

## Product Information

# VPS 1178

**N-Vinylbenzyl-N'-aminoethyl-3-aminopropylsilane hydrochloride in methanol with multifunctional properties**

### CAS NUMBER

confidential

### PRODUCT DESCRIPTION

VPS 1178 is a monomeric multifunctional product, that contains

- reactive secondary amino groups
- reactive styrenic double bonds
- antistatic cationic centers
- and hydrolyzable silyl methoxy groups.

The dual nature of its reactivity allows VPS 1178 to bind chemically to both inorganic materials (e.g. glass, metals, fillers) and organic polymers (e.g. thermosets, thermoplastics, elastomers), thus functioning as an adhesion promoter and as a surface modifier. VPS 1178 is a dark yellow to brown liquid and contains 40-42% active ingredient and about 58-60% methanol. To improve the solubility of VPS 1178 in water, organic or mineral acids can be used as a catalyst.

#### Typical Properties

Property	Unit	Value
<b>Color</b> ISO 4630, Gardner		<= 9.0
<b>Density</b> (25 °C) DIN 51757	g/cm <sup>3</sup>	0.89-0.92
<b>Flash Point, min.</b> DIN 13736 (methanol)	°C	11
<b>pH Value</b> (20 °C) DIN 38404-C5, 1:1 in water		-7-8

The data represents typical values (no product specification)

### TYPICAL APPLICATIONS

VPS 1178 is a multifunctional organic compound in which the silanol groups can be bonded to an inorganic substrate and the organophilic amino groups can interact with a suitable polymer or resin.

Examples of suitable inorganic substrates are:

- glass, glass fibers, glass beads and glass wool
- mineral wool
- metals
- and various fillers like quartz, wollastonite or ATH.

Examples of suitable polymers or resins are:

- Thermosets like epoxy, phenolic, furanic and melaminic resins
- Thermoplastics like PA, PBT, EVA, PPS, MAPE, MAPP, PVB, acrylates
- Elastomers like silicones.

VPS 1178 finds application in many industries. Advantages arise in water-based systems. Examples are:

- as a size constituent of glass fiber/glass fabric composites or mineral wool insulating materials
- as a primer or additive for sealants and adhesives
- as a pretreatment or an additive to mineral-filled thermoplastic compounds
- as a glass and metal primer
- as a primer and/or additive for paints and varnishes to improve adhesion to the substrat.

#### Product Composition

Product Composition	Unit	Value
<b>Chloride (Cl) Content, max.</b> SOP 0411	wt%	3

The data represents typical values (no product specification)

## BENEFITS & ADVANTAGES

Important product effects that can be achieved by the use of VPS 1178 are:

Improved mechanical properties: e.g.

- flexural strength
- tensile strength
- impact toughness
- modulus of elasticity.

Improved electrical properties: e.g.

- dielectric constantspecific
- volume resistance.

Improved temperature stability at the inorganic/organic interphase

- >300°C.

VPS 1178 may also be used to improve processing properties such as

- better polymer wetting
- elongated gelation time of resins
- immediate solubility in water
- lower turbidity in water solution
- organic and inorganic reactivity for coupling

## DOSAGE

In the presence of water, the methoxy groups of VPS 1178 hydrolyze and form reactive silanol groups which can bond to a variety of inorganic substrates. The organophilic amino groups as well as the styrenic groups of VPS 1178 will react with suitable polymers.

Because VPS 1178 possesses both an amino group and a reactive double bond it can react with amine-reactive polymers and also with free-radical reactive polymers. The cationic structure provides antistatic properties and, in many applications, particularly good wetting of the resin.

Hydrolysis of VPS 1178 is preferably carried out in the presence of acetic acid (pH 3-4).

Guideline for hydrolysis of VPS 1178:

Method A:

VPS 1178 is stirred in a water based acetic acid solution, pH (hydrolysate) = 3.4.

Acetic acid solution is prepared by diluting 99.50 g deionized water with 0.50 g glacial acetic acid. 99.70 g acetic acid solution (w HAC = 0.5%) is filled in a glass bottle. Solution is stirred with a magnetic stirrer. Under stirring 0.30 g VPS 1178 is added to the acetic acid solution. After 2 min. the hydrolysate becomes clear (turbidity after 10

min.: 2.4 FNU). Also after 24 h the hydrolysate is clear (turbidity: 1.0 FNU).

Method B:

Prehydrolyse VPS 1178 with water. Prehydrolysate is stirred in a water based acetic acid solution, pH (hydrolysate) = 3.7.

Acetic acid solution is prepared by diluting 99.83 g deionized water with 0.17 g glacial acetic acid. 60 g VPS 1178 is filled in a glass bottle and stirred with a magnetic stirrer. Under stirring 3.87 g deionized water is added dropwise to the VPS 1178. The prehydrolysate stays clear. After 20 minutes 0.3 g of the prehydrolysate is stirred in 99.7 g acetic acid solution (w HAC = 0.17%). After 4 min. the hydrolysate becomes clear (turbidity after 10 min. : 1.1 FNU). Also after 24h the hydrolysate is clear (turbidity: 2.3 FNU).

## HANDLING & PROCESSING

Before considering the use of Dynasylan® 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 on our website <https://silanes.evonik.com/en> or upon request from your local representative, customer service or from Evonik Operations GmbH, Product Safety Department, E-MAIL [sds-hu@evonik.com](mailto:sds-hu@evonik.com).

Please consult your local Evonik representative to discuss exact handling (e.g. dilution, wetting, curing temperature) of VPS 1178 with a technical expert to achieve the best possible results in your application.

## PACKAGING

VPS 1178 is supplied in 24 kg and 160 kg drums.

## STORAGE

It is recommended to store VPS 1178 above 4°C.

## SHELF LIFE

VPS 1178 has a shelf life of at least 12 months from delivery in an originally sealed drum.

#### Registration Listings

Registry	Status
Canada (DSL)	Yes
China (IECSC)	Yes
European Union (EINECS/ELINCS)	Yes
United Kingdom (UK-REACH)	Pending

#### Registration Listings

Registry	Status
South Korea (KECL)	Yes
United States of America (TSCA)	Yes

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