

Dynasytan® M

Tetramethylorthosilicate

Technical data

Properties and test methods	Value	Unit	Method
Density (20 °C)	1.03	g/cm ³	DIN 51757
Viscosity (20 °C)	0.7	mPa·s (cSt)	DIN 53015
Initial boiling point	122	°C	DIN 51751
Flash point	26	°C	DIN EN ISO 13736

Registrations

Dynasytan® M

EINECS/ELINCS (EU):	Yes
AICS (Australia):	Yes
DSL/NDL (Canada):	Yes
PICCS (Philippines):	Yes
TSCA (USA):	Yes
IECS (P.R. China):	Yes
ENCS (Japan):	Yes
ECL (South Korea):	Yes
REACH (Europe)	Registered

Dynasytan® M is the methyl ester of orthosilicic acid. In the literature it is frequently also referred to as TMOS (tetramethoxysilane).

Dynasytan® M is a colorless or slightly yellow, low-viscosity liquid with an SiO₂ content of 39.5%. Use does not require acid- or alkali-catalyzed hydrolysis. Dynasytan® M easily hydrolyses upon addition of water.

Since all four methoxy groups are able to participate in this reaction, Dynasytan® M is regarded as tetrafunctional. Hydrolysis leads to silanol groups which, in a subsequent condensation reaction, form very stable siloxane bonds (-Si-O-Si-). Condensation starts before hydrolysis is complete. During storage of these hydrolysates condensation, continues until a gel is formed, where the rate depends on the degree of hydrolysis.

Safety and handling

Before considering the use of Dynasytan® 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 Operations GmbH, Product Safety Department, E-MAIL sds-hu@evonik.com.

Packaging, storage and shelf life

Dynasytan® M is supplied ready to use in 25 kg or 200 kg drums.

Dynasytan® M must be stored with exclusion of moisture.

In the unopened container Dynasytan® M has a shelf life of min. 12 months from delivery.

Properties and applications

Dynasylan® M is a ready source of silicic acid for many applications. Silicic acid is usually obtained by hydrolysis or thermally by condensation at elevated temperature. The resulting silicic acid bonds well to many inorganic substrates and can be deposited in situ in a controlled manner. The surfaces of glass, metals, pigments, fillers and synthetic fibers can be coated with a very thin SiO₂ layer in order to improve chemical and thermal stability and mechanical properties.

Dynasylan® M is an important starting material for sol-gel processes, where the additional use of alkylalkoxysilanes (e. g. Dynasylan® MTMS) can give the siloxane network a somewhat organic character as a result of the incorporation of alkyl groups.

It is also possible to construct an inorganic/organic network by adding silanes containing organofunctional groups (e.g. aminopropyl groups) and polymerizing with organic precursors. This principle makes it possible to obtain highly scratch- and abrasion-resistant coatings.

Partial hydrolysis gives hydrolysates of Dynasylan® M whose shelf life depends on the amount of water and solvent used. The amount of water determines the activity of the hydrolysate. Activity and shelf life are inversely proportional. The correct choice of the amount of water can give hydrolysates which have a shelf life of a few months.

Processing

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