Si
siloxene

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Siloxene Product

OVERVIEW

Siloxene Technology at a Glance

2025

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WE BUILD
MOLECULES
SO YOU CAN
BUILD THE
FUTURE
DISCOVER
SILOXENE'S
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TECHNOLOGY

Siloxene Technology at a Glance

THE REVOLUTIONARY Q-T POLYSILOXANE SYSTEM

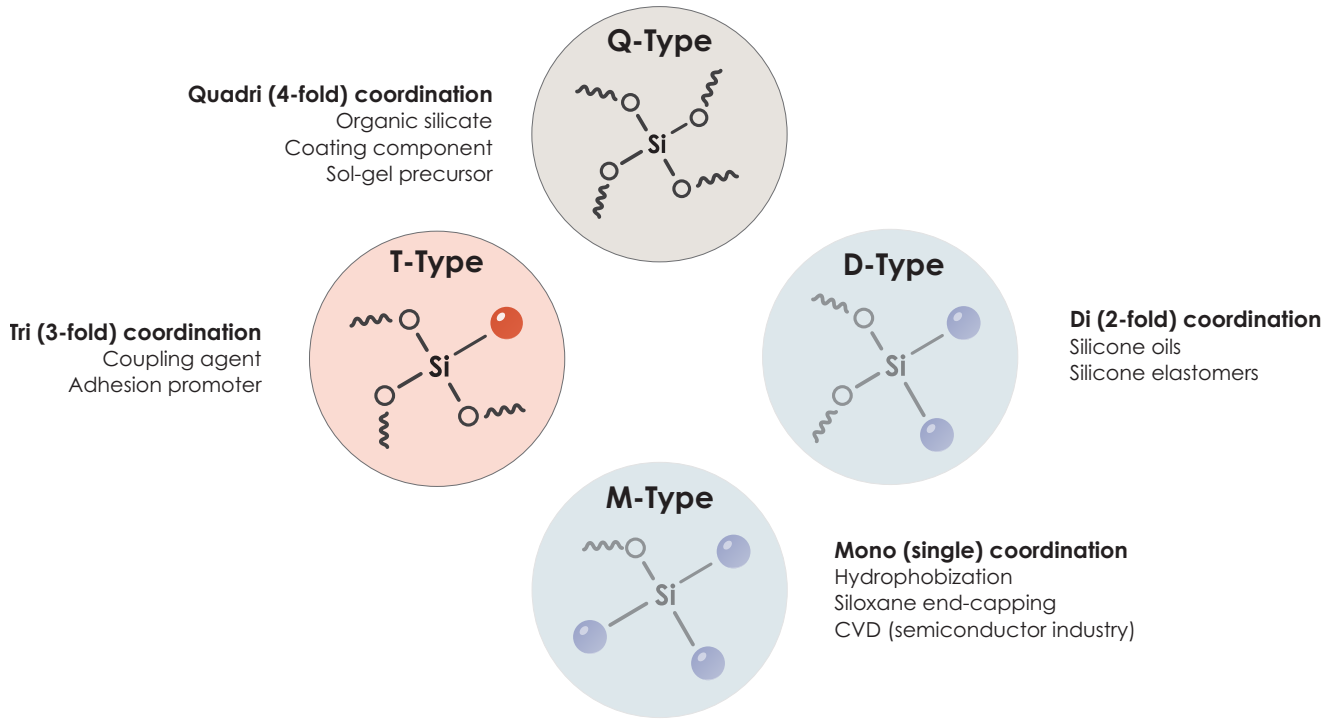
At siloxene, we have developed **a new class of hybrid inorganic/organic polysiloxane resins** comprising a non-functional silicate carrier and specifically tailored organic functionalities to enable various application benefits.

Our products feature a Q-type ethyl silicate "core/carrier" decorated with a "shell" of T-type functional silanes. The robust carrier is partly polymerized, leading to fast curing and controlled adhesion onto substrates.

Thanks to their dendritic molecular architecture and unique organo-polysiloxane hybrid chemistry, siloxene products are the ideal solution for tuning material properties and interface behavior across a broad range of applications, thus significantly outperforming conventional silane products.

Q, T, D, M, TERMINOLOGY OF SILANES

Siloxene materials are a new class of functional polymer silanes. They consist of a **dendritic Q-type ethyl silicate carrier grafted with T-type silanes**. This structure differs from traditional silicone resins (*often also referred to as polysiloxanes)* which are composed of D-type and T-type silane units. Conventional silicone oils and fluids, derived from D-type moieties, are subject to growing regulations due to their persistent, bio-accumulative and potentially hazardous nature while Q-T polysiloxanes are non-hazardous in nature and are generally silicone-free.



Technology Advantages

The siloxene technology platform features "●" functionalized Q-T polysiloxane compounds which are available in 5 distinct product families (i.e. XenCure™, XenSlick™, XenLink™, XenBlu™ and XenRes™). Whether it is **reactive or hydrophobic properties** you are looking for, we have a solution for you. The siloxene portfolio offers a wide spectrum of functionalities, **allowing us to tailor to many applications**. Furthermore, we offer hybrid solutions in which the "●" functional groups allow for the embedding of the polysiloxanes into different resin systems, including isocyanate, epoxy, acrylate and silane terminated polymers (STPs).

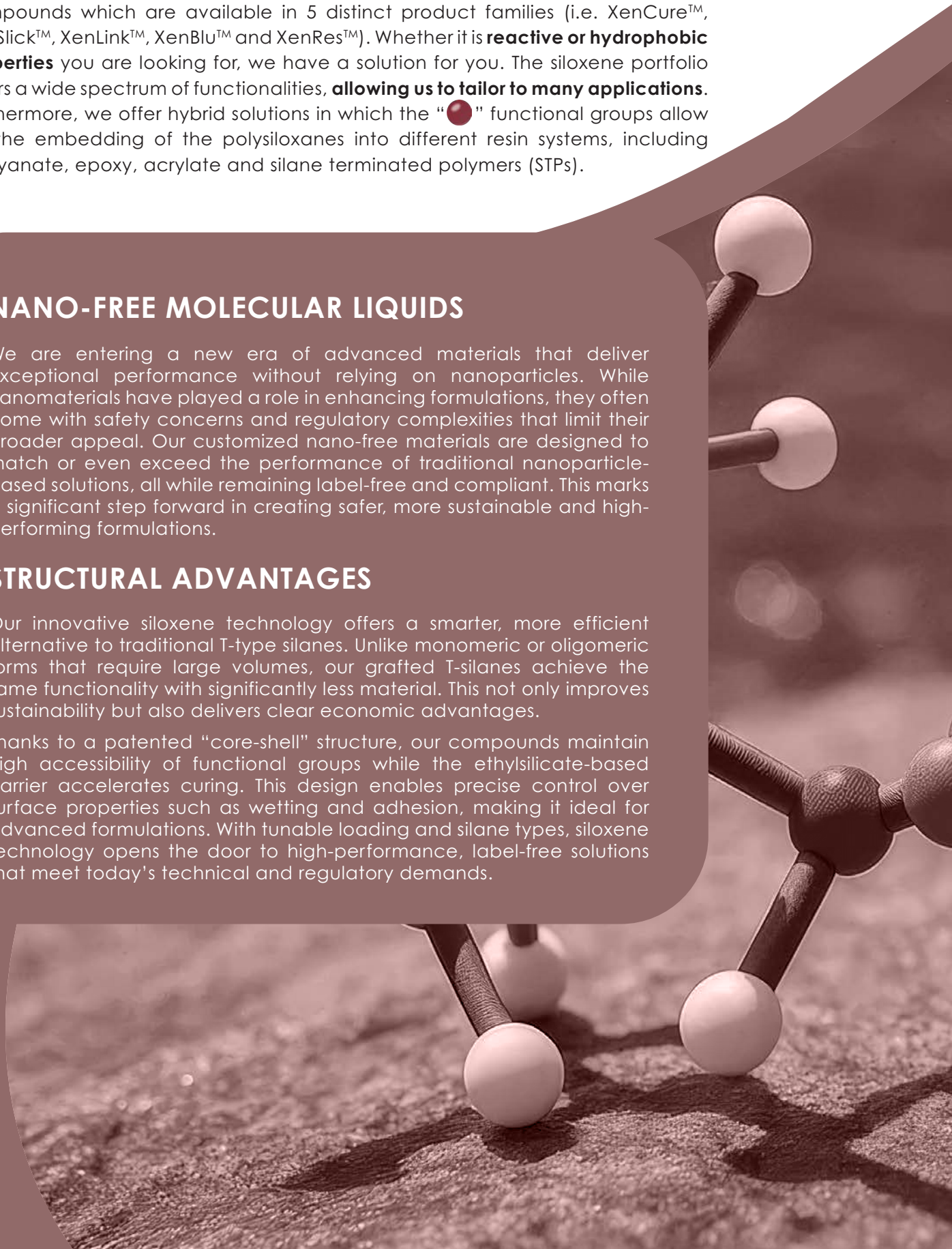
NANO-FREE MOLECULAR LIQUIDS

We are entering a new era of advanced materials that deliver exceptional performance without relying on nanoparticles. While nanomaterials have played a role in enhancing formulations, they often come with safety concerns and regulatory complexities that limit their broader appeal. Our customized nano-free materials are designed to match or even exceed the performance of traditional nanoparticle-based solutions, all while remaining label-free and compliant. This marks a significant step forward in creating safer, more sustainable and high-performing formulations.

STRUCTURAL ADVANTAGES

Our innovative siloxene technology offers a smarter, more efficient alternative to traditional T-type silanes. Unlike monomeric or oligomeric forms that require large volumes, our grafted T-silanes achieve the same functionality with significantly less material. This not only improves sustainability but also delivers clear economic advantages.

Thanks to a patented "core-shell" structure, our compounds maintain high accessibility of functional groups while the ethylsilicate-based carrier accelerates curing. This design enables precise control over surface properties such as wetting and adhesion, making it ideal for advanced formulations. With tunable loading and silane types, siloxene technology opens the door to high-performance, label-free solutions that meet today's technical and regulatory demands.



Discover our Products

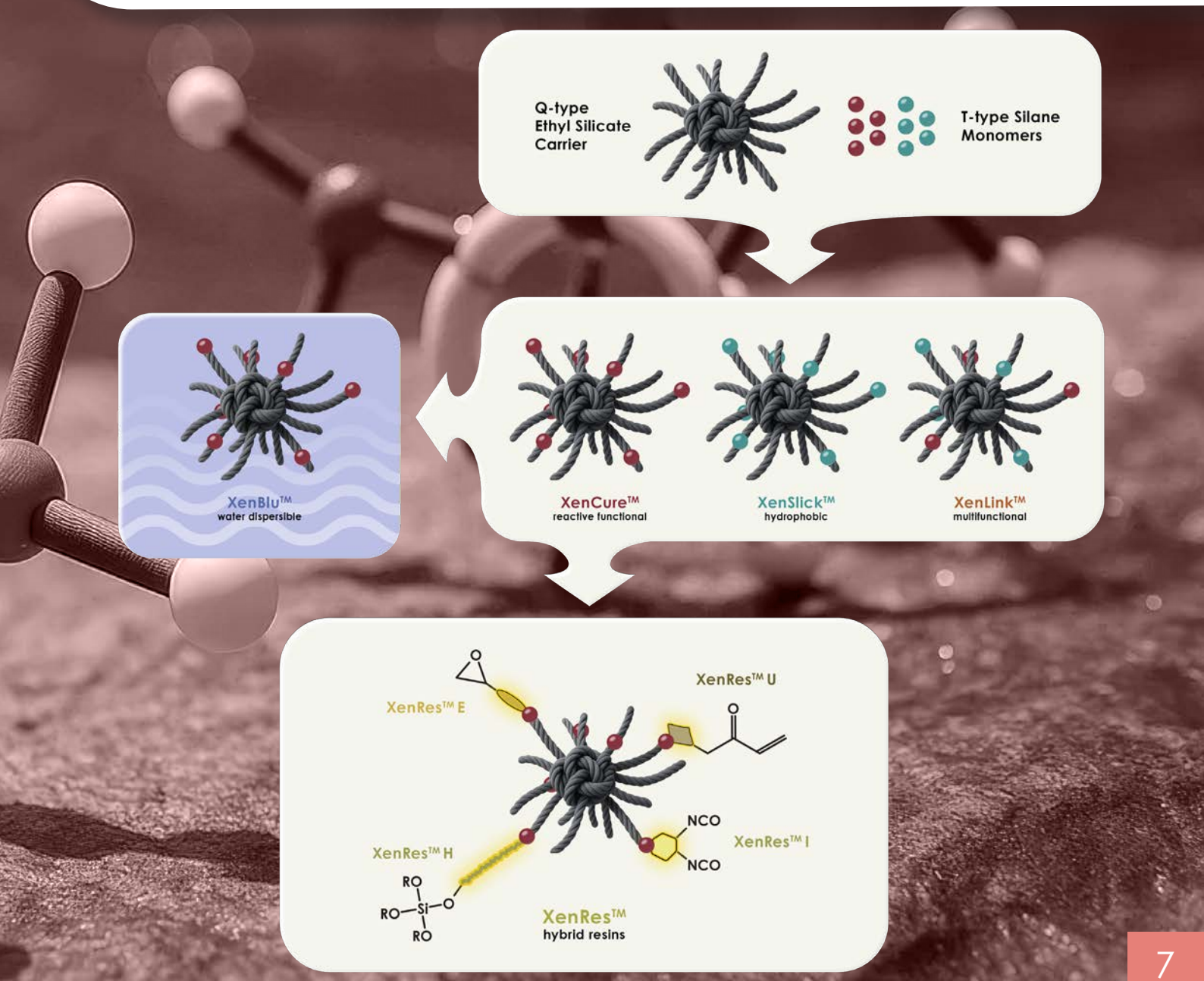
XenCure™ products consist of Q-T polysiloxanes containing reactive functional groups. These products make for outstanding additives in reactive curing systems.

XenSlick™ products consist of Q-T polysiloxanes containing non-reactive alkyl or other hydrophobic functional groups. These products show excellent hydrophobic character and can be used as emulsifiers or defoamers.

XenLink™ products consist of Q-T polysiloxanes containing at least one reactive functional group and one hydrophobic functional group, yielding reactive-hydrophobic compounds with amphiphilic character.

XenBlu™ products consist of Q-T polysiloxanes engineered with modified reactive functional groups, enabling full water dispersibility and excellent dispersion stability.

XenRes™ products consist of reactive Q-T polysiloxanes combined with an active resin component to form a hybrid polysiloxane resin (e.g. STP, epoxy, acrylate or isocyanate resin).



XenCure™

Reactive functional Q-T polysiloxane materials

XenCure™ materials are Q-T polysiloxane dendrimer resins based on polymeric **ethylsilicate with grafted organo-silane reactive functional groups**. They are low viscosity, almost odorless liquids with very low vapor pressure and high flash points.

The functionality type, functional group loading and silica content of the Q-T polysiloxanes **can all be customized** to meet your specific needs. Whether you need a single functionality or you want to combine several types into one product, we offer individualized, custom-tailored solutions.

PERFORMANCE BENEFITS

The XenCure™ product family is designed to offer improved adhesion and curing characteristics in organic resins and polymer systems. Specifically, the products excel in the following aspects:

- Fast cure speed
- Crosslinking ability
- Improved wetting and adhesion on metal and mineral substrates
- Compatibilization between polymer resin and inorganic substrate or filler matrix
- Boosting mechanical properties and durability of product formulations

APPLICATIONS

XenCure™ products are highly versatile and suitable for numerous applications. We particularly recommend them as formulation ingredient for the following applications:

- Crosslinker, adhesion promoter and toughness modifier in adhesives and sealants
- Coupling agent and crosslinker in rubber and elastomer compounds
- Binder and reactive diluent in mineral filled moisture curing formulations
- Surface modifier for fillers and sizing / finish ingredient in fiber and textiles
- Processing aid and reactive crosslinker in polymer processing
- Additive for thermoplastics processing and in hot melt adhesives

PRODUCT RANGE

XenCure™ products and their corresponding functionalities include:

• XenCure™ A	primary amino
• XenCure™ A1/A2/A9	secondary amino
• XenCure™ 2A	aminoethyl-amino
• XenCure™ S	mercapto
• XenCure™ V	vinyl
• XenCure™ G	glycidoxy/modified glycidoxy
• XenCure™ U	methacryloxy

All XenCure™ products are available with functional group loadings ranging from 0.15 to 1.70 mmol/g and silica contents between 34% and 46%.

XenSlick™

Alkyl–, aryl–functional Q-T polysiloxane materials

XenSlick™ products are Q-T polysiloxane dendrimer resins based on **polymeric ethylsilicate with grafted non-reactive functionalities**. They are similar to XenCure™ materials but differ in the functionality of the grafted T-silane moieties: XenSlick™ products bear hydrophobic alkyl/aryl groups instead of reactive functional ones.

The functionality, functional group loading and silica content of the Q-T polysiloxanes can all be customized to meet your specific needs, including multi-functionality.

PERFORMANCE BENEFITS

The XenSlick™ product family is designed to introduce hydrophobic properties while improving adhesion properties. Specifically, XenSlick™ products excel in the following aspects:

- Self-emulsification
- Enhanced surface properties in coatings
- Defoaming properties
- Oil in water / water in oil compatible
- Cold processing ability (e.g. emulsifier in cosmetics formulations)

APPLICATIONS

XenSlick™ compounds can be employed in a variety of different applications. We particularly recommend them for the following uses:

- Active hydrophobe:
  - Surface protection
  - Cement hydrophobization
- Emulsifier
  - Water-based emulsions
  - Dispersant
- Additive in coatings, lacquers and varnishes to enhance
  - Scratch and abrasion resistance
  - Surface properties (gloss, friction, surface free energy)
- Additive for thermoplastic processing, hot melts, etc.

PRODUCT RANGE

XenSlick™ products and their corresponding functionalities include:

• XenSlick™ M	methyl
• XenSlick™ P	propyl
• XenSlick™ iB	iso-butyl
• XenSlick™ O	octyl
• XenSlick™ iO	iso-octyl
• XenSlick™ X	dodecyl
• XenSlick™ R	phenyl

All XenSlick™ products are available with functional group loadings ranging from 0.15 to 1.70 mmol/g and silica contents between 34% and 46%.

XenLink™ and Multifunctionality

Mixed functionality Q-T polysiloxane materials

EXPANDING YOUR OPTIONS

The siloxene platform offers customized solutions to bring together **several functionalities in one product**. Whether you are looking for two reactive functionalities, an **amphiphilic solution** or two hydrophobic functionalities, our product platform can be adjusted to meet your needs.

XenCure™ Multifunctional Products

Multifunctional XenCure™ products can be combined using any of the standard reactive functional group options. Examples include:

- XenCure™ UA methacryloxy / primary amino
- XenCure™ VS vinyl / mercapto
- XenCure™ UG methacryloxy / glycidoxy

XenSlick™ Multifunctional Products

Multifunctional XenSlick™ products can be combined using any of the standard non-reactive functional group options. Examples include:

- XenSlick™ MO methyl / octyl
- XenSlick™ iBO iso-butyl / octyl
- XenSlick™ MR methyl / phenyl

XenLink™ Multifunctional Products

XenLink™ products are combinations comprising at least one reactive (XenCure™) and one hydrophobic functionality (XenSlick™). Examples include:

- XenLink™ AO amino / octyl
- XenLink™ SR mercapto / phenyl
- XenLink™ GM glycidoxy / methyl

XenBlu™

Water dispersible Q-T polysiloxanes

XenBlu™ is a new class of Q-T polysiloxane dendrimers available both as:

- Water-dispersible, ready to use resins as a concentrate for facile preparation of colloidal dispersions
- Premade aqueous colloidal dispersions with defined particle size.

These colloidal **translucent dispersions**, often **blueish in color,** can be prepared and diluted in water and alcohols. They offer **unprecedented control of functionality** when compared with classical colloidal silica.

Our **colloid engineering** specialists offer XenBlu™ systems with reliable chemistry, function and stability, bringing the highest performance to a range of applications.

PERFORMANCE BENEFITS

The XenBlu™ product family offers next-generation functional colloidal silica technology in the form of ready-to-use products. Key benefits include:

- Highest adhesion across metals, minerals and polymers
- Ability to control wetting, film formation, drying and durability in water-based formulations
- Good long-term stability without the use of surfactants or additives
- VOC-free, non-toxic and label-free composition
- Instant hydrolysis in water, no waiting time required

APPLICATIONS

XenBlu™ products are recommended for use in the following applications:

- Pretreatment / conversion coating for enhanced adhesion on the following substrates
  - Aluminum
  - Steel
  - Copper
  - Cement
- Size treatments for inorganic and organic fibers
- Activation of mineral materials such as oxides, cements, ceramics, etc.

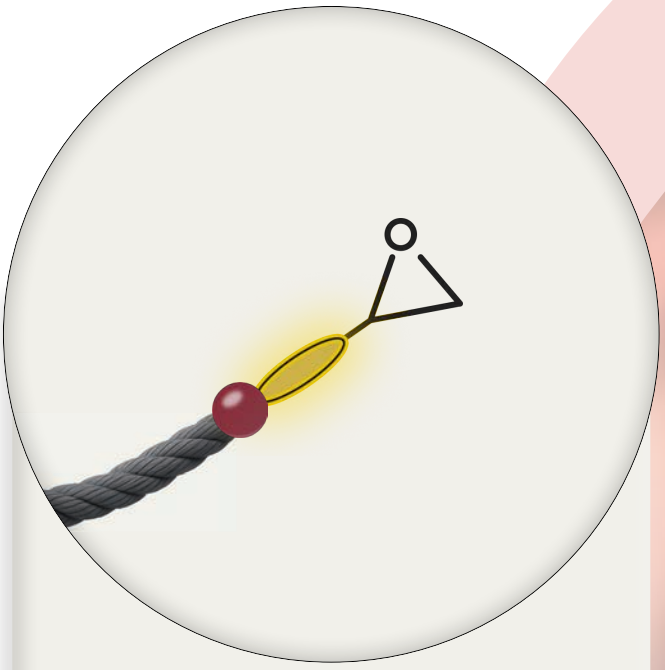
PRODUCT RANGE

XenBlu™ products include:

- XenBlu™ CDC
- XenBlu™ CD
- XenBlu™ EDC
- XenBlu™ ED

XenRes™

Hybrid organic-polysiloxane resins



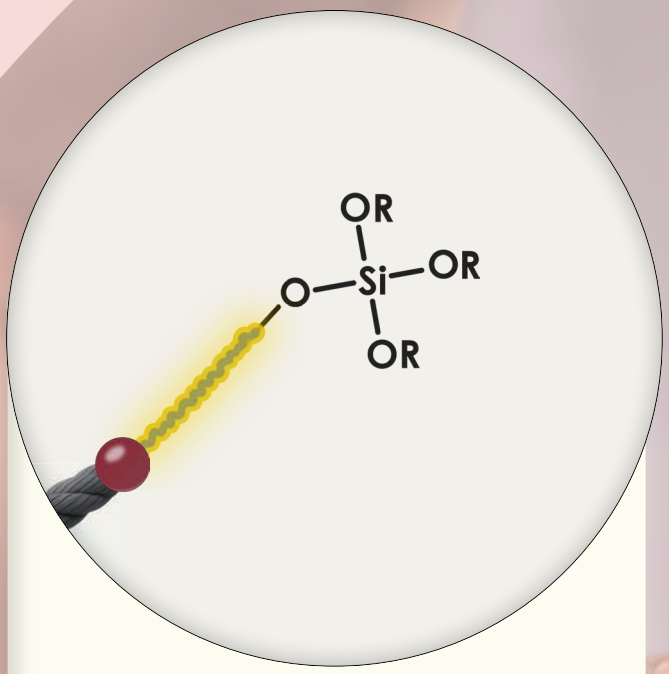
XenRes™ E

XenRes™ E is a hybrid resin, consisting of Q-T polysiloxanes modified with epoxy resins. XenRes™ E offers the following advantages:

- Crosslinking ability
- Curing speed improvement
- Multimaterial compatibilization
- Adhesion promotion

XenRes™ E products are available in various commodity resin grades, such as bisphenol-A diglycidyl ether, bisphenol-F diglycidyl ether, Novolac resins, cycloaliphatic resins and epoxidized vegetable oils. We recommend the use of XenRes™ E in all epoxy resin applications, including:

- Paints and coatings
- Adhesives
- Composites
- Electronics
- Fibre sizing



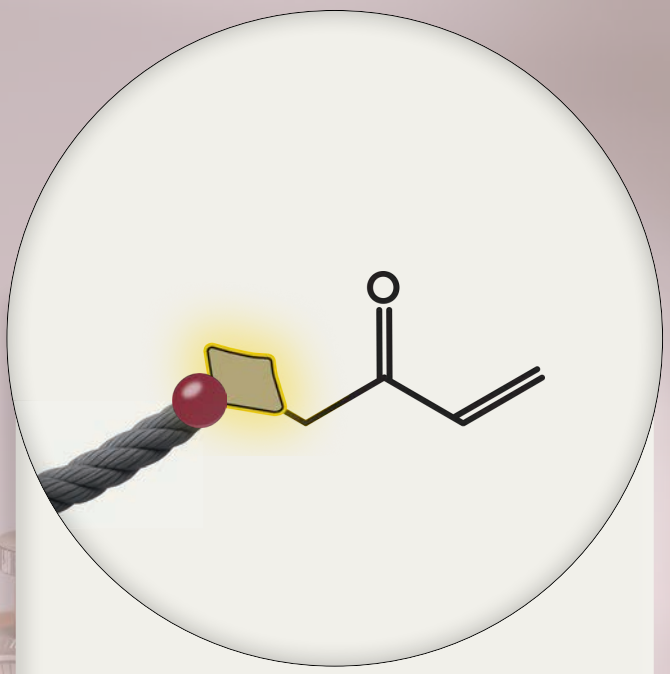
XenRes™ H

XenRes™ H is a hybrid resin featuring Q-T polysiloxane technology combined with silane terminated polymers (STP). XenRes™ H products offer the following advantages:

- Ultrafast moisture curing
- Excellent adhesion on metal, mineral and various polymer substrates
- Toughness and scratch resistance
- Organotin-free composition

XenRes™ H products are available with polyether, polyurethane, polyester and acrylic STP backbones of various molecular weights, featuring different terminal groups (di and trimethoxysilyl terminations) and different coupling chemistries. We recommend the use of XenRes™ H in all STP applications, including:

- Primers
- Adhesives and sealants
- Paints and coatings
- Ambient, moisture curing binder chemistry



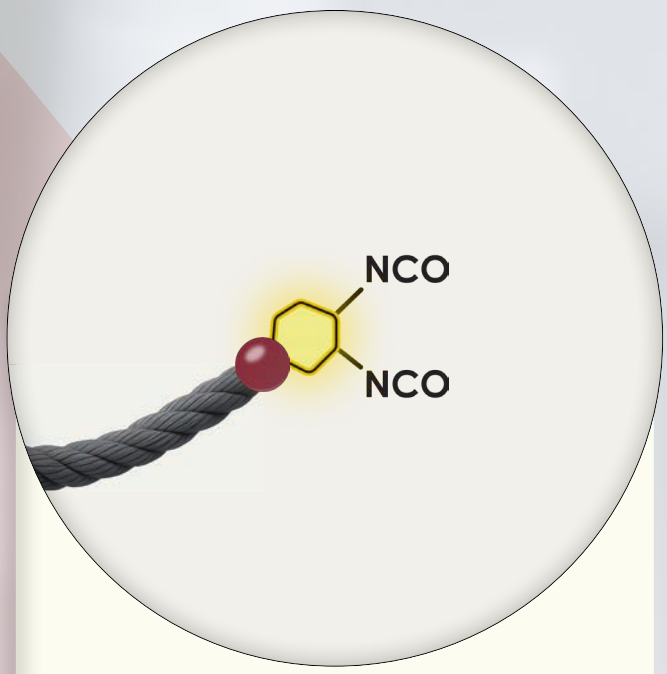
XenRes™ U

XenRes™ U is a hybrid resin combining our polysiloxane technology with acrylate or methacrylate building blocks. XenRes™ U offers the following advantages:

- High crosslinking ability
- Cure speed improvement in radical polymerization binders
- Compatibilization between polymer resin and inorganic substrate or filler matrix
- Improved substrate adhesion

XenRes™ U products are available in many variations based on common diacrylate, triacrylate and trimethacrylate reactive diluent precursors. We recommend the use of XenRes™ U in UV and radical cure formulations, including:

- UV light curable photopolymers
- 3D printable resins
- Paints, coatings and lacquers
- Packaging inks
- Interface compatibilizer in mineral-filled radical cure preparations such as unsaturated polyester or vinyl ester resins



XenRes™ I

XenRes™ I is a hybrid resin consisting of our polysiloxane technology modified with isocyanate chemistry. XenRes™ I offers the following advantages:

- Ultra-low monomer content
- Improved cure speed
- Built-in adhesion promoter functionality
- Excellent mechanical properties

XenRes™ I products are available in the form of reactive adducts with most common isocyanate building blocks such as biurets, trimers or oligomers of IPDI, HDI, TDI and MDI. We recommend their use in polyurethane, polyurea and polyamide based applications, including:

- Paints and coatings
- Adhesives
- 1K and 2K polyurethane systems
- Polyurethane foams
- Polyaspartic coatings

Product Family Specifications

XenCure™

Reactive functional Q-T polysiloxane materials

Properties	XenCure™ A	XenCure™ A1/A2/A9	XenCure™ 2A	XenCure™ S
Functionality	Primary amino	Secondary amino	Aminoethyl-amino	Mercapto
Viscosity [cPs]	10 - 32	10 - 32	10 - 32	10 - 32
Density [g/cm³]	1.06 - 1.13	1.07 - 1.13	1.07 - 1.13	1.07 - 1.15
Molecular weight [g/mol]	2000 - 4500	2000 - 4500	2000 - 4500	2000 - 4500
Refractive index	1.406 - 1.415	1.405 - 1.413	1.405 - 1.413	1.408 - 1.417
Functional group loading [mmol/g]	0.15 - 1.66	0.15 - 1.50	0.15 - 1.52	0.15 - 1.62
Gardner color	< 3	< 3	< 3	< 3
Flash point [°C]	> 61	> 61	> 61	> 61
Acid-base spectrum*	B	B	B	B
Moisture sensitivity**	◊◊◊◊	◊◊◊◊	◊◊◊◊	◊◊◊◊

Properties	XenCure™ V	XenCure™ G	XenCure™ U
Functionality	Vinyl	Glycidoxy	Methacryloxy
Viscosity [cPs]	12-32	14-32	14-32
Density [g/cm³]	1.05 - 1.10	1.03 - 1.08	1.04 - 1.08
Molecular weight [g/mol]	2000 - 4500	2000 - 4500	2000 - 4500
Refractive index	1.404 -1.412	1.408 - 1.415	1.410 - 1.421
Functional group loading [mmol/g]	0.15 - 1.75	0.15 - 1.52	0.15 - 1.49
Gardner color	< 4	< 5	< 4
Flash point [°C]	> 61	> 61	> 61
Acid-base spectrum*	N	N	N
Moisture sensitivity**	◊	◊◊	◊

***** Acidic = **A;** Neutral = **N;** Basic = **B**
****** Not sensitive = ◊; High moisture reactivity= ◊◊◊◊


SHORE A
0
10
20
30
40
50
60
70
80
90
SAUTER

XenSlick™

Alkyl– aryl–functional Q-T polysiloxane materials

Properties	XenSlick™ M	XenSlick™ P	XenSlick™ R	XenSlick™ iB	XenSlick™ O	XenSlick™ iO
Functionality	Methyl	Propyl	Phenyl	iso-Butyl	Octyl	iso-Octyl
Viscosity [cPs]	10 - 32	10 - 32	10 - 32	10 - 32	10 - 32	10 - 32
Density [g/cm^3]	0.99 - 1.03	1.08 - 1.12	1.02 - 1.06	0.97 - 1.01	1.05 - 1.09	0.96 - 1.01
Molecular weight g/mol)	2000 - 4500	2000 - 4500	2000 - 4500	2000 - 4500	2000 - 4500	2000 - 4500
Refractive index	1.401 - 1.408	1.403 - 1.410	1.422 - 1.427	1.403 - 1.410	1.404 - 1.412	1.404 - 1.411
Functional group loading [mmol/g]	0.15 - 1.79	0.15 - 1.59	0.15 - 1.61	0.15 - 1.56	0.15 - 1.43	0.15 - 1.43
Gardner color	< 3	< 3	< 3	< 4	< 3	< 3
Flash point [°C]	> 61	> 61	> 61	> 61	> 61	> 61
Acid-base spectrum*	N	N	N	N	N	N
Moisture sensitivity**	◊	◊	◊	◊	◊	◊

XenRes™

Organic-resin polysiloxane hybrids

Properties	XenRes™ H	XenRes™ I	XenRes™ U	XenRes™ E
Resin type	Silane terminated polymer	Isocyanate	Acrylate/ metharylate	Epoxy
Viscosity [cPs]	5000 - 40000	1500 - 5000	50 - 230	3000 - 12000
Density [g/cm^3]	1.06 - 1.13	1.09 - 1.17	1.04 - 1.11	1.15 - 1.25
Refractive index	1.423 - 1.438	1.454 - 1.458	1.432 - 1.443	1.555 - 1.560
Gardner color	< 4	< 10	< 3	< 3
Flash point [°C]	> 90	> 80	> 90	> 90
Moisture sensitivity**	◊◊◊◊	◊◊◊◊	◊◊	◊◊◊
Light sensitivity***	◊	◊◊	◊◊◊◊	◊

***** Acidic = **A;** Neutral = **N;** Basic = **B**
****** Not sensitive = **◊;** High moisture reactivity= **◊◊◊◊**
******* Not sensitive = **◊**; High light reactivity=**◊◊◊◊**

Product Solubility

Solubility in *	XenCure™	XenSlick™	XenLink™	XenRes™ H	XenRes™ I	XenRes™ U	XenRes™ E
Alcohols	+	+	+	+	◊	◊	+
Aliphatic hydrocarbons	+	+	+	+	◊	+	◊
Aromatic hydrocarbons	+	+	+	+	◊	+	+
Esters	+	+	+	+	+	◊	◊
Ethers	+	+	+	+	◊	◊	◊
Glycols	◊	◊	◊	◊	◊	◊	◊
Ketones	+	+	+	+	+	+	+
Acetic acid	+	+	+	+	◊	◊	◊
NMP	+	+	+	+	◊	◊	◊
THF	+	+	+	+	◊	+	◊
Pyridine	+	+	+	+	◊	◊	◊
Chloroform	+	+	+	+	◊	+	+
DMSO	+	+	+	+	◊	+	+
Water	◊	◊	◊	◊	◊	◊	◊

*** Soluble** = +; **Incompatible** = ◊
The solubility reflects adding solvent to a polysiloxane product in a ratio 1:1 by wt.
The solubility chart is not applicable to XenBlu™ products, as they are already in a water-based form.

Notes

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