

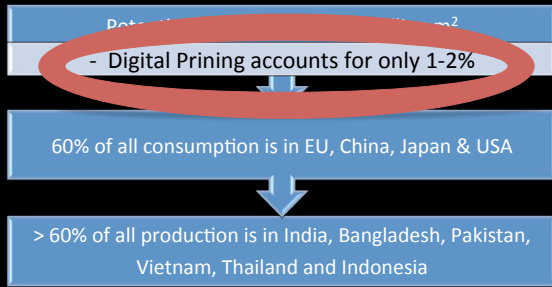
Digital Finishing – Coating

From wet to dry



Prof. Dr. em Marc Van Parys
UNITEX

Some Facts



- Digital Printing accounts for only 1-2%
- 60% of all consumption is in EU, China, Japan & USA
- > 60% of all production is in India, Bangladesh, Pakistan, Vietnam, Thailand and Indonesia

Source: J. Provost – WTIN, Mimaki, Spgprints

Some Facts

UPCOMING EU-MARKETS FOR DP

Turkey	3%
Spain	1%
Portugal	1%

SOFT SIGN

Germany, Scandinavia, Belgium, Holland are the big players/markets

FASHION

Italy, Spain, Portugal

STARTING

UK, France, Belgium and other EU-countries

Source:
J. Provost – WTIN,
Mimaki, Spgprints

Digital Technologies



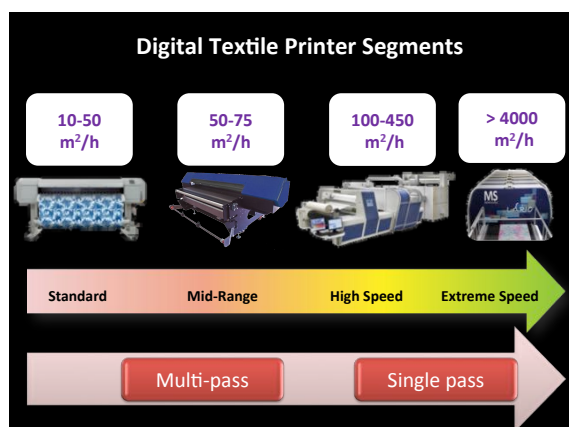
The change is clear: from analog to digital



Advantages

- Efficient use of resources (energy, water...)
- Minimal set up cost
- Link Creativity and Functionality
- Workflow is already digital
- No Stocks
- Increasing Life Cycle of Textile
- New Business models
- **PERSONALIZATION**
- **MASS CUSTOMIZATION ...**

It's all about added Value!



DP-printers for DP inks

Waterborne inks

Working width: 1,6 – 2,2 – 3,2 m

Solvent printers

Working width up to 5 m

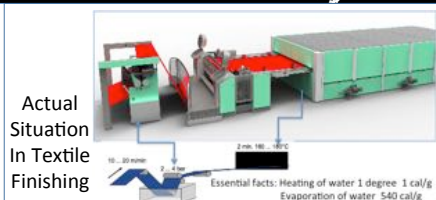
Super width format printer

Printing width: 12 m !
(rolls up to 50 m)

WHY DIGITAL Technologies For Micro-Deposition of Functionalities



Water & Energy issues



1 kg Textile – approx. 30 l water

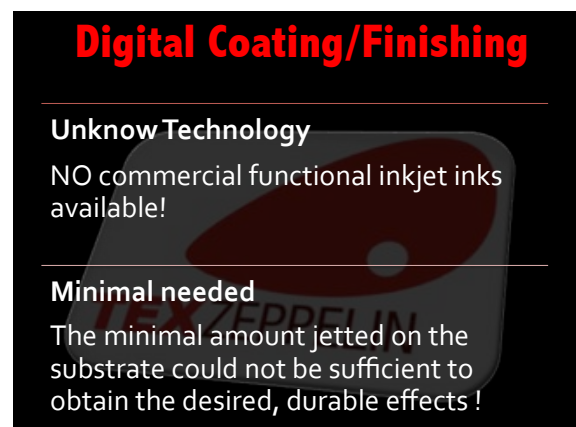
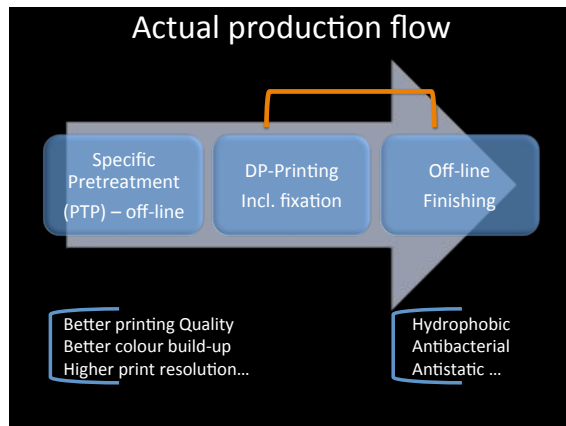
- Water availability and access become critical issues
- Cost of water & energy use varies greatly across Europe
- Water legislation becomes stricter, raising compliance costs

Digital micro-deposition of Functional inks or

Link between Creativity and Functionality

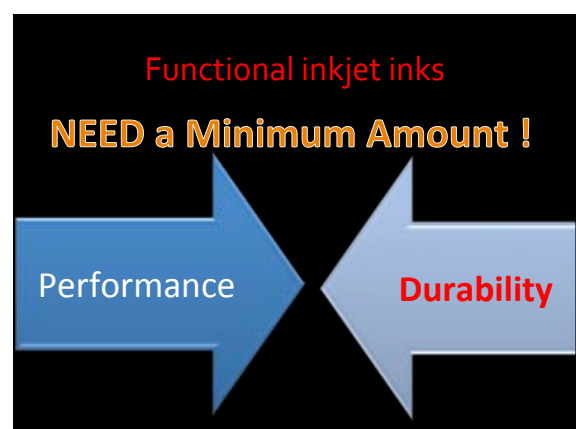
- Full coverage - functionalization
- Local or patterning functionalization





Digital Printing versus Digital Coating

PRINTING	Resolution (greyscale print heads...)
	Image quality
	Colour buildup
	Gamut
	Fastness (rub, wash ...) - durability properties ...
COATING	Quantity of functional product
	Full coverage – localised/patterned deposition
	Fastness – durability properties
	Target Functionality



Functional inkjet inks

MINIMUM AMOUNT IS NECESSARY

PRINthead 4PL

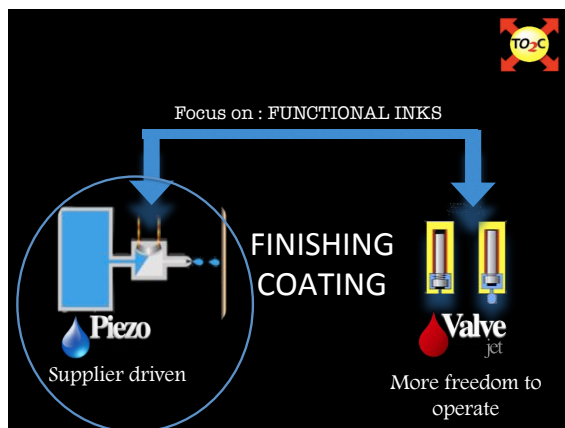
1L ink FOR 100 m2

Not Enough !

TEXZEPPELIN

**HOW TO
COUNTERACT
THIS CHALLENGE**

?



Piezo printhead

**Which let us jet
functional inks?**

High Speed Piezo-Printheads

Waterborne inks	UV-curable inks
<ul style="list-style-type: none"> <input type="checkbox"/> Kyocera <input type="checkbox"/> Seiko <input type="checkbox"/> Dimatix <input type="checkbox"/> RicoH <input type="checkbox"/> ... 	<ul style="list-style-type: none"> <input type="checkbox"/> Xaar <input type="checkbox"/> Konica <input type="checkbox"/> Seiko <input type="checkbox"/> Spectra <input type="checkbox"/> ...

Functional Ink Challenges

The flowchart starts with 'Functional Ink Challenges' and an icon of ink bottles. It branches into 'Higher Firing Frequencies' and 'Higher Viscosity'. Both lead to 'Broader choice of ingredients', which then leads to 'More jet volume'. An icon of four ink bottles (grey, pink, blue, yellow) is shown on the left.


Scanning XY ONE PASS OR TWO PASS?

One pass:

- High productivity

Two pass:

- Passing two times over the same line
- Typically 2 different nozzles print on the same line
- Deposition of more volume



Creativity meets Innovations

DIGITAL TECHNOLOGIES IS MORE THAN PRINTING!

New developments Functional inks

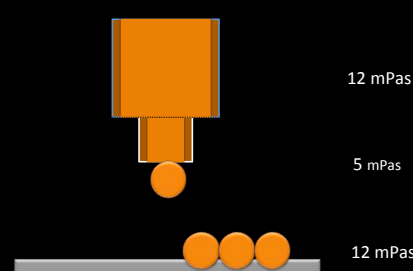
From Ideas to Industrial Productivity

Piezo

Waterborne formulation	UV Curable -formulation
Rheology Modifier <i>Thixotropic Thickener</i> Adjusts Viscosity	Rheology modifier/ carrier (Monomer)
Host-system <i>Functional chemical, Humectants, Surfactants, Water</i>	Host-system PHOTO-INITIATOR <i>Functional chemical, O2-inhibitor, ...</i>

Adapted Rheology – Shear thinning

Phase	Viscosity (mPas)
Phase 1	12 mPas
Phase 2	5 mPas
Phase 3	12 mPas



Digital Finishes/Coating


TOPOCHEMICAL Engineering

H ₂ O-based	UV-based
<ul style="list-style-type: none"> • Hydro/oleophobic • Invisible inks • Chromic sensors • AM • Antistatic ... 	<ul style="list-style-type: none"> • Layer-on-layer • Transparent layers • ...

1st EXAMPLE: INVISIBLE INKS (DNA marker)

INCORE

European CORNET Project



Or pirate products?

