

Adhesion of Polyurethane to Various Plastic Substrates Surface Energy of Your Substrate

The adhesion strength of the polyurethane resin formula to the substrate can be predicted by testing the surface energy of your substrate. It can be measured by a fairly simple method. You can refer to the method at this web site.

<http://www.accudynetest.com/pentest.html>

The surface energy of a material can be measured in dynes/cm unit using dyne pens. In general, if your substrate measures its surface energy to be **above 40 dynes/cm**, you have a very good chance of getting decent adhesion of urethane resins. If it's 35- 40 dynes/cm, you may have an OK adhesion. If it's below 35 dynes/cm, you'd probably need to prep the surface to get better surface energy.

There are data of general surface energy values available on the Internet. You can use it as the general guidance to choose materials for your parts that need to adhere to polyurethane resins.

If the surface energy of your plastic part is low, you need to prep the surface to get a good adhesion. The easier and cheaper way is to use primer. The proper way of prepping the surface with primer is first, you sand the virgin surface off the primer, solvent-wipe it, and apply the primer. The primer needs to be dried for a certain amount of time before you pour urethane on it. You need to follow the instruction on the primer from the manufacturer.

The following company carries good primers. You can contact the technical service for the recommendation for your substrate type and process.

<http://www.lord.com/products-and-solutions/adhesives.xml>

The primer method has a limitation. If the surface energy of substrate is low, primer may not work well. There is a way to modify the surface energy of polymer substrate. The Plasma Treatment (a.k.a. Corona Treatment) is commonly used for the purpose. This process actually changes the surface energy of the polymer, so you can apply the resin directly. However, the effect of the treatment only lasts for a short time. So, if you need to treat the surface, you need to buy the machine and treat it just before you cast urethane on it. The general information is available on this page:

http://en.wikipedia.org/wiki/Corona_treatment

We hope this information helps. Please feel free to contact Northstar Polymers for any questions.

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