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 GENIOSIL®

SILANES | GENIOSIL®

BUILDING BRIDGES WITH ORGANOFUNCTIONAL SILANES

THREE PRODUCTION SITES ONE QUALITY STANDARD

At our manufacturing plants in Burghausen and Nünchritz, Germany, as well as in Jining, China, we produce a broad range of organofunctional silanes and market them under the GENIOSIL® trademark. With our large portfolio, we are well equipped to meet the growing demand for stand-

ard and specialty organofunctional silanes all over the world. Our products are available globally via sales companies. The same high quality standards apply at all three production sites. Identical processes and technologies guarantee consistently high product quality worldwide.

Burghausen

Nünchritz

Jining

We introduced a new naming convention for our GENIOSIL® products originating in China. 

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BUILDING BRIDGES

HOW SILANES WORK



Organofunctional silanes combine the functionality of a reactive organic group with the inorganic functionality of an alkoxy silane in a single molecule. They can act as molecular bridges between organic polymers and inorganic materials (e.g. glass, metal, ceramics).

HIGHLY FUNCTIONAL HIGHLY VERSATILE

GENIOSIL® organofunctional silanes are indispensable in many applications and industries. Used as adhesion promoters, curing agents and water scavengers, they are an important component of adhesives and sealants, surface coatings and composites. They are also used for modifying fillers and producing crosslinkable polyethylene (PE) and (PP) in the plastics industry.

Which organofunctional group for which polymer? 

Functions and Application Benefits of Organofunctional Silanes

Functions

Adhesion Promotion

Organofunctional silanes enhance bonding between substrates by forming strong chemical bonds with the surface.

Surface Modification

Organofunctional silanes change the surface composition of a solid material and increase the interaction and the compatibility of the surface with the matrix.

Crosslinking

Organofunctional silanes function as crosslinkers and reactive binders for organic polymers, e.g., in moisture-curing adhesives and sealants, in paints and varnishes and in thermoplastics.

Organofunctional silanes function as co-monomers for polymer modification.

Water Scavenging

Organofunctional silanes scavenge water molecules from moisture-curing polymers.

Application Benefits

- Enhanced adhesion of coatings, adhesives and sealants to a variety of substrates
- Improved corrosion resistance
- Improved mechanics of glass fiber composites

- Enhanced dispersibility of fillers
- Higher filler loading capacity
- Reduced tendency of filler systems to adsorb water on the surface
- Improved mechanical properties
- Optimization of polymerization catalysts

- Selective optimization and customization of mechanical properties, e.g., tensile strength and elongation at break, tear strength, abrasion resistance

- Improved storage stability, chemical resistance and weathering resistance
- Improved adhesion to various substrates
- High-temperature-resistant binder in moisture crosslinkable PE-Xb systems
- High-temperature-resistant binder

- Enhanced adhesion to inorganic surfaces
- Improved mechanical strength via crosslinking between organic polymer chains

- Enhanced adhesion and bonding of coatings or adhesives to the substrate
- Modification of surface properties
- Enhanced shelf life
- Improved processes involving water-sensitive materials or processes

α -OR γ -SILANES? REACTIVITY MATTERS

Many applications require highly reactive silanes. Therefore, we offer a unique portfolio of organofunctional α -silanes: in comparison with conventional γ -silanes, α -silanes show extremely high reactivity towards moisture. And what's more, the corresponding α -silane-modified polymers do not require tin catalysts for fast curing, making α -silanes a more sustainable alternative.

Compare the skin formation time of
 α - and γ -silane-terminated polymers [i](#)

The α -Effect in a Nutshell

Conventional organofunctional γ -silanes have a propylene spacer (C3- or γ -spacer) between the silyl group and the organic group. The corresponding γ -silane-modified polymers exhibit only moderate reactivity towards moisture and need strong catalysts – usually tin catalysts – for a sufficiently fast curing reaction.

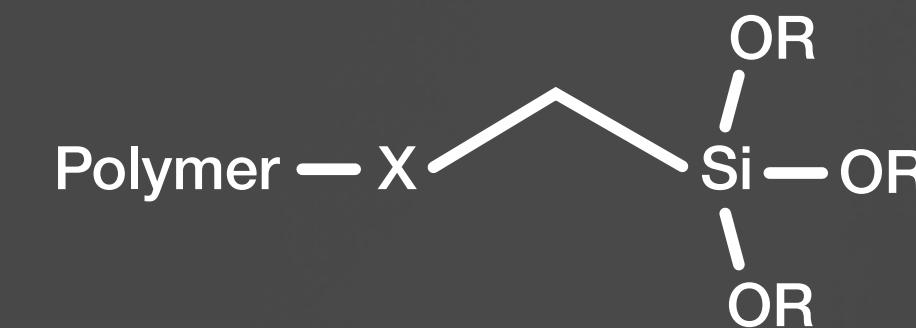
WACKER γ -Silane-Terminated Polymer



Rather than a propyl group, WACKER organofunctional α -silanes have a very short methyl or α -spacer linked to the silicon atom. As a result, the organofunctional groups are much more reactive. And the same applies to the corresponding α -silane-terminated polymers: they can cure 100 – 1,000 times faster and do not need tin catalysts.

See all benefits. [i](#)

WACKER α -Silane-Terminated Polymer



THE PERFECT FIT FOR YOUR REQUIREMENTS

Find the right GENIOSIL® product for your industry!

Adhesives

**Composites
and Fillers**

**Resin
Modification**

Aerogels

**Foundry
Applications**

**Plastics, Cables
and Compounding**

**Glass Fiber
Treatment**

Organofunctional Silanes for ADHESIVES

Organofunctional silanes are essential components in almost all adhesives. They permit good adhesion to a variety of different substrates, e.g., glass, metal and ceramics. The silanes act as crosslinkers in moisture-curing reactive adhesives and improve the physical and mechanical properties of filled and reinforced formulations. Formulations exhibit good storage stability and do not cure prematurely.

Function

- Adhesion promoter between substrates and resins
- Surface modification
- Water scavenger

Functional Group

- n-/iso-Alkyl
- Aryl
- Amino
- Vinyl
- Glycidoxyl
- Methacryl

Products by Function		i
Function	CAS Number	
Adhesion promoter	2996-92-1	
	919-30-2	
	13822-56-5	
	3069-29-2	
	5089-72-5	
	1760-24-3	
	31024-56-3	
	23843-64-3	
	3068-76-6	
	78-62-6	
	78-08-0	
	1067-53-4	
	2768-02-7	
	2602-34-8	
	2897-60-1	
	2530-83-8	
	2530-85-0	
Surface modification		
	17980-47-1	
	18395-30-7	
	35435-21-3	
	2943-75-1	
	16415-12-6	
	2996-92-1	
	919-30-2	
	13822-56-5	
	3069-29-2	
	5089-72-5	
	1760-24-3	
	31024-56-3	
	23843-64-3	
	3068-76-6	
Water scavenger		
	78-08-0	
	2768-02-7	
Functional Group	CAS Number	i
n-/iso-Alkyl	17980-47-1	
	18395-30-7	
	35435-21-3	
	2943-75-1	
Aryl	2996-92-1	
Amino	919-30-2	
	13822-56-5	
	3069-29-2	
	5089-72-5	
	1760-24-3	
	31024-56-3	
	23843-64-3	
	3068-76-6	
Vinyl	78-62-6	
	78-08-0	
	1067-53-4	
	2768-02-7	
Glycidoxyl	2602-34-8	
	2897-60-1	
	2530-83-8	
Methacryl	2530-85-0	



Organofunctional Silanes for

FOUNDRY APPLICATIONS

Many high-end metal parts for turbines, engines and more are produced in a precision casting process. A preliminary step is mold-building, in which silicates act as a source for a SiO₂-based binder. The die formed from wax is covered with a silicate-based layer via multiple dip-coating and drying steps. After thermal removal of the wax die and ceramification of the silicate-based layer, the mold can finally be filled with liquid metal.

Function

- Crosslinker and reactive binder
- Precision casting

Functional Group

- Silicates

Products by Function	
Function	CAS Number
Crosslinker	78-10-4
	11099-06-02
	-
	-

Products by Organofunctional Group	
Functional Group	CAS Number
Silicates	78-10-4
	11099-06-02
	-
	-

Organofunctional Silanes for COMPOSITES AND FILLERS

Composite materials (in short: “composites”) are made from two or more constituent materials with significantly different physical or chemical properties. One material constitutes the matrix, into which reinforcing fillers are embedded to add specific properties to the composite.

Within the composite, the individual materials remain separate on a macroscopic scale. To improve matrix / filler interaction and compatibility, functional silanes are added. This is especially important when using inorganic fillers in an organic resin matrix. Filler systems in composites can be either isotropic powder-like systems or anisotropic fiber-like materials.

Function

- Adhesion promoter between matrix and filler
- Surface modification
- Water scavenger

Functional Group

- n-/iso-Alkyl
- Amino
- Vinyl
- Glycidoxyl
- Methacryl

Products by Function	
Function	CAS Number
Adhesion promoter	919-30-2
	13822-56-5
	3069-29-2
	5089-72-5
	1760-24-3
	31024-56-3
	23843-64-3
	3068-76-6
	78-62-6
	78-08-0
	1067-53-4
	2768-02-7
	2602-34-8
	2530-83-8
	2530-85-0
	68400-07-7
Surface modification	17980-47-1
	18395-30-7
	35435-21-3
	2943-75-1
	919-30-2
	13822-56-5
	3069-29-2
	5089-72-5
	1760-24-3
	31024-56-3
	23843-64-3
	3068-76-6
	68400-07-7
Vinyl	78-62-6
	78-08-0
	1067-53-4
	2768-02-7
Glycidoxyl	2602-34-8
	2530-83-8
Methacryl	2530-85-0
Water scavenger	16415-12-6
	78-08-0
	2768-02-7

Organofunctional Silanes for PLASTICS, CABLES AND COMPOUNDING

We offer a wide product portfolio for processing thermoplastic materials and silicone rubber compounds. Our specialty products enable the upgrade of cost-efficient standard plastics, such as PE or PP, to higher-value plastics with enhanced or new properties by selectively modifying polymers and compounding with silane- or silicone-based additives.

Crosslinking polyethylene with vinyl silanes is the established method to produce crosslinkable compounds for high-quality cable insulation (XLPE) and durable pipe applications (PE-Xb). GENIOSIL® vinyl-silane-crosslinked polyethylene provides higher-quality end products. Donor silanes are commonly used as co-catalysts for the production of polypropylene.

Function

- Adhesion promoter between matrix and filler
- Surface modification
- Water scavenger
- Crosslinker

Functional Group

- n-/iso-Alkyl
- Cycloalkyl
- Amino
- Vinyl
- Glycidoxyl
- Methacryl

Products by Function		i
Function	CAS Number	
Adhesion promoter	919-30-2	
	13822-56-5	
	3069-29-2	
	5089-72-5	
	1760-24-3	
	31024-56-3	
	23843-64-3	
	3068-76-6	
	78-62-6	
	78-08-0	
	1067-53-4	
	1067-53-4	
	2768-02-7	
	2602-34-8	
	2530-83-8	
	2897-60-1	
	2530-85-0	
Surface modification	16415-12-6	
	919-30-2	
	13822-56-5	
	3069-29-2	
	5089-72-5	
	1760-24-3	
	31024-56-3	
	23843-64-3	
	3068-76-6	
	78-62-6	
Co-catalyst / Donor silane	78-08-0	
	1067-53-4	
	2768-02-7	
	2602-34-8	
	2897-60-1	
Water scavenger	2530-83-8	
	2530-85-0	
	17865-32-6	
	18230-61-0	
	126990-35-0	
n-/iso-Alkyl	1067-25-0	
	2550-02-9	
	78-08-0	
	2768-02-7	
Cycloalkyl	17865-32-6	
	126990-35-0	
	919-30-2	
	13822-56-5	
Amino	3069-29-2	
	5089-72-5	
	1760-24-3	
	31024-56-3	
Vinyl	23843-64-3	
	3068-76-6	
	78-62-6	
	78-08-0	
Glycidoxyl	1067-53-4	
	2768-02-7	
	2602-34-8	
	2897-60-1	
Methacryl	2530-83-8	
	2530-85-0	

Organofunctional Silanes for RESIN MODIFICATION

Organofunctional silanes are also used as co-monomers for the synthesis of synthetic polymer resins. Typical systems are vinyl acetate or acrylic dispersions or polymers such as epoxies or polyurethanes.

Incorporation of alkoxy-silane groups via a radical-emulsion polymerization reaction, for instance, yields improved substrate adhesion and higher scrub and weathering resistance in the resulting silane-modified aqueous dispersions. Incorporation of alkoxy silanes in non-aqueous systems like polyurethanes or epoxies will improve the adhesive properties of those polymers and introduce an additional moisture-curing mechanism to linear polymer systems.

Function

- Adhesion promoter between matrix and filler
- Surface modification
- Water scavenger
- Crosslinker

Functional Group

- Amino
- Vinyl
- Glycidoxy
- Methacryl

Products by Function	
Function	CAS Number
Adhesion promoter	919-30-2
	13822-56-5
	3069-29-2
	5089-72-5
	1760-24-3
	31024-56-3
	23843-64-3
	3068-76-6
	78-62-6
	78-08-0
	1067-53-4
	2768-02-7
	2602-34-8
	2897-60-1
	2530-83-8
	2530-85-0
Surface modification	919-30-2
	13822-56-5
	3069-29-2
	5089-72-5
	1760-24-3
	31024-56-3
	23843-64-3
	3068-76-6
	78-62-6
	78-08-0
	1067-53-4
	2768-02-7
	2602-34-8
	2897-60-1
	2530-83-8
	2530-85-0
Water scavenger	78-08-0
	2768-02-7

Products by Organofunctional Group	
Functional Group	CAS Number
Amino	919-30-2
	13822-56-5
	3069-29-2
	5089-72-5
	1760-24-3
	31024-56-3
	23843-64-3
	3068-76-6
Vinyl	78-62-6
	78-08-0
	1067-53-4
	2768-02-7
Glycidoxy	2602-34-8
	2897-60-1
	2530-83-8
Methacryl	2530-85-0

Organofunctional Silanes for

GLASS FIBER TREATMENT

During the glass fiber manufacturing process, fiber sizing is a critical step in which the freshly extruded fibers are coated with an aqueous emulsion to ensure adequate processability of the fibers and optimal composite performance. Organofunctional silanes are a key component of sizing formulations, serving as a coupling agent between the fiber and the matrix in glass-reinforced composite products.

To facilitate adhesion between the glass fiber and the matrix, organofunctional silanes with different functionalities are available for co-reaction with various thermosetting resins. By chemically modifying the fiber surface, organofunctional silanes also improve fiber wetting by the surrounding matrix.

Function

- Adhesion promoter between fiber and matrix
- Surface modification

Functional Group

- Amino
- Vinyl
- Glycidoxyl
- Methacryl

Products by Function		i	Products by Organofunctional Group		i
Function	CAS Number		Functional Group	CAS Number	
Adhesion promoter	919-30-2		Amino	919-30-2	
	1760-24-3			1760-24-3	
	23843-64-3			23843-64-3	
	78-08-0			68400-07-7	
	2768-02-7		Vinyl	78-62-6	
	2602-34-8			78-08-0	
	2530-83-8			2768-02-7	
	2530-85-0		Glycidoxyl	2602-34-8	
	2897-60-1			2530-83-8	
	68400-07-7			2897-60-1	
Surface modification	919-30-2		Methacryl	2530-85-0	
	1760-24-3				
	23843-64-3				
	78-08-0				
	2768-02-7				
	2602-34-8				
	2530-83-8				
	2530-85-0				
	2897-60-1				

Organofunctional Silanes for AEROGELS

Silica aerogels are among those material concepts which combine some very extreme product properties: low material densities, low thermal conductivity, low optical refractive index and low dielectric constant, combined with high temperature resistance.

In the manufacturing process, silicate-based resins are typically hydrolyzed and condensed in a specific way and afterwards treated with reactive silanes providing hydrophobicity.

Typical silanes used for network buildup are GENIOSIL® TE 28 and GENIOSIL® TE 40.

Function

- Crosslinker
- Surface modification

Functional Group

- M1 silanes
- Silicates

Products by Function		i	Products by Organofunctional Group		i
Function	CAS Number		Functional Group	CAS Number	
Surface modification	1112-39-6		M1 silanes	1112-39-6	
	78-62-6			78-62-6	
	2031-67-6			2031-67-6	
	1185-55-3			1185-55-3	
	99-97-3			99-97-3	
	78-10-4			78-10-4	
	11099-06-02		Silicates	11099-06-02	

PRODUCT OVERVIEW

Organofunctional Silanes Product Portfolio					
Functional Group	Chemical Name	CAS Number	WACKER Product Name	Function	Application
n-/iso-Alkyl	i-Butyltriethoxysilane	17980-47-1	GENIOSIL® IBTE	Surface modification	Adhesives, composites & fillers
	i-Butyltrimethoxysilane	18395-30-7	GENIOSIL® IBTM		
	i-Octyltriethoxysilane	35435-21-3	GENIOSIL® IOTE		
	n-Octyltriethoxysilane	2943-75-1	GENIOSIL® NOTE	Surface modification	Adhesives, plastics, cables & compounding, composites & fillers
	n-Hexadecyltrimethoxysilane	16415-12-6	WACKER® SILANE 25013 VP / GENIOSIL® HDTM		
	n-Hexadecyltrimethoxysilane	16415-12-6	WACKER® SILANE HD-TRIMETHOXY / GENIOSIL® HDTM-T		
	n-Propyltrimethoxysilane ("Donor")	1067-25-0	GENIOSIL® NPTM	Surface modification, co-catalyst / donor silane	Plastics, cables & compounding
	n-Propyltriethoxysilane ("Donor")	2550-02-9	GENIOSIL® NPTE		
	Diisopropylmethoxysilane ("Donor P")	18230-61-0	WACKER® SILANE IP2 DIMETHOXY		
Cycloalkyl	(Cyclohexyl)methyldimethoxysilane ("Donor C")	17865-32-6	WACKER® SILANE CHM DIMETHOXY	Co-catalyst / donor silane	Plastics, cables & compounding
	Dicyclopentyldimethoxysilane ("Donor D")	126990-35-0	WACKER® SILANE CP2 DIMETHOXY / GENIOSIL® DCPDM		
Aryl	Phenyltrimethoxysilane	2996-92-1	GENIOSIL® PTM	Surface modification, adhesion promotion	Adhesives
Amino	3-Aminopropyltriethoxysilane	919-30-2	GENIOSIL® APTE	Adhesion promotion, Surface modification	Adhesives, composites & fillers, glass fibers, plastics, cables & compounding, resin modification
	3-Aminopropyltriethoxysilane	919-30-2	GENIOSIL® APTE SQ		
	3-Aminopropyltrimethoxysilane	13822-56-5	GENIOSIL® APTM		
	N-(2-Aminoethyl)-3-aminopropylmethoxymethylsilane	3069-29-2	GENIOSIL® DAPDM		
	N-(2-Aminoethyl)-3-aminopropyltriethoxysilane	5089-72-5	GENIOSIL® GF 94 / GENIOSIL® DAPTE		
	N-(2-Aminoethyl)-3-aminopropyltrimethoxysilane	1760-24-3	GENIOSIL® GF 91 / GENIOSIL® DAPTM		
	N-Butyl-3-aminopropyltrimethoxysilane	31024-56-3	GENIOSIL® BAPTM		
	3-Ureidopropyltrimethoxysilane	23843-64-3	GENIOSIL® UPTM		
	N-Phenyl-3-aminopropyltrimethoxysilane	3068-76-6	GENIOSIL® PAPTM		
	Amino-functional hydrolysate compound	68400-07-7	GENIOSIL® 9151	Adhesion promotion	Composites & fillers, glass fiber

* Quality not identical to TES 40, evaluation recommended ** Not available in EMEA *** Quality not identical to GENIOSIL® XL 10, evaluation recommended

PRODUCT OVERVIEW

Organofunctional Silanes Product Portfolio						
Functional Group	Chemical Name	CAS Number	WACKER Product Name	Function	Application	
M1 Silanes	Dimethyldimethoxysilane	1112-39-6	WACKER® SILANE M2-DIMETHOXY / GENIOSIL® DMDM	Surface modification	Adhesives, aerogel	
	Dimethylmethoxysilane	78-62-6	WACKER® SILANE M2-DIETHOXY / GENIOSIL® DMDE			
	Methyltriethoxysilane	2031-67-6	WACKER® SILANE M1-TRIETHOXY / GENIOSIL® MTE			
	Methyltrimethoxysilane	1185-55-3	WACKER® SILANE M1-TRIMETHOXY / GENIOSIL® MTM	Aerogel		
	Hexamethyldisilazan	99-97-3	WACKER® SILAZAN HMN / GENIOSIL® HMDSZ			
Silicates	Tetraethyl orthosilicate	78-10-4	WACKER® SILICATE TES 28 / GENIOSIL® TE 28	Crosslinker	Foundry, aerogel, precision casting	
	Polymeric ethyl silicate	11099-06-02	WACKER® SILICATE TES 40 WN / GENIOSIL® TE 40*			
	Polymeric ethyl silicate in ethanol	-	SILESTER® AR			
	Polymeric ethyl silicate in propanol	-	SILESTER® XAR			
Vinyl	Vinylmethyldimethoxysilane	78-62-6	GENIOSIL® XL 12 / GENIOSIL® VMDM	Adhesion promotion, surface modification	Resin modification, plastics, cables & compounding, glass fiber, composites & fillers, adhesives	
	Vinyltris-(2-methoxyethoxy)silane	1067-53-4	GENIOSIL® VTME**			
	Vinyltriethoxysilane	78-08-0	GENIOSIL® GF 56 / GENIOSIL® VTE	Adhesion promotion, surface modification, water scavenger		
	Vinyltrimethoxysilane	2768-02-7	GENIOSIL® XL 10 / GENIOSIL® VTM***			
Glycidoxy	3-Glycidoxypropyltriethoxysilane	2602-34-8	GENIOSIL® GPTE	Adhesion promotion, surface modification	Resin modification, plastics, cables & compounding, glass fiber, composites & fillers, adhesives	
	3-Glycidoxypropyltrimethoxysilane	2530-83-8	GENIOSIL® GPTM			
	3-Glycidoxypropyltrimethoxysilane	2530-83-8	GENIOSIL® GPTM SQ			
	3-Glycidoxypropylmethyldiethoxysilane	2897-60-1	GENIOSIL® GPDE			
Methacryl	3-Methacryloxypropyltrimethoxysilane	2530-85-0	GENIOSIL® MPTM	Adhesion promotion, surface modification	Resin modification, plastics, cables & compounding, glass fiber, composites & fillers, adhesives	
	3-Methacryloxypropyltrimethoxysilane	2530-85-0	GENIOSIL® MPTM SQ			

* Quality not identical to TES 40, evaluation recommended ** Not available in EMEA *** Quality not identical to GENIOSIL® XL 10, evaluation recommended

THE WACKER ACADEMY

CONNECTING THE BEST

The global forum for learners, networkers, creators and discoverers

WACKER ACADEMY offers cutting-edge expertise for regional markets. Participants can meet and swap experiences with colleagues from similar areas – at 14 locations around the world.



CREATING TOMORROW'S SOLUTIONS

A Diverse Array of Products for Growing Markets

Our product portfolio ranges from silicones, binders and polymeric additives all the way up to bioengineered pharmaceutical actives. Rounding these out is hyperpure silicon for semiconductors and solar applications.

Innovations That Improve Quality of Life

Resource scarcity, climate change, urbanization: the challenges of our time demand new responses. In our search for solutions, we invest some 3.5% of our annual sales in research and development. With their emphasis on using energy efficiently and protecting the climate and our environment, our products are already improving quality of life for people all over the world.

Global Knowledge for Local Markets

When you work with WACKER, you have 100 years of chemistry expertise at your disposal, with access to the research findings and best practices of our experts throughout the world. Our knowledge base consists of a network of 22 technical centers, 14 training centers and our basic research center.

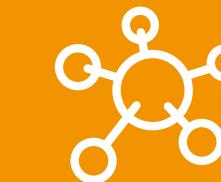
And most importantly: we are there wherever you need us – worldwide. Our local specialists know your markets and speak your language. Working with them, you will find innovative solutions that win over your customers and make you more competitive.

Follow us:

Find us on LinkedIn, YouTube, X and Instagram, where we'll keep you up to date on the latest and discuss current issues with you.



All figures are based on fiscal 2023.



Silicones and Polymers

3,200 specialty products from organic and inorganic chemistry



Global Market Leader

In dispersions and dispersible polymer powders based on vinyl acetate-ethylene (VAE), in building-protection silicones and in the production of cyclodextrin and cystein.



Globally Active

- Sites worldwide
- Headquartered in Munich
- 27 production sites in Europe, Asia and the Americas
- 22 technical centers
- 14 WACKER ACADEMY training centers
- 48 sales offices



Employees: 16,400



Total Sales

€6.4 billion

WACKER

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