

# Dynasylan® for Paints and Coatings



  
Dynasylan®



## Dynasylan®. More Valuable to Our Customers Than a Guarantee

Products for paint and coatings are a tradition at Evonik. They have made us one of the largest and most experienced chemical suppliers to the paint and coatings market worldwide. And the same goes for Dynasylan®. For more than 50 years, our products have been important components in paint and coatings systems, and Dynasylan® is now the leading global brand of functional silanes. Thanks to the Evonik Group's own research and technical service worldwide, Evonik now possesses a large number of exclusive patents and technologies that are unique throughout the world.

Dynasylan® organofunctional silanes are produced worldwide with the utmost efficiency and cost effectiveness. The production and supply chain processes follow strict internal requirements. As a result, our quality standards conform to even the most stringent demands of the electronics, semiconductor, and solar industries.



That such carefully produced and extensively tested products are used cost-effectively in an wide range of industries can be attributed to two important factors. First, Dynasylan® has the necessary capacity for the cost-effective, large-scale manufacture of these products by means of processes that conserve energy and resources. Second, even relatively small quantities of our silanes have a positive and lasting effect on the final product's performance.

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## Growing Expectations ...

No supplier of paints or coatings changes their formulations or processes without good reason. But the industry's demands on product performance, processability, and environmental compatibility are becoming ever more stringent. Paint and coatings systems, for example, must satisfy a large number of requirements:

- longer shelf life for coating systems
- improved weathering resistance
- outstanding UV resistance
- excellent corrosion resistance
- high scratch resistance
- very good thermal stability

These requirements can seldomly be achieved using conventional options for formulating paint and coatings systems. Functional silanes, which have consistently proven their reliability in various fields of the paint and coatings industry, can help in many cases.

Because silanes are not raw materials in the traditional sense, a knowledge of their chemical behavior is a basic requirement for successfully using them in novel paint and coatings. The great strength of silanes lies in their ability to react with other components in the formulation. The use of silanes in paint and coatings systems requires intensive development. As a result, entirely new paint and coating systems can be created, and properties can be adapted to individual applications.

In this development process, the Dynasytan® brand stands for an expert partner to the paint and coatings industry. Working out solutions jointly with our customers has helped us distinguish short-lived trends from genuine added value.



## ... That Dynasylan® Fulfills

The best argument for the use of silanes in paint and coatings formulations can be put quite simply: A little bit goes a long way. Dynasylan® offers solutions to the challenges that the paint and coatings industry currently faces, whether by adapting traditional formulations to incorporate the latest technology or by providing the opportunity to design coating systems with entirely novel property profiles.

### **Trend 1: Products and processes that protect health and the environment**

There is less and less tolerance towards materials that are hazardous to human health or the environment, such as toxic solvents or chromium salts, even in critical application fields. One of the most important challenges consists of eliminating these raw materials from traditional formulations while maintaining, or even improving, the required performance profile of the paint or the coating system.

### **Trend 2: The emergence of new markets**

Life cycles of products and application fields have shortened dramatically. New applications, new sectors, and new customers have to be found faster than ever before. Intelligent development concepts help reduce time-to-market, thus providing a competitive advantage.

### **Trend 3: The challenge of globalization**

High-volume products are becoming increasingly interchangeable and are under severe price pressure as a result of aggressive international competition. A strong market position can be secured in the long term only through high quality.

### **Trend 4: Reduced system costs of coating**

If system costs are to be lowered without sacrificing performance, or even with an improvement in performance, then products and processes must be revitalized. Multifunctional Silane Systems™ allow such simplification processes, thanks to a combination of multiple chemical functionalities in a single product.





## Organic or Inorganic, Dynasylan® Binds

Many industries, but particularly the paint and coatings industry, need to bind organic with inorganic materials. Metals, fillers, and pigments often have molecular structures that are entirely different from those of resins, polymers, and latices. It is often the case that these two classes of material can be efficiently bound together only with the help of silanes. This is due to the special structure of silanes, which have dual functionalities:

- organic functionality (reacts with organic polymers, resins, and latices)
- inorganic functionality (reacts with metals, fillers, minerals, glass, oxides, ceramic materials, concrete, leather, stone, textiles, etc.)

Today's coating systems containing resins and polymers are based on standard organic carbon-hydrogen chemistry. However, the inorganic functionalities provided by Dynasylan® allow stronger adhesion to the substrate, as well as a large number of further advantages:

### 1. Improved resistance and adhesion

- stronger adhesion to a range of different materials, including challenging substrates
- improved resistance to heat and mechanical stress
- improved UV and abrasion resistance
- higher resistance to corrosion

### 2. A higher degree of crosslinking

- greater durability
- increased resistance to alternation of heat and cold, climate change etc.
- improved mechanical properties
- customization of reactivity possible (rapid or delayed reaction)

### 3. Small quantities used

- high cost efficiency due to small amounts of Dynasylan® in total formulation (only 1–5% of silane is usually necessary)
- high reactivity and small quantities

### 4. Other advantages

- sealing of inorganic surfaces
- passivation of substrates liable to corrosion
- reduction of water and chloride diffusion to the surface

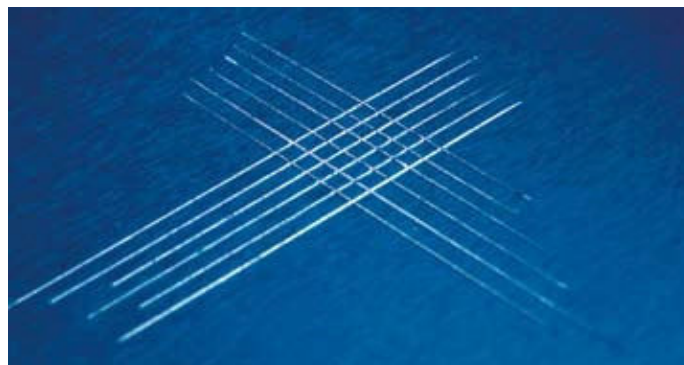
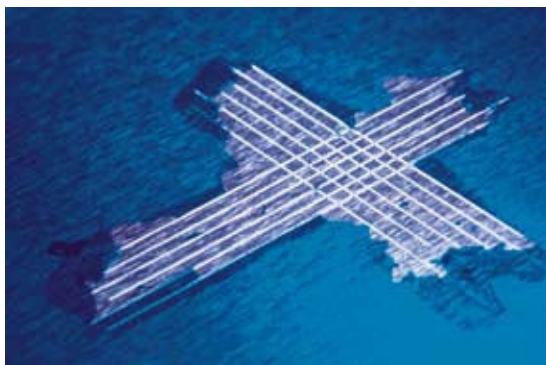


# The Use of Dynasylan® in the Paint and Coatings Industry

Dynasylan® offers the paint and coatings industry a wealth of products, such as adhesion promoters and drying agents. These are used in high-end paints and coatings systems in accordance with their functions. The Multifunctional Silane Systems™ developed by Evonik combine a number of chemical functions in a single product, that can simultaneously perform a number of tasks in the subsequent application.

Improved performance, lower complexity, simplified processing, and lower storage costs are the most important advantages offered by this new class of substances. Thanks to Evonik's broad product range, silanes make it possible to find the perfect solution to most challenges posed by paint and coatings systems:

1. Customized Multifunctional Silane Systems™ can be provided and even, if desired, optimized for special requirements. But Evonik also offers customers the option of replacing the silane systems they are already using with the newer and simpler Multifunctional Silane Systems™.
2. Water-based silane specialties eliminate the need for undesirable solvents in the production or application of coating systems. The VOC content of older formulations can be reduced with the use of water-based systems, with no deterioration and possibly even some improvement in product properties.
3. Evonik offers the broadest range of sol-gel raw materials. Both VOC-containing raw materials for special applications and purely water-based specialty products are available in commercial quantities on the metric-ton scale. No other company offers this combination from a single source.





## Silane Chemistry: The Solution to Physical Problems

In the past, a number of challenging problems in paint and coatings were of a physical nature. So it is not surprising that attempts to solve problems of adhesion, scratch resistance, and weathering resistance relied mainly on the laws of physics. Because chemical systems such as silanes had not yet found their way into the formulation of coatings, development was based mainly on organic binders or resins. The limitations of this approach were frequently apparent when these organic materials had to bond to inorganic substrates such as metals. But it was not only adhesion that left much to be desired; the cohesion of coating films or layers in the presence of in-organic fillers was also problematic.

We now know better. Our mastery of silane chemistry opens up a range of entirely new possibilities for developing high-performance coatings. But handling functional silanes is not a trivial task and

calls for rethinking research and product formulations in coating systems.

The development of conventional coating systems differs considerably from those of novel and silane-based coating systems.

The chemical behavior of the components in a formulation must be understood at least at a basic level and must be optimized for subsequent processing. The reason for this is clear. While silanes are reactive systems, allowing functionalities that have never previously been attained, they cannot simply be added to formulations because they often react with other components in the coating system. To achieve the desired coating effect and ensure optimal storage stability and viscosity, one simultaneously needs to test a number of silanes for compatibility and performance.





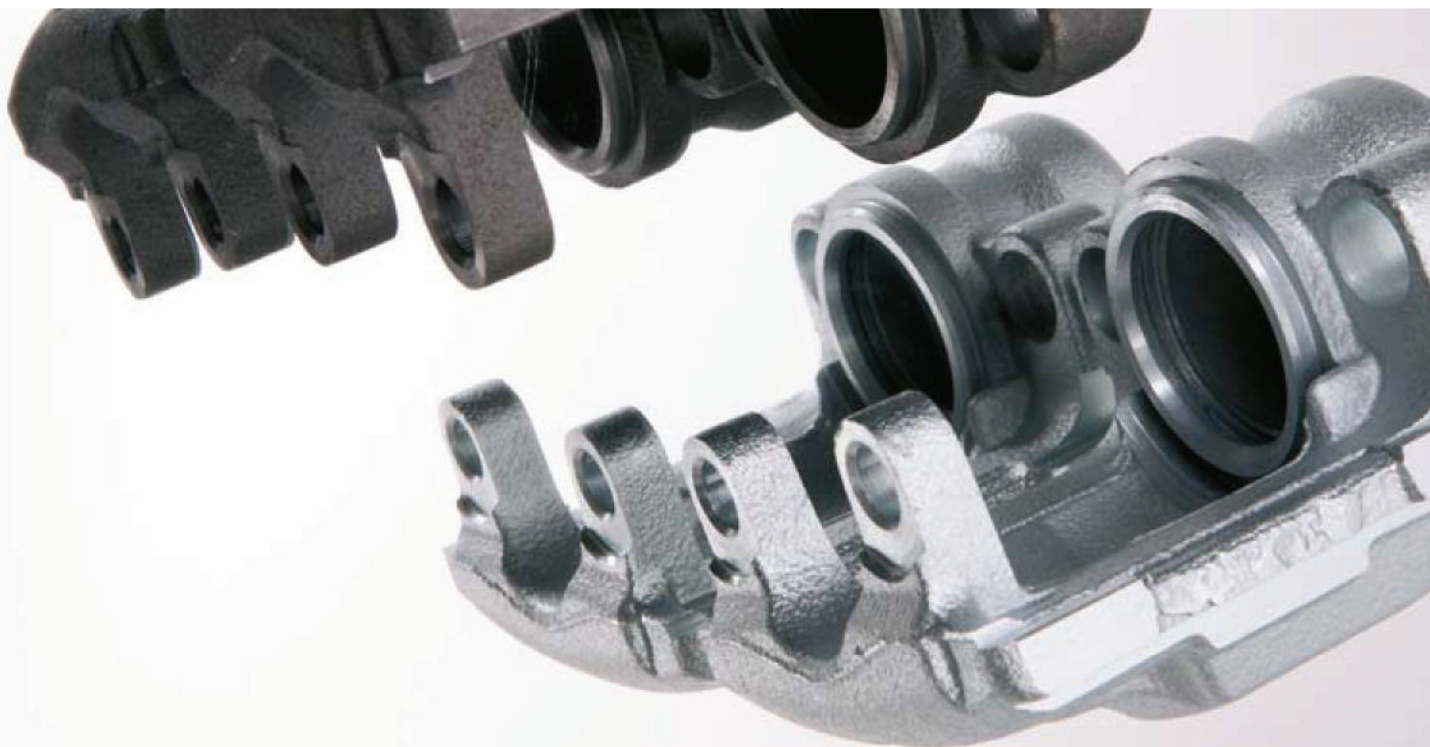
To facilitate this testing for their customers, the makers of Dynasylan® provide comprehensive information. The requirements of coatings users and the market as regards compatibility and environmental protection both point to one thing. Only innovative paint and coatings systems will be able to establish themselves in the long term. To allow our customers to fully exploit the possibilities of Dynasylan® silanes, we see it as our task to support this process.

Information for researchers and formulators on the fundamental and correct technical usage of silanes in coating systems is available at

**[www.dynasylan.com](http://www.dynasylan.com)**

This brochure and other technical publications also address various aspects of the use of silanes in paint and coatings.





## Monofunctional Isn't Good Enough

Adhesion, gloss, weathering resistance, and scratch resistance remain the most important requirements in the formulation of coating systems. But other aspects are becoming increasingly important. For example, new raw materials or technologies must be capable of being integrated into existing coating systems and should preferably have a fairly low solvent content, as is the case in water-based or high-solids coatings. In other words, advanced products must possess a range of functionalities.

It is for these advanced systems that Evonik has developed Multifunctional Silane Systems™, which combine a variety of functions in a single product. One of the most successful examples is the Dynasylan® HYDROSIL product family. Products of this series are water-based silanes that, although highly reactive, are stable in storage. This highly successful product range is now being supplemented by the latest generation of Multifunctional Silane Systems™, the Dynasylan® SIVO products.

This product line is being launched, appropriately, with the release of the first water-based modularly structured sol-gel system under the Dynasylan® SIVO brand name.



Dynasylan® SIVO systems have proven themselves even under the strictest specifications and the most stringent demands, as in the automotive industry. For example, they improve the corrosion protection of automotive parts, thus eliminating the need for undesirable formulation components such as solvents or chromium compounds.



## Dynasylan® SIVO: The Future Is Multifunctional

Application-oriented products are developed in close collaboration with our customers. To ensure this, Evonik has its own team of researchers and technical service staff working exclusively on the development of novel Multifunctional Silane Systems™ – the Dynasylan® SIVO products. The Dynasylan® SIVO product family is heavily geared toward problems encountered in daily life, and future products will continue to be developed and perfected jointly with our customers.

This will allow the rapid realization of relevant competitive advantages:

- improved performance in special application fields
- improved handling and increased storage stability of the paints or coatings systems, and better surface coverage of the subsequently formed films
- reduced toxicity and better environmental compatibility, both in production and in processing by the end-customer
- use of fewer ordinary silanes and therefore less complexity and better inventory control

All products of the Dynasylan® series offer both new product properties and increased efficiency for our customers' production processes.



## The New Dynasylan® Service Concept

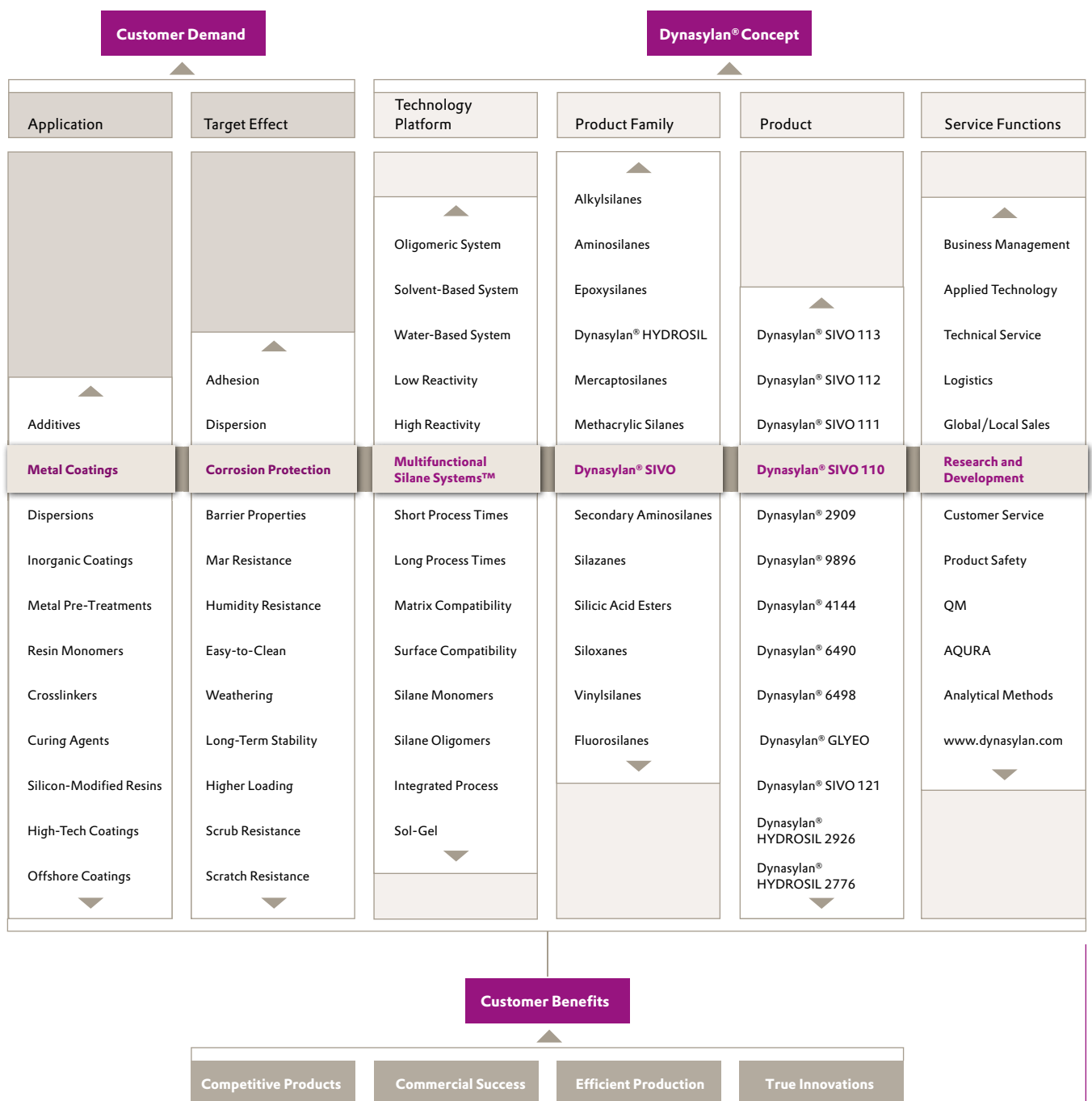
When producing its Dynasylan® products, Evonik leaves nothing to chance. As the global leader in specialty chemicals, we prefer to take charge of important production steps ourselves, because producing more than 150 organofunctional silanes in many different complex production steps demands a high degree of care and expertise.

For example, we process high-purity silicon in an integrated production process in accordance with strict criteria. These stringent requirements are tight specifications, high purity, process safety for the customer, and environmental protection. All these apply to the full range of Dynasylan® products.

But we also impose exacting requirements on all new products, because using Dynasylan® products in paint and coatings is far from trivial. However, if important basic rules for the use of silanes in paint and coatings are followed, our products can be more easily used in our customers' processes. This leads to measurably better properties in the subsequent products, as well as excellent commercial results.

Many of our customers have confirmed that their aims can be achieved through ever closer collaboration in product evaluation. Therefore, working jointly with them, we will be bringing into the market a number of new Dynasylan® SIVO products over the next few years. Creativity, close collaboration, and speed are of utmost importance here.

We hope that our service concept will convince more and more producers and users of paint and coatings systems of the benefits of choosing Dynasylan®.





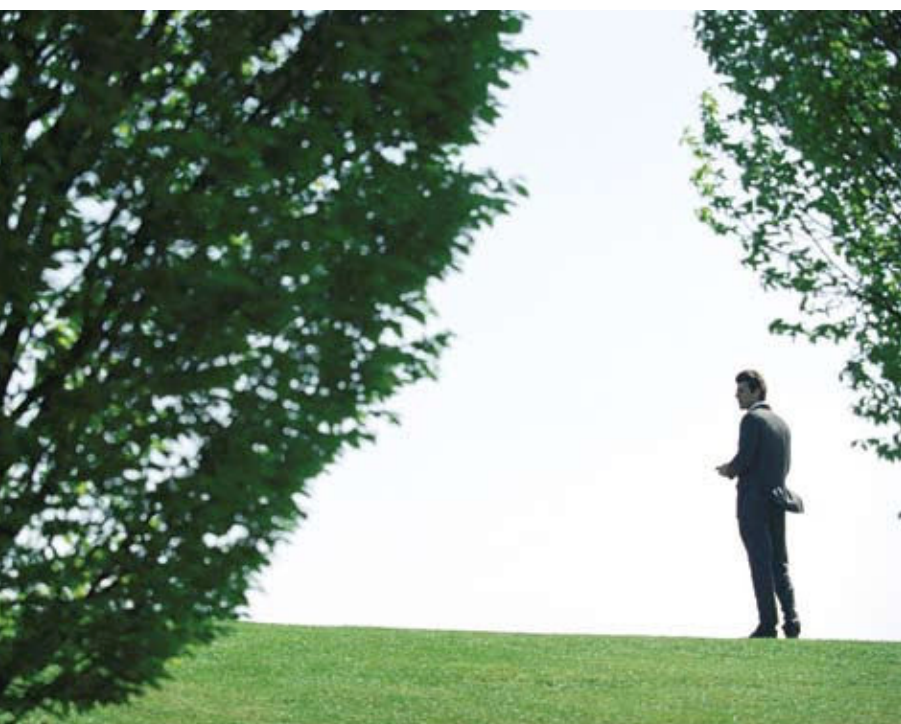
# Making Progress – by Staying Focused

For the Dynasylan® brand, we've set ourselves high standards, mainly in connection with resource conservation, prudent management, efficiency, compatibility, and implementation of the Responsible Care® initiative. To ensure that we meet these requirements, we produce all standard and specialty products in low-waste and energy cycles, or closed-loop processes. These "closed" production processes are so designed that the by-products or residues from one process are used as starting materials for another.

As a responsible producer of specialty chemicals, Evonik has been concentrating for decades on continually improving its own standards of environmental protection, sustainability, and resource-conserving production technology. Our self-imposed standards are often even more stringent than statutory legal requirements.

This is why our production sites are recognized as highly advanced and leaders in their field, by any international standard. Avoidance of residues and economical process management has three-fold benefits: to you, as our customers, to us, as producers, and not least to our environment.

Thus, timely worldwide production and distribution of more than 150 silane products ensure that our international customers also receive raw materials of the same high quality.







## The Question Is Not Whether Dynasylan® Works, But How Well!

In addition to this resource-conserving production process, the Dynasylan® brand name offers our customers products that are genuine problem-solvers, thanks mainly to their excellent functionality.

A good example of our “green” silanes is Dynasylan® HYDROSIL 2926. This purely water-based silane in oligomeric form, used as a highly reactive primer for metal coatings, allows the complete elimination of undesirable components such as hazardous chromium compounds, methanol, and other solvents.

In its patented Dynasylan® HYDROSIL technology, available on a commercial scale and the only one of its kind worldwide, Evonik has succeeded in combining two seemingly irreconcilable opposites:

the very high reactivity of Dynasylan® HYDROSIL 2926 with the high storage stability and chemical resistance over a very wide pH range of the finished product. As a result, one can, when formulating metal coatings, avoid both undesirable volatile organic components (VOCs) and the release of solvents during the reaction of the silane specialty with the metal surface. With conventional silane products, this reaction releases methanol.

Of equal importance, if not more, is the environmental acceptability of the coated end-product. Metal coating systems formulated with Dynasylan® HYDROSIL already conform to the strict requirements of future legislation with regard to both the absence of solvents and low toxicity.



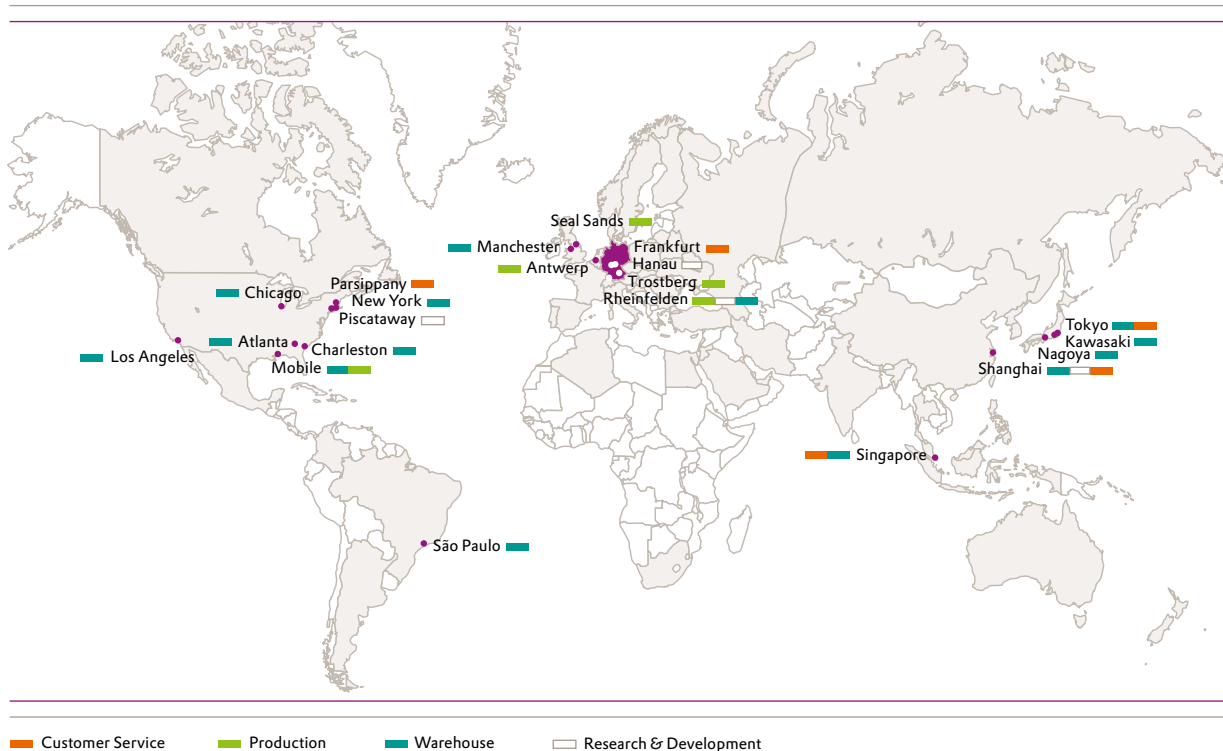
## Where is Dynasylan® Available? All Over the World.

Like many of our customers, we operate worldwide. For more than half a century, we have had a presence in major economic regions all over the world.

But good products alone are not enough; service oriented to customers' needs is an essential part of the package. For this reason, we have continually brought our logistics (supply chain) into line with customers' supply requirements. Our experience and expertise have been proven over decades all over the world.

In addition to on-time delivery, we are also working on logistics solutions for the future. To accurately match logistics concepts to customer requirements, we also use modern approaches such as the SCOR (Supply Chain Operations Reference) concept. This allows us to reliably execute almost any task that a customer gives us.

As the only large-scale producer of organofunctional silanes, Evonik offers packaging ranging from 25 kg drums to 20-metric-ton bulk containers, and can also meet requests for individual packaging. Because of our global presence, we possess, in many cases, country-specific expertise in the area of environmental protection and hazardous chemicals regulations. For many companies, this knowledge facilitates the establishment of new local production facilities.



## Your Customers Are All Over the World. As Are You. As Is Dynasylan®.

Let's assume your production site is in Brazil, where you produce water-based, chromium-free metal coating systems for automotive applications in the European market. Because of high demand for these, you need, unexpectedly and at short notice, an additional 4 metric tons of a silane delivered in 1,000 kg IBCs. The material must be delivered to your production site as soon as possible, so that the just-in-time fabrication process of a well-known automotive company won't be disrupted.

Thanks to Dynasylan®'s service concept, that's no problem. And being able to guarantee supply reliability and quality to your customers, even in exceptional situations, is an advantage.





## Applications of Silanes in the Paint and Coatings Industry

The multifunctionality of silanes opens up many different possibilities in the paint and coatings industry. The markets described on the following pages represent just a few selected examples, because the possibilities for using silanes in the coatings industry are growing day by day.

Customer expectations in the paint and coatings industry in particular have grown significantly over the last few years. Existing application fields need increasingly complex support to meet customers' specifications. Novel and specially developed coatings are also necessary for new applications in which the use of silanes will play an ever important role in the future.

Thanks to their special chemistry, silanes inherently possess, and can impart, a number of chemical functionalities to other materials. This entails many advantages. In marine and protective coatings, for example, Dynasytan® can be used as a curing agent or a binder; in the automotive industry it allows production of scratch-proof coatings. In corrosion protection of metal coatings, and also in the final sealing of galvanized coating layers, silanes used as primers improve the performance of the coating system.

# Dynasylan® in Corrosion-Inhibiting Metal Coatings

Metals are protected from corrosion by a variety of methods and coatings. In many cases, coating the metal almost completely prevents corrosion. Typical metal treatments to improve corrosion resistance include chromatisation or chromate treatment, (zinc) phosphatization, and electrochemical galvanization. Toxic components such as chromium compounds are, however, being replaced for reasons of occupational safety and environmental protection. Silanes are playing an increasingly important role in these environmentally friendly systems.

Used as additives, they also serve outstandingly in applications as adhesion promoters, ensuring excellent adhesion of the coating layer to be formed. Dynasylan® products also bind metal or other pigments with the polymer components of the formulation, thus helping to form a highly effective barrier layer that protects against harmful environmental effects such as the combination of water and chloride salts. Good wetting and low viscosity are additional advantages in production, and result in faster drip-off and uniform coating-film thicknesses.

# Dynasylan® in Marine and Protective Coatings

Bridges, port facilities, and ships are constantly exposed to a strongly corrosive environment. Many formulations for zinc dust paints use hydrolysates of silicic acid esters. These are produced from Dynasylan® 40 using sol-gel technology and can provide corrosion protection for several decades. An epoxy primer system with a PU topcoat is often used as a final film over a zinc dust primer. The use of silane technology allows these two films to be combined. Just one single two-component epoxy coating based on a silicon epoxy resin performs all the tasks described. The resin is cured by aminosilanes, and the cure speed and reactivity can be adjusted through the use of various aminosilanes for a broad range of temperatures, climatic conditions, and regions of use. This results in highly resilient marine and protective coatings with outstanding resistance to weathering or chemical effects.





# Dynasylan® in Binders

The advantages of using silicic acid esters in zinc dust paints have long been known. Dynasylan® 40 is the standard product for heavy corrosion protection in the production of binders for zinc silicate paints. Hybrid and sol-gel systems represent a further development in the use of silanes as binders. In coatings of these types, silanes are used as binders or components

of the binder system, and for special high-performance coatings. In the synthesis of synthetic resins such as acrylic resin dispersions (latex), silanes can also be used as monomers, but in very small quantities of approximately 1%. The use of Dynasylan® results in improved adhesion to concrete, abrasion resistance, and resistance of building paints to moisture and rain.

# Dynasylan® for Wood Treatment

Dynasylan® is used for water-repellent (hydrophobizing) treatment, as well as for modification of wood surfaces, to make them oil and grease-repellent. Depending on the treatment, the surfaces either feature a water-repellent effect or prevent oils and greases from adhering to or per-

meating into the treated wood surface. This also results in a reduced tendency to staining caused by adhering particles of dirt that are carried along with water or oils. Keeping out water ensures a longer lifetime for the treated woods.

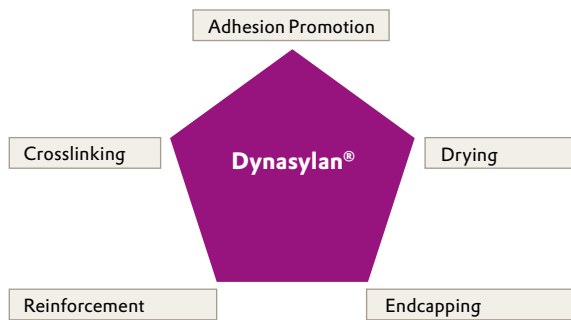
Surfaces treated with Dynasylan® remain air permeable and breathable, and therefore have high weathering resistance.





# One Brand – Multiple Functions

The improvements provided by Dynasylan® in the applications described are based on various functions that are possible because of the chemical nature of silanes.



## Dynasylan® for adhesion promotion

Silanes form permanent chemical bonds between (mainly inorganic) substrates and organic polymers or resins. In coating formulations, therefore, the addition of silanes results in excellent adhesion to challenging substrates such as glass, aluminum, steel, or concrete. The use of silanes to improve adhesion has long been of considerable technical (and commercial) importance.

## Dynasylan® for crosslinking

Silanes also act as crosslinkers for certain epoxy resins in challenging environments. Three films are often applied on bridges, ships, and other installations that are particularly susceptible to corrosion. Aminosilanes crosslink silicone-based epoxy resins with the formation of very hard and weathering resistant coating films. In such cases, a final PU coating is not applied.



## Dynasylan® as a drying agent

Silanes can also be used for drying mainly solvent-based PU coating formulations, where infiltration of moisture must be avoided at all costs. They trap excess moisture that has been carried in by fillers or from the humidity in the atmosphere. Silanes used as drying agents are effective even when the formulation contains other silanes with different properties. The use of silanes as drying agents can prevent a premature reaction (such as premature curing); it also results in more uniform curing.

## Dynasylan® as a monomer

Silanes can be used as chemical building blocks to produce synthetic resins. The starting quantity used varies, depending on the branch of industry in which the system is being used. In coatings such as latex dispersions or automotive coatings, the percentage of Dynasylan® used usually varies between 0.5% and 20%.

In sol-gel technology, on the other hand, the silane concentration is 80–100%. Sol-gel coating films are already being used in certain applications, some of which are highly specialized. In addition to lense coatings, and specialty coatings in automobiles, sol-gel sectors also include traditional fields such as zinc silicate paints based on Dynasylan® silicic acid esters.

## Dynasylan® for pigment modification

Silane-modified inorganic pigments can now be much more easily incorporated into coating formulations. They allow, for example, hydrophilic pigments to be hydrophobized with alkyl silanes. The improved compatibility of the hydrophobized pigments helps achieve higher levels of filler content, lower viscosities, longer shelf lives, better sedimentation resistance, improved mechanical properties of the cured coating, and increased UV stability.

Dynasylan® 4144 is particularly effective in hydrophilic systems such as water-based dispersions or pastes. Even highly hydrophilic pigment systems can be converted through treatment with Dynasylan® 4144 into a “superhydrophilic” pigment; pigments treated in this way are particularly easily dispersed and have long-term dispersion stability, with a significantly lower tendency to sedimentation.

# One Brand – Versatile Products

## Dynasylan® HYDROSIL

Traditional silanes and most of the known VOC-based sol-gel systems are hydrolyzed during use with the formation of alcohol, which is released during the reaction as a volatile organic component (VOC). In the case of Dynasylan® HYDROSIL, the alcohol (VOC) has been almost completely separated out during the production stage.

However, Dynasylan® HYDROSIL products still contain reactive silanol groups and are also storage-stable. This special technology thus allows us to offer products that are solvent-free and water-based, but also storage-stable. Dynasylan® HYDROSIL products can be used as primers for adhesion promotion and for final sealing of microporous systems.



## Dynasylan® GLYEO, Dynasylan® GLYMO

Both of these products are ideally suited as adhesion promoters on substrates like glass, metal, or ceramics. For water-based coating systems, however, Dynasylan® GLYEO is highly regarded thanks to its greater resistance to water. Because of its chemical structure, it hydrolyzes and condenses much more slowly and does not release toxic methanol. This ensures considerably improved stability in water-based (acrylate, epoxy, latex) coating systems. Dynasylan® GLYEO is particularly recommended for applications where controlled adhesion and crosslinking are important. Dynasylan® GLYEO is also used as a binder component in future-oriented and environmentally friendly ethoxy-based sol-gel syntheses.

## Dynasylan® silicic acid esters

Coating films based exclusively on silanes as binders can also be produced. These are often crosslinked by moisture. For example, zinc dust paints based on Dynasylan® silicic acid esters are successfully used for heavy-duty corrosion protection. Such coatings can have a lifetime of 15–20 years or more, even in particularly challenging environments.



## Dynasylan® SIVO Products: Valuable All-Rounders

Evonik is the first producer anywhere in the world to offer a modular sol-gel system that provides our customers with entirely novel opportunities for formulation. All of the building blocks of this modular system are coordinated and can be combined by the customer in accordance with their own concepts and requirements profile.

This new binder system allows the development of improved water-based sol-gel systems for thermal curing. The properties of the coatings can be varied using the modular concept, consisting of a binder and three special additive components. The customer decides which parameters to prioritize – the hardness of the coating film, the adhesion between the substrate and the coating film, or the UV stability. Films produced in this way can be designed, for example, to be scratch- and weathering-resistant, and also have excellent resistance to chemicals and boiling water.

Because of its low thickness, the film remains flexible and so retains its good adhesion, thereby contributing to excellent corrosion protection. Typical applications for Dynasylan® SIVO technology include metal pre-treatment or coatings for corrosion protection and adhesion promotion in the film to be applied. The coated substrates or metal parts find versatile application in the automotive industry, aviation, and components for structural steel work and electronics.



## Available for the First Time: Water-Based, Modular, Sol-Gel Dynasylan® SIVO Products

### Dynasylan® SIVO 110

Dynasylan® SIVO 110 is the base component of the first modular sol-gel system of the Dynasylan® SIVO series, and is derived from the successful Dynasylan® HYDROSIL product family. Following intensive development work, Evonik's researchers have succeeded in overcoming the earlier limitations of the Dynasylan® HYDROSIL system. As a water-based binder, Dynasylan® SIVO 110 represents the "backbone" of the series.

### Dynasylan® SIVO 112

With the additive Dynasylan® SIVO 112, oil and water-repellent coatings can be produced that provide improved protection against corrosion. Easy-to-clean coating films can also be produced. As a water-based component, Dynasylan® SIVO 112 is ideally suited for incorporation into the overall sol-gel system of the Dynasylan® SIVO series, which is itself water-based.

### Dynasylan® SIVO 111

Dynasylan® SIVO 111 is used as an additive to regulate the pH of Dynasylan® SIVO 110 or to neutralize it. Neutral or mildly basic coating formulations are required in many applications, but the pH must not be adjusted by means of "simple" (i.e., salt-forming) neutralization reagents, which would later negatively impact corrosion protection. Dynasylan® SIVO 111, by contrast, allows for the protective and effective neutralization of the overall system without undermining the subsequent corrosion protection properties.

### Dynasylan® SIVO 113

Dynasylan® SIVO 113 can be used as an additive if the water-repellent properties of a coating film are important. It establishes and reinforces the hydrophobic properties of the coating film. If it is added to the Dynasylan® SIVO 110 base component, the coating film will develop water-repellent properties, that are advantageous mainly in exterior applications and on metals. The use of Dynasylan® SIVO 113 considerably improves the weathering resistance of coating films.



Product	Description	Typical Amount Added <sup>1</sup>
Dynasylan® SIVO 110	Base module	–
Dynasylan® SIVO 111	Neutralization agent	2–5%
Dynasylan® SIVO 112	Oleophobic additive	10–50%*
Dynasylan® SIVO 113	Hydrophobic additive	5–10%

<sup>1</sup>approximate values

\*depending on the degree of oleophobicity required

## Other Multifunctional Silane Systems™

### Dynasylan® SIVO 121 (for wood protection)

Dynasylan® SIVO 121 is a novel solvent-free impregnating agent for wood surfaces. It is used both for hydrophobizing and oleophobizing wood surfaces. Uptake of water and dirt is significantly reduced, while the surface remains air-permeable and breathable. Surface modification with Dynasylan® SIVO 121 offers extremely high weathering resistance and is effective for up to three years. Water-based, odorless, and free of volatile organic components (VOCs), Dynasylan® SIVO 121 is a superior alternative to conventional waxes, oils, and varnishes.



# Dynasylan® on the Internet

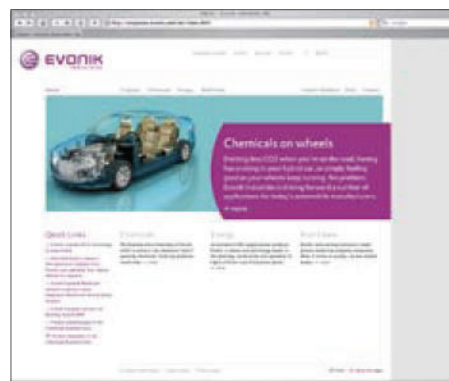
## Information, addresses, and contacts

The **www.dynasylan.com** website offers a well-structured platform where you can find information on products, methods, and chemical processes. A solution-finder leads the way to informative brochures and presentations for downloading, in addition to product information and safety data sheets.

A database of Evonik contacts and dealers worldwide provides important contact data, conveniently accessible at all times.

**www.dynasylan.com**

**www.evonik.com**



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