COLARIS.VAT

INKJET PRINTING FOR CELLULOSIC FIBERS
FOR HIGHEST LIGHT-, WASH- AND CROC K FASTNESS

Uniforms
Camouflage
Home Textiles
Technical Textiles
COMPARISON BETWEEN CONVENTIONAL AND DIGITAL PRINTING

97% CONVENTIONAL PRINTING
33 Billion m²
- Reactive 27%
- Acid 3%
- Disperse 17%
- Vat 3%
- Pigment 45%
- Sublimation 3%
- Others 2%

3% DIGITAL PRINTING
57 Billion m²
- Reactive 36%
- Disperse 3%
- Pigment 4%
- Acid 1%

On which fibers could VAT dyes be used?
- Cotton, Flax, Jute, Bamboo, Hemp, Modal, Sisal, Rayon, Lyocell, ...
- Certain shades also on Wool, Silk and Nylon

REQUIREMENTS ON VAT INKS
- Best fastness properties
- Improved compatibility and stability
- Improved open time
- Improved stress resistance
- Tighter drop forming performance
- Drop speed, weight, flowability ...
- Higher color strength and brilliancy

REQUIREMENTS ON INKJET PRINTING SYSTEM MANUFACTURER
- Innovative
- High quality materials and manufacturing process
- Good support and service
- Good know-how of complete textile and print process

REQUIREMENTS ON PRINT HEADS
- Circulation system
- Repairable
- Gray-level printing
- Robust
- Heads with different drop sizes for different applications

REQUIREMENTS ON INKJET PRINTING SYSTEM
- Reliability and stability
- High resolution of 400 x 800 dpi
- Application driven software
- Easy maintenance
### THE PRINCIPLE OF VAT PRINTING

- The VAT dye is printed in form of a pigment.
- During the padding with a reducing liquor and the steaming process the vat dye pigments are transformed into a solubilized so-called leuco form which can enter the cellulosic fibre.
- During the oxidizing step the solubilized vat dyes are transformed back into their insoluble pigment form and thus become immobilized and anchored in the fibre which guarantees highest fastness properties.

### CHARACTERISTICS OF REACTIVE, VAT AND PIGMENT PRINTS ON CELLULOSIC FIBERS

<table>
<thead>
<tr>
<th></th>
<th>Reactive</th>
<th>VAT</th>
<th>Pigment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple wash fastness</td>
<td>3-4</td>
<td>5</td>
<td>2-3</td>
</tr>
<tr>
<td>Light fastness</td>
<td>5-6</td>
<td>6-8</td>
<td>5-8</td>
</tr>
<tr>
<td>Crock fastness</td>
<td>4-5</td>
<td>4-5</td>
<td>2 without - and 3-4 with post-treatment</td>
</tr>
<tr>
<td>Chlorine fastness</td>
<td>2</td>
<td>4-5</td>
<td>4-5</td>
</tr>
<tr>
<td>Handle and drape</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Simplicity of process</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Depth of black</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Color gamut</td>
<td>4</td>
<td>3</td>
<td>5</td>
</tr>
</tbody>
</table>

### VAT PRINT AND FIXATION PROCESS COMPARISON

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>3-phase process</th>
<th>B</th>
<th>2-phase wet-in-wet process</th>
<th>C</th>
<th>1-phase process</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pre-coat</td>
<td>Padding (with thickener)</td>
<td>Padding (with thickener) + wetting agent</td>
<td>Padding (with rongalit or hydro sulphite)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Drying</td>
<td>110 - 130°C</td>
<td>110 - 130°C</td>
<td>6 - 10 colors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>VAT Printing</td>
<td>6 - 10 colors</td>
<td>6 - 10 colors</td>
<td>110°-130°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Drying</td>
<td>110 - 130°C</td>
<td>Steaming at about 100 - 110°C for about 5 - 15 min dependent on substrate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Padding</td>
<td>Steaming at about 100 - 110°C for about 5 - 15 min dependent on substrate</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Steaming</td>
<td>Rinsing, Oxidizing, Soaping, Rinsing</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Washing</td>
<td>110 - 130°C</td>
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TYPICAL AND POSSIBLE APPLICATIONS FOR **COLARIS**. DIGITAL VAT PRINTING

**HOME TEXTILE, UPHOLSTERY AND WINDOW FASHION**

Whenever extreme light fastness, excellent crock fastness and a soft handle is needed.

**TERRY TOWELS AND BATH ROBES**

Terry products and other hospitality items with deep colors, highest wash fastness and softest touch.

**DENIM FASHION AND JEANS**

Indigo blue of the jeans is part of the VAT dye family. So denim could also be printed with the same fastness standards.

**WORK WEAR AND UNIFORMS**

Custom designed work wear, uniforms and camouflage patterns (that e.g. match a certain reflectance profile at NIR region) with highest wash and light fastness and a soft handle can be digitally printed.