

Silyl Terminated Polyether Technology (STPE)

By Ezio Fabrizi

How is STPE technology accomplished?

Silyl-Terminated Polyether polymers are made up of polypropylene oxide polyethers, which are terminated with hydrolyzable dimethoxysilyl groups. The STPE technology utilizes moisture and catalysts for room temperature curing.

How long has STPE technology been around?

Silyl Terminated Polyether Technology has been around for 25 years and widely used in Europe and Japan. This technology has been established in the United States and is being used in industrial and residential applications. (Hutchison & Pagliuca, 1996; Schuman & Yazujian, 1979).

What are some advantages of the STPE technology?

STPE technology has offerings of high performance capabilities (Hashimoto, 1998) with attractive characteristics such as:

Environmentally friendly- Isocyanate free with close to 100% solids

Weather resistance and durability- Extensive testing in a published study performed in and out of a laboratory setting demonstrated no splitting, discoloration, cracking, or adhesion failure over a seven-year testing period.

Adhesion- STPE sealants can be applied to a wide variety of substrates with good adhesion characteristics. Examples of substrates are wood, concrete, metals, plastics and ceramics. Silyl Terminated Polyether sealants show superior adhesion when compared to both Polyurethane and Silicone sealants (Petrie, 2007).

Quick cure rate- STPE sealants offer a technology that is fast to strengthen.

Storage Stability- Excellent shelf life as long as the sealant is protected from moisture.

About STPE

STPE technology offers a well-balanced and versatile foundation for sealants that are used in a broad range of applications. STPE technology is very well suited in industries, such as construction, where a quick forming strong bond is needed.

Silyl Terminated Polyether technology offers the ability to formulate adhesives and sealants that are based on a unique chemical structured Silyl-terminated polyether, also known as Silane Modified Polymers (SMP) or MS-Polymers.

These innovative, environmentally friendly, one-part, moisture curing MS Polymers are solvent and isocyanate free. STPE technology essentially combines the strength of polyurethanes with the weathering resistance of silicones representing the latest generation of high-performance adhesives/sealants.

STPE technologies offer a wide range of physical properties. They withstand the most stringent requirements for high performance bonding and elasticity under severe aging and UV weathering conditions without cracking or yellowing when subjected to extended UV-light exposure. After 24 hours, MS-Polymers can be painted with most industrial paint or lacquer systems.

STPE technology is particularly useful for applications where their non-staining characteristics and excellent adhesion provide long-term use without significant changes in properties. STPE characteristics eliminate or minimize pre-treatment of substrates, while ensuring optimal elongation and tensile strength properties for durable, flexible, tear resistant bonds. STPE adhesives and sealants are reported to be unsurpassed for lasting bond durability, modulus of elasticity and low-temperature resistance. STPE technology cures at ambient temperature in the presence of both moisture and hardening catalysts.

Summary

Silyl Terminated Polyether Technology is a fast-growing product technology that is used in formulations for sealant-adhesives for a wide variety of substrates. The majority of these types of products are one component, with air moisture being the second component. While initially the main benefits of MS Polymer technology containing products were mainly focused on the 'safety' related matters (environmental as well as human safety), nowadays also significant performance benefits can be claimed. Indeed, recent progress in the polymer design and formulation optimization allow more critical applications to be handled with MS Polymer technology due to improved mechanical, adhesion and rheology properties. Also, many applications can be done without a primer making installation faster than other adhesive/ sealant technologies.

1. Schuman, M.A., and A.D. Yazujian, "Technology of Polysulfide Sealants," in Plastic Mortars, Sealants, and Caulking Compounds, R.B. Seymour, ed., ACS Symposium Series 113, Washington, DC, 1979
2. Hutchinson, A., and A. Pagliuca, "MS Sealants: A Comparative study of Performance Properties." Adhesives Age, April 1996.
3. Hashimoto, K., "Silyl-Terminated Polyether's for Sealant Use: Performance Updates," Adhesives Age, August 1998
4. Petrie, E. M., "Handbook of Adhesives and Sealants." McGraw Hills: New York, 2007