

Product Information

# Dynasylan® 40

## Ethyl polysilicate

### CAS NUMBER

confidential

### PRODUCT DESCRIPTION

Dynasylan® 40 is a ethyl silicate with a silicon dioxide content of approximately 40 - 42 % upon complete hydrolysis (the Si content of Dynasylan® 40 is calculated as SiO<sub>2</sub>).

Dynasylan® 40 is formed in the presence of water from tetraethyl silicate (Si[OEt]<sub>4</sub>) by partial hydrolysis of the ethoxy groups to hydroxyl groups and subsequent condensation with formation of siloxane bonds (-Si-O-Si-).

Dynasylan® 40 is a colorless, low-viscosity liquid with an SiO<sub>2</sub> content of 40% (the Si content of Dynasylan® 40 is calculated as SiO<sub>2</sub>). The polysilicic acids still have a sufficient content of ethoxy groups which can be activated by acid- or base-catalyzed hydrolysis. Condensation starts even during hydrolysis, with the formation of relatively large polymeric molecules. During storage of these hydrolysates, condensation continues until a gel is formed, where the rate depends on the degree of hydrolysis.

The action of the hydrolysates as binders is based on the continuation of the hydrolysis with subsequent gelation and dehydration to give polymeric SiO<sub>2</sub> structures.

#### Typical Properties

Property	Unit	Value
<b>Chemical Name</b>		Ethylpolysilikat/ Ethyl polysilicate
<b>Density</b> DIN 51757	g/cm <sup>3</sup>	1.05-1.07
<b>Flash Point, min.</b> DIN 51755	°C	61
<b>Viscosity</b> DIN 53015 (20 °)	mPa·s	5

The data represents typical values (no product specification)

### TYPICAL APPLICATIONS

Similarly to Dynasylan® A, Dynasylan® 40 is used to deposit silicic acid formed as a result of complete hydrolysis. The resulting silicic acid bonds well to many inorganic substrates, such as glass, ceramic, metal, fillers, pigments and synthetic fibers. The deposition of a thin SiO<sub>2</sub> layer improves the chemical and thermal stability and mechanical properties.

Other applications are:

- crosslinker component in cold-curing silicone rubber systems
- binder, especially as a Dynasylan® 40 hydrolysates for molds used e.g. in the precision foundry industry.
- hardening component in dentistry for impression materials and as binder for embedding material

Dynasylan® 40 is also used as starting material for sol-gel processes. It is usually used in conjunction with alkylsilanes (e.g. Dynasylan® PTEO) organofunctional silanes and/or organic precursors (e.g. organic resins) to form siloxane networks. This makes it possible to obtain highly scratch-, abrasion- and chemical-resistant coatings.

Dynasylan® 40 is immiscible with water, so hydrolysis therefore requires a cosolvent as solubilizer. Mineral acids and ammonia are suitable as catalysts.

Dynasylan® 40 or its hydrolysates are also the binder component for 1- and 2-pack zinc dust paints, crucial for corrosion protection on steel.

### Dynasylan® 40 as binder for 1-pack zinc dust paints:

The hydrolysis and condensation reaction of Dynasylan® 40 is catalysed through via basic compounds such as diethanolamin. Dynasylan® 40 zinc dust paints or binders catalysed in such manner have an excellent storage stability (under exclusion of moisture). Through addition of a physically drying binder, such as an acrylate, the initial hardness of the coating can be improved dramatically.

Such zinc dust paints cure rapidly with ambient humidity through hydrolysis and condensation.

The zinc pigment can be added to the binder without a reaction if moisture is rigorously excluded. After applica-

tion of the ready-made zinc dust paint, hydrolysis and condensation of the binder will then proceed rapidly under action of ambient humidity. The paint will cure to a hard coating. Temperature and humidity are important parameters for the curing process. Appropriate formulation of the paint and careful application this system will lead to outstanding results.

### Dynasylan® 40 as binder in 2-pack zinc dust paints:

The binders are hydrolysates made by mixing of Dynasylan® 40 with selected solvents (e.g. alcohols, ethers), water, and an acid.

Important for the reaction behavior and storage stability is the amount of water added to the system. 2-pack systems usually have a SiO<sub>2</sub>-content of about 20% and a degree of hydrolysis of about 85-95%. The higher the amount of water that has been added, the lower the storage stability of the hydrolysate system.

The pH of the system is changed through the addition of zinc dust, and condensation starts. The pot life of such a hydrolysate will be about 8-16 hours.

#### Product Composition

Product Composition	Unit	Value
<b>Silicon Dioxide (SiO<sub>2</sub>) Content</b>	wt%	40.0-42.0

The data represents typical values (no product specification)

### BENEFITS & ADVANTAGES

Dynasylan® 40 is a ethyl silicate with a silicon dioxide content of approximately 40 - 42 % upon complete hydrolysis (the Si content of Dynasylan® 40 is calculated as SiO<sub>2</sub>).

### HANDLING & PROCESSING

Before considering the use of Dynasylan® products please read its Safety Data Sheet (SDS) thoroughly for safety and toxicological data as well as for information on proper transportation, storage and use.

The Safety Data Sheet is available on our website <https://silanes.evonik.com/en> or upon request from your local representative, customer service or from Evonik Operations GmbH, Product Safety Department, E-MAIL [sds-hu@evonik.com](mailto:sds-hu@evonik.com).

### PACKAGING

Dynasylan® 40 is supplied ready to use in 25 kg, 220 kg drums or in 1.000 kg IBC containers.

### SHELF LIFE

In an unopened container Dynasylan® 40 has a shelf life of min. 12 months from delivery.

#### Registration Listings

Registry	Status
<b>Australia (AIC)</b>	Yes
<b>Canada (DSL)</b>	Yes
<b>China (IECSC)</b>	Yes
<b>EU (REACH)</b>	Yes
<b>European Union (EINECS/ELINCS)</b>	Yes
<b>Japan (ENCS)</b>	Yes
<b>South Korea (KECL)</b>	Yes
<b>Philippines (PICCS)</b>	Yes
<b>United States of America (TSCA)</b>	Yes

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