

Dynasytan® SILBOND® 40-HF

Ethyl polysilicates - higher flashpoint

Technical Data

Properties and test methods	Unit	Value
Physical Form	-	Clear Liquid
Density (20 °C)	g/cm ³	1.055 - 1.070
Viscosity (20 °C)	mPa's / cSt	5.0
Boiling Point	°C / °F	78 / 172
Flash Point	°C / °F	50 / 122
Silica Content (as SiO ₂)	% by wt min	40.0

Dynasytan® SILBOND® 40-HF is a clear, low-viscosity liquid with a minimum silica content of 40.0% (the Si content of Dynasytan® SILBOND® 40-HF is calculated as SiO₂) and a flash point above 100° F (38° C), classifying it as a combustible liquid. This product is available to customers requiring a higher flashpoint than Dynasytan® SILBOND® 40.

Dynasytan® SILBOND® 40-HF is an ethyl polysilicate that is the partially hydrolyzed product of tetraethyl orthosilicate (TEOS). The partial hydrolysis of TEOS (Si[OEt]₄) results in the conversion of ethoxy groups to hydroxyl groups forming silanols. Subsequent condensation of silanols will form siloxane bonds (-Si-O-Si-O-) and eventually cause the material to gel.

Dynasytan® SILBOND® 40-HF is often used as an intermediate, which is further hydrolyzed to produce a binder that can be used for many applications. Several of these end-uses include inorganic zinc-rich primers, investment casting molds, cores and ceramic shapes, coatings, and thermal insulation.

Safety and handling

Before considering the use of Dynasytan® SILBOND® 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 after registration on our website www.dynasytan.com or upon request from your local representative, customer service or from Evonik Resource Efficiency GmbH, Product Safety Department, E-MAIL sds-hu@evonik.com.

Packaging, storage and shelf life

Dynasytan® SILBOND® 40-HF could be available in pails, drums, totes, and tanker quantities.

In the unopened container Dynasytan® SILBOND® 40-HF has a shelf life of min. 12 months from date of manufacture.

Please ask us for further details.

Properties and applications

Similar to Dynasylan® SILBOND® Condensed and Dynasylan® SILBOND® 40, Dynasylan® SILBOND® 40-HF 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 SiO₂ layer improves the chemical and thermal stability and mechanical properties.

Other applications are:

- binder, especially for inorganic zinc-rich coatings or precision investment castings
- encapsulant for hydroxyl poor fillers to enhance adhesion with functional silanes
- crosslinker component in cold-curing silicone rubber systems
- hardening component in dentistry for impression materials and as a binder for embedding material

Dynasylan® SILBOND® 40-HF is also used as starting material for sol-gel processes. It is usually used in conjunction with alkylsilanes (e.g. Dynasylan® MTES) 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® SILBOND® 40-HF is immiscible with water, therefore hydrolysis requires a cosolvent as a solubilizer. Mineral acids and ammonia are suitable as catalysts.

Dynasylan® SILBOND® 40-HF or its hydrolysates are also the binder component for 1- and 2-pack inorganic zinc-rich coatings, for corrosion protection on steel, and for slurries used in precision investment castings.

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