{SiCH}=\text{CH}_2$		•	
	GENIOSIL® XL 70	Phenyltrimethoxysilane: High flash point, low odor	$(\text{CH}_3\text{O})_3\text{SiC}_6\text{H}_5$		•	
Amino	GENIOSIL® GF 96	3-Aminopropyltrimethoxysilane: Standard grade	$(\text{CH}_3\text{O})_3\text{SiC}_3\text{H}_6\text{NH}_2$	•		•
	GENIOSIL® GF 9	N-(2-Aminoethyl)-3-aminopropyl-trimethoxysilane: Standard adhesion promoter, low cost, broad adhesion profile	$(\text{CH}_3\text{O})_3\text{SiC}_3\text{H}_6\text{NHC}_2\text{H}_4\text{NH}_2$	•		•
	GENIOSIL® GF 91	N-(2-Aminoethyl)-3-aminopropyl-trimethoxysilane/ high purity: Higher in purity than GF 9, less yellowing	$(\text{CH}_3\text{O})_3\text{SiC}_3\text{H}_6\text{NHC}_2\text{H}_4\text{NH}_2$	•		•
	GENIOSIL® GF 92	N-Cyclohexyl-3-aminopropyltrimethoxysilan: Standard grade	$(\text{CH}_3\text{O})_3\text{SiC}_3\text{H}_6\text{NH}$ 	•		•
	GENIOSIL® GF 93	3-Aminopropyltriethoxysilane: Standard grade with ethoxy groups	$(\text{C}_2\text{H}_5\text{O})_3\text{SiC}_3\text{H}_6\text{NH}_2$	•		•
	GENIOSIL® GF 95	N-(2-Aminoethyl)-3-aminopropylmethyl-dimethoxysilane: Increased elasticity and improved water resistance, mainly used for GENIOSIL® XB formulations	$\begin{matrix} \text{CH}_3 \\ \\ (\text{CH}_3\text{O})_2\text{SiC}_3\text{H}_6\text{NHC}_2\text{H}_4\text{NH}_2 \end{matrix}$	•		•
	GENIOSIL® GF 995	N-(2-Aminoethyl)-3-aminopropyl-methoxypolysiloxane: For special effects, adhesion promoter for special applications like D4 adhesives with GENIOSIL® XB	—	•		
Methacryloxy	GENIOSIL® GF 31	3-Methacryloxypropyltrimethoxysilane: For low energy surfaces, e.g. PMMA	$(\text{CH}_3\text{O})_3\text{SiC}_3\text{H}_6\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-\underset{\text{CH}_3}{\text{C}}=\text{CH}_2$	•		
	GENIOSIL® XL 32	Methacryloxymethylmethyldimethoxy-silan: For low energy surfaces, e.g. PMMA	$\begin{matrix} \text{CH}_3 \\ \\ (\text{CH}_3\text{O})_2\text{SiCH}_2\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-\underset{\text{CH}_3}{\text{C}}=\text{CH}_2 \end{matrix}$	•	•	
	GENIOSIL® XL 33	Methacryloxymethyltrimethoxysilan: For low energy surfaces, e.g. PMMA	$(\text{CH}_3\text{O})_3\text{SiCH}_2\text{O}-\overset{\text{O}}{\parallel}{\text{C}}-\underset{\text{CH}_3}{\text{C}}=\text{CH}_2$	•	•	
Glycidoxy	GENIOSIL® GF 80	3-Glycidoxypropyltrimethoxysilane: Improves water resistance especially in combination with aminosilanes, enhanced plastic adhesion	$(\text{CH}_3\text{O})_3\text{SiC}_3\text{H}_6\text{OCH}_2\text{CH}-\overset{\text{O}}{\triangle}-\text{CH}_2$	•		

WACKER has also developed an exciting range of silane-modified polymers.
Visit us at: www.wacker.com/geniosil

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GENIOSIL®

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