

Why is Bonding on Polyethylene Difficult?

Polyethylene is a non-polar thermoplastic with a smooth and chemically inert surface. This makes it difficult for adhesives and sealants to bond to it, as they cannot form a chemical bond with the surface.

Possible Solutions for Improved Bonding

1. Use of a Suitable Primer

A primer can increase the surface tension of PE and introduce functional groups that allow reactions with the silicone sealant.

Silicone Primers for Plastics: There are special primers developed for bonding to polyolefins such as PE and PP.

Recommended Products:

• Wacker Primer G790

Application:

- Thoroughly clean the PE surface with isopropyl alcohol to remove dirt and grease.
- Apply the primer thinly and evenly with a clean cloth or brush.
- Allow the primer to dry according to the manufacturer's instructions (usually 30 minutes).
- 2. Surface Treatment of Polyethylene

Modifying the surface can significantly improve adhesion.

- **Flame Treatment:** Briefly expose the PE surface to a flame. This slightly oxidizes the surface, increasing the surface tension. Observe safety measures to avoid deformation of the PE.
- **Corona Treatment:** An electrical discharge is used to activate the surface. Often used in industrial applications.
- **Plasma Treatment:** An effective but more advanced method. Improves adhesion by activating the surface without chemical additives.
- 3. Use of Special Silicones or Adhesives
- **MS Polymer Sealants:** These hybrids combine properties of silicones and polyurethane. Adhere better to difficult substrates without primer. Example: Soudal Fix ALL or Den Braven Hybriseal.
- Silicone Sealant with Increased Adhesion: Some manufacturers offer silicone sealants formulated for better adhesion to plastics.



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4. Mechanical Anchoring

• **Roughening the Surface:** Lightly sand with fine sandpaper (grit 200-400) to roughen the surface. Thoroughly remove sanding residues before applying the primer or sealant.

Step-by-Step Guide

- **Cleaning:** Use isopropyl alcohol or a suitable degreaser. Remove all dirt, dust, and grease.
- **Surface Treatment (optional but recommended):** Apply flame, corona, or plasma treatment. Be careful with flame treatment to avoid material damage.
- **Primer Application:** Apply the suitable primer according to the instructions. Ensure a thin, even layer. Allow sufficient drying time.
- **Application of the Silicone Sealant:** Choose a high-quality silicone sealant compatible with the primer. Apply the sealant evenly to the surface. Press the silicone firmly for good contact.
- **Curing:** Allow the sealant to cure according to the specifications (usually 24-48 hours). Avoid movement or load during curing.

Important Tips

- Testing: Always perform an adhesion test on a small area to check compatibility.
- **Compatibility:** Ensure that the primer and silicone sealant are compatible. Consult the technical data sheets or contact the manufacturer.
- **Safety:** Wear appropriate personal protective equipment such as gloves and safety glasses. Ensure good ventilation when using solvent-based primers.

Additional Information

- Alternative Adhesives: Polyurethane adhesives can sometimes offer better adhesion on PE without primer. Structural Acrylates with special initiators can also be effective.
- **Consideration of Material Replacement:** If adhesion is crucial, consider using another material with better adhesion properties.

Conclusion

Successfully bonding silicone to a polyethylene surface requires careful preparation and the right materials. By properly preparing the surface and using a suitable primer and sealant, you can achieve a durable and reliable bond.





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