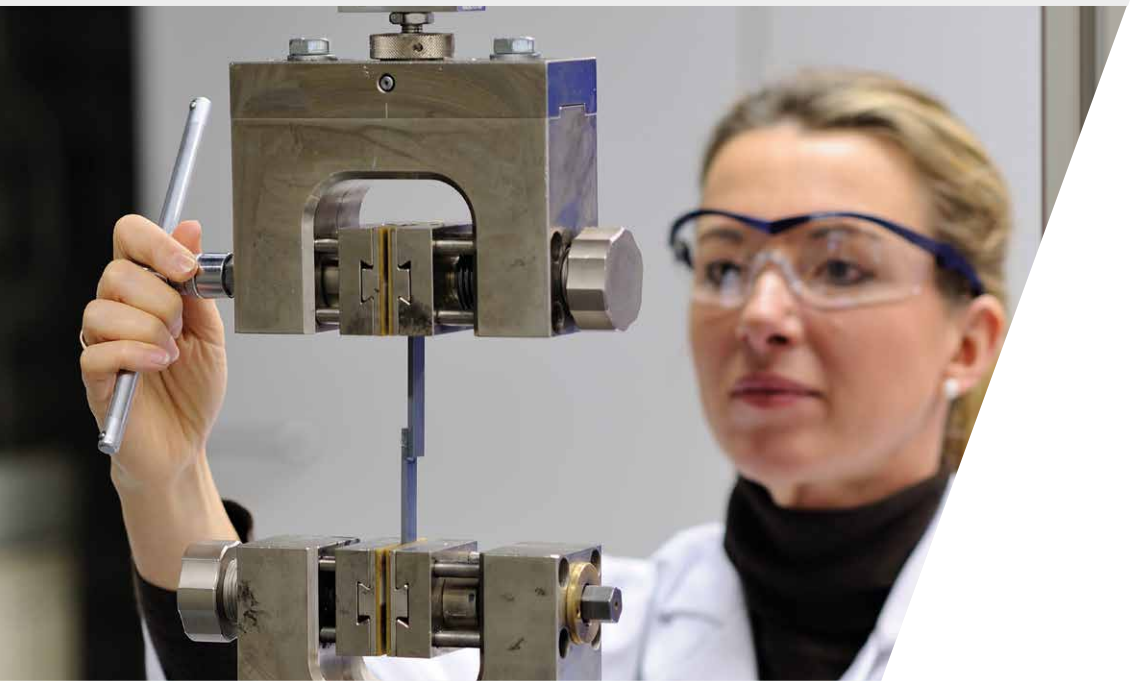
SABA

adhesives & sealants

What is the right sealing system for your tank or silo?

The differences between MS polymer and polyurethane-based sealing technologies

a strong bond



Introduction

Durable seals are an important part of the construction or renovation of tanks and silos.
Various aspects play a major role in the choice of the right sealing material. These could include:

- the (chemical) content of the tank
- the composition of the walls and bottom, including the finish (e.g. coating)
- the ambient temperature
- the temperature in the tank
- the certification requirements
- the durability

It is also important that the sealing system is both safe and easy to transport and easy to work with.
So what is the best sealing material?

This document provides a more in-depth discussion of two sealing technologies used in the tank construction sector: sealants based on MS polymer (MSP) and sealants based on polyurethane (PU). There are many different types of MSP and PU systems. We clearly set out the main differences, with information on the bonding properties, the elasticity and the safety. After reading this document you will have more background information and clarity about the differences between these technologies and are able to select the right sealing system for your specific tank. And you can then be sure that your tank or silo is sealed in the best possible way.

Sealing systems based on MS polymer or polyurethane:

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Both MSP and PU technologies are permanently elastic and have good bonding properties. They both react to moisture, forming a strong and flexible network. This makes these sealing technologies highly suitable for absorbing motion and vibration.

Application possibilities

Movable joints can be sealed well with both technologies. MSP and PU sealants are also suitable in situations where materials with different thermal expansion coefficients need to be sealed.
On this basis, therefore, both technologies can be applied for durable sealing of tanks or silos.

The differences

Although at first glance, MSP and PU sealants appear to have many similar properties, there are clear differences in the basis of the two technologies. For example, MSP contains reactive silane/ silyl groups that provide for the curing. PU systems contain reactive isocyanate groups for curing.

Silane versus isocyanate

The curing reaction based on silane (MSP system) has fewer or no undesirable secondary reactions under the influence of moisture. This is in contrast to material containing isocyanate (PU system), which will foam or blister in a moist environment. This is because carbon dioxide is released during curing, which leads to deterioration in the properties of the material. Another disadvantage of PU sealants is that contact with isocyanates is possible during application, particularly during the finishing process: these chemicals constitute a health risk.

In short, a label-free MSP is safer during application. This sealant can also be applied in less favorable (moist) conditions.

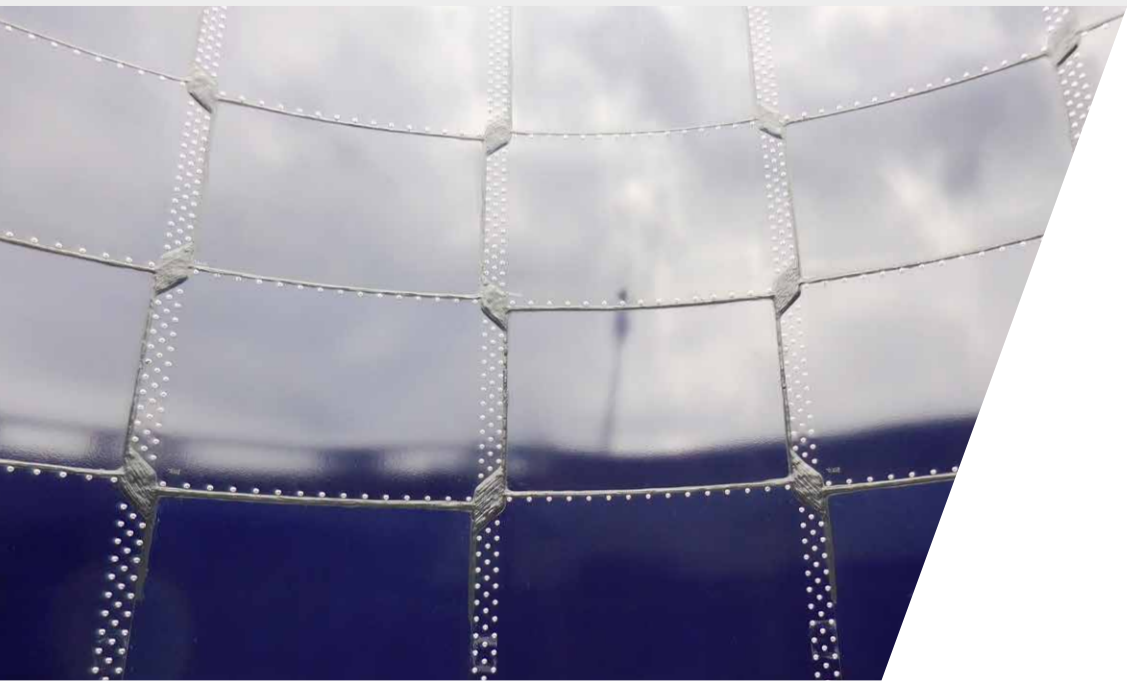
After curing

Differences between MSP and PU also remain after the sealant has hardened. For example, hardened MSP is in many cases less sensitive to chemical damage. In some cases, MSP systems are also more resistant to higher temperatures and certain chemicals, such as chlorine.

PU systems generally have a higher yield and tensile strength. But with more relevant movements of up to 100%, an MSP system shows a higher modulus. An MSP system is therefore well able to absorb common movements in tanks and silos, which assures a durable seal.

Finally, MSP systems have a lower glass transition temperature. This means that MSP systems also remain elastic for longer at lower temperatures and so retain their properties.

	MS POLYMER	POLYURETHANE
UV resistance	● ● ● ○	● ● ○ ○
Resistance to heat and cold		
Flexible in combination pH 6	-40° C / +90° C ● ● ● ○	-30° C / +55° C ● ● ○ ○
Flexible in combination pH 2	-40° C / +65° C ● ● ○ ○	-30° C / +40° C ● ○ ○ ○
Flexible in combination pH 13	-40° C / +65° C ● ● ○ ○	-30° C / +40° C ● ○ ○ ○
Cracking resistance	● ● ● ○	● ● ● ○
Chlorine resistance (in water)	● ● ● ○	● ○ ○ ○
Open time	● ● ○ ○	● ● ● ○
Curing time	● ● ○ ○	● ● ○ ○
Moisture during application	● ● ● ○	● ○ ○ ○
Bonding	● ● ● ○	● ● ● ○
Safe for people and the environment	● ● ● ○	● ○ ○ ○



Conclusion

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Unfortunately, there is no single system with lasting resistance to all possible factors. But both MSP and PU can be used as sealing materials. Both products are permanently flexible, resistant to cracking and available in several variants. Every technology has its own advantages and disadvantages.

In practice, PU sealants are regularly used. PU sealants have a higher yield and tensile strength and are suitable for applications where the pH value is not very high or low. But MSP has a clear advantage in terms of bonding and resistance to chemicals, cold and heat. This is shown partly by the fact that in comparison with PU, MSP is more resistant to e.g. water containing chlorine. Because it contains no isocyanate, MSP is also clearly safer to apply. Always check if a specific certification is requested, such as NSF ANSI 61 drinking water certificate, ISEGA (HACCP) in relation to food or EMICODE EC1 plus.

System choice

If you want certainty, we recommend contacting the producer of the sealing system. In order to see which technology suits your situation, it is important to state the following points with your request:

- The pH content of the tank (or the range)
- The temperature range in the tank (if fluctuating over time)
- The chemical content of the tank in %.

If the substrate has not been tested, it is also advisable to share this information too, as there are many different (coating) composites that may have a different bonding profile.

Would you like to know more about the benefits of SABA for your project, without obligation?
Make an appointment via **+31 315 658999** or **building@saba-adhesives.com**

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