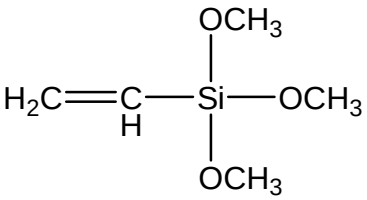
Power Chemical PCC

SiSiB® PC6110

Vinyltrimethoxysilane



Introduction

PC6110 silane, vinyltrimethoxysilane, is used as a polymer modifier via grafting reactions. The resulting pendant trimethoxysilyl groups can function as moisture-activated crosslinking sites. The Silane grafted polymer is processed as a thermoplastic and crosslinking occurs after fabrication of the finished article upon exposure to moisture.

Typical Physical Properties

Chemical Name	Vinyltrimethoxysilane
CAS No.	2768-02-7
EINECS No.	220-449-8
Formula	$C_5H_{12}O_3Si$
Molecular Weight	148.2
Color and Appearance	Colorless transparent liquid
Density $_{25/25°C}$	0.960-0.970
Boiling Point	122°C [760mmHg]
Refractive Index	1.3905 [25°C]
Flash Point	28°C
Purity	Min 99.0%

Power Chemical PCC

SiSiB® PC6110

Applications

- **Polymer Modification**

PC6110 is used to modify polyethylene and other polymers by grafting its vinyl group to the polymer backbone using a radical initiator, such as peroxide. This provides a polymer with pendant trimethoxysilyl groups that may be used as moisture-activated crosslinking sites via hydrolysis of the alkoxy groups followed by condensation of the resulting silanols.

- **Crosslinking of Silane-Grafted Polymers.**

The reaction of Silane-grafted polyethylene to form a crosslinked or vulcanized polyethylene uses water to form the crosslinks. This technology is widely used around the world for commercial applications in wire and cable insulation, tubing, and other similar uses.

The basic reaction sequence is as follows: polyethylene is reacted (grafted) with vinyltrimethoxysilane, using a peroxide initiator, in an extruder. The grafted polyethylene is then formed into a finished product, such as cable jacketing, wire insulation, or pipe. The forming step is usually done by a second extrusion, during which a catalyst for the moisture-cure step is added. Finally, the formed article is exposed to moisture or hot water to cause hydrolysis of the Silane and condensation to form crosslinks via Si-O-Si bond formation.

Benefits of Crosslinking

- Higher maximum use temperature
- Reduced deformation under load (creep)
- Improved chemical resistance
- Superior environmental stress crack resistance
- Increased abrasion resistance
- Improved impact strength
- Memory characteristics (shrink film, tubing)

SiSiB® PC6110

- Improved impact strength

Advantages of Silane Crosslinking over Radiation or Peroxide Crosslinking

- Low capital investment
- Low operating (energy) costs
- Higher productivity
- Processing versatility
- Thick, thin, or variable thicknesses possible
- Complex shaps possible
- Wilder processing latitude (control of premature crosslinking)
- Useful with filled composites
- Applicable to all polyethylene densities and copolymers.