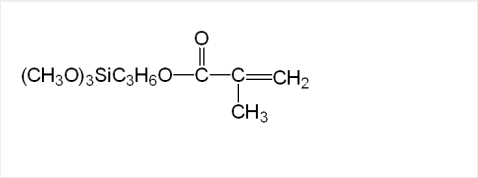
# GENIOSIL® GF 31

## Organofunctional Silanes

3-Methacryloxypropyltrimethoxysilane




## Properties

The use of GENIOSIL® GF 31 as a coupling agent in glass fiber-reinforced or filler-modified plastics improves filler dispersibility while reducing the filler's sedimentation tendency. It also results in a major reduction in the melt viscosity of casting resins, as well as a marked improvement in the mechanical properties of glass-fiber-reinforced or mineral-filled plastics. In addition, use of GENIOSIL® GF 31 in these materials leads to a sizable increase in moisture (vapor) resistance as well as greater resistance to acids and bases. Used as a co-monomer in polymers, GENIOSIL® GF 31 produces binders that exhibit much improved wet scrub, abrasion and scratch resistance thanks to crosslinking and strong adhesion to the base. As a component of free-radical curable adhesives and sealants, GENIOSIL® GF 31 leads to improved mechanical properties and enhanced substrate adhesion.
GENIOSIL® GF 31 is an alkoxysilane with a methacrylic organofunctional group. It´s a clear, colorless, light and heat sensitive liquid with a characteristically sweet odor. The silane hydrolyzes in the presence of moisture (methanol is released) to form silanols, which can then react with themselves to produce siloxanes. As a bifunctional, organically unsaturated molecule, GENIOSIL® GF 31 can be incorporated into organic polymers, e.g. via radical grafting.

## Technical data

### General Characteristics

| Property | Condition | Value | Method |
|---|---|---|---|
| Boiling point | 15 hPa | 125 °C | - |
| Density | 25 °C | 1.05 g/cm$^3$ | DIN 51757 |
| Flash point | - | > 100 °C | ISO 2719 |
| Hydrolyzable chloride as HCl | - | < 30 mg/kg | - |
| Ignition temperature (liquids) | - | 265 °C | DIN 51794 |
| Molecular weight | - | 248.4 | - |
| Purity | - | > 98.0 % | - |
| Viscosity, dynamic | 25 °C | 2.6 mPa·s | - |

These figures are only intended as a guide and should not be used in preparing specifications.



## Application details

1. General processing information GENIOSIL® GF 31 is highly miscible with standard organic solvents, such as alcohols, toluene and acetone. GENIOSIL® GF 31 is practically insoluble in neutral water. However, by adjusting the pH to between 3 and 4 with a hydrolysis catalyst (e.g. acetic acid), an aqueous solution of up to 5 percent by weight can be obtained. The resulting clear solution should be used as soon as possible (within 1-2 days), before siloxane formation has proceeded too far. Deactivation of GENIOSIL® GF 31 by siloxane formation is signalized by clouding of the aqueous solution. 2. GENIOSIL ® GF 31 in glass-fiber reinforced or mineral-filled polymers Fillers are treated either with pure GENIOSIL® GF 31 or a solution thereof. It may be necessary to pretreat the substrate with water and/or a catalyst. Subsequent binding of the treated filler to unsaturated polyester resins, for example, is preferably effected via peroxide or radiation initiated copolymerization or grafting. In an alternative procedure referred to as "blending", GENIOSIL® GF 31 is added directly to the polymer - either before the organic materials is compounded with the filler or at the same time. A prerequisite for the blending process is that GENIOSIL® GF 31 and the polymer are compatible and that the resin and GENIOSIL® GF 31 do not react prematurely. 3. GENIOSIL® GF 31 as a surface modifier Used as a primer, GENIOSIL® GF 31 is applied as an aqueous or organic solution to an inorganic substrate (e.g. metal or glass surfaces). Once GENIOSIL® GF 31 has dried and bonded to the surface, an organic coating may be applied using a standard technique (e.g. spraying or knife coating). 4. GENIOSIL® GF 31 as a polymer building block To incorporate GENIOSIL® GF 31 in organic polymers, it is added as a co-monomer - along with typically used monomers and free-radical initiators such as diazo compounds or peroxides - during production of the solution or emulsion polymer. Promoters (e.g. cobalt compounds) can give additional impetus to the radical grafting of GENIOSIL® GF 31 to organic polymers. The polymers obtained in this way can be formulated as coatings, adhesives or sealants. GENIOSIL® GF 31 is mainly used in glass fiber or glass fabric-reinforced polyester and polyolefin molded components. In addition, GENIOSIL® GF 31 is used as a surface modifier for fillers and pigments used in thermosetting plastics (e.g. polyacrylates, polyesters), thermoplastics (polyesters, polyolefins) and elastomers, as well as a polymer component in surface coatings. Further important areas of application are heat and/or radiation-curable adhesives and sealants.

## Packaging and storage

### Packaging

Information on available container sizes is obtainable from WACKER subsidiaries.

### Storage

The 'Best use before end' date of each batch is shown on the product label.
Storage beyond the date specified on the label does not necessarily mean that the product is no longer usable. In this case however, the properties required for the intended use must be checked for quality assurance reasons.

## Safety notes

Comprehensive instructions are given in the corresponding Material Safety Data Sheets. They are available on request from WACKER subsidiaries or may be printed via WACKER web site http://www.wacker.com.

## QR Code GENIOSIL® GF 31

### For technical, quality or product safety questions, please contact:

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