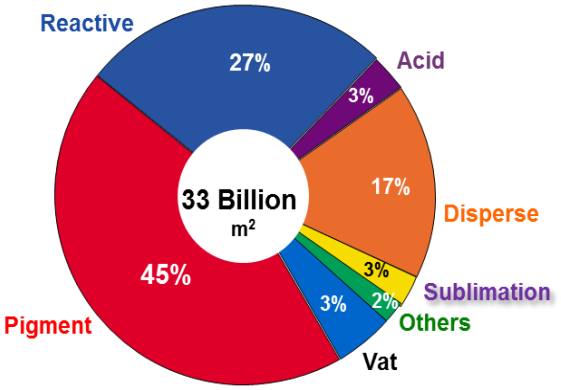
COLARIS.PIGMENT

INKJET PRINTING FOR ALL FIBERS

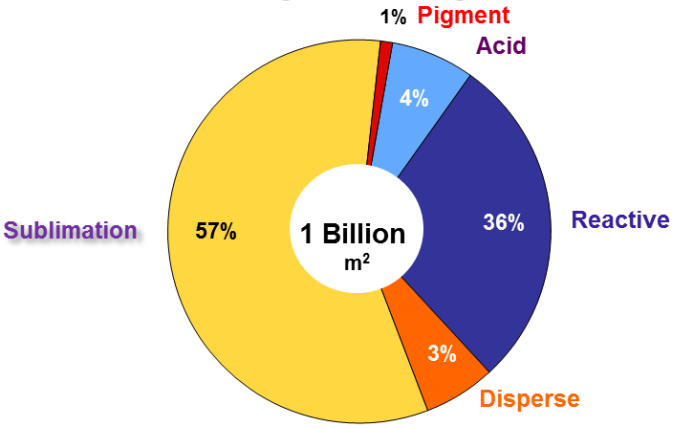
COMPARISON BETWEEN CONVENTIONAL AND DIGITAL PRINTING

97% CONVENTIONAL PRINTING



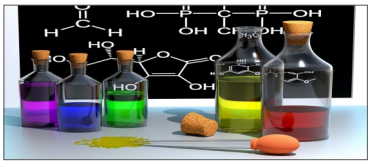
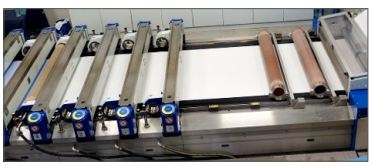
- Average growth of digital textile printing is around 25% per year
- Pigment holds a share of about 45% on conventional prints

3% DIGITAL PRINTING



- Among digital printing, in 2017 pigment held a share of a mere 1 % of all printed textiles
- With new inks, print heads and processes, pigment has the potential to grow very strongly

PIGMENT PRINTING - WHY?

	**Many different types of fabric and fibers could be printed with one machine**	Pigment works on almost any type of fibers, paper, wood and many other materials.
	**Easy process "not much know-how about textile printing is required"**	There is no special know how needed to operate a **COLARIS.**PIGMENT PRINTER.
	**No waste water, no solvents and low energy consumption**	There is almost no wet-process involved and for fixation only temperature is needed - this is a real **green process**.
	**Low investment**	In its simplest form, only a 4 color **COLARIS.**PRINTER and a drying and fixation unit is needed.
	**4 or 6 base colors are enough**	Due to its color strength and brilliancy 4 to 6 colors are enough to cover the full color gamut.
	**Low print cost**	Pigment printing has the potential to replace traditional printing processes. Ink price and process cost are very competitive with reactive and disperse printing.

PIGMENT PRINTING - AND ITS SYSTEM REQUIREMENT

REQUIREMENTS ON PIGMENT INKS

- High color strength and brilliancy
- Best fastness properties
- Best compatibility and stability
- Excellent drop forming performance
- High drop speed and flowability

REQUIREMENTS ON 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 to avoid segmentation
- Repairable
- Gray-level printing
- Robust
- Heads with different drop sizes for different applications

REQUIREMENTS ON PRINTING SYSTEM

- Reliability and stability
- Variable and high resolution up to 1600 x 1600 dpi
- Application driven software
- Easy maintenance

PRE-COATING, POST COATING - AND THEIR INFLUENCES

UN-TREATED FABRIC

- ink spreading in width and depth
- less ink on surface of substrate
- duller print
- less clarity due to ink migration- good haptics of fabric

PRE-COATED FABRIC

- sharp and brilliant prints
- less penetration
- clear images
- slightly improved rub fastness

PRE- AND TOP-COATED FABRIC

- sharp and brilliant print
- clear image
- good rub fastness
- stiffer haptics

PRINTING COST IN EURO (based on about 5 g ink on a 200g/sqm fabric)

	DIRECT PRINT	WITH PRE-COAT	WITH PRE- AND POST COATING
Pre-coating cost		0,20	0,20
Ink cost (EUR 20,-/kg)	0,10	0,10	0,10
Printing cost	0,10	0,10	0,10
Post coating			0,25
Total	**0,20**	**0,40**	**0,65**

Depending on fabric, design and quality expectation - it has to be decided case by case, if pre- and/or post-coating is needed.

There are many applications and qualities which can be printed without any additional coating.

COLARIS.PIGMENT PRINTING (ENG)

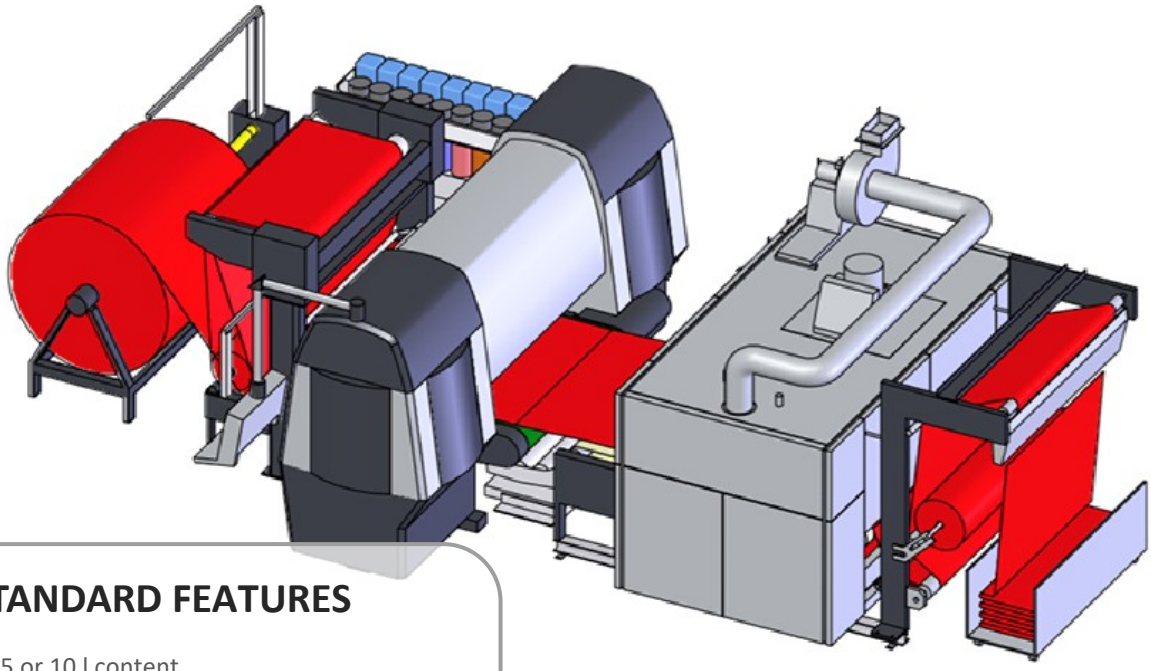
	REACTIVE	ACID	DISPERSE	SUBLIMATION	PIGMENT	VAT/ INDANTHRENE
Light fastness	+	-	+	-	+ + +	+ + +
Dry rub fastness	+	+	+	+	+	+ +
Wet rub fastness	+	+	+	+	- / +	+ +
Washing fastness	+	+	+ +	+	- / +	+ + +
Chlorine fastness	- -	-	+	+	+	+ + +

APPLICATIONS	REACTIVE	ACID	DISPERSE	SUBLIMATION	PIGMENT	VAT/ INDANTHRENE
FLOORING						
PA carpet and mats	+ +	+ + +				
PES carpet and mats			+ + +			
PES needlefelt			+ + +			
Polyamide flock		+ + +				
HOME TEXTILES						
High-end bedding	+ +					++
Low-end bedding				+	+ +	
Curtains	-		+	+	+ + +	++
Upholstery	-		+	+	+	+ + +
Terry towels	+ +		+	+	+	+ + +
OUTDOOR FABRICS						
Tents	- - -				+ + +	
Camping	- - -	-	+	-	+ + +	
Awning	- - -	-	+	-	+ + +	
Sun-blinds	- - -	-	+		+ + +	
FASHION AND GARMENT						
Dress material	+ +			+	+	
Bottom wear	+ +			-	+	
Underwear	+				+ +	
Night wear	+				+ +	
Outer wear	-			+	+	
Sports wear	-			+	+	
Military					+ +	+
Work wear					+	+ + +
ADVERTISEMENT						
PES flags			+ +	+	+	
PES banners			+	+ + +	+	
Point of sale		+	+	+ + +	+	
Expo booth decoration					+ +	

	REACTIVE	ACID	DISPERSE	SUBLIMATION	PIGMENT	VAT/INDANTHRENE
Suitability	Cotton, linen, viscose, wool, silk	Polyamide fibers (nylon, wool, silk)	PES fiber	PES fiber and special coated substrates	Any textile and most non textile substrates	Cotton, linen, viscose
Advantages	Bright and brilliant colors	Bright and brilliant colors	Decent light fastness on PES fabrics	Mostly no wet process required	Dry fixation only, no washing required	Highest wash and light fastness
Process	Pre-coating, printing-drying, (printing-steam-drying), washing, stenter drying, finishing	Light weight fabrics: pre-coating, printing-drying, steaming, washing, stenter-drying, finishing. Heavy substrates: (carpets) printing, steaming, washing, drying, finishing	Light weight fabrics: pre-coating, printing, drying, washing, drying. Heavy substrates (i.e. carpets) printing-drying. On all PES substrates the process is dependent on end use of substrate. It may require additional washing, drying and finishing as well.	Transfer paper printing is the simplest process for PES - printing on transfer paper, transferring by heated press (plate or calender) mostly no post print processing re-quired. Direct sublimation print on substrates is easy and mostly no post print process is required.	Easiest print process as there is in many cases no no pre-coating and no post print process required. Energy efficient, environ-ment friendly. Simple process with low investment costs.	Highest light and wash fastness available on the market; incl. chlorine bleach resistance. Pre-coating not required, printing with special post print process for strong and vibrant colors.
Pre-print process	Ready for print fabric required					
Pre-coating	Required - offline or inline	Fabric and process dependent	Fabric dependent	Fabric dependent	May improve brightness and color strength	Not required
Printing	Standard inkjet printing	Inkjet printing with penetration booster for voluminous substrates	Inkjet printing with penetration booster for voluminous substrates	Printing directly on substrate or on paper for transfer printing	Direct printing	Printing with penetration booster
Drying	Heavy substrates allow use of inline steam dry fixation process for reduced energy consumption.	Flat textile substrates require drying	Hot air drying for dye fixation	Direct sublimation printing requires hot air dye fixation . Sublimation paper printing requires drying and off line dye transfer process.	Hot air drying and dye fixation (polymerization) process - all inline.	Single Phase VAT printing requires drying process. Two phase VAT printing does not require intermediate drying.
Steaming	Min 8 minutes at 102 °C steaming time required with pre-dried fabrics. In case of inline steam dry fixation the fixation time is reduced to less than 4 minutes.	Pre-dried fabric needs 15 to 30 minutes of fixation time. Inline print-steam process reduces fixation time to 4 - 6 min.	Steam fixation is available optionally. Fixation is done at 180 °C superheated steam.	No steam fixation required.	No steam fixation required	Steam fixation in flash ager or loop steamer required.
Curing	Not required	Not required	Not required	Not required	Required in case of post coating (application of binder for improved rub fastness)	Not required
Washing	Required for good rub fastness	Required for good rub fastness	Suggested for improved rub fastness	Not required	Not required	Required for fixation and good rub fastness
Drying	Yes	Yes	Yes	No	No	Yes

COLARIS.CONFIGURATIONS FOR PIGMENT PRINTING

	COLARIS 12-2200	COLARIS 48-2200	COLARIS 48-2600	COLARIS 48-3400	COLARIS 96-2200	COLARIS 96-2600	COLARIS 96-3400
Max. print width	2200 mm	2200 mm	2600 mm	3400 mm	2200 mm	2600 mm	3400 mm
Number of colors	6	6	6	6	6	6	6
Print heads/color	max. 2	max. 8	max. 8	max. 8	max. 16	max. 16	max. 16
Max. sqm/h at 6c at 400 x 800 dpi	**140**	**460**	**500**	**570**	**840**	**920**	**1060**
Recommended dryer	IR	2 x 3-pass	2 x 3-pass	2 x 5-pass	2 x 5-pass	2 x 5-pass	2 x 5-pass



COLARIS STANDARD FEATURES

- Ink tanks with 5 or 10 l content
- 3-stage ink filtration system
- Ink and print-head heating and cooling for constant temperature
- Ink circulation system for trouble-free print performance
- Automatic print head cleaning with water and vacuum extraction
- Height adjustment up to 50 mm (for sheets, tiles, pieces)
- Precise servo drives for print head and conveyor
- Control system with remote internet service
- Sophisticated printing software
- Print heads with 12, 30 or 80 pl native droplet size - for best match of application
- “sticky belt” (permanent glue application device) for textiles and nonwoven products

OPTIONS

- Integrated unrolling for small batch operation
- Positioning device to print carpet tiles, mats and sheet material in perfect registration
- Washing device for transport blanket to clean-up any overprints
- Second vacuum system to operate the printer with different ink types (penetration booster) at the same time
- Wet-glue application device
- Different dryers or steamers for dye fixation

BUTTERFLY

Fabric weight	255 g/sqm
Fabric composition	100 % PES
Print resolution	400 x 800 dpi (ink limit per color 17 ml/sqm max.)
Ink lay down	6,4 ml/sqm
Print head	StarFire™ SG1024 **SA**

ROSES ON SACKCLOTH

Fabric weight	345 g/sqm
Fabric composition	80 % PAN | 15 % CO | 5 % LI
Print resolution	400 x 800 dpi (ink limit per color 17 ml/sqm max.)
Ink lay down	2,7 ml/sqm
Print head	StarFire™ SG1024 **SA**

DEER

Fabric weight	315 g/sqm
Fabric composition	65% PES | 35 % CO
Print resolution	400 x 800 dpi (ink limit per color 17 ml/sqm max.)
Ink lay down	1,24 ml/sqm
Print head	StarFire™ SG1024 **SA**

COLARIS.PIGMENT PRINTING WITH PRE- AND TOP-COATED FABRIC

TYPICAL APPLICATIONS FOR **COLARIS**.DIGITAL PIGMENT PRINTING

HOME TEXTILES, BED-LINEN, UPHOLSTERY, CUSHIONS, WINDOW FASHION

All kinds of home-textiles - whenever best light fastness is needed.

OUTDOOR FABRICS

Sun-blinds, tents, ... For all outdoor fabrics where excellent light fastness and creativity is important.

WORK WEAR AND **UNIFORMS**

Custom designed camouflage patterns on poly-cotton fabrics can be digitally printed.

PRINT ON PANELS

Pigment can also be used to print on panels which have an absorbing surface. This opens up a lot of new applications.

Zimmer AUSTRIA

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