# Waterless Dyeing Technology in the market

HKPC

Partnering for a Smart Future
同行五十載 智慧創未來

# Waterless Dyeing Process Technology in textile

- Digital printing
- Sublimation dyeing
- AirDye®

# Digital Printing

- Save water and environment
- exact amount of ink or dyes needed
- Small runs of each design
- Pattern print directly on the fabric

# Digital Printing

- **Design Process**

be created digitally with:

1. existing artwork

2. almost any graphic design software (Photoshop /Illustrator)

# Digital Printing

## Other applications

- Flags
- Banners
- Retail graphics
- Signs

# Digital Printing

Cellulosics

- Reactive Inks
- Pigment Inks

Polyester

- Disperse Inks
- Pigment Inks

Polyamide

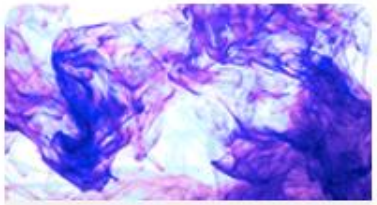
- Reactive Inks
- Acid / Metal Complex Inks
- Pigment Inks

Wool

- Acid / Metal Complex Inks
- Pigment Inks

Silk

- Acid / Metal Complex Inks
- Pigment Inks



Inkjet Auxiliaries

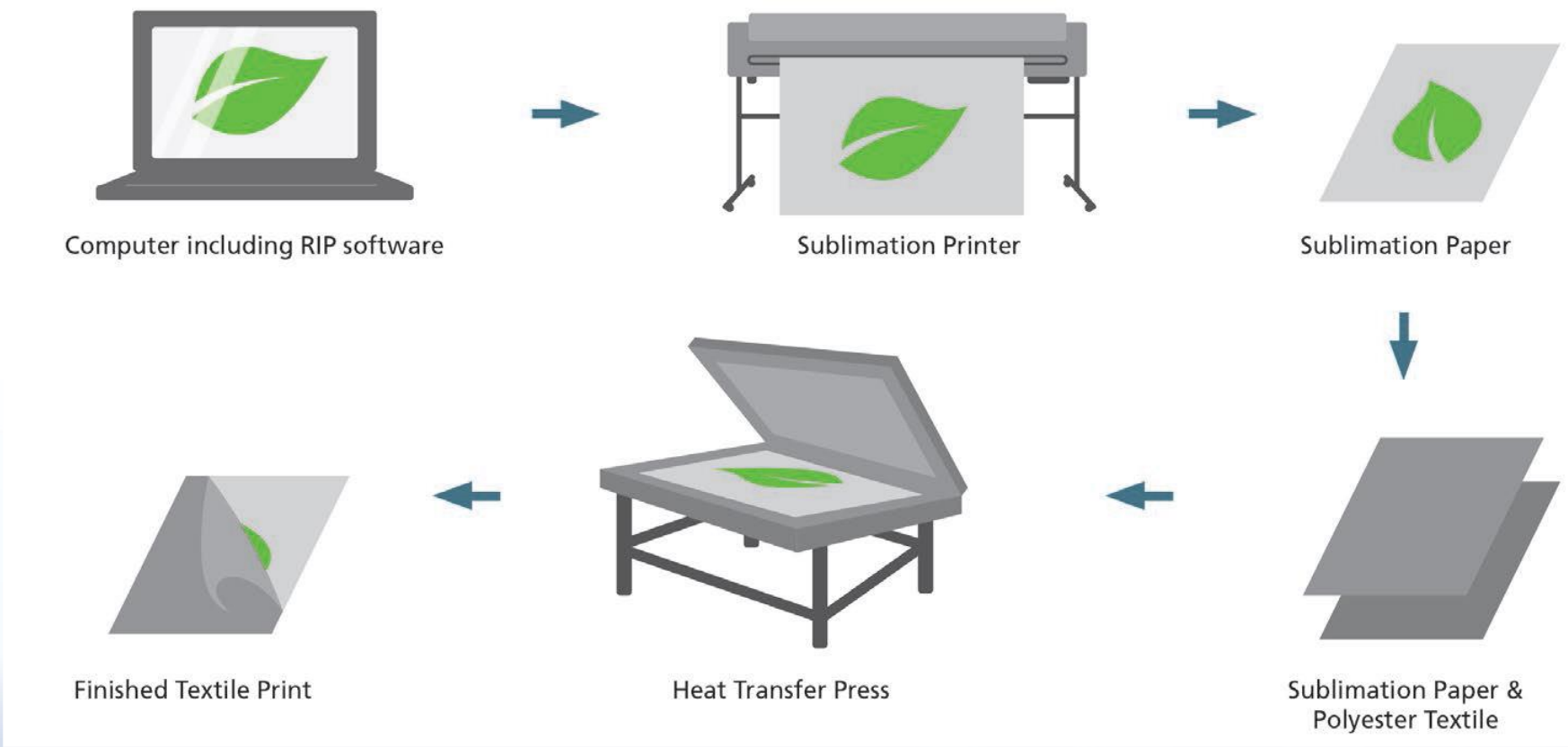
- Ink Diluents
- Equipment Cleaners
- Fabric Preparation Agents

- Inks used in digital printing are formulated specifically for each type of fiber (cotton, silk, polyester, nylon, etc)

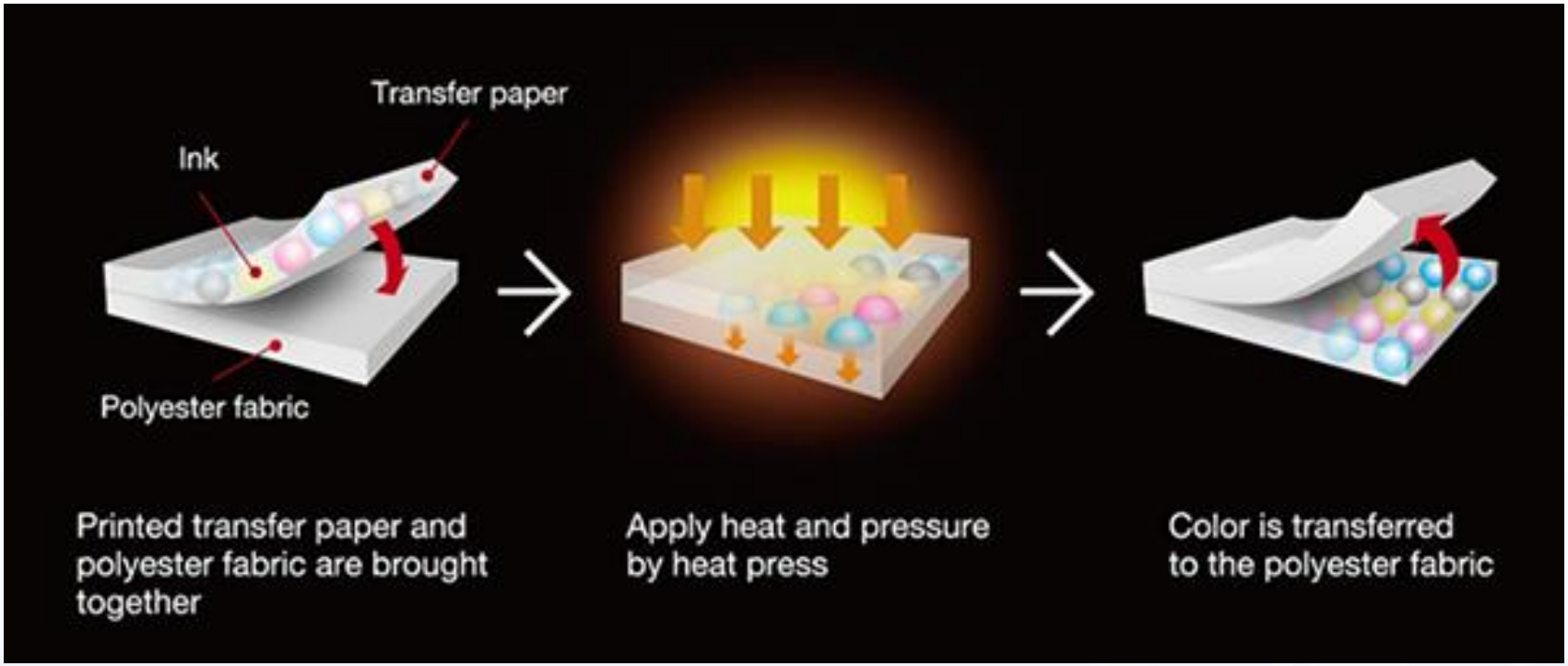
# Sublimation dyeing

- Less vulnerable to fading and distortion over time and even after multiple washings
- Heat sensitive inks
  -turn into gas under the influence of heat
- 100% pre-shrunk polyester fabric shrinking when heat is applied
- takes about a minute to produce a print regardless of whether it's a full color photo or a page of typed text

# Sublimation dyeing



# Sublimation dyeing



# Sublimation dyeing

# Sublimation dyeing

**Other applications**

# Comparison between digital printing and sublimation dyeing

## Digital Printing

-Inks are printed directly on coated fabric

- Need coated fabric

-All fabric can be used except polyester or synthetic

-Reactive dye are used

-Digital print can get fade after multiple washing

-Dye penetrate the surface of base fabric. Digital relying on molecular boning

-Not production feasible, ideal for sampling only.

## Sublimation dyeing

-Paper image is transferred on the surface of polyester fabric

-No need coated fabric

-Basic fabric should be synthetic or 100% polyester

-Disperses dyes are used

-Sublimation will not fade, even after multiple washing

-Sublimation dyes does not penetrate the surface of fabric. So back side of fabric always white

-Production feasible and less costly for bigger run

# AirDye®

- Nearly waterless printing and dyeing technology
- Replacement of water with air to permeate dyestuff into fiber
- Transfer dyestuff to fabric by Sublimation
- Print dyestuff on the transfer paper

  1) Dyestuff is shifted from transfer paper to fabric surface by heat

  2) Dyestuff penetrates into fiber inside, not on the surface. Colour will be more sharp and rich.

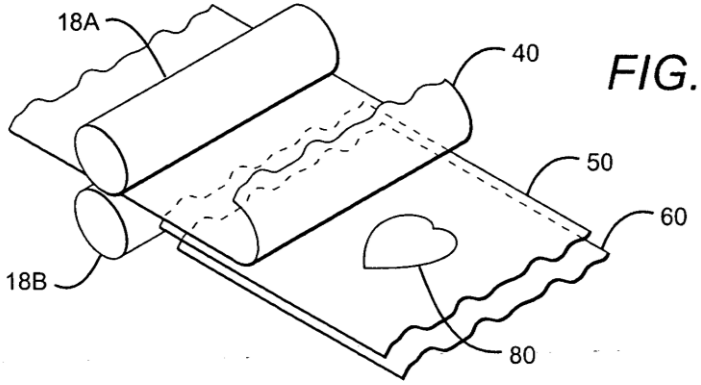
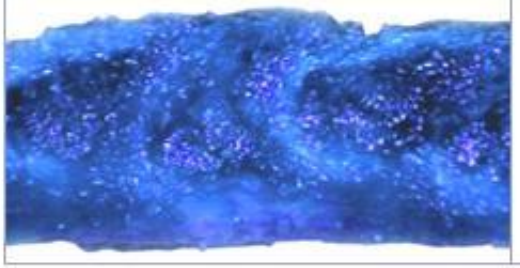


FIG. 4

**Standard Sublimation & Heat Transfer Printing**
The dye does not completely penetrate the fibers, therefore, white fiber may show after cutting or needle penetration.



**Conventional Dyes**
After treatment in a water dye-bath, the fibers show complete dye penetration. However, colorfastness is low to moderate.

**AirDye Controlled Penetration**
Using our proprietary Sibius™ Dyes, penetration is deeper. Colors are richer and colorfastness is better. Penetration control is used with Dye Contrast, Print 2 Dye, and Print to Print products, including AirDye wovens.

**AirDye® Complete Penetration**
AirDye is so advanced that it not only colors the yarn, but also thousands of filaments in each piece of yarn, yielding rich, brilliant colors. Penetration is complete.

# AirDye®

### AirDye Solids

AirDye Solids dyes both sides of a fabric a single color.

### AirDye Singles

AirDye Singles prints one side of fabric while leaving the other side undyed.

### AirDye Wovens

AirDye Wovens simulates dyed woven jacquard and dobby weave.

### AirDye Contrast

AirDye contrast dyes opposite sides of fabric two different colors.

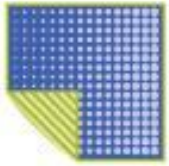
### Print-to-Solid

Print-to-Solid prints one side of fabric and dyes the other.

### AirDye Imprints

AirDye Imprints dyes or prints an image or logo on fabric.

### Print-Contrast



Print-Contrast prints opposite sides of fabric with different designs.

### Print-Squared

Print-Squared prints opposite sides of fabric with the same design.

# AirDye®

- ✓ Nearly waterless printing and dyeing technology
  - Reduce 95% water usage
  - Reduce 86% energy loss
- ✓ Less threat to environmental pollution
  - Reduce 84% greenhouse gases
- ✓ Recyclable dyestuff and transfer paper

- ✓ Selection of one or Two side, pattern and decorative design
  - ✗ Require specific dyestuff- Sibius™
  - ✗ Mainly used in synthetic fiber

# AirDye®




# Comparison between air dye and sublimation dyeing

| Air dye | Sublimation dyeing |
| --- | --- |
| Print into the fiber | Not completely penetrate the fibres, white fibre may show after cutting or needle penetration |
| Can be used in all synthetic fibers | cannot be applied on not coated with a layer of polyester non-porous surfaces |