

MACHINERY MANUFACTURER

**Zimmer**  
AUSTRIA



PIONNERING INNOVATIONS  
150 YEARS



# COLARIS & CHROMOJET *floor coverings*

DIGITAL PRINTING SYSTEMS

 04/2024

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# 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



1874

QUALITY SINCE 1874  
Factory Franz Zimmer's Erben KG Warndorf

Start of ZIMMER AUSTRIA -  
first duplex blanket printing machine

1951



1955

RSD rotary screen printer

TDA carpet flat screen printer

1962



1968

TRSDM carpet rotary screen printer

CHROMOTRONIC digital carpet printer

1976



2008

CHROMOJET 800 -  
valve-based process color printer

COLARIS high resolution carpet printer

2015



# Decision guidance

1. What is the target market?  
rugs, wall-to-wall carpets, carpet tiles, dust control mats, logo mats, needelfelt
2. What substrate width is required and what capacity based on realistic sales forecast is required?
3. What is the fiber base of substrate?  
polyamide, wool, polyester, modified or cationic polyester, cotton...
4. Fastness requirement?  
light-, wash-, crock-, weather-, chlorine fastness
5. Fiber of substrate and fastness requirement will determine ink class which defines the process needs.
6. Is there a specific ink supplier you wish to work with?  
Will you require technical and technological support from the ink supplier?
7. Which process colors are required to cover desired color gamut?  
COLARIS printers can be prepared for up to 12 individual colors.  
CHROMOJET printers can be prepared with up to 16 individual colors.
8. Is your plant and the environment prepared for a fully digital workflow?  
Industrial production requires process stability.
9. How do you define, measure and communicate the colors internally and with the customer? Do you have a measuring system such as spectro-photometer?
10. Which software is most suitable for your business and how do you convert the design into a printable color?
11. Which requirements or skills are needed to operate a digital print line at a given capacity, in regard to the utilities or the operator?



**R&D SUPPORT**  
APPLICATION  
TECHNOLOGY



**MACHINERY**  
ENGINEERING &  
MANUFACTURING



**SERVICE**  
SOFTWARE &  
TECHNICAL SUPPORT

# ink classes

THE INK SELECTION DEPENDS ON FIBER AND FINAL APPLICATION.



## ACID | METAL COMPLEX

polyamide, wool

light fastness	++
wash fastness	++
crock fastness	++
chlorine fastness	+
brilliance	++

### PROCESS REQUIREMENTS

- pre-washing,
- printing,
- steaming,
- washing,
- drying

END PRODUCTS  
tufted and woven mats,  
rugs,  
carpet tiles,  
wall-to-wall carpet

## CATIONIC

acrylic, modified (cationic)  
polyester

light fastness	++
wash fastness	++
crock fastness	++
chlorine fastness	+
brilliance	+++

### PROCESS REQUIREMENTS

- printing,
- steaming,
- washing,
- drying

END PRODUCTS  
mats,  
rugs

## high energy DISPERSE

polyester

light fastness	+++
wash fastness	++
crock fastness	++
chlorine fastness	+
brilliance	++

### PROCESS REQUIREMENTS

- printing,
- drying/fixation ,
- reductive washing
- drying

END PRODUCTS  
nonwoven carpet,  
mats,  
rugs

## low energy DISPERSE

polyester

light fastness	++
wash fastness	++
crock fastness	+
chlorine fastness	+
brilliance	+++

### PROCESS REQUIREMENTS

- printing,
- drying/fixation,
- reductive washing
- drying

END PRODUCTS  
nonwoven carpet,  
mats,  
rugs

## REACTIVE

polyamide, cotton, wool

light fastness	++
wash fastness	+++
crock fastness	++
chlorine fastness	+
brilliance	+++

### PROCESS REQUIREMENTS

- pre-washing,
- printing,
- steaming,
- washing,
- drying

END PRODUCTS  
cotton mats,  
polyamide carpets with  
good wash fastness,  
wool carpet with good  
brilliance

# printing systems

## CHROMOJET & COLARIS

CHROMOJET is a valve-based jet-print technology which was developed by ZIMMER in 1976. At that time the machine was named Chromotronic, a synonym for electronically controlled dye application.

In 1980 CHROMOJET brand was created, and soon became the leading technology in digital jet-printing for carpets. With several generations of electromagnetically controlled jets, and availability of more powerful computers, the resolution became finer over the years. The invention of the high-speed magnetic valves starting from HSV-200, HSV-400 and HSV-800 brought the real break-through for CHROMOJET technology. Both, the HSV-400 and HSV-800 printer generations are still maintained and have seen several updates over the years. The CHROMOJET-400 has become the work horse for very heavy and high pile substrates and is laid out for spot color printing only. The CHROMOJET-800 is the first digital printer which can print spot colors, process colors or even a combination of both.

In the year 2015 ZIMMER AUSTRIA Digital Printing Systems has introduced the piezo printhead based, high resolution COLARIS carpet printer. Although, COLARIS technology is taking a major market share today, CHROMOJET has still its prominent position within the carpet printing industry. With print images and carpet constructions becoming finer day by day, the potential future will lay in the COLARIS piezo-based technology.

The basic layouts of print production lines are similar, irrespective of machine model selected.



CHROMOJET-400 print carriage with 12 colors and 1280 jets per color under assembly with the base of the printer. The carriage weight is approx. 6 tons when filled with inks, ready for printing. With a carriage speed of 1 m/sec the printer needs a sturdy construction to withstand 24/7 hours operation over a long service life. CHROMOJET-400 is the workhorse for high capacity printing on very heavy carpet constructions.

CHROMOJET-800 printers are suitable for process and spot color printing. In both cases pre-mixed print pastes are used. Pastes are prepared in a color kitchen.



CHROMOJET printers are using conventional dyes and the print paste needs to be prepared beforehand. For accurate color preparation, ZIMMER AUSTRIA offers color kitchen equipment.



COLARIS carpet printers, which are based on piezo printhead technology need pre-formulated inks which are supplied in ink canisters or for high volume consumption by ICB containers. The real advantage of COLARIS printers comes with the wide color gamut being produced out of 4 or 6 colors only. Additionally the print resolution of 400 dpi allows finest definitions in printing and nice color degradations for photorealistic print results.



### CHROMOJET-400

print resolution:  
25 dpi

max. number of colors:  
16

production capacity:  
scalable to the needs



### CHROMOJET-800

print resolution:  
76 dpi

max. number of colors:  
16 spot or process colors  
for hundreds of color shades

production capacity:  
scalable to the needs



### COLARIS

print resolution:  
400 dpi

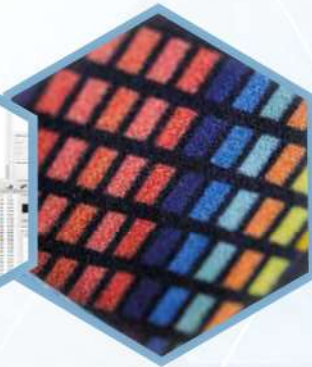
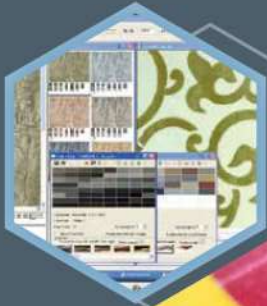
number of colors:  
up to 12 process colors  
for thousands of color shades

production capacity:  
scalable from 60 to 1200 sqm/h

# 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.



## 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.



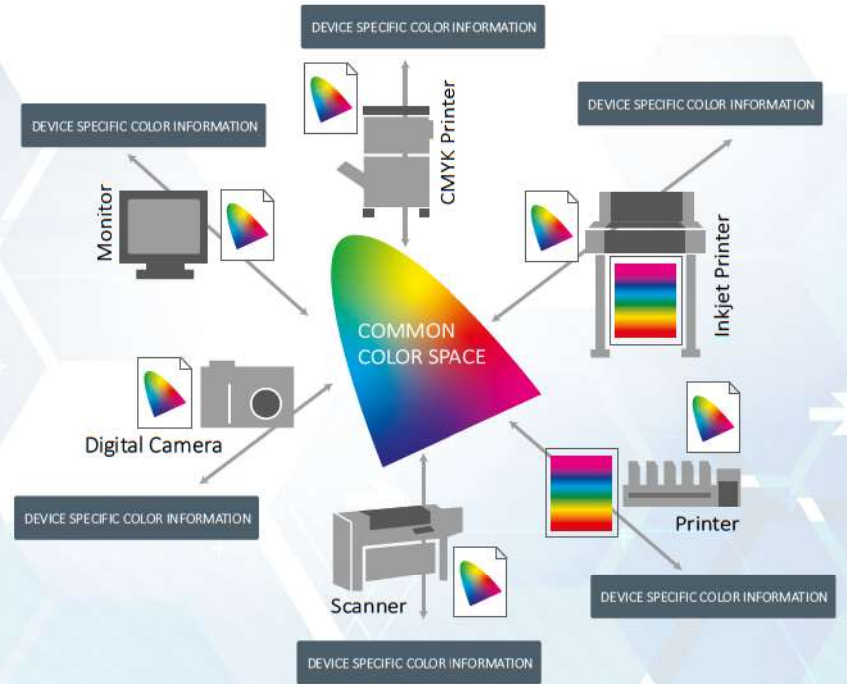
## DESIGN SOFTWARE

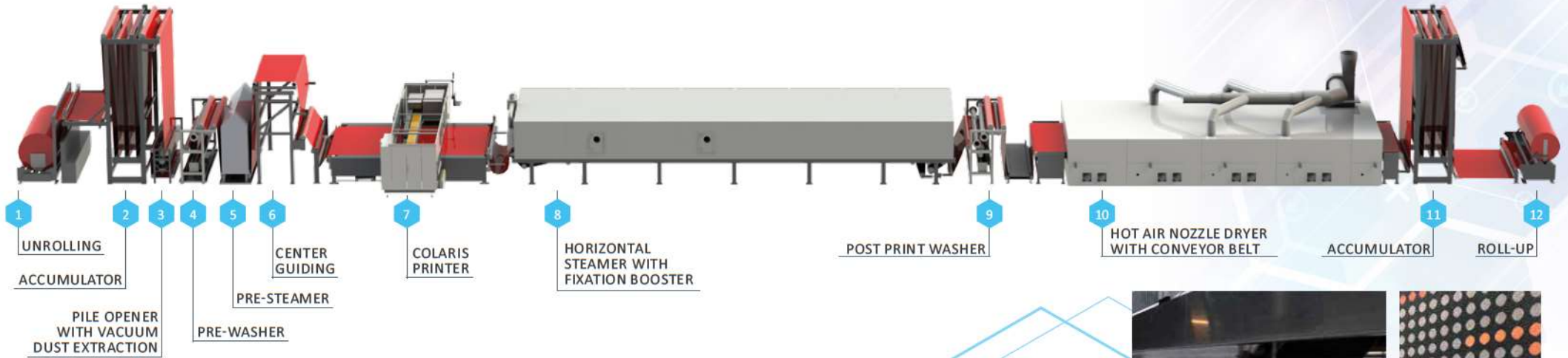
There are a number of pixel- or vector- based software tools on the market: Photoshop®, Gimp®, Nedgraphics®, Illustrator®, Corel Draw®...



## 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.





## COLARIS PRINT LINE FOR CARPETS

MADE OF POLYAMIDE, WOOL, ACRYLIC, CATIONIC POLYESTER, COTTON AND OTHER CELLULOSIC FIBERS

To fix dyes (ink) on the fiber, a saturated steam process is required.



### FIBERS | DYE

- polyamide and wool are printed with metal-complex/acid or reactive inks (dyes)
- cationic dyeable polyester can be printed with cationic, or disperse inks (dyes)
- cotton and cellulosic fiber-based carpets are printed with reactive inks (dyes)



### APPLICATIONS

- contract carpets for hospitality and office market
- carpet tiles
- logo and laundry mats for commercial usage
- rugs and mats



### TECHNICAL DATA

print width:  
2200 | 2600 | 3400 |  
4200 | 5200 mm

print resolution:  
400/400 up to  
400/3200 dpi

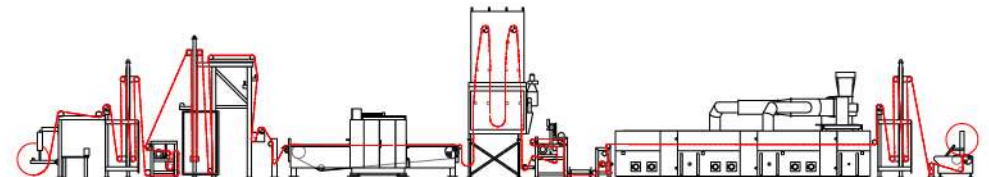
number of color groups:  
6 | 8 | 10 | 12

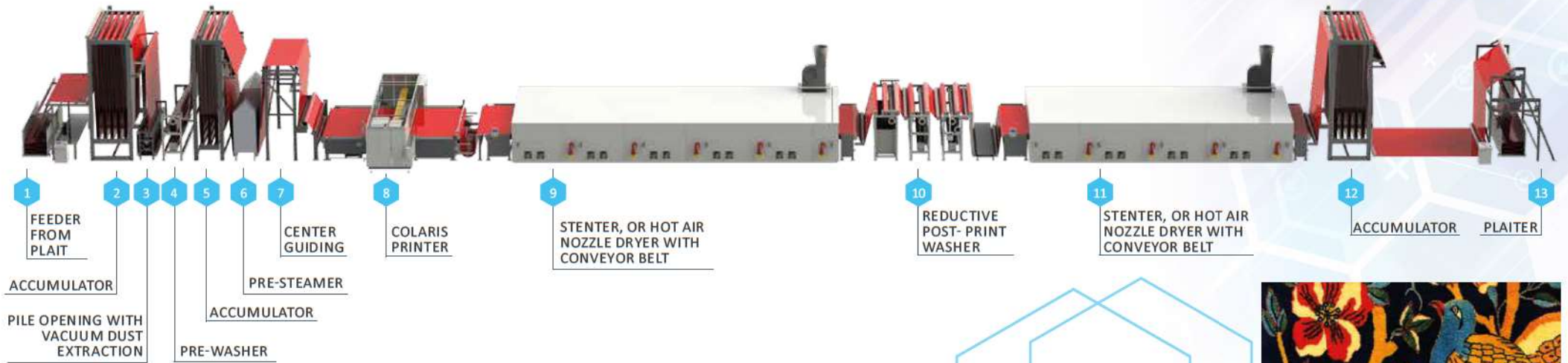
number of printheads:  
1 | 2 | 4 | 8 | 16 per color

production capacity:  
scalable from 60 to 1000 sqm/h



## COLARIS PRINT LINE - ULTRA-COMPACT 4.2 M WIDE





## COLARIS PRINT LINE FOR CARPETS

MADE OF POLYESTER FIBER

To fix dyes (ink) on the fiber, a hot air curing process is required. The dye sublimates and diffuses into the fiber. After cooling the dye is locked in the fiber and achieves good fastness properties. Unfixed dyes need to be washed off with a reductive washing process.



### FIBERS | DYE

Polyester is the fiber of the future.

- low price
- easy recycling
- woven polyester carpets are the ultimate combination between quality of weaving, flexibility and productivity when it comes to rug production



### APPLICATIONS

Polyester fiber-based products are of increasing demand and are manufactured in various constructions.

- heavy weight, high pile woven rugs
- low price alternative for tufted loop or cut pile rugs for residential use
- nonwoven needle felt carpets
- raschel blanket and raschel carpet



### TECHNICAL DATA

print width:  
2200 | 2600 | 3400 |  
4200 | 5200 mm

print resolution:  
400 / 400 up to  
800 / 3200 dpi

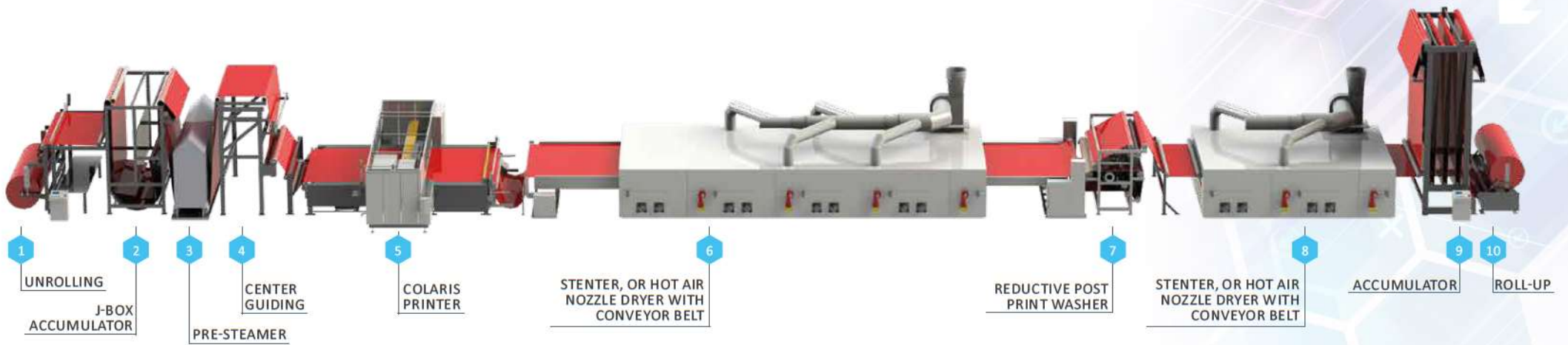
number of color groups:  
4 | 5 | 6

number of printheads:  
1 | 2 | 4 | 8 | 16 per color

production capacity:  
scalable from 500 to 1000 sqm/h







## COLARIS PRINT LINE FOR CARPETS

MADE OF POLYESTER NEEDLEFELT. PRINTING IS MAINLY DONE WITH LOW ENERGY DISPERSE DYES

To fix dyes (ink) on the fiber, a hot air curing process is required. The dye sublimates and diffuses into the fiber. After cooling, the dye is locked in the fiber and achieves good fastness properties.



### FIBERS | DYE

Polyester is the fiber of the future.

- low price, polyester based nonwoven construction
- easy recycling
- low energy disperse inks for good fastness, brilliant prints and deep penetration
- hot air fixation without heat press keeps natural construction a life
- highest crock fastness can be achieved through an optional reductive washing process



### APPLICATIONS

Polyester fiber-based needle felt is perfect for various applications including:

- wall-to-wall carpets
- runners
- event carpets (exhibition-, wedding- and red carpet...)
- mats and rugs for residential usage
- promotion mats
- wall coverings
- acoustic and insulation panels



### TECHNICAL DATA

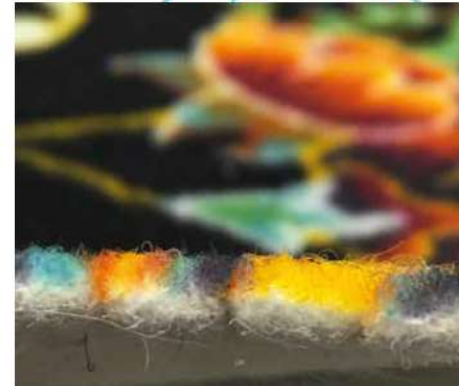
print width:  
2200 | 3400 | 4200 | 5200 mm

print resolution:  
400/400 up to 800/1600 dpi

number of color groups:  
4 | 6

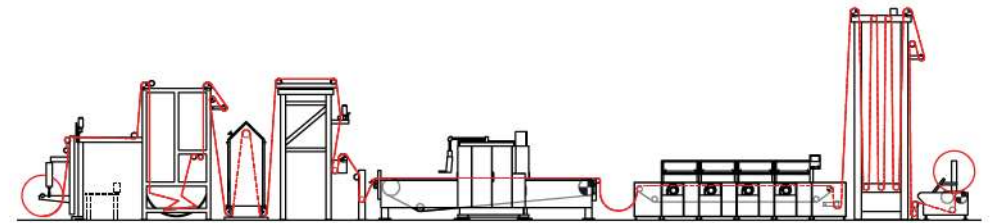
number of printheads:  
8 | 16 per color

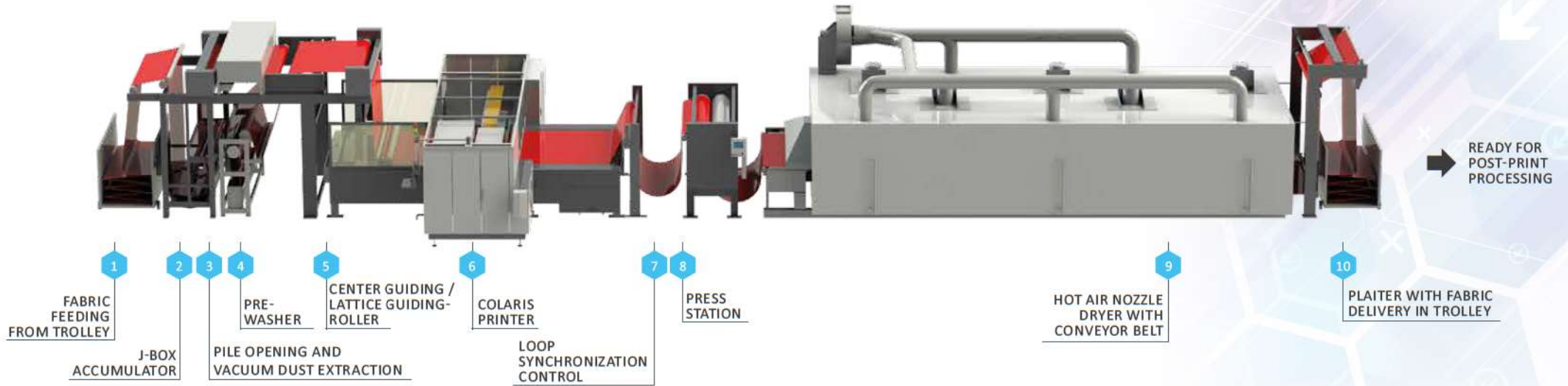
production capacity:  
scalable from 500 to 1000 sqm/h



## COMPACT COLARIS PRINT LINE FOR NEEDLEFELT

without (or offline) washing





## COLARIS PRINT LINE FOR BLANKETS

MADE OF POLYESTER RASCHEL AND FLEECE SUBSTRATE.

Printing is mainly done with disperse dyes (inks). Dyes (inks) are mostly fixed by curing in a loop steamer, using superheated steam. Fixation can also be done with a hot air curing process.



### FIBERS | DYE

Due to price reason, polyester has widely substituted the use of acrylic fiber in blanket manufacturing.

- lower costs
- easy recycling
- excellent fastness and brilliant prints
- deep penetration



### APPLICATIONS

Polyester fiber-based plush constructions are soft and comfortable in skin contact. Typical applications are:

- raschel blankets
- raschel carpets
- polar fleece blankets
- coral fleece blankets



### TECHNICAL DATA

print width:  
2200 | 2600 | 3400 | 4200 mm

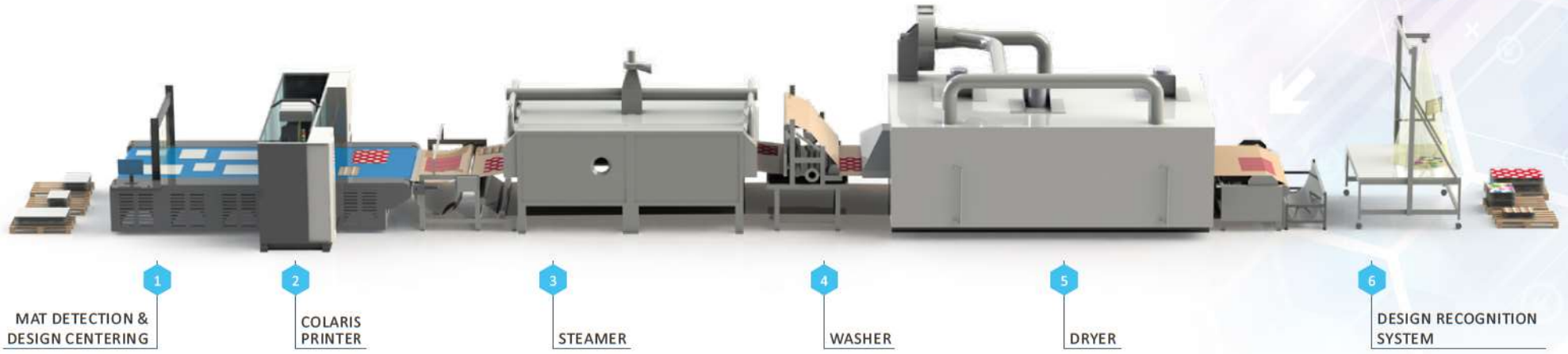
resolution:  
400 x 400 up to  
400 x 1600 dpi

number of colors:  
4 | 6

number of printheads:  
8 | 16 per color

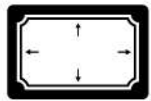
production speed:  
scalable from 500 to 1000 sqm/h





## COLARIS PRINT LINE FOR INDIVIDUAL MATS & TILES

For production of personalized mats from white blanks. Camera based mat detection & design centering are the base for a webshop integration.



### MAT PRINTING

Printed logo-, promotion- and entrance mats out of polyamide or polyester are popular all over the world. COLARIS guarantees highest brilliancy, best penetration and total flexibility.

- print on roll-to-roll: for high volume production
- print on pre-cut mats: most universal and efficient
- print on ready backed mats: efficient way to go if no back coating equipment is available



### TILE PRINTING

Besides their modularity, carpet tiles also offer a wide range of design possibilities. Constructions for printing can vary from tufted low-loop pile up to high-pile constructions.

- print on roll-to-roll: most economical method
- print on slabs or pre-cut tiles: methode to achieve perfect edges
- print on individual, pre-cut tiles: method is perfect for small runs



### TECHNICAL DATA

print width: 2200 mm

resolution: 400 x 400 up to 800 x 3200 dpi

number colors: 6 up to 12

number of printheads: 1, 2, 4, 8 per color

production speed: scalable from 60 to 400 sqm/h





## BACK COATING SYSTEMS FOR TUFTED CARPET

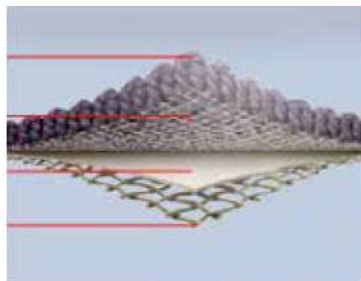
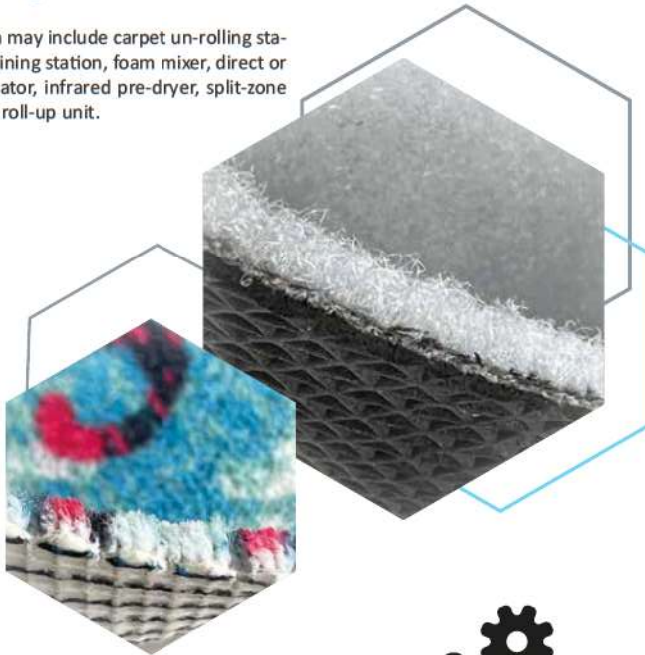
ZIMMER AUSTRIA | Digital Printing Systems offers carpet coating and lamination lines for various carpet backings.

Complete lines can be provided which may include carpet un-rolling station, secondary backing un-winder, joining station, foam mixer, direct or indirect foam/paste applicator, laminator, infrared pre-dryer, split-zone dryer, cooling units, accumulator and roll-up unit.



### APPLICATIONS

- embossed latex gel foam
- latex action-bac
- fleece or felt backing
- PVC with glass fiber fleece lamination
- lamination and anti-slip PVC foam dot-coating



face yarn  
primary backing  
SBR latex coat  
secondary backing



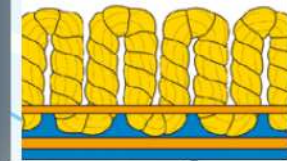
### TECHNICAL DATA

print width:  
4200 | 5200 mm  
production capacity:  
laid out as per customers needs

## CARPET PVC COATING LINE

### THE SMART WAY OF PVC BACKING:

- carpet tiles
- entrance mats
- runners and 2 m/6 ft wide broadloom carpet



Primary Backing  
Polymer layer No.1  
Fiberglass layer No.1  
Polymer layer No.2

### PROCESS:

- tufting of a carpet
- pre-coating the tufted carpet with EVA or NBR pre-coat
- PVC back coating on a tile back coating line
- tile punching or cutting



# machine components

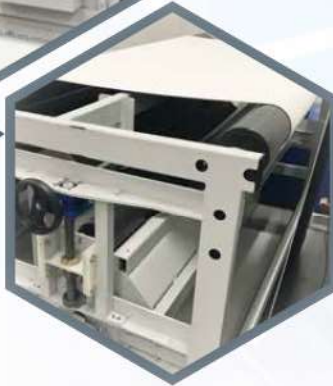
## FABRIC FEEDING SYSTEM

Various entry units are available. Depending on carpet construction, carpet weight and how the carpet is provided to the print line, the fabric feeding system will be laid out.



## DUST REMOVAL AND PILE OPENER

The dust removal system is based on a vacuum extraction combined with a pile beater to align the pile and extract lint and loose fiber from the carpet pile.



## PRE-STEAMER

The pre-steamer is a device to equalize and relax the carpet base. Additionally it opens the pile for improved ink absorbency.



## PENETRATION MAXIMIZER

Some products such as raschel blankets or raschel carpets may need additional mechanical penetration support. The ink penetration can be maximized by a press station.



## HORIZONTAL STEAMER

For inline fixation of reactive, acid, and cationic inks horizontal steamers are the common solution.



## POST-PRINT WASHER

Post-print washers are available in various setups as they need to match with different fiber base and ink classes as well as with various carpet or blanket constructions. Some are sensitive to tension and others may already have a final back-coating applied. Mats and tiles may even be printed in final cut size. Accordingly, the washers have to be laid out in line with the actual needs.



## DRYER

Hot air nozzle dryers are the most common machines to dry the washed carpet. But there are also needs for stenter drying in some cases. Especially nonwoven needle felt products are sensitive to tension and need to be guided by a stenter frame during the drying and high temperature dye fixation in case of disperse printing on polyester.





### EXIT AND ROLL-UP SYSTEMS

After printing and drying of carpet or blankets, they can either be rolled or plaited into a trolley for additional processing such as back coating of carpet products or dye fixation in a superheated steam condition, raising and tige-ting in case of blanket production.



### BACK-COATING SYSTEMS

After printing most of the carpets go for back-coating. This may be a Latex jell foam coat with embossing or an action-bac with lamination of a secondary backing. Carpets which are cut into tiles or modular carpets, are receiving a PVC back-coating with lamination of a fiber glass fleece and may also include an additional final felt layer.



### FOAM MIXER FOAM APPLICATOR

For a perfect dosing and distribution of finishing chemicals such as stain blockers etc. a foam application system is offered by ZIMMER AUSTRIA.

# 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

#### 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

### POST-PRINT PROCESSING LINE



#### TECHNICAL DATA

### CHROMOJET-TT



max. printable size:  
300/300 mm  
printhead model:  
HSV-800  
color groups:  
4  
jets:  
8 per module  
nozzle diameters:  
120 | 150 | 200 | 250 | 280 µm

# printhead

## TECHNICAL DATA

ZIMMER AUSTRIA offers 4 different models of the new high performance industrial inkjet printheads from FUJIFILM Dimatix.

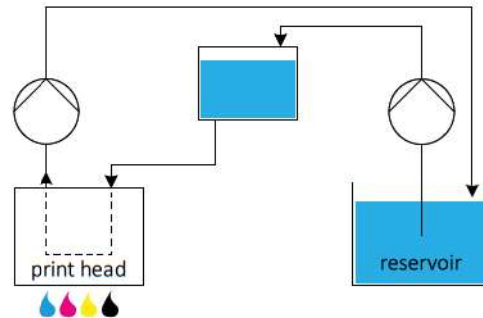
The StarFire™ SG1024 (XSA/SA/MA/LA) is a compact, self-contained unit built to withstand demanding industrial textile and carpet printing and other applications. It uses field proven materials to deliver consistent output over a long service life with continuous ink recirculation and single color operation 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

## INK SUPPLY & CIRCULATION SYSTEM



**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

# 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.



# 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.



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.





**COLARIS**



**MACHINERY  
MANUFACTURER**

**chromoJET**



**DIGITAL PRINTING  
SYSTEMS**



**INNOVATION | QUALITY | SERVICE**

**Zimmer**  
AUSTRIA

**ZIMMER MASCHINENBAU GMBH**  
DIGITAL PRINTING SYSTEMS

[www.zimmer-austria.com](http://www.zimmer-austria.com)



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