Product information

Dynasylan® SIVO 110

SIVO® SOL Technology for coating systems

Technical data

Properties and test methods	Value	Unit	Method
Flash Pint	> 95	°C	EN 22719
Boiling Point	approx. 96	°C	ASTM D-1120
pH-value	approx. 4.3	-	DIN 19268
Solid content	approx. 35	%	3g / 2h 105 ° C
Density	approx. 1.14	g/cm3	DIN 51757
Viscosity	approx. 7	mPa.s	DIN 53015

Registrations

Dynasylan® SIVO 110

DSL/NDSL (Canada):	No
PICCS (Philippines):	No
TSCA (USA):	Yes
IECSC (P.R. China):	*
ENCS (Japan):	*
ECL (South Korea):	Yes
EINECS/ELINCS (EU):	Yes
AICS (Australia):	No
* = information on request	

Dynasylan® SIVO 110 is a multifunctional, basically VOC-free, water-borne sol-gel system.

It is composed of organofunctional silanes and functionalized, nanoscale SiO_2 particles. **Dynasylan®** SIVO 110 is an opaque to milky, colorless to slightly yellow, low viscous liquid. **Dynasylan®** SIVO 110 can be diluted in water and a variety of common organic solvents. Besides reactive silanol groups it also contains organic functionalities based on Si-bonded epoxy groups.

Safety and handling

Before considering the use of Dynasylan® products please read its Material Safety Data sheet (MSDS) thoroughly for safety and toxicological data as well as for information on proper transportation, storage and use. The Material Safety Data Sheet is available after registration on our website www.dynasylan.com or upon request from your local representative, customer service or from Evonik Industries AG, Product Safety Department, E-MAIL sds-im@evonik.com.

Packaging and storage

Dynasylan® SIVO 110 is supplied in 25 kg PE drums and 200 kg PE-inlined steel drums. Due to its water content **Dynasylan®** SIVO 110 must be stored above freezing temperature. Storage temperatures must not exceed 40 °C. In sealed containers **Dynasylan®** SIVO 110 has a shelf life of 12 months.

Properties and application

Dynasylan® SIVO 110 is suited as binder component in temperature crosslinking sol-gel coatings and sol-gel - based hybrid coatings. **Dynasylan®** SIVO 110 coatings boast of:

- high hardness ("Bleistifthärte" up to 5H, depending on formulation)
- excellent scratch and mar resistance
- superior stability in boiling water (Gt0 upon 2 h treatment in water at 100 °C)
- very good adhesion on various substrates
- very good adhesion towards organic top coats (e.g. epoxies)
- sound flexibility ("Dornbiegeprüfung" according to DIN EN ISO 1519: 2 mm)
- very low thickness of formed layers (recommendation: dry layer of < 2 µm)
- excellent resistance against solvents and other chemicals

Recommended areas of application:

- corrosion resistant primer systems
- transparent sol-gel top coats which exhibit a temperature resistance of up to 220 °C
- coatings comprising high hardness, which can be additionally improved by introduction of up to 20 wt.-% silica sol
- transparent easy-to-clean sol-gel - top coats upon adding **Dynasylan®** SIVO 112

Dynasylan® SIVO 110 containing formulations can be sprayed, dipped or applied with a doctor blade. It is recommended to orient towards a 0.2 - 2 µm thickness of the dry layer (approx. 4 µm of a wet layer equals approx. 1 µm of the respective dry layer). Hence the total quantity to be applied on smooth substrates will amount to approx. 5g / m^2. Generally for spray application an aqueous dilution should be used (e.g. 20 wt.-% **Dynasylan®** SIVO 110, 0.06 wt.-% processing agent, 79.94 wt.-% water). Surfaces of treated substrates must be clean and free of grease and dust.

Processing

Dynasylan® SIVO 110 can be mixed with water at any proportion. Dilution in common organic solvents such as ethanol, isopropanol, butyl glycol or methoxy propanol is possible. **Dynasylan®** SIVO 110 can be formulated with a variety of water-thinnable binders and other auxiliary agents such as Tego® Wet 280. As of such e.g. a satisfactory compatibility with acrylate-based polymer dispersions has been achieved. Nevertheless, the final formulation must be checked towards possible incompatibilities such as phase separation or precipitation. Recommended procedures a.o. are storage or stress tests. Upon addition of acids and bases the pH value of **Dynasylan®** SIVO 110 can be varied between 4 and 9. These acid or alkaline additives must be selected with care as flocculation or gelation can occur in contact with certain substances. For neutralization **Dynasylan®** SIVO 111 is strongly recommended. For acidification phosphoric acid may be used. For achievement of easy-to-clean properties **Dynasylan®** SIVO 112 is highly recommended. **Dynasylan®** SIVO 110 must be protected against freezing temperatures!

Reactivity

Dynasylan® SIVO 110 resembles a water-borne sol-gel system which does not contain organic solvents. It does not release alcohols upon hydrolysis contrary to standard functional alkoxysilanes. **Dynasylan®** SIVO 110 contains a high concentration of active silanol functions. Consequently it can chemically bond to surfaces of suited substrates and achieves a high degree of crosslinking by formation of 2- and 3-dimensional siloxane networks. During curing functionalized SiO_2 nanoparticles align into a densely packed structure and are covalently incorporated into the siloxane network. This phenomenon serves as an explanation why exceptional hardness and scratch resistance can be achieved with **Dynasylan®** SIVO 110. Additionally a high degree of flexibility is obtained at a considerably low thickness fo the formed layers. Suited substrates: steel, stainless steel, Zn-galvanized steel, aluminum, glass. **Dynasylan®** SIVO 110 - based coatings exhibit a state of dryness of 5 (DIN 53150) once dried a room temperature for 20 min. Complete crosslinking (including reaction of silanol groups) will be reached at temperatures between a minimum of 150 °C and, ideally, 200 – 220 °C.

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