

Solution Case Study

Formulate VOC-Reduced SMP Based Adhesives and Sealants and Silicones with Excellent Mechanical Properties

Technology

Dynasylan® organofunctional silanes

Key adhesives and sealants technologies

- Silane modified polyurethane/polyether (SMP)
- MS Polymer
- RTV-1/RTV-2 oxime- and alkoxy-silicones

Markets

Construction, transportation, do-it-yourself, industrial assembly

Key benefits

- Improved adhesion to plastics, especially to polycarbonate (PC)
- High tensile strength in SMP
- Well-balanced mechanical properties in silicones
- > 50 % VOC-reduction compared to traditional aminosilanes
- Without regards to other raw materials, add up to 30 % VPS SIVO 260 without labeling

The challenge

Adhesion on critical substrates like plastics is a key challenge in the adhesive industry. It comes along with the difficult task to keep other performances like mechanical properties at a suitable level. What if you could go even beyond and get adhesion on critical substrates along with increased mechanical properties and VOC-reduction?

The solution

You can now develop adhesives, sealants and silicones with increased adhesion performance, excellent mechanical properties within an environmentally friendly formulation. Indeed, with VPS SIVO 260, you now get up to 27 % adhesion increase on PC and achieve higher strength by higher flexibility in silicones. Not only it enables the formulation of environmentally friendly products, it usually allows labeling free adhesives or sealants.



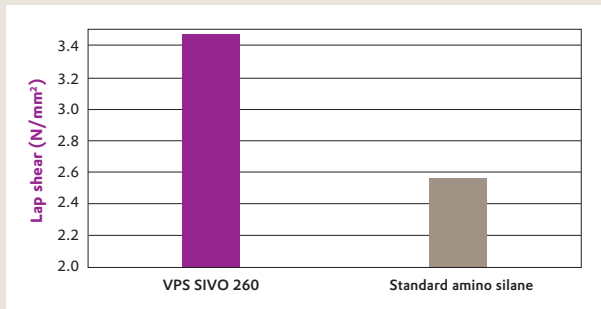
This unique combination of performances enables:

- Longer product lifecycle
- Higher endurance to vibration, stress, temperature variation
- The possibility to bond complex substrates to broaden the application
- Providing of environmentally friendly and labeling free final products

Excellent adhesion performance on metal and plastics

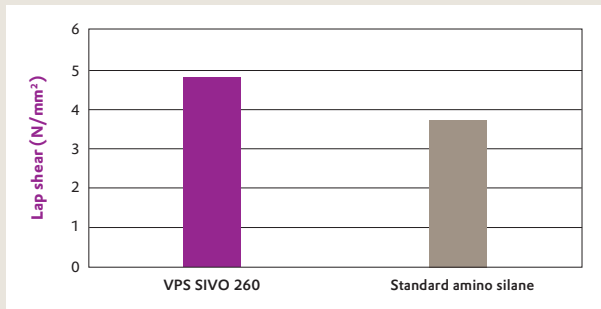
With VPS SIVO 260, formulated in SMP products or RTV-silicones, excellent adhesion on a wide variety of substrates like metal and low energy plastic surfaces (e.g. PVC, PET) can be achieved.

As shown in the figure below, a STPU adhesive with VPS SIVO 260 exhibits an outstanding adhesion on PC with +27 % compared to standard aminosilanes:



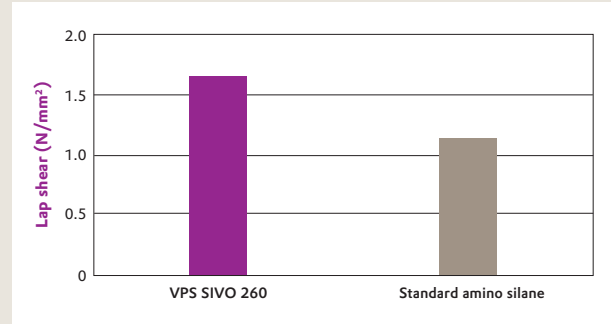
Lap shear (N/mm²) in a cured STPU sealant on PC (adhesion promoter = 1.11 %)

In addition, the final STPU adhesive showed better adhesion on aluminum with +29 % adhesion performance vs. standard aminosilanes, too:



Lap shear (N/mm²) in a cured STPU sealant on aluminum (adhesion promoter = 1.11 %)

MS-polymer adhesives showed also improved adhesion on plastics e.g. PVC with +45 % compared to standard aminosilanes

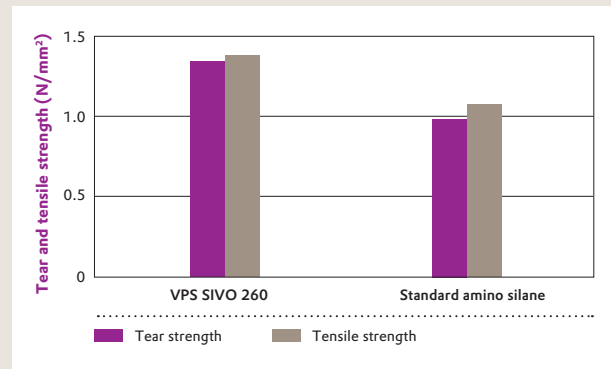


Lap shear (N/mm²) in a cured MS-adhesive on PC (adhesion promoter = 1.5 %)

Excellent performance in silicones: adhesion and mechanical performance at its best

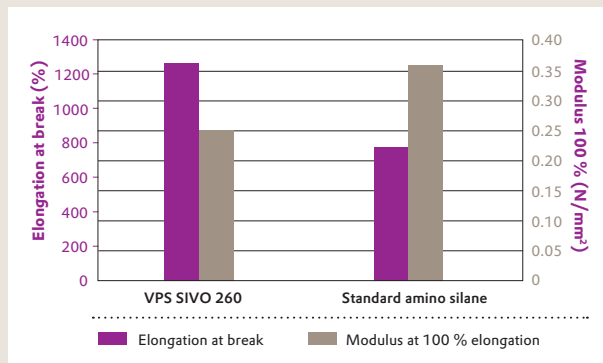
With VPS SIVO 260, formulated in RTV-silicones, you can achieve excellent adhesion and mechanical performance.

In oxime silicones, VPS SIVO 260 improves the mechanical properties positively. So you can achieve higher strength by higher flexibility. The tear and tensile strength are respectively increased by 35 % and 25 % with VPS SIVO 260 vs. standard aminosilanes.



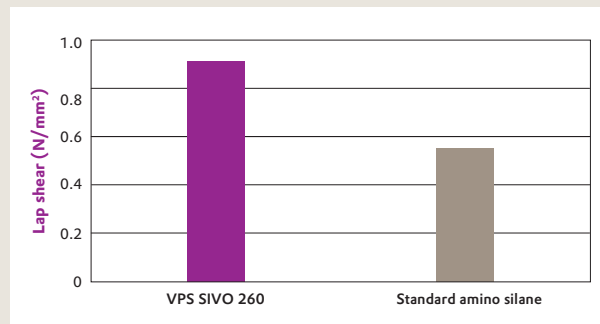
Tear and tensile strength (N/mm²) in a cured oxime silicone (adhesion promoter = 1 %)

Moreover, the elongation at break is increased by 60 % with VPS SIVO 260:



Elongation at break (%) and Modulus 100 % elongation (N/mm²) in a cured oxime silicone (adhesion promoter = 1 %)

In addition, thanks to VPS SIVO 260, the final oxime silicone showed a better adhesion on PVC compared to standard aminosilanes:



Lap shear strength (N/mm²) in a cured oxime silicone on PVC (adhesion promoter = 1 %)

Additional advantages are provided by VPS SIVO 260:

- Low volatile adhesion promoter for the use in odor reduced hotmelt formulations
- Environmentally friendly silane, due to significant VOC-reduction compared to conventional aminosilanes

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 Industries or one of its subsidiaries.

EVONIK RESOURCE EFFICIENCY GMBH

Business Line Silanes
 Rodenbacher Chaussee 4
 63457 Hanau
 Germany
dynasytan@evonik.com
www.dynasytan.com

