

SURFACE TENSION

The surface tension of a substrate is of great importance for the adhesion of our bonding systems.

Surface tension arises because the molecules on the surface of the substrate strongly attract. Because the molecules attract one another a tension of the surface occurs. This can be seen as a tension between the molecules. The molecules continue to attract each other and will remain close together as long as possible. Because of this they do not give passage, because then they have to be separated. This physical activity at the surface substrate makes the adhesive flows out well, and then can adhere well to the surface. This is called 'wetting'.

It can be illustrated well with a drop of water. When a drop is placed down on very clean glass, it spreads completely. This is because of the high surface tension of glass. By contrast, the same drop deposited on a sheet of plastic, with a very low surface tension, the drop remains stuck in its place.

By nature some materials and with manufacturing of some facade panels sometimes processing aids (mold release agents) are used e.g. to allow the panel come out of the mold easily. In the event a protection foil is applied on the facade panels, the surface is pre-treated in order to lower the surface tension and thereby facilitating the detachment of the foil. Please take notice of the fact that these substances reduces the chemical activity at the surface and must be removed from the surface before bonding to.

Good wetting is achieved when the surface tension of the adhesive is lower than the surface tension of the surfaces to be bonded. The TWEHA adhesives, based on Silane modified polymers, are polar and therefore have a relatively high surface energy. Therefore achieve these adhesives an optimal adhesion to polar substrates (e.g., glass or metal) with a relatively high surface energy.

Critical is bonding on materials with a low surface tension (a-polar substrates) such as most polymers (plastics) which are characterized with low to very low surface tensions. It explains why it is so difficult to achieve good adhesion to low surface tension materials such as polyethylene, polypropylene, silicones and polytetrafluoroethylene (Teflon™)..

The surface tension of the substrate is, moreover, easy to indicate by placing (demineralized) water, in the form of a drop on the surface. If the drop of water remains lying than the surface tension of the substrate is low (eg Teflon). If the waterdrop flows out the surface tension of the substrate is high. TWEHA tested and approved materials on this issue also. Unless otherwise indicated, bonding without addition or modification with TWEHA's bonding products is allowed.