

## Solution Case Study

# Enhance the Adhesion of Polyurethanes with VPS 7161 – A Special Silane from Evonik

### Additive

Dynasytan® organofunctional silane–adhesion promoter and co-crosslinker

### Key adhesives and sealants technologies

- Polyurethanes (1K and 2K)
- PU hot melts
- Silicones

### Markets

Construction, industrial assembly, transportation, wood working

### Key benefits

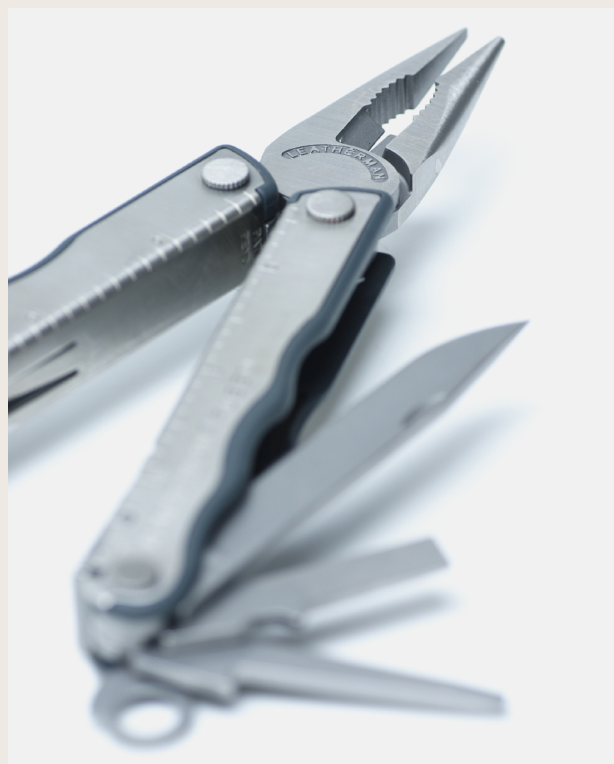
- Planar molecule with 9 methoxy groups, thus high crosslinking potential
- Compatible with amine-critical formulations, thus broad formulation window for users
- Favorable physical properties like e. g. high boiling/flash points
- Excellent adhesion profile towards metals and selected polymers

### The challenge

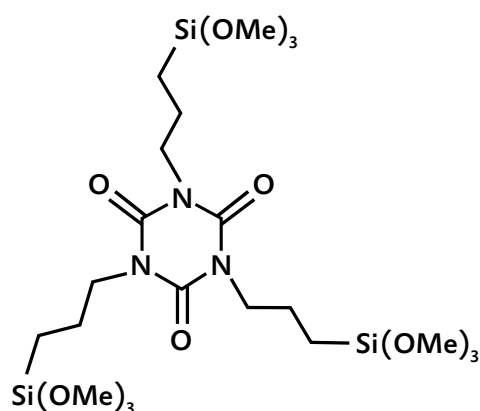
Many PU formulators are facing significant challenges when formulating polyurethane adhesives, especially when it comes to primerless adhesion to critical substrates and metals.

### The solution

VPS 7161 is a special silane adhesion promoter with a planar structure and a very high crosslinking potential. It shows excellent chemical compatibility to amine-critical, sensitive isocyanates that makes it a tailor-made solution for PU-based adhesives and sealants.

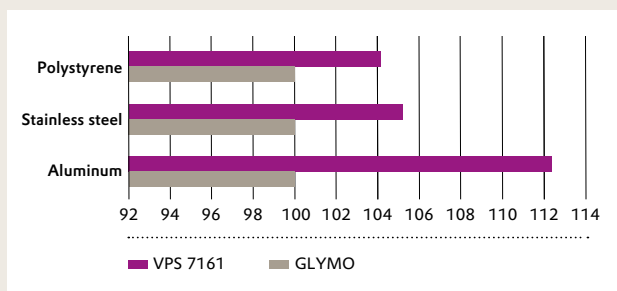


### Chemical structure:



In the 1<sup>st</sup> lab study, VPS 7161 has been tested in a 2K-PU adhesive guide formulation compared to the market standard Dynasytan® GLYMO (silane concentration: 1 wt.-%). VPS 7161 led to better adhesion on aluminum, stainless steel, and even critical ABS polymer, tested by single lap shear testing shown in Figure 1.

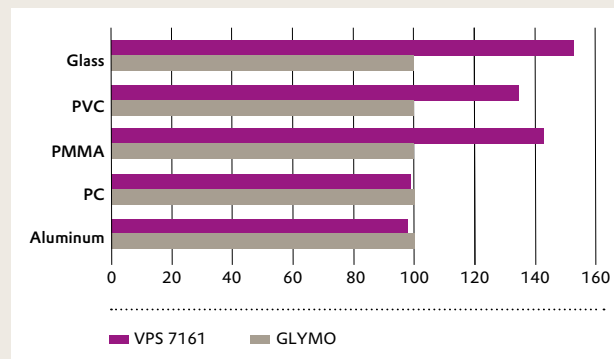
### Adhesion performance of a 2K-PU adhesive



**Figure 1** Adhesion performance of VPS 7161 in a 2K-PU adhesive (Dynasytan® GLYMO = 100 per index)

Due to the high boiling point (approx. 240 °C at 35 hPa), the high flash point and the high temperature stability, VPS 7161 is foreseen also for (PU-based) reactive hot melt formulations and other 1K PU systems. This was illustrated by a 2<sup>nd</sup> test series in a CaCO<sub>3</sub>/silica filled 1K-PU formulation (silane concentration = 2 wt.-%).

### Adhesion performance of a 1K-PU formulation (adhesive)



**Figure 2** Adhesion performance of VPS 7161 in a 1K-PU adhesive (Dynasytan® GLYMO = 100 per index)

Here, VPS 7161 gave an adhesion boost on glass, PVC and PC. Next to this, VPS 7161 also positively impacted crucial mechanical properties of the adhesive films such as tensile strength and tear strength without negatively influencing the adhesive's viscosity.

#### Summary:

VPS 7161 is a silane specialty from Evonik that is predominantly recommended for 1K/2K polyurethanes incl. reactive hot melt adhesives. It helps formulators to overcome challenges of poor adhesion on certain metals and critical polymer substrates without using a primer.

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