COLARIS³ DIGITAL TOWEL PRINTING

EVENT. TOWELS
PROMOTION. TOWELS
BEACH. TOWELS
BATH. ROBES
others ...
How to print terry fabric efficiently with a digital printer?

Different towel qualities and fabric structures require a flexible printing method. The key to success can be a digital printing solution only. Flexibility in terms of application amount, penetration control, and an efficient process for dye fixation is the challenge.

Heavy and voluminous products can’t be printed with conventional digital printers as offered by other manufacturers. Such printers may be suitable for fashion fabric but are not economical for heavy fabric structures. Conventional digital printers need offline fabric pre-treatment with a padder on a stenter and will achieve a limited penetration with a high ink consumption only. Digitally printed terry fabric with low penetration will result in a poor and faded image after few washing cycles already.

For terry and velour printing, ZIMMER.AUSTRIA has developed special printing lines, dedicated to the needs of such fabric, and offering maximum flexibility with highest quality print results.

Terry fabric printed by a ZIMMER.AUSTRIA COLARIS³ printing line will look nice even after many washes, as the penetration will be controlled precisely and will enter deeper into the pile. Improved fastness, strong, vibrant and brilliant colors for a long time are the benefits.

What does printing need?

- Mostly made from 100% cotton fabrics.
- Printed side: mostly sheared/velour type with high density and short pile. Backside: loop pile for better drying results, either white or colored by use of dyed yarn in construction of the fabric.
- Fabric should be well prepared for printing. Mercerizing of fabric is strongly recommended for high quality towels with bright colors.
- Nice velour, mostly double sheared and brushed for fine and even surface.
- Well cleaned fabric surface to avoid uneven printing.
- Cellulose fibers (cotton) will need reactive printing for a bright, brilliant and deep shade.
- Reactive printing needs pre-treatment for the fabric by special coating. Pre-coating contains migration control agent (thickener), bi-carbonate, carbonate, urea and possibly a wetting agent to adjust the penetration and the required line sharpness in printing.
- Inkjet technology for printing the design onto the substrate.
- Steam fixation process to fix the dye on the fiber.
- Post print washing, softener application and final finishing by drying, continuous tumble drying etc.

The most economical way of printing is the all inline process. It may involve a slightly higher investment, but gives 100% control of penetration, reduces ink consumption and logistical needs and delivers fabrics ready for post print washing and final finishing.

Shorter process means less handling, less energy consumption, less work force demand and finally a much faster process (ready to market).
Supply of fabric to the printer

Fabric may be provided on roll or from stack on pallets. The fabric feeding system needs fine alignment for a precise fabric positioning onto the printer from any kind of fabric supply.

Towel alignment

Although we recommend the use of precisely aligned fabric for printing, some cases may require additional weft correction/alignment system. Such devices can be incorporated into the line on demand.

Towel cutting and hemming

Towels may be made from terry fabric with all over terry, from pre-filled woven structure with flat hemming seam in weft direction, or in weft and warp direction.

In case of hemming seams in warp direction, the towel length may vary and the print image needs trimming according to the actual towel length. ZIMMER.AUSTRIA installs a special towel measuring and subsequent design trimming function in every towel printing line.

SCREEN PRINTING TRADITIONAL PROCESS

Color overlap due to screen engraving or repeat adjustment may create smudges.

DIGITAL PRINTING CONVENTIONAL PROCESS

Offline pre-treatment does not allow full penetration but will consume more ink.

DIGITAL PRINTING ZIMMER.AUSTRIA INLINE PROCESS

Inline pre-treatment and inline fixation guarantee perfect penetration, strong brilliant colors.
**Screen Printing**

**Traditional Process**

- **Screen engraving / Color kitchen required**
- **Ready to print fabric**
- **Not required**
- **Not required**
- **Not required**

**Screen Printing**

A space and efficiency consuming process with need of screen preparation, screen washing, long printer down time for design changes, high logistical handling demand, screen washing, left over colors polluting the effluent, extremely space consuming due to machine size and needs for screen storage etc.

**Inline (conventional) drying after printing**

**Offline steam fixation in loop steamer**

Requires minimum 10 minutes fixation time as fabric needs to pick up moisture before fixation starts. High urea demand for a uniform moisture pickup – increased ecologic impact through excess urea. Urea washed off in the post print washing is polluting the wash water.

**Post print washing (Offline Process)**

High content of unfixed dyes – needs stronger washing and more chemicals to avoid staining. High urea content is additionally polluting the wash water.
### DIGITAL PRINTING

#### CONVENTIONAL PROCESS

<table>
<thead>
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<tr>
<td>Ready to print fabric</td>
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<tr>
<td>Application of inkjet pre-treatment</td>
<td>by padding process on a stenter. High urea content is required as fabric needs to pick up moisture in the steamer for a proper ink fixation. The offline application process needs much higher urea content as compared with inline wet in wet process as some of the urea evaporates in the drying process.</td>
</tr>
<tr>
<td>Stenter drying</td>
<td>after padding with inkjet pre-treatment.</td>
</tr>
<tr>
<td>DIGITAL PRINTING</td>
<td>Done on dry fabric - demands high ink amount even with limited penetration. Lots of unfixed ink will be washed out in post print washing (ecological impact is high).</td>
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#### ZIMMER AUSTRIA INLINE PROCESS

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<tr>
<td>Inline application of inkjet pre-treatment</td>
<td>No drying required. Reduced urea demand, application is done digitally and can be adjusted to the demands of different substrates.</td>
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<td>SUPRAFIX (ZIMMER AUSTRIA)</td>
<td>Ink fixation and drying without fabric handling between the two steps. Steaming time is reduced to 1/4 compared with conventional offline fixation by a loop steamer as ink is fixed in wet condition. Steamer does not need to re-moisten the fabric after a drying process. Superheated steam is used for drying process, thus reduces the energy consumption drastically.</td>
</tr>
<tr>
<td>Post print washing (Offline Process)</td>
<td>Higher fixation grade of ink. Less ink loss. Less wash water consumption. Less pollution of water by the use of 1/3 urea only.</td>
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**DIGITAL PRINTING LINE**

**FABRIC FEEDING DEVICE**
- OPTION: Centric driven A-frame unwinder with synchronization control system.
- Basic fabric guiding and positioning system – various alternative layouts available to match the exact requirements of different fabrics.

**WEFT STRAIGHTENER (OPTION)**
- Needle wheel, weft alignment system with skew and bow rollers for mechanical fabric alignment.
- Various alternative layouts available – i.e. horizontal or vertical fabric feeding.

**INLINE PRE-TREATMENT**
- Digital inline pre-treatment system CHROMOJET DPT, adjustable to the required production speed.
- Available as an applicator for inkjet pre-treatment. Could also be laid out as a spot color printer with a maximum of four colors.
Above illustration shows

- Fabric cleaning, A-frame, fabric feeding, CHROMOJET DPT inline pre-treatment applicator, COLARIS³, SUPRAFIX

**COLARIS³. PRINTING MACHINE**

- Most terry fabrics are printed in CMYK mode only.
- Printer could also be laid out with 6 or 8 colors.
- Equipped with up to 16 print heads per color at CMYK set-up or up to 8 print heads at 6 or 8 color set-up.

**SUPRAFIX**

- Inline steam fixation and drying system.
- Print capacity will determine the number of fixation chambers.

**FABRIC. OUTLET SYSTEM**

- Fabric plaited into fabric transport trollies.
- Allows easy pre-inspection and easy transport to next treatment.
PRINTING. PROCESS

Printed substrate right after printing, still on the printer

Fabric take-off from the printer

Fabric plaiting after fixation of ink

Samples placed at the back of the fixation unit
**WEAVING. OPTIONS**

- All over terry -- no splits
- Split in warp direction
- Split in warp and weft direction

**HEMMING. OPTIONS**

- Flat hem at weft split, rolled hem at warp split
- Rolled edge at weft and warp split
- Flat hem at warp and weft split
- Edge trimming

**TERRY. PRODUCTS**

- Bath robe
- Promotion towel
- Kitchen towel
- Body fit baby bath towel
CONTROLLED. INK PENETRATION

Well prepared and printed fabric should have a good and precisely controlled ink penetration with deep and strong colors.

Front image is well penetrated with strong colors. Backside shows penetration at the ground, but loop is still clear. Deep penetration and no migration are important for good image quality.

SUPRAWASH

is a high-performance post print washer, dedicated to the needs of cotton terry fabrics printed with reactive dyes. Even the best fixation process will leave unfixed dyes on the fabric. They need to be washed out together with other pre-treatment residue.

Advantages, characteristics, options

- Open-width washing system for all kinds of fabrics
- Stable, all stainless-steel construction
- Modular layout with options for the entry and exit sections (fresh water spraying and rinsing) and a selectable number of hot water basins
- Fabric treatment with selectable number of vacuum bars, squeezing rollers and further mechanic devices
- All hot water basins with complete insulation for reduced energy consumption, optional top cover for vapor discharge
- Various heating technologies like direct steam injection or direct hot water supply
- OPTION: Dosing system at the heated basins for additional chemicals
- All roller bearings outside of the basins for easy maintenance
- Easy access for fabric feeding and for service work
- All fabric pulling rollers with synchronized drive system
- Various fabric feeding systems, pendulum roller units and plaiting system at the washer exit are available
ZIMMER AUSTRIA offers 3 different models of the new high performance industrial inkjet print heads from FUJIFILM Dimatix. The StarFire™ SG1024 is a compact, self-contained unit built to withstand demanding industrial textile printing and other applications. It uses field proven materials to deliver consistent output over a long service life with continuous ink recirculation and single color operation at 400 dpi. Equipped with a single replaceable metal nozzle plate that is designed to withstand abrasion and to resist damage.

TECHNICAL FEATURES

- Robust and reliable construction
- Coated metal nozzle plate - to withstand abrasion and resist damage
- High firing frequency - for high productivity
- High drop velocity - distance between print head and nozzle can be up to 10 mm
- VersaDrop™ - Incorporated binary and greyscale jetting modes
- RediJet™ - Continuous ink recirculation system to avoid nozzle blockage and to reduce ink waste
- 3 interchangeable printing modules with different drop sizes for a wide range of applications

INK SUPPLY & CIRCULATION SYSTEM

Circulating tank

Printing tank

Print heads

Color station
All machines and components from ZIMMER.AUSTRIA are strictly inspected and tested before shipping to customers to ensure efficient installation and best performance with 100% satisfaction.

COLARIS on-site customer support is guaranteed by service partners and ZIMMER engineers and technologists.

This setup guarantees a short response time on a service call from a customer.