

Case Study

## Enhance the Adhesion of Polyurethanes with VPS 7163 – A Unique Silane from Evonik

**Additive:**

Dynasylan® Organofunctional silane – adhesion promoter and crosslinker

**Key Adhesives and Sealants Technologies:**

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

**Markets:**

Construction, Industrial Assembly, Transportation, Woodworking

**Key Benefits:**

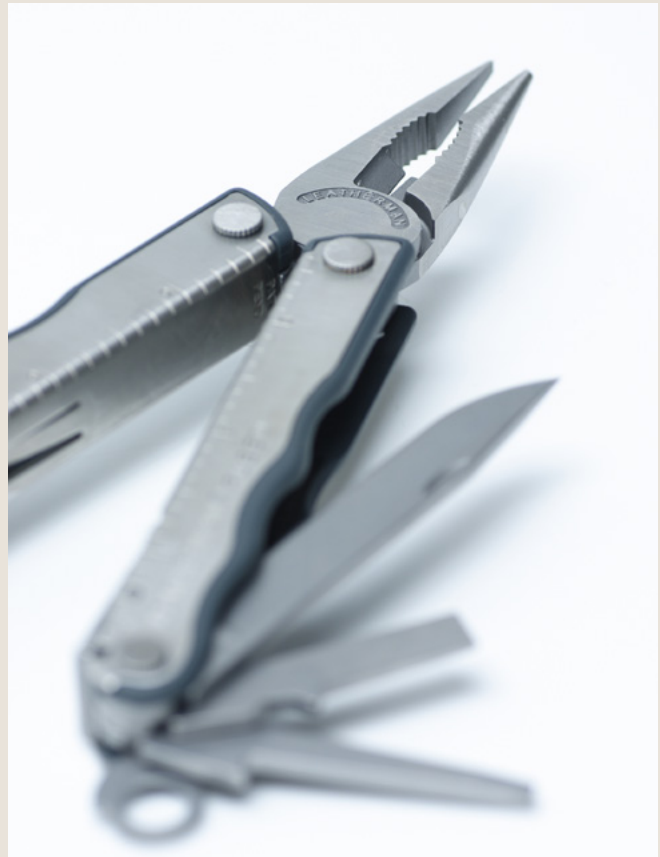
- Planar molecule with 9 methoxy groups, thus high crosslinking potential
- Compatible with amine-critical formulations, thus broad formulation window for users
- Favorable physical properties such as high boiling/flash points, colorless additive, etc.
- Excellent adhesion profile towards metals and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

**The Challenge**

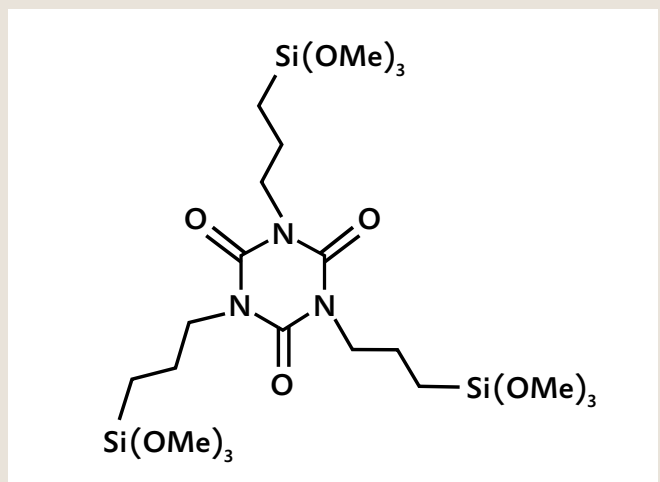
Many PU formulators are facing significant challenges when formulating polyurethane adhesives, especially when it comes to primerless adhesion to critical substrates and metals.

**The Solution**

**VPS 7163** 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.



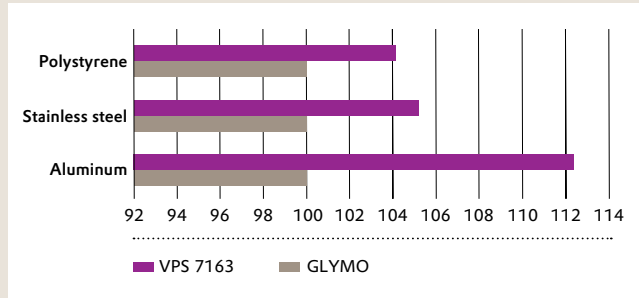
**Chemical Structure:**



In the first lab study, we tested **VPS 7163** in a 2K PU adhesive guide formulation compared to the market standard Dynasytan® GLYMO (silane concentration: 1 wt.-%).

**VPS 7163** led to better adhesion on aluminum, stainless steel, and also ABS polymer, tested by single lap shear testing shown in **Figure 1**.

### Adhesion Performance in a 2K PU Adhesive

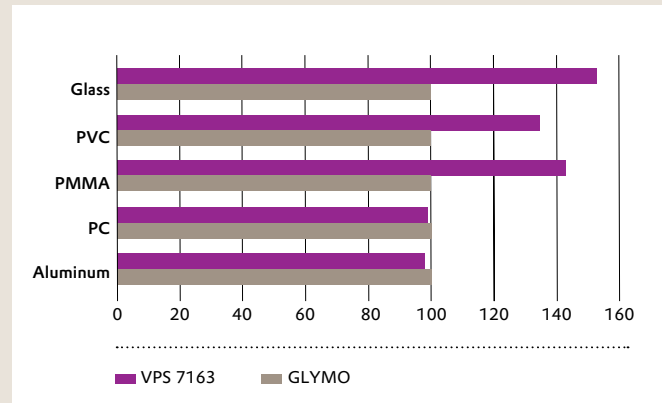


**Figure 1** Adhesion performance of **VPS 7163** in a 2K PU adhesive (Dynasytan® GLYMO = 100 per index)

Due to its high boiling point (approx. 240°C), high flash point and high temperature stability, **VPS 7163** can also be used for PU-based reactive hot melt formulations.

This was illustrated by a second test series in a CaCO<sub>3</sub>/silica filled, 1K PU formulation with a silane concentration of two weight percent.

### Adhesion Performance in a 1K PU Adhesive



**Figure 2** Adhesion performance of **VPS 7163** in a 1K PU adhesive (Dynasytan® GLYMO = 100 per index)

Here, **VPS 7163** improved adhesion on glass, PVC and PC. **VPS 7163** 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 7163** is a unique silane from Evonik that is predominantly recommended for 1K/2K polyurethanes, including reactive hot melt adhesives. It helps formulators to overcome challenges of poor adhesion on certain metals, and critical polymer substrates – without using a primer.

This information and any recommendations, technical or otherwise, are presented in good faith and believed to be correct as of the date prepared. Recipients of this information and recommendations must make their own determination as to its suitability for their purposes. In no event shall Evonik assume liability for damages or losses of any kind or nature that result from the use of or reliance upon this information and recommendations. EVONIK EXPRESSLY DISCLAIMS ANY REPRESENTATIONS AND WARRANTIES OF ANY KIND, WHETHER EXPRESS OR IMPLIED, AS TO THE ACCURACY, COMPLETENESS, NON-INFRINGEMENT, MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE (EVEN IF EVONIK IS AWARE OF SUCH PURPOSE) WITH RESPECT TO ANY INFORMATION AND RECOMMENDATIONS PROVIDED. Reference to any trade names used by other companies is neither a recommendation nor an endorsement of the corresponding product, and does not imply that similar products could not be used. Evonik reserves the right to make any changes to the information and/or recommendations at any time, without prior or subsequent notice.

Dynasytan® is a registered trademark of Evonik Operations GmbH or one of its subsidiaries.

### EVONIK OPERATIONS GMBH

Silanes Business Line  
 Rodenbacher Chaussee 4  
 63457 Hanau  
 Germany

[dynasytan@evonik.com](mailto:dynasytan@evonik.com)  
[www.dynasytan.com](http://www.dynasytan.com)

