Substrate Selection & Print Quality

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Content & Introduction

Matching substrate to the digital printing process.

Ink transfer, print quality and substrate selection for:

a. Dry Toner
b. Liquid Toner
c. Inkjet (UV curable inks)
d. Water-based Inkjet

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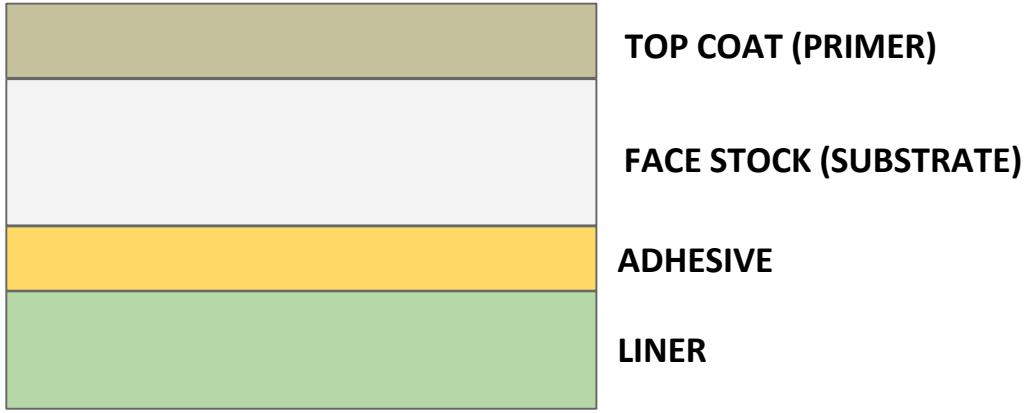
Printing on PSL substrate

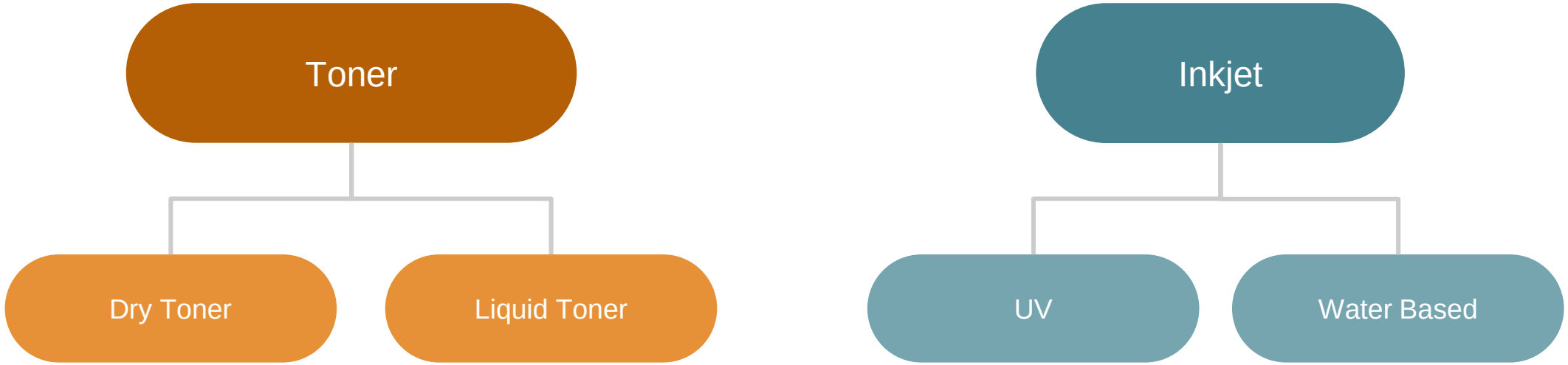
Digital inks and toners have different properties and apply on the substrates in the different environments comparing to conventional printing.

It is often necessary to modify the substrate surfaces to achieve optimal print performance. Surface modification is most frequently achieved through application of coating (primer / top coat).

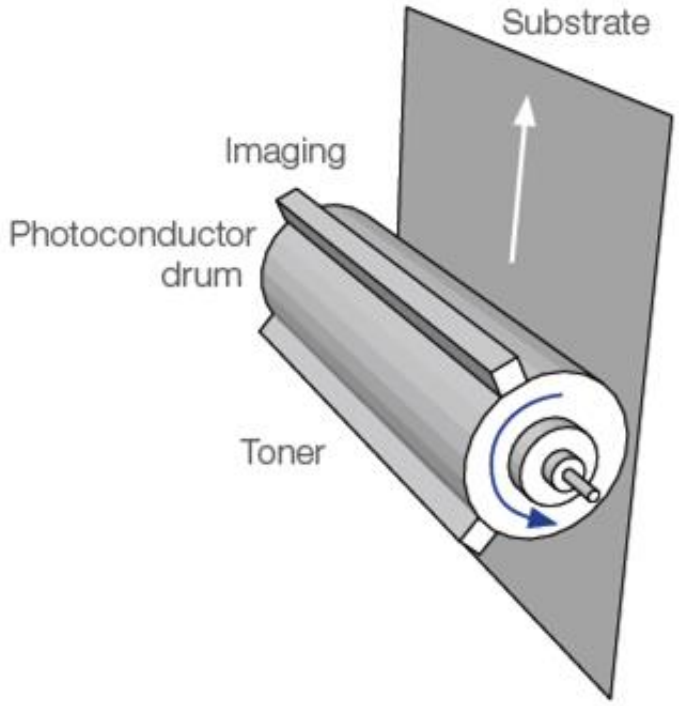
PSL Label section



Digital Label Printing Technologies



Dry Toner: Ink Transfer & Adhesion



In a printing process with a dry toner technology:

> Image is electrostatically transferred to the substrate

> The toner is fused by applying heat and pressure to fix the image

> Heat causes the toner particles to melt and forming a homogeneous image layer on the substrate

Image source: Xeikon

Dry Toner: Substrate requirements

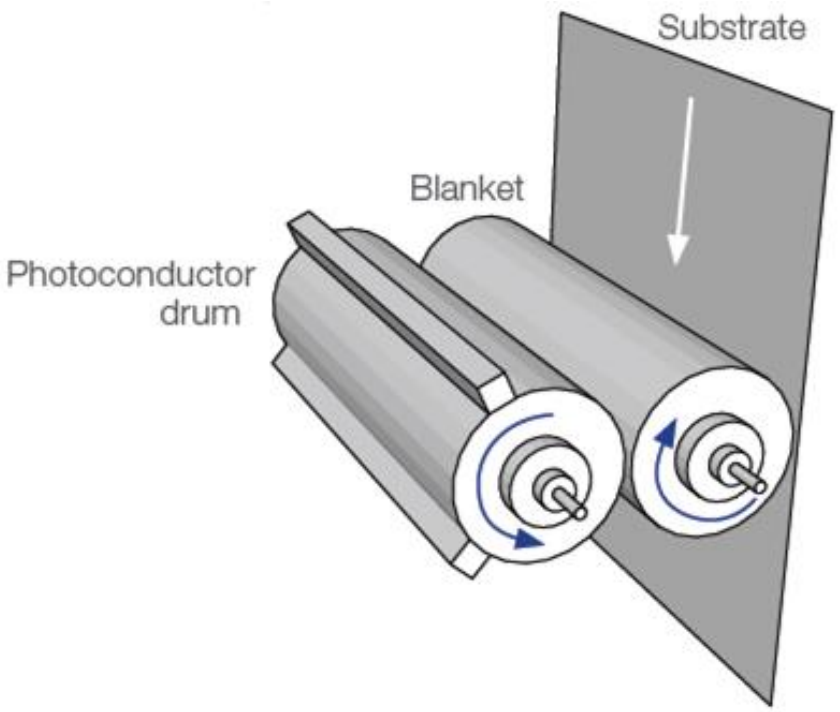
No special top coat is required.

Important considerations:

- Heat sensitive substrates
  - PE & other conformable substrates
  - Xeikon’s ICE toner
- Heat sensitive adhesives (hot-melt)
- Metalized materials

Image source: www.xeikon.com

Liquid Toner: Ink Transfer & Adhesion



In a printing process with a liquid toner technology:

> Image is transferred by the carrier liquid to an intermediate heated blanket

> At the blanket toner particles coagulate at and the carrier liquid evaporates

> It leaves a homogeneous image layer which is transferred to the substrate

Image source: Xeikon

Liquid Toner: Substrate requirements

Special technology optimized topcoat is required.

Important considerations:

- Application technology - materials coated at large industrial scale are the most controllable
- Surface roughness - smoother is better
- Coating chemistry - special formulations

Image source: www8.hp.com

Liquid Toner: In-line vs. off-line considerations

Pre-coated

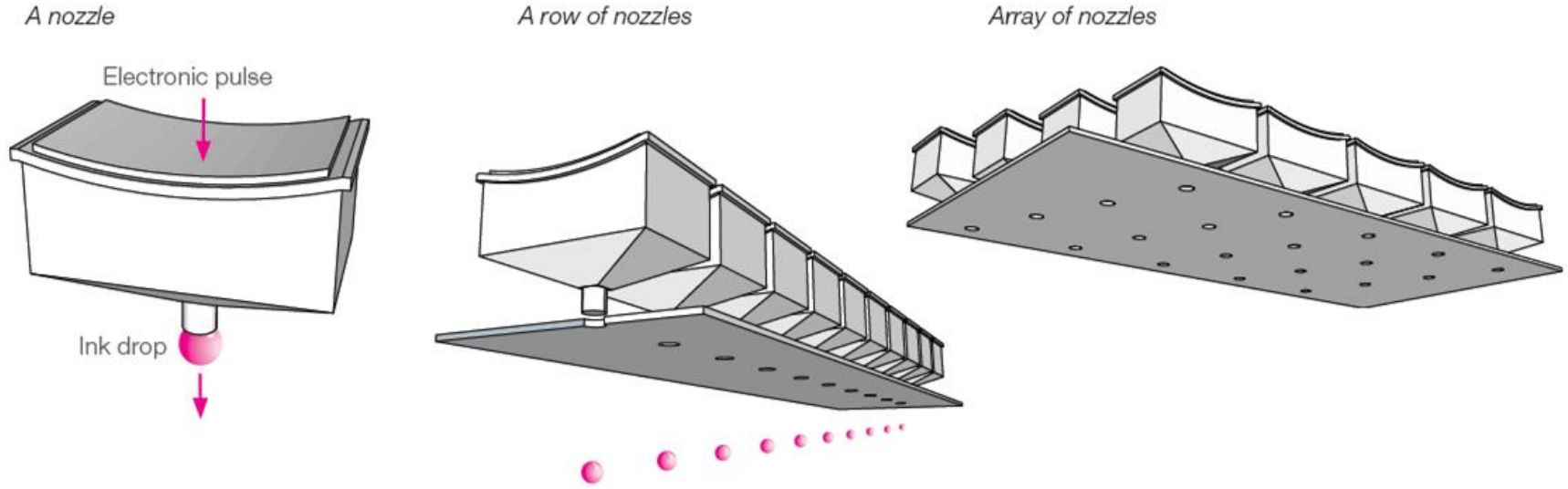
Consistency and color accuracy

In-line priming

SKU optimization (digital and analog press)

- Pre-optimized substrates are especially recommended for textured substrates, such as wine labels.

Inkjet: Ink Transfer & Adhesion



In a printing process with Inkjet technology the ink is transferred through the tiny nozzles to the substrate and subsequently cured (non-contact process).

> **UV Inkjet**: Curing through UV lamp. Ink contain 100% solids.

> **Water-based Inkjet**: Curing through evaporation. Ink contain around 5% color / 95% ink vehicle.

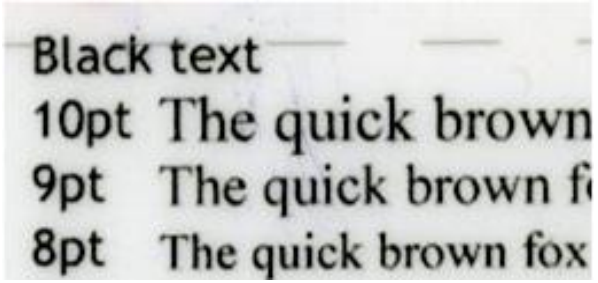
Image source: Xeikon

UV Inkjet: Substrate requirements

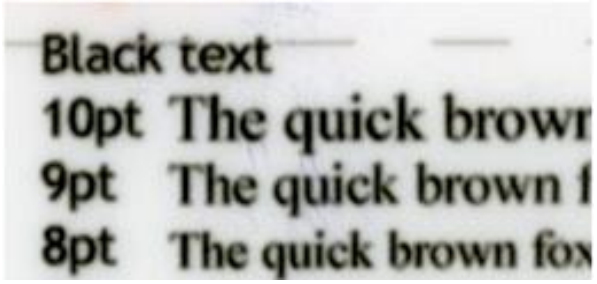
Top coat is required to achieve good image quality. Some top coats used for UV flexo are also suitable for UV Inkjet technology.

Example 1: Matt BOPP

Technology optimised top coat



Standard top coat



Example 2: Uncoated structured paper

Technology optimized top coat

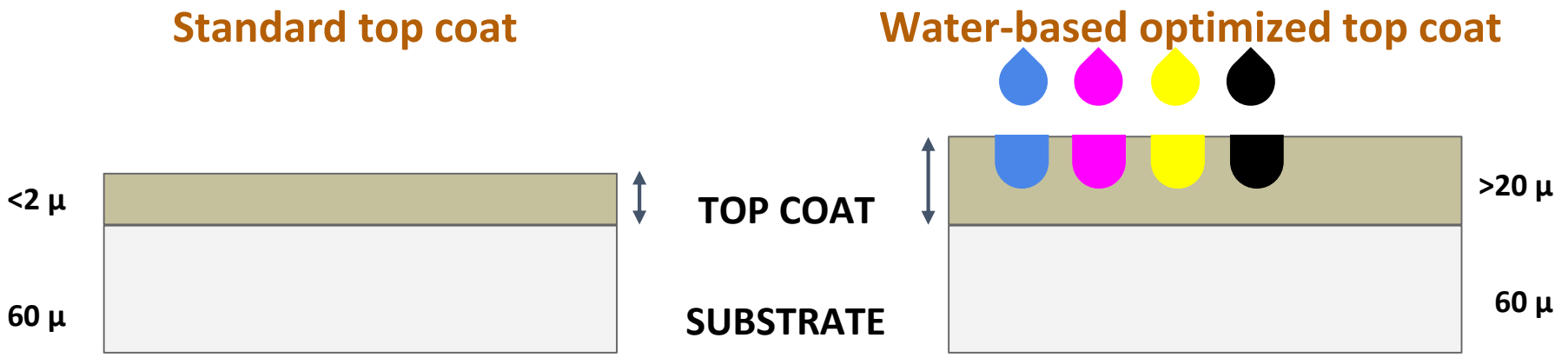
No top-coat

Water-based Inkjet: Substrate requirements

Special technology optimized topcoat is required.

> Ink transfer and adhesion dictates a unique condition for substrate treatment - thick porous topcoat for ink reception and anchorage.

> Unlike in other digital print technologies, in water-based top coat is used to store the ink vehicle (water) before it evaporates.



Summary

Toner Dry	**Toner** Liquid	**Inkjet** UV	**Inkjet** WB
> No need for special materials > Standard substrates can be used > The use of heat sensitive and metallized substrates can be limited.	> Special technology dedicated top-coat is required > Top-coating can be applied off-line (material manufacturer or converter) and in-line > Off-line large scale top coat application provides more consistency	> Top coat is required to achieve optimum print performance. While some top-coats used for flexo printing perform well with UV Inkjet technology, some cases require dedicated top-coats. > Top-coating is usually applied off-line (material manufacturer)	> Special technology dedicated top-coat is required > Thick layer of top-coat is required to absorb ink vehicle > Top-coating is applied off-line (material manufacturer)

Thank you!
Q&A