

Green Printing Practices

UV Ink Technology Benefits Compared to Solvent and Water-Based Ink Technologies

UV-curable inks are formulated with liquid monomers and oligomers together with photo-initiators that instantly harden when exposed to (UV) light. UV inks, when exposed to specific wavelengths of concentrated UV radiation, causes a chemical reaction to take place during which the photo initiators cause the ink components to cross-link into a solid.

UV-curable ink technology has several benefits compared to solvent inks and water-based inks.

UV-curable inks are:

- 100% solids and cure to an inert film.
- 100% solvent-free, and do not result in the emission of volatile organic compounds (VOCs).
- Compliant with SCAQMD Rule 1130.
- Do not contain hazardous air pollutants (HAPS)
- Provide higher coverage at low usage rates
- Require lower energy requirement to cure
- Inert and do not re-solubilize after cure
- Free of antifungals or antimicrobial additives
- Free of heavy metals
- Consistently printed with very low scrap rates
- Printed at high speeds for optimum energy efficiency

Recycling of UV Printed Paper and Plastics:

Printing of UV inks on paper or board does not present problems since the recycling industry is fairly mature and the de-inking process is quite robust. Solvent-based and UV-curing inks will act very similarly in a paper pulping plant as they are water insoluble and easily separated. In some paper recycling processes if the ink is, overall, a tiny proportion of the bulk, it is just absorbed into the finished product. If loading of ink onto the paper is significant, it will potentially impact on this type of process. Water-based ink will be more difficult to deal with due to its difficulty to separate in the pulping process.

Removal of UV cured ink from plastic is not really feasible. Ink is designed for maximum adhesion and resistance to weathering. Essentially a printed ink is a cured film on the plastic substrate. Recycling printed plastics is possible as long as the ink loading is not too great. Most plastic recycling operations can cope with up to 5% contamination of mixed plastics or printed plastics.

	UV-curable ink	Solvent ink	Water-based ink
Solids	100%	30-40%	30-40%
Volatiles	Zero	60-70%	<5%
Volatile Organic Compounds (VOC's)	No – Fully compliant with SCAQMD Rule 1130	Yes - Not compliant with SCAQMD Rule 1130	Yes - Not compliant with SCAQMD Rule 1130
Hazardous Air Pollutants (HAPS)	No	Possibly – depending on formulation	Possibly – depending on formulation
Usage	Low – High coverage per gallon	High – Low coverage per gallon	High – Low coverage per gallon
Energy	Low – Cured with ultra-violet light exposure	High – Cured with highly heated air	Low – Cured with minimal heated air
Ink Film	Inert	Can become re-solubilized	Can become re-solubilized
Toxic Stabilizers	None	None	May contain toxic anti-fungals or antimicrobial additives
Scrap Rate	Low – 1-3% standard reject rate	Low- 1-3% standard reject rate	High – 10-15% reject rate due to reduced color stability on press
Heavy Metals	No	Possible – depending on formulation	No
Print Speeds	High	Low by comparison to UV, further reducing energy consumption per print	Low by comparison to UV, further reducing energy consumption per print

Technical Information