

Release layers for plastic impressions

Transfer offering

In plastics processing, tool surfaces are exposed to high mechanical demands. Adhesion effects have a negative effect on the surface structure of the tools and thus on the quality of the moulded part surfaces. The adhesion of plastic residues, the formation of coatings and adhesions lead to increased cleaning efforts of the tools and even to tool failure. By using release layers in injection moulding and hot stamping tools, the adhesion of plastic moulded parts to the tool surfaces can be minimized. Atmospheric pressure-based coatings replace the use of conventional release agents in the mold and thus enable the reproduction of optically perfect surfaces.



Approach

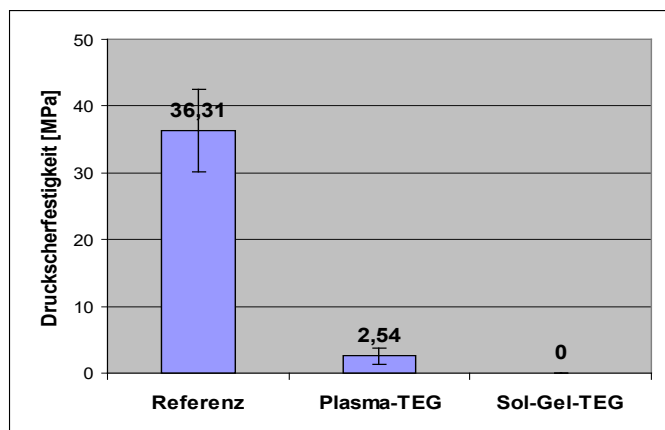
With the sol-gel technique, functional layers with hydrophobic properties can be applied to surfaces. Long-chain siloxanes are introduced into the sol to form these permanent separating layers. The coating is deposited under ambient conditions by spraying, dipping or rolling. After complete cross-linking of the coating by thermal (ΔT , RT, IR) or photochemical (UV, VIS, Laser) influence, a permanent release layer is formed on the tool surface.

Advantages

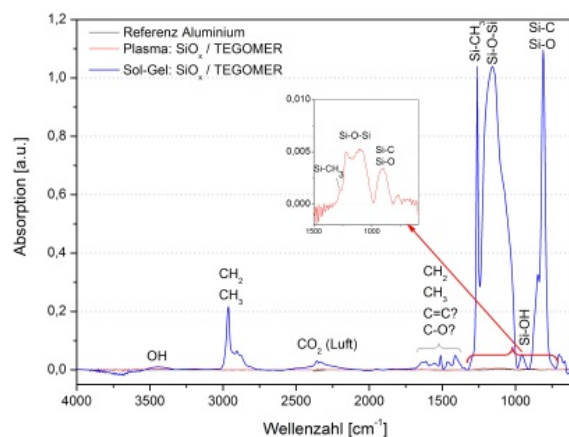
- Reduction of the adhesion tendency, thus good demoldability of the plastic molded parts
- Minimization of the demoulding forces in the mould
- Savings on demoulding aids
- Increase of the tool life due to
- Reduction of adhesion effects
- Optimum surface properties and long life
- continued dimensional tolerance

Development status and property rights

The sol-gel coatings developed so far work excellently on moulded parts with simple geometries, such as discs, rings, caps, etc. For more complex components, the coatings are currently affected by the extreme shear forces. For this reason, work is constantly being carried out on the further development and modification of the sol-gel coatings with regard to flexibility and long-term stability in order to adapt them to possible applications and materials. There is already cooperation with industrial partners where the coatings are successfully used.



The comparison of the release effect of hydrophobic coatings (reference: uncoated surface) illustrates the strong effect of the sol-gel layer



FT-IR absorption spectra of uncoated and coated fracture surfaces from the compression shear test. The sol-gel layer is also detectable on the aluminium substrate after the test