Zimmer
AUSTRIA

PIONEERING INNOVATIONS
150 YEARS

COLARIS
technical textiles

content

highlights

- digital workflow from design through output
- open ink system allows free selection from certified ink suppliers
- permanent ink circulation system for efficient production
- automatic printhead cleaning system
- printhead re-condition center for extended printhead service life
- modular concept for wet-on-dry offline or wet-on-wet inline print production
- environmentally-friendly, sustainable process

milestones

Year	
1874	QUALITY SINCE 1874 Factory Franz Zimmer´s Erben KG Warndorf
1951	Start of ZIMMER AUSTRIA - first duplex blanket printing machine
1955	RSD rotary screen printer
1976	CHROMOJET digital carpet printer
2008	COLARIS digital inkjet printer for textile
2012	COLARIS -NF narrow single-pass printer for webbings
2021	COLARIS transport fabric printer
2022	COLARIS digital camouflage printing system

decision guidance

1. Which fiber, size or target market do you seek for and what's your fastness requirement?

2. Do you have equipment available, which you would like to integrate into a new print line?

3. Is there a specific ink supplier you wish to work with? Will you require technical and technological support from the ink supplier?

4. Is your plant and the environment prepared for a fully digital workflow? Industrial production requires process stability.

5. Which software is most suitable for your business and how do you convert the design into a printable color?

6. How do you define, measure and communicate the colors internally and with the costumer? Do you have a measuring system such as spectro-photometer?

7. Which requirements or skills are needed to operate a digital print line at a given capacity, regarding to the utilities or the operator?

R&D SUPPORT
APPLICATION TECHNOLOGY

MACHINERY
ENGINEERING & MANUFACTURING

SERVICE
SOFTWARE & TECHNICAL SUPPORT

concept

Technical Textiles cover a wide range of fabrics, made of various fibers and blends. These Fabrics are mostly used under severe environmental conditions and require highest fastness levels.

The wide range of end products covers textiles for indoor use such as furnishing for contract business or different variants of sun blinds. Workwear and protective clothing are another group of products, as well as outdoor fabrics such as canopies and tent fabrics, parasols and awnings or furnishing fabrics for camping use.

High end furnishing fabrics for public transport systems such as buses, subways, trains, cable cars, aeronautic and marine needs are another challenge to deal with. Last but not least the needs for printed military fabrics with specific infrared reflectance control can be matched with ZIMMER AUSTRIA Digital Inkjet Printing Systems.

APPLICATIONS

- workwear
- military camouflage
- transport fabrics
- outdoor fabrics
- advertising fabrics
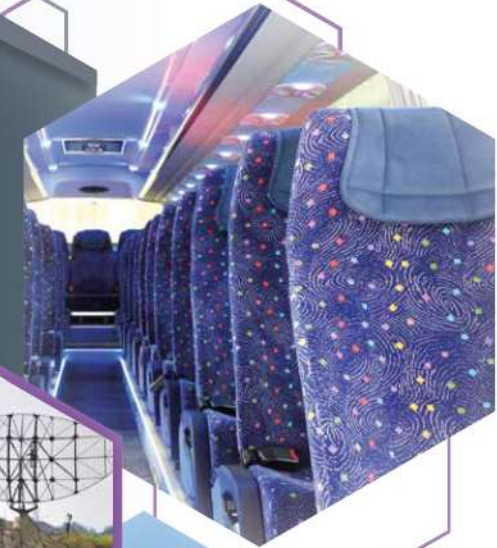
FIBERS AND CONSTRUCTIONS

- cellulosic fibers
- polyamide, Aramid
- cationic polyester & acrylic
- polyester
- any kind of blends

DYE FAMILIES

- reactive, VAT or pigment
- acid or pigment
- cationic or pigment
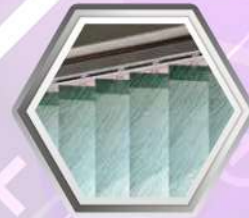- disperse or sublimation
- pigment

PRINT PROCESS

Depending on the applied ink class, different print processes are required. Processing can be done as a wet-on-wet inline process or in multiple offline processes.

ink classes

THE INK SELECTION DEPENDS ON FIBER AND FINAL APPLICATION.

REACTIVE

cellulosic, protein based, and polyamide fibers

light fastness	+
wash fastness	+++
crock fastness	++
chlorine fastness	+
brilliancy	++

PROCESS REQUIREMENTS
- pre-treatment
- printing, drying
- steaming
- washing
- drying

END PRODUCTS
home furnishing
decorative fabrics
terry towels

ACID | METAL COMPLEX

polyamide, wool, Aramid

light fastness	++
wash fastness	++
crock fastness	++
chlorine fastness	+
brilliancy	++

PROCESS REQUIREMENTS
- pre-treatment
- printing, drying
- steaming
- washing
- drying

END PRODUCTS
home furnishing
transport fabrics
military applications

VAT

cellulosic, polyamide, Aramid

light fastness	++
wash fastness	+++
crock fastness	++
chlorine fastness	+
brilliancy	+++

PROCESS REQUIREMENTS
- pre-treatment
- printing, drying
- steaming - oxidizing
- washing
- drying

END PRODUCTS
furnishing
workwear, uniforms
military fabrics
institutional fabrics

DISPERSE | SUBLIMATION

polyester

light fastness	+++
wash fastness	++
crock fastness	++
chlorine fastness	+
brilliancy	++

PROCESS REQUIREMENTS
- pre-treatment
- printing, drying
- dye fixation
- reductive washing
- drying

END PRODUCTS
advertisement
outdoor fabrics
home furnishing

PIGMENT

any kind of fibers

light fastness	++
wash fastness	++
crock fastness	+
chlorine fastness	+
brilliancy	+++

PROCESS REQUIREMENTS
- pre-treatment
- printing, drying
- (post-treatment)
- polymerization

END PRODUCTS
indoor or outdoor fabrics
with high light fastness
requirement

FUNCTIONAL INKS

any kind of fibers

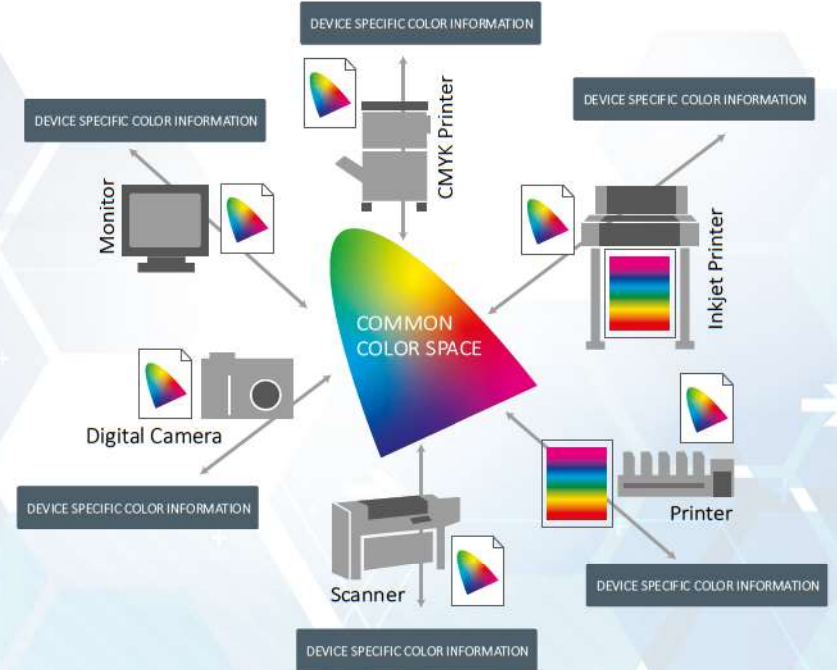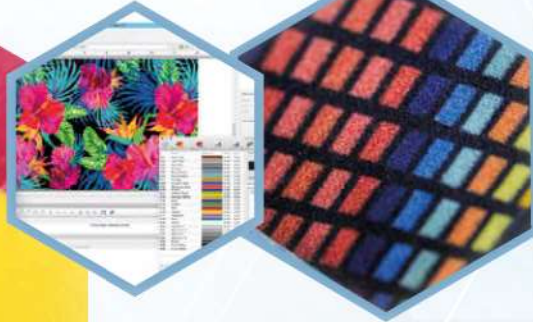|	
light fastness	n.ch.
wash fastness	n.ch.
crock fastness	n.ch.
chlorine fastness	n.ch.
brilliancy	n.ch.

n.ch. = no change

Some substrates or end-products need addition of functional inks. This may be a special carbon black for IR-reflectance control on military fabrics. Other functional inks may be penetration boosters, conductive inks or special inks for hydrophilic or hydrophobic finishing.

pre-print process

Digital printing is a complex task for which the entire workflow has to match. From design, color management and communication up to printer calibration - all must be perfect for a superb result.

Essential tools are fast computers with fast networks, a lot of memory space and well trained operators.

DEVICE SPECIFIC COLOR INFORMATION

DEVICE SPECIFIC COLOR INFORMATION

DEVICE SPECIFIC COLOR INFORMATION

CMYK Printer

Inkjet Printer

Monitor

COMMON COLOR SPACE

Digital Camera

DEVICE SPECIFIC COLOR INFORMATION

Scanner

Printer

DEVICE SPECIFIC COLOR INFORMATION

DEVICE SPECIFIC COLOR INFORMATION

PRINTER CALIBRATION

Basic process setup and print resolution must be defined and stable before a calibration is made.

Calibration is a software supported process made in several steps (linearization, printing and measuring targets, generating of printer and ICC profiles).

COLOR MEASUREMENT

Digital printing needs digital information to communicate. Color measurement is essential. Different measuring devices can be used - depending on substrate and surface.

Color is normally communicated within the L*a*b color-system.

COLOR CALIBRATION

Color calibration is needed to communicate and match colors. This makes sure that colors appear identical on different devices and printers.

A re-calibration is normally needed if a major parameter (base material, ink, fixation process, ...) is changed within the total process.

DESIGN SOFTWARE

There are a number of pixel- or vector- based software tools on the market: Photoshop®, Gimp®, Nedgraphics®, Illustrator®, Corel Draw®...

RIP PROCESS

During the RIP process the color information from the art-work file is transformed and split into channels. For each process color (ink) one channel is used.

workwear

VAT printing is known for unsurpassed fastness properties on any kind of cellulosic and regenerated cellulose fibers. Prints with VAT dyes easily withstand natural UV light exposure, boil washing and even resist chlorine bleach to a great extent.

VAT printing is more complex compared to other direct-to-fabric printing solutions, but the achieved properties of end products are paying well for the additional steps in processing.

Due to their high performance VAT prints are ideal for heavy duty environments and are also used for clothing in the security and special forces segment incl. camouflage fabrics.

TECHNICAL DATA

working widths:
2200 | 2600 | 3400 mm

print substrates:
woven, nonwoven, knitted fabrics

color groups:
up to 12

ink class per printer:
1 ink class at up to 12 colors
2 ink classes at up to 6 colors
3 ink classes at max. 4 colors

number of printheads:
up to 8 per color group, or 16 per color, max. 96 possible

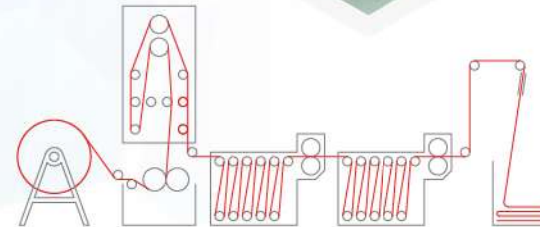**production capacity:**
from 60 to 1100 m²/h

1
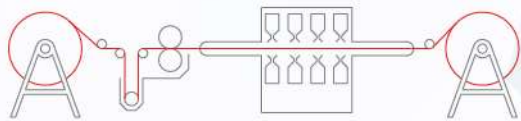
OFFLINE INKJET PRE-TREATMENT:
padder application followed by stenter drying is required for wet-on-dry print process

2

OFFLINE DIGITAL PRINTING:
printing on ready for inkjet prepared fabric followed by infrared- or hot air drying

3

OFFLINE POST-PRINT PROCESSING:
padding, steam fixation, oxidizing, washing

After printing and drying the substrate needs to undergo a padding process where a reducing agent is applied to solubilize the dye. Through a steam fixation the dye develops on the substrate and is permanently fixed by undergoing an oxidation process after leaving the steamer.
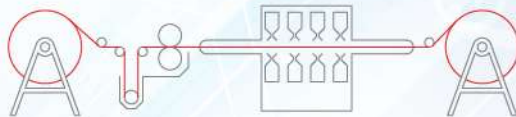
military camouflage

Military camouflage fabrics have to fulfill a wide range of protection needs. Accordingly, a great variety of fiber bases are used. From cotton, re-generated cellulose fibers, polyamide, Aramid™, Kermel™ Nomex™, Conex™, Kevlar™ Twaron™, LENZING™ Lycell and Modal, LENZING™ FR, polyester and their blends are well known for their specific properties. Products may include uniforms, bullet-proof vests, rain protection, ponchos, tents, carrying systems, sleeping bags, nettings, webbings or hook and loop quick-fix-and-release products, etc. All these products need camouflage with IR-reflection control and this is what ZIMMER AUSTRIA Digital Printing Systems can offer now. COLARIS Digital Prints with IR-reflectance control, perfectly match requirements of military and paramilitary forces around the globe. Camouflage printing is not about existing patterns being reproduced digitally from traditional screen printing – digital camouflage printing can offer so much more.
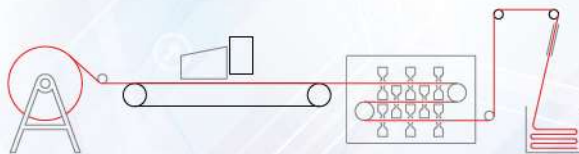
1

OFFLINE INKJET PRE-TREATMENT:
padder application followed by stenter drying is required for wet-on-dry print process

2

OFFLINE DIGITAL PRINTING:
printing and drying on ready for inkjet print fabric

print seen at daylight

with IRR Control

without IRR Control

TECHNICAL DATA

working widths:
2200 | 2600 | 3400 mm

print substrates:
woven, nonwoven, knitted fabrics

color groups:
up to 12

ink class per printer:
1 ink class at up to 12 colors
2 ink classes at up to 6 colors
3 ink classes at max. 4 colors

number of printheads:
up to 8 per color group, or 16 per color, max. 96 possible
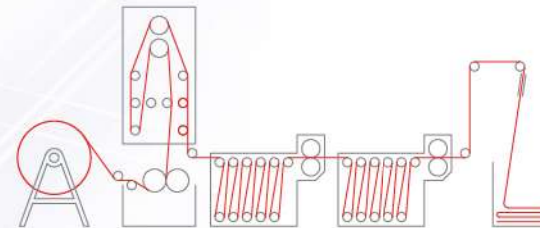
production capacity:
from 60 to 1100 m²/h

3

OFFLINE POST-PRINT PROCESSING:
padding, steam fixation, oxidizing, washing

After printing and drying the substrate needs to undergo a padding process where a reducing agent is applied to solubilize the dye. Through a steam fixation the dye develops on the substrate and is permanently fixed by undergoing an oxidation process after leaving the steamer.
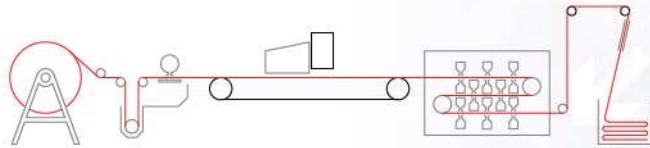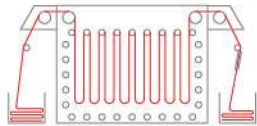
transport fabrics

ACID print lines are more complex than a simple print and dry process. Most important criteria for velour or loop fabric are penetration and sharpness of the print.
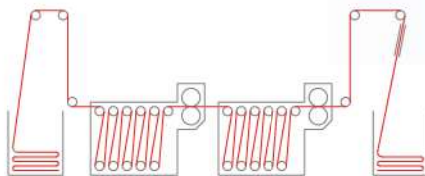
1

INLINE PRE-TREATMENT & DIGITAL PRINTING:
wet-on-wet process - integrated inline pre-treatment, followed by printing and drying.

2

DYE FIXATION PROCESS:
a) OFFLINE: saturated steam
b) INLINE: saturated steam

3

OFFLINE POST-PRINT WASHING:
multi-step washing system

4

OFFLINE DRYING / FINISHING
plait - stenter dry - roll

Typical applications are upholstery, velour and seat furnishing fabrics for the public transport such as train, subway, cable cars, buses, aircrafts and cruise ships.

ACID prints are known for good fastness properties. For extended fastness requirements, pre-metallized inks are available. Such inks are good for improved light and chlorine fastness.

TECHNICAL DATA

working widths:
2200 | 2600 | 3400 mm

print substrates:
woven, nonwoven, knitted fabrics
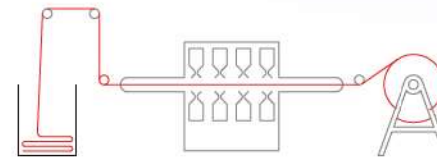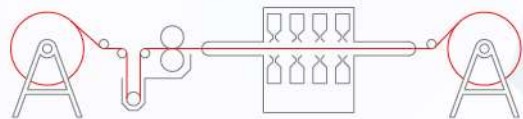
color groups:
up to 12

ink class per printer:
1 ink class at up to 12 colors
2 ink classes at up to 6 colors
3 ink classes at max. 4 colors

number of printheads:
up to 8 per color group, or 16 per color, max. 96 possible

production capacity:
from 60 to 1100 m²/h

outdoor fabrics

Ecological needs are forcing the industry to look out for environment-friendly processes.

Pigment printing is the most eco-friendly print method today. Energy consumption is less than one third of a print process that requires steaming and washing. Water consumption and effluent discharge for post-print finishing are more or less completely eliminated. With the latest ink developments, dry and wet rub fastness are in line with conventional pigment printing and the haptics have drastically improved.

1
OFFLINE INKJET PRE-TREATMENT:
padder application followed by stenter drying is required for wet-on-dry print process

2
OFFLINE DIGITAL PRINTING:
printing on ready for inkjet prepared fabric followed by infrared- or hot air drying, with optional inline polymerization.

Pigment prints are suitable for almost any fiber class and are therefore the only ink suitable for multi-fiber-based substrates.

Pigment prints are known for high light fastness. Accordingly, window fashion, sun blinds and outdoor fabrics including various technical textiles, are the key products printed with pigment inks. The simple and environment-friendly process is rapidly growing - not just for the afore-mentioned end products, but also within the fashion and home textile market.
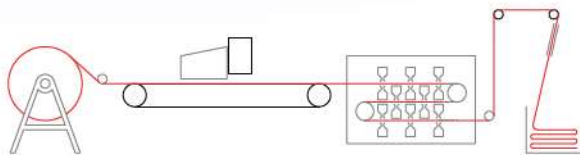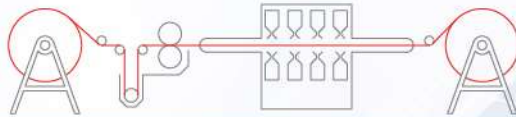
TECHNICAL DATA

working widths:
2200 | 2600 | 3400 mm

print substrates:
woven, nonwoven, knitted fabrics

color groups:
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production capacity:
from 60 to 1100 m²/h

advertising fabrics

DISPERSE or SUBLIMATION inks are categorized by their molecular structure. They are also known as low, medium and high energy disperse inks. Disperse is referring to the ink characteristics, as solid dye particles are kept evenly distributed within the ink by a dispersion to reduce the risk of sedimentation/aggregation/agglomeration to a minimum.
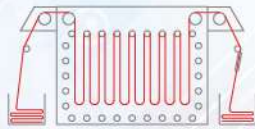
1

OFFLINE INKJET PRE-TREATMENT:
padder application followed by stenter drying is required for wet-on-dry print process

2
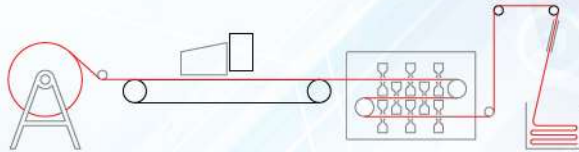
OFFLINE DIGITAL PRINTING:
printing and drying on ready for inkjet print fabric

3

OFFLINE DYE FIXATION PROCESS:
saturated steam

4

OFFLINE POST-PRINT WASHING:
multi-step washing system

Polyester DISPERSE printing covers a wide range of products incl. shower curtains, window fashion, flags & banners, various outdoor fabrics, etc.

TECHNICAL DATA

working widths:
2200 | 2600 | 3400 mm

print substrates:
woven, nonwoven, knitted fabrics

color groups:
up to 12

ink class per printer:
1 ink class at up to 12 colors
2 ink classes at up to 6 colors
3 ink classes at max. 4 colors

number of printheads:
up to 8 per color group, or 16 per color, max. 96 possible

**production capacity:**
from 60 to 1100 m²/h
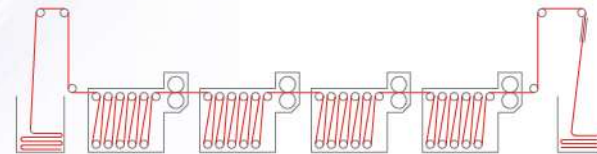
CHROMOJET
valve-based technology

Our CHROMOJET valve-based technology has initially been developed for carpet printing. Over the years, with new generations of jets and improved computer power, the applications have expanded into other fields. Today CHROMOJET stands for carpet printing, high-tech functionalization of textile substrates and technical textiles.

CHROMOJET technology is available with two different jet versions. This allows a wide range of applications starting from digital functionalization of flat textiles, through printing of medium to heavy weight pile substrates including loop and velour carpets and medium to heavy weight raschel blankets.
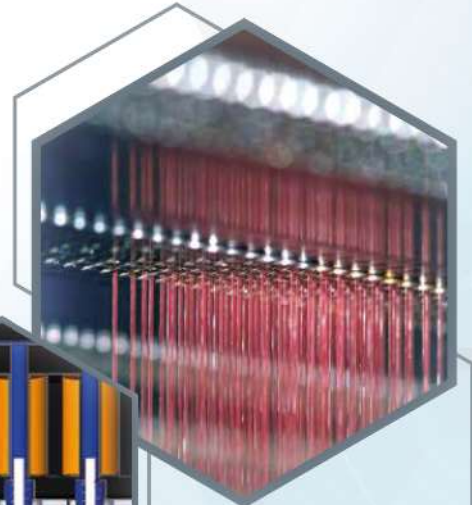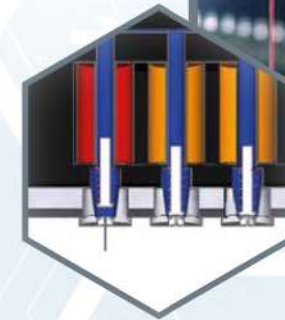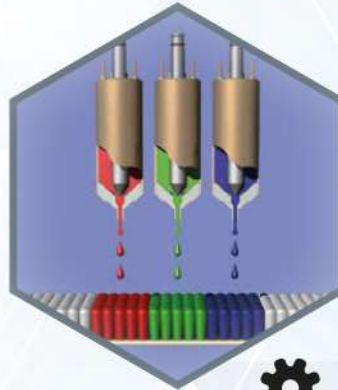
TECHNICAL DATA

jet versions:
HSV-400-R & HSV-800

max. particle size:
7 μm

pH range:
2 - 13

chemicals:
water-based liquids

viscosity range:
50 - 400 cPs

HSV-400-R

spot color printing only

print resolution:
25.4 dpi

max. jetting frequency:
400 Hz

HSV-800

spot & process color printing

digital functionalization

print resolution:
up to 76.2 dpi

max. jetting frequency:
800 Hz

CHROMOJET
applications

nozzle type HSV-400-R

- spot color printing
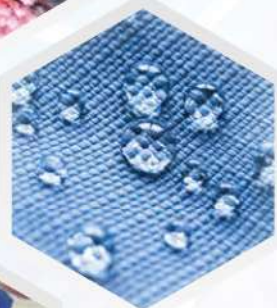- high-pile carpets
- heavy weight raschel blankets

nozzle type HSV-800

- digital functionalization - flat substrates
- printing low to medium weight carpets
- printing medium weight raschel blankets

high-pile
spot color print

hydrophobic
digital coating

process color print

African print

digitally printed blanket

CHROMOJET-TT
laboratory printer

The CHROMOJET TABLETOP printer is perfect for product and process development under lab conditions. It requires very little space on a table.

Small removable medium tanks provide quick and easy change of fluids and dyes. Designs can be uploaded from a standard computer.

Resolution, rasterization, pressure, head-speed, nozzle size, viscosity: These are the parameters to control penetration, pick-up and definition.

TECHNICAL DATA

sample size:
max. 300 x 300 mm

number of colors, tanks, modules:
4 modules

jets:
8 jets per module

nozzle diameter range:
120, 150, 200, 250, 280 µm

medium pressure:
1.0 - 3.5 bar

medium viscosity:
50 - 400 cps

machine components

The large variety of substrates suitable for COLARIS Digital Inkjet Printers requires various processes. The simplest option is stand-alone inkjet pre-treatment followed by a stand-alone print process and stand-alone post-print fixation.

Various machine components are available from ZIMMER AUSTRIA, which can be installed as offline or inline components.

The ZIMMER AUSTRIA MODUS loop steamer is known for excellent color yield and perfect color fixation with saturated steam for reactive, acid or cationic dyes. It also is available as a loop polymerizer to cure pigment, or with superheated steam to fix disperse dyes on polyester substrates.

For inline post-print washing, ZIMMER AUSTRIA can offer various combinations and dimensions of single-step or multi-step washing systems.

Dryers are mostly installed inline, but can also be offered as a stand-alone unit or in combination with other machine components. Heating source may be electric IR heating, indirect steam, or thermal fluids. Also gas direct heated solutions are offered.

For inkjet pre-treatment ZIMMER AUSTRIA can provide MAGNOROLL coating units to be installed with a stenter as well as for inline pre-treatment. Applicators with vacuum extraction are used for inline pre-treatment of velour and other voluminous substrates as they are the best option to control moisture and chemical application at the same time.

laboratory components

In addition to complex print lines, ZIMMER AUSTRIA offers a large range of laboratory equipment like sample printers or evaluation devices for process development by our customers.

COLARIS 12-1200T

TECHNICAL DATA

max. printable size:
1200/1200 mm

printhead model:
FUJIFILM Dimatix Starfire™
nozzle versions: XSA, SA, MA, LA

color groups:
up to 12 possible

ink setup:
1 ink class at up to 12 colors
2 ink classes at up to 6 colors
3 ink classes at max. 4 colors

POST-PRINT PROCESSING LINE

TECHNICAL DATA

working width:
1200 mm

Operation options:
for individual pieces or continuous processing

processing options:
steam fixation for dyes, post-print washing or pre-treatment application, drying or hot air curing

dyestuff classes:
reactive, acid, cationic, disperse, direct sublimation, pigment

COLARIS-IPT
Ink Performance Tester

TECHNICAL DATA

max. printing width:
65 mm

printhead model:
FUJIFILM Dimatix Starfire™
nozzle versions: XSA, SA, MA, LA

purpose of COLARIS-IPT:
ink development, ink & printheads performance testing

customers:
ink manufacturers, textile and carpet printers

TECHNICAL DATA

ZIMMER AUSTRIA offers 4 different models of the new high performance industrial inkjet printheads from FUJIFILM Dimatix.
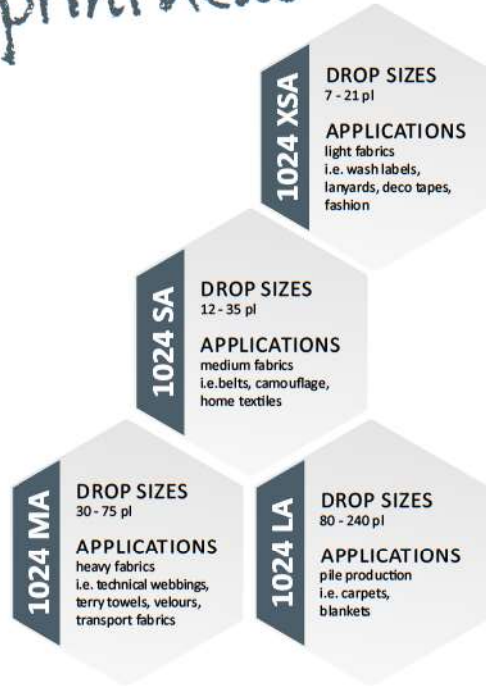
The StarFire™ SG1024 (XSA/SA/MA/LA) is a compact, self-contained unit built to withstand demanding industrial textile and carpet printing and other applications. It uses field proven materials to deliver consistent output over a long service life with continuous ink recirculation and single color operation at 400 dpi. It is equipped with a replaceable metal nozzle plate.
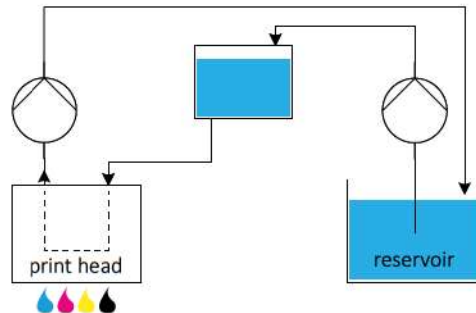
TECHNICAL FEATURES

- 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 fabric can be up to 6 mm
- VersaDrop™- incorporated binary and greyscale jetting modes
- RediJet™- continuous ink recirculation system to avoid nozzle blockage and to reduce ink waste
- 4 interchangeable print head models with different drop sizes for a wide range of applications

printhead

1024 XSA
DROP SIZES
7 - 21 pl

APPLICATIONS
light fabrics
i.e. wash labels, lanyards, deco tapes, fashion

1024 SA
DROP SIZES
12 - 35 pl

APPLICATIONS
medium fabrics
i.e.belts, camouflage, home textiles

1024 MA
DROP SIZES
30 - 75 pl

APPLICATIONS
heavy fabrics
i.e. technical webbings, terry towels, velours, transport fabrics

1024 LA
DROP SIZES
80 - 240 pl

APPLICATIONS
pile production
i.e. carpets, blankets

INK SUPPLY & CIRCULATION SYSTEM

print head

reservoir

recondition center

PRINTHEADS CAN BE COMPLETELY DISMANTLED

AUTOMATIC CLEANING PROCESSES

PACKING, BILLING, SHIPPING

Printheads are a significant cost factor in digital printing systems. Nevertheless, our experience shows that rather deposits or mechanical damage result in malfunctioning printheads than natural aging. Usually, clogged printheads are no longer usable and must be replaced.

To relieve our customers and to extend the printheads service life, ZIMMER AUSTRIA built up a great deal of knowledge and technology to understand, clean and repair StarFire™ print heads. Depending on the error pattern and ink used, different approaches, chemicals and procedures are applied to restore print heads. It also required significant investments in a cleanroom, exhaust, pumps, tanks, process controls, specialized tools and equipment, microscopes, databases, and more.

manufacturing

ZIMMER AUSTRIA Digital Printing Systems is known for flexibility and for building tailor-made machines and systems. This is the reason why we remain one of few textile machine manufacturers with a deep, vertical inhouse manufacturing capability.

Starting from engineering to mechanical manufacturing, electronic and software development, machine and control cabinet assembly, programming, internal testing, we also provide shipping, on-site installation, start-up and training of customer personnel and most important: after sales service through our own team.

Additionally, we can offer on-site process development and optimization for a wide range of digital printing and coating applications.

ZIMMER AUSTRIA laboratories are furnished with state-of-the-art facilities including equipment for ink development and ink evaluation.

The drop-watcher evaluates the qualification of inks from different manufacturers for COLARIS printers and controls ink samples provided by certified manufacturers for customer safety.
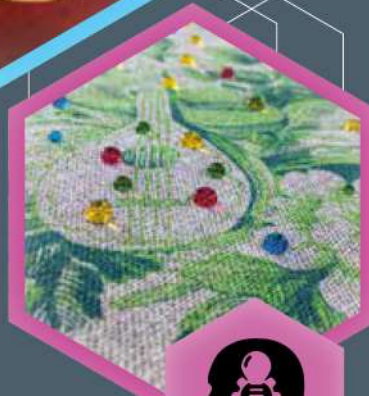
technology center

Our technology center is the heart and source of all our developments and innovations. New technologies and processes are developed and tested on individual textiles, carpets, narrow fabrics and other materials.

Our facilities are fitted with all technologies including CHROMOJET, COLARIS Printing and Coating Systems, as well as with a comprehensive set-up of laboratory equipment. But most important is the staff working in the Technology Center: Each of them is a specialist in his field.

The technology and application center supports machinery and technology development. Furthermore, it gives proof to customers about results on their own products.

It is also used as a service center for our customers´ personnel in case of new product development, as well as for operator training .