A Subsidiary of PETRONAS Chemicals Group

PRODUCT DATA SHEET

BRB Silanil® 533 ESO

Silanes

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BRB Silanil® 533 ESO
Epoxy functional silane oligomer

Description

BRB Silanil® 533 ESO is a silane oligomer containing gamma-glycidoxy groups and methoxy groups.

When comparing with monomeric epoxy silanes, *BRB Silanil® 533 ESO* provides less emission of methyl alcohol upon hydrolysis since partial condensations in the parts of methoxy groups are happened resulting in the reduction of the number of methoxy groups and the change of structure from monomer to oligomer.

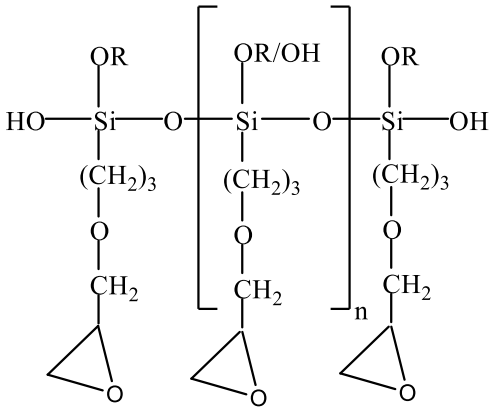
Highlights

- *BRB Silanil® 533 ESO* gives lower VOC during application (VOC from hydrolysis reaction) than monomeric epoxy silanes.
- When using in water-based system, *BRB Silanil® 533 ESO* provides better stability of formulated product than monomeric epoxy silanes due to less hydrolysis sensitivity of oligomeric structure.
- *BRB Silanil® 533 ESO* can provide greater grafting efficiency on polymer chains containing amino, hydroxyl, or carboxyl functional group since there is higher content of epoxy groups per molecule when comparing with monomeric silanes.

Typical Data

Parameter	Unit	Value
Appearance		Pale yellowish transparent liquid
Refractive index (n_D^{20})		1.44
Flash point	°C	122
Boiling point at 760mmHg	°C	190
Density at 25°C	g/ml	1.17

Chemical Structure



How to Use

BRB Silanil® 533 ESO easily hydrolyzes upon contact with water or moisture, where methoxy groups transform to silanol groups and release methanol as by product. The silanol groups are highly reactive which are ready to bond hydroxyl groups in inorganic fillers or substrates and also crosslink among the silanol groups themselves. Meanwhile, the epoxy groups in *BRB Silanil® 533 ESO* can undergo ring-opening reaction with nucleophiles such as amines and alcohols, then they can create covalent bonds with those of substances, in which catalyst may be required.

BRB Silanil® 533 ESO is soluble in ketones, alcohols, and aliphatic/aromatic hydrocarbons.

How to Use

Coupling agent in metallic pigment coatings

In this application, *BRB Silanil® 533 ESO* can improve dispersion ability of metallic fillers or pigments in water-based system such as epoxy coatings containing zinc or other metallic pigments. Surface of metallic fillers can be treated by mixing with the silane solution at medium shear for several minutes. The silane solution can be prepared by dissolving 10-20% silane concentration in water or mixture of water and solvents. A certain amount of acid solution can be added to accelerate hydrolysis rate (water dissolution), in which pH in the range of 4-5 is recommended. After that, resin and other additives can be added and mixed according to coating formulation. Dosage of silane can be varied from 0.2–2 wt% based on weight of metallic fillers. The optimum silane dosage and treatment condition should be determined in each application prior to use in a commercial process.

Crosslinker for polymer modification

BRB Silanil® 533 ESO can be used to modify polymer structure by simple addition into polymerized water-based resins such as acrylic latexes. The method is so-called post addition. *BRB Silanil® 533 ESO* is recommended to directly add into a resin, without the presence of other additives or pigments, at 0.2-2 wt% based on solid content of resin. Induction time of the mixture between silane and resin is required at least 24 hrs prior to addition of other additives, fillers, and pigments. For determination of crosslinking level, formulation aging is required at least 7 days prior to gel content test.

Adhesion promoter in coatings and adhesives

BRB Silanil® 533 ESO can also improve adhesion performance of coatings and adhesives on inorganic surfaces by post addition into solvent-based and water-based resins. *BRB Silanil® 533 ESO* is recommended to directly add into a resin same as the application in crosslinker, in which the induction time is also required. Nevertheless, in case of water-based resin, pH of system should be close to neutral (pH 7) in order to control hydrolysis rate at low level when storage in containers prior to actual use

Storage Recommendation

Store in dry and cool (approx. 20-25 ° C) condition. After opening, avoid exposure to atmospheric moisture. Inert gas e.g. N_2 gas is required to purge into the container after opening to prevent hydrolysis by moisture.

A Product Safety Data Sheet should be obtained from your BRB office prior to use.
ATTENTION: Before handling, read product information, Product Safety Data Sheets and container labels for safe use, and any physical and/or health hazard information.

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FOR MORE INFORMATION

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