



UNLOCKING THE SECRET TO PRINTING ON PLASTIC

Durability. Wearability. Stability. Aesthetic appeal. For print applications, PVC, PET and other polymer films offer these and other benefits. However, printing on polymers can raise questions. This Print Tips & Tricks explains what printers and designers need to know to get the best results.

Tip:

Printing on plastics is all about managing the surface energy differential between the ink and the substrate, and curing the ink at the ink-substrate interface.

Inks and polymers have inherent surface energies measured in dynes/cm. Ideally, the substrate surface energy will be significantly higher than the ink surface tension. In this scenario, ink spreads over or “wets out” the substrate where molecular surface forces bond to the ink creating adhesion.

The opposite occurs when the ink surface tension is higher than the substrate. In this case the ink does not wet out the substrate resulting in low adhesion, less ink transfer, voids, and quality loss.

Trick:

To ensure quality ink adhesion, measure dyne levels and then make sure that the substrate surface energy is at least five to 10 dynes/cm higher than the ink surface tension. Surface energy can be measured quickly and conveniently with dyne pens. Substrate surface energy can be increased with corona or plasma treatments. Treatment can be done by the film supplier, the printer, or both. Ink surface tension can be decreased with wetting additives, but care must be taken not to alter ink performance.

Tip:

In general, surface treatment will improve ink adhesion, but too much can damage the substrate.

The most common way to adjust dyne levels is corona surface treatment of the substrate. Corona treatment involves passing film through a dielectric created with an electrode and a grounded roll. The exposed film’s surface chemistry is modified so that bonds form more easily with the ink surface. It is possible for extended corona treatment to damage the plastic surface. In this case, ink may not adhere properly to the compromised surface, resulting in quality issues. Consult with the film supplier on questions regarding corona treatment.

Proper ink wetting through surface energy matching is necessary but not always sufficient for optimal ink adhesion. The curing of the ink at the ink-substrate interface is critical for acceptable ink adhesion. Care must be taken to make sure the ink is dried correctly which for UV-cured inks means adjusting curing time and lamp energy so that photons penetrate the ink to the substrate surface without changing surface chemistry. Film suppliers can help with questions about ink drying time and conditions songwriter at a Nashville SPE Thermoforming Conference.

Trick:

Corona surface treatment will fade over time. It is recommended to use corona-treated film on a FIFO basis, and handle the film carefully as improper storage or transportation can accelerate surface energy loss, causing the treatment to be less effective.

For more information, download the free White Paper [Printing On Clear Plastics](#) or email kp at info@kpfilms.com.

© 2017 Klöckner Pentaplast. All rights reserved. The statements contained herein are for informational purposes only and are true and accurate to the best of our scientific and technical knowledge. This information does not constitute a guarantee or warranty, express or implied, nor does it establish a legally valid contractual relationship. It is the customer's responsibility to determine the suitability of this product for the customer's intended use, and Klöckner Pentaplast does not assume any liability for the customer's use of this product or the information contained herein. (06/17)

Klöckner Pentaplast Group
Europe:
P.O. 1165, 56401 Montabaur
Industriestraße 3-5, 56412 Heiligenroth
Germany
Phone: +49 2602 915-0
Fax: +49 2602 915-297
www.kpfilms.com
kpinfo@kpfilms.com

Klöckner Pentaplast Group
Americas:
3585 Klöckner Road
Gordonsville, VA 22942 USA
Phone: +1.540.832.3600
Fax: +1.540.832.5656
www.kpfilms.com
kpinfo@kpfilms.com

Klöckner Pentaplast Group
Asia:
12 Xia Sheng Road
Suzhou Industrial Park
Suzhou 215126, P.R. China
Phone: +86.(0).512.6260.9991
Fax: +86.(0).512.6260.9992
www.kpfilms.com
kpinfo-CN@kpfilms.com