

Alchemie Technology, waterless dyeing and finishing processes

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Chief Marketing Officer

The PROBLEM

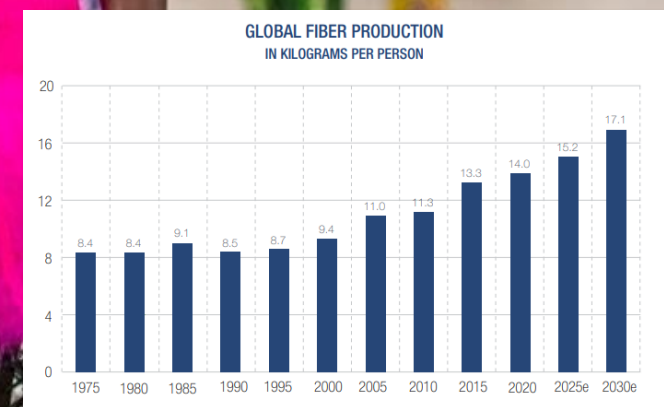
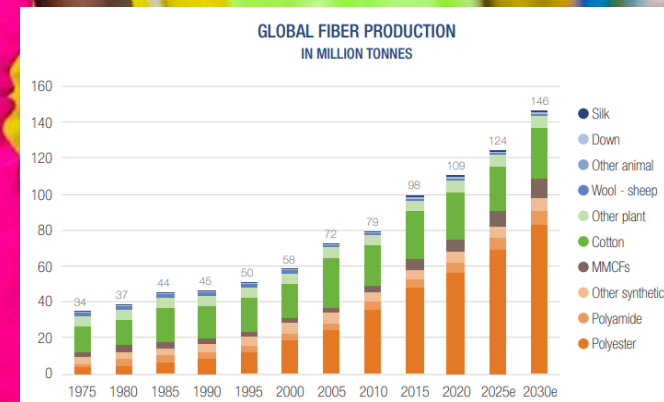
Textile dyeing
accounts for 3% of
global CO₂
emissions...

...and is the second
largest
cause of
global water
pollution.



IF NOTHING CHANGES – CO₂ emissions from textile dyeing set to reach 2.5 Gigatonnes by 2050, making it one of the most polluting industries on the planet

- Increasing global population
- Increasing use of synthetics (polyester)
- Increased consumption per person:
 - Fast fashion
 - Increased affluence
 - US consumption ~ 35 kg/person
<https://fiberjournal.com/textiles-2025/>
 - EU ~ 26 kg/person
<https://www.eea.europa.eu/publications/textiles-in-europes-circular-economy>
- By 2050 the carbon emissions from dyeing/finishing >3X today to >2.5 G Tonnes CO₂



2050

Textile
Dyeing
>300
million
tonnes

CO₂
>2.5
Gtonnes

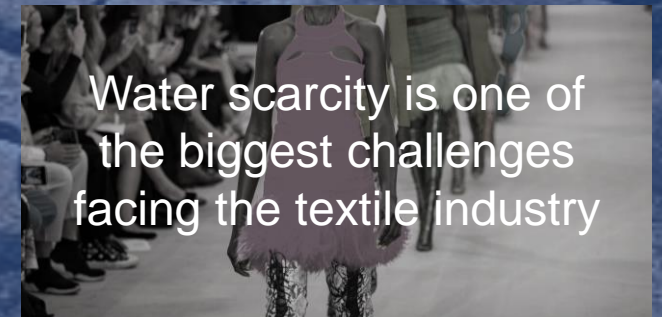


The impact of the dyeing industry today



Water scarcity is threatening human and business survival

- The fashion industry has a colossal water footprint – more than 1.5 trillion litres of water annually
- 30 tonnes of water are used to dye one tonne of fabric
- By 2030 global water demand will exceed supply by 40%*



*World bank

Textile Finishing

Anti-microb

Stain resist

Insect repell

Water repell

Digital pre-t

ent

But **50%** of these chemicals are **unnecessary**

OUR SOLUTION.

Endeavour.

Waterless, low energy textile dyeing



Novara.

Energy saving non-contact finishing



Water
reduction
95%



Energy
reduction
85%



Chemistry
reduction
50%



Cost
reduction
50%



It's the (sustainable) future

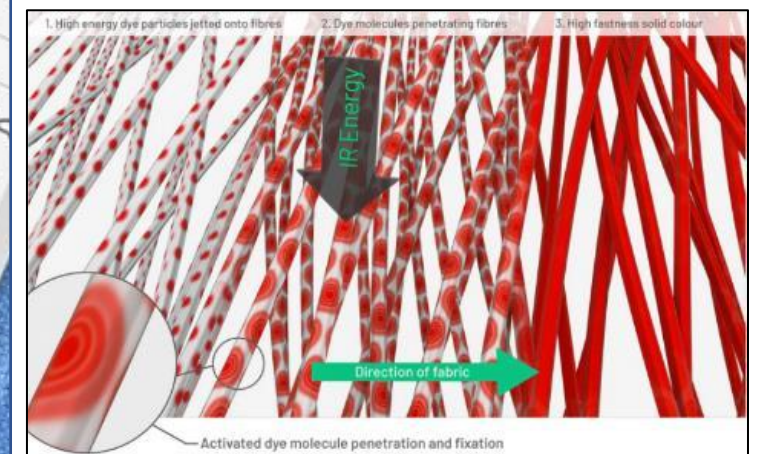
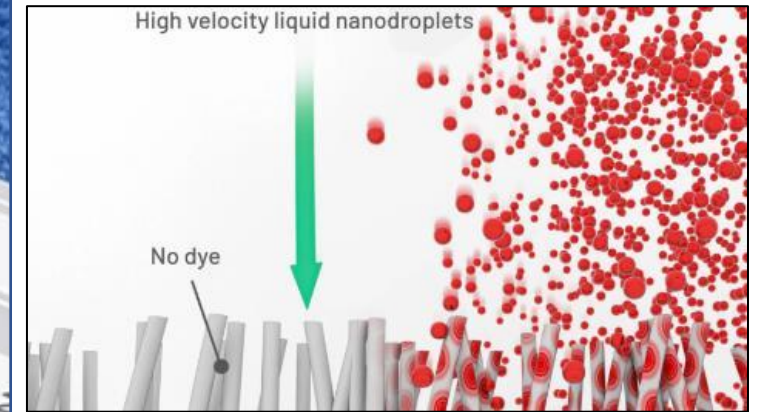
Endeavour jets the exact amount of dye for 100% penetration of fibres.

No excess dye is used in the dyeing process.

Eliminates the industry practice of high temperature BATH IMMERSION reducing the energy required to dye and finish fabric up to 85%



The disruptive technology

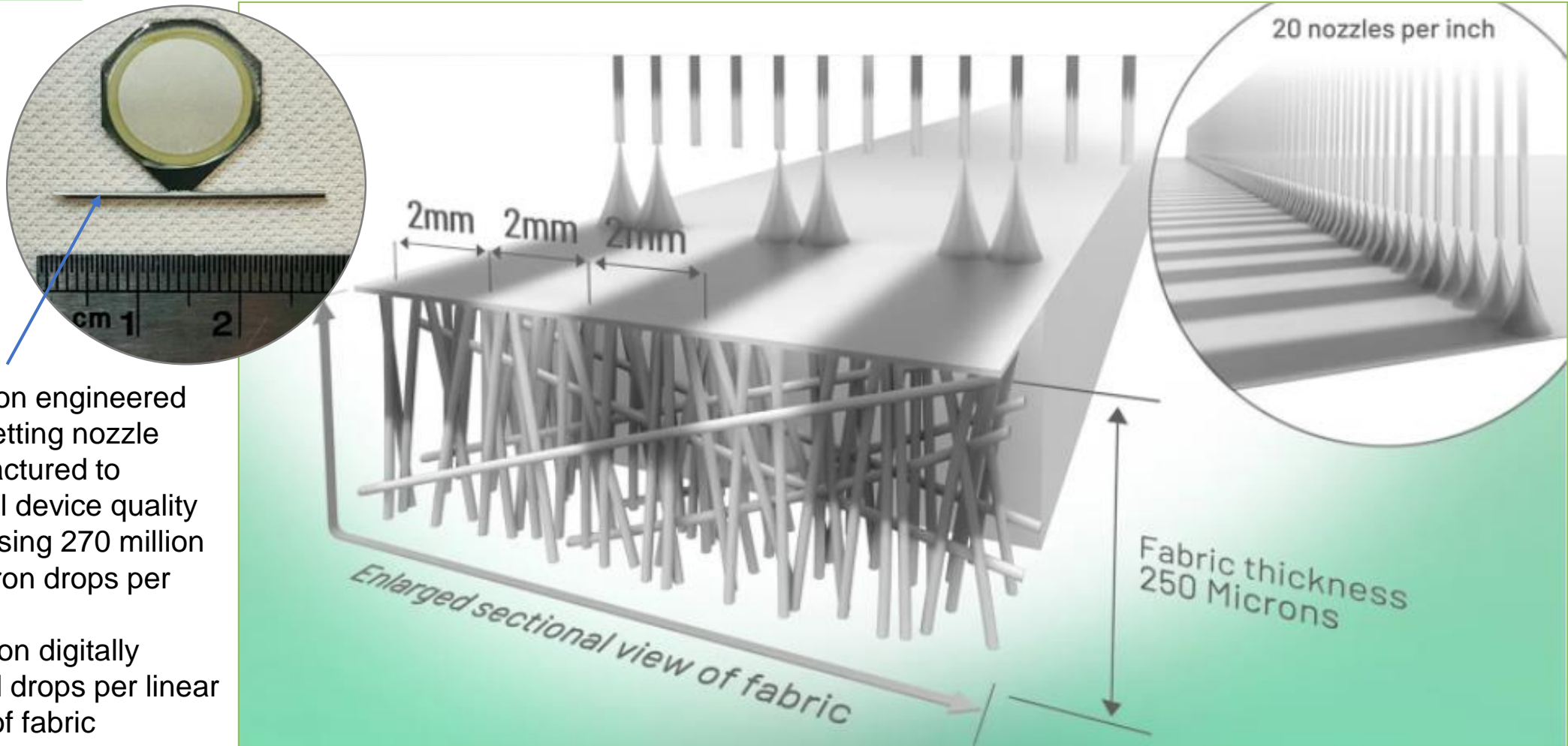


12 filed/granted patents

HOW DOES IT WORK?

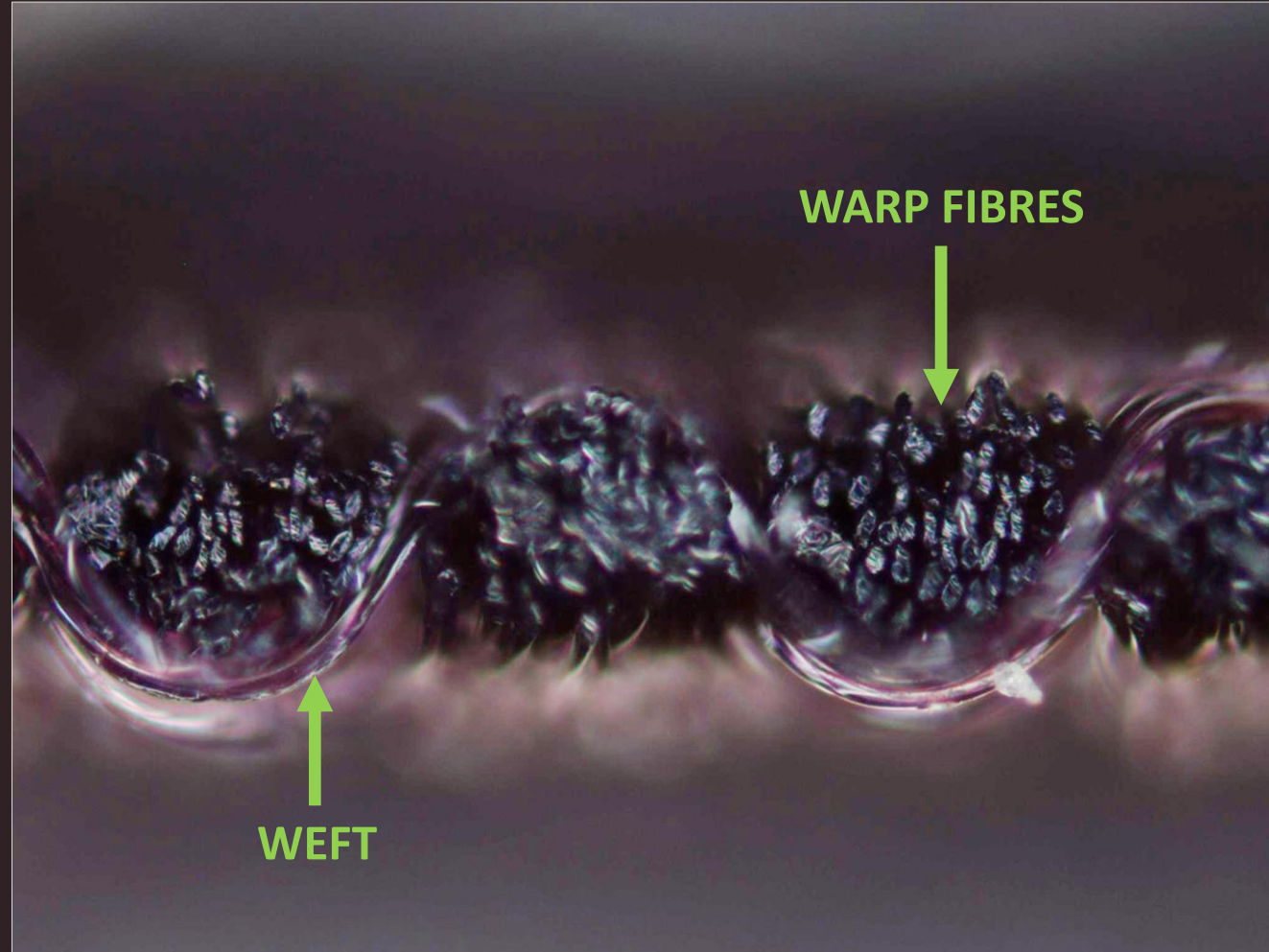
Breakthrough proprietary digital liquid application technology

7+ years of R&D to develop core technology and develop the clean-tech textile dyeing process



- Precision engineered piezo jetting nozzle manufactured to medical device quality
- Dispensing 270 million 10 micron drops per second
- 1.2 billion digitally defined drops per linear metre of fabric

**Electron microscopy image
Endeavour dyed polyester textile**



Endeavour dyeing machine



The first Endeavour machine In Taiwan

Alchemie



Alchemie Technology is helping to create a world with zero pollution from textile dyeing and finishing

- Chiffon
- Weight: 78gsm
- Dye: K3 Black

- Warp Knit
- Weight: 152gsm
- Dye: Dianics Dystar XF2 Black

Examples Endeavour dyed Polyester

sample was dyed using >85% less energy
Alchemie Technology is helping to create a world with zero pollution from textile dyeing and finishing
alchemietechnology.com

This sample was dyed using >85% less energy
Alchemie Technology is helping to create a world with zero pollution from textile dyeing and finishing
alchemietechnology.com

Endeavour dyed fabric can meet industry quality specifications.

- Dralon
- Weight: 530gsm
- Dye: Dianics Dystar XF2 Yellow

- Microfibre
- Weight: 145gsm
- Dye: Dianics Dystar XF2 Violet

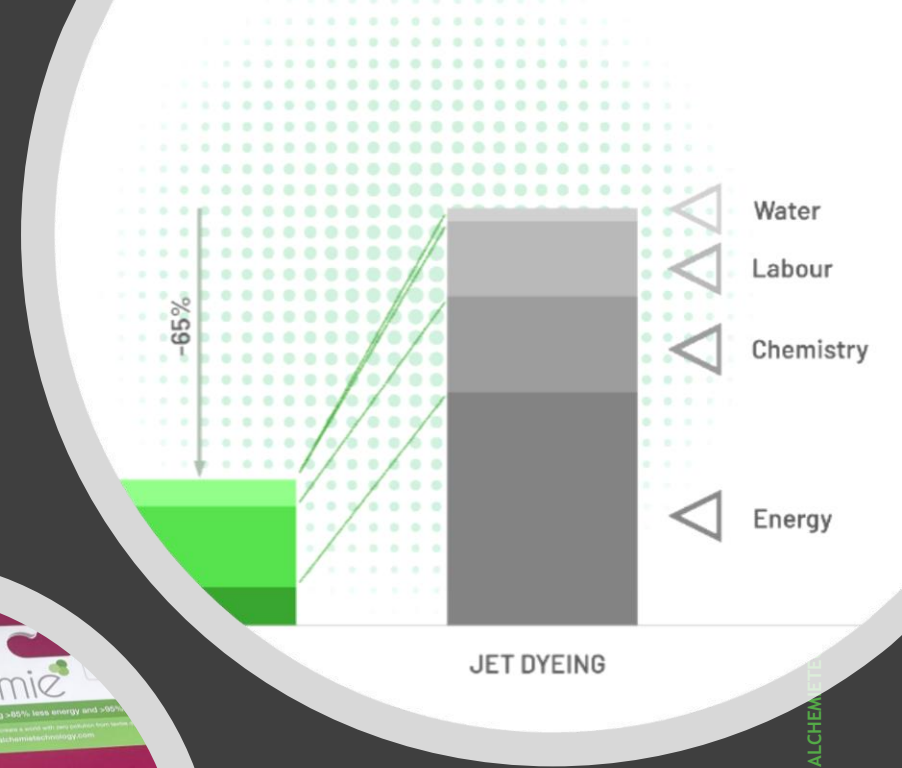
- 100% Cotton
- Weight: 245gsm
- Dye: Dystar Levafix Red

Cotton and Cellulosic

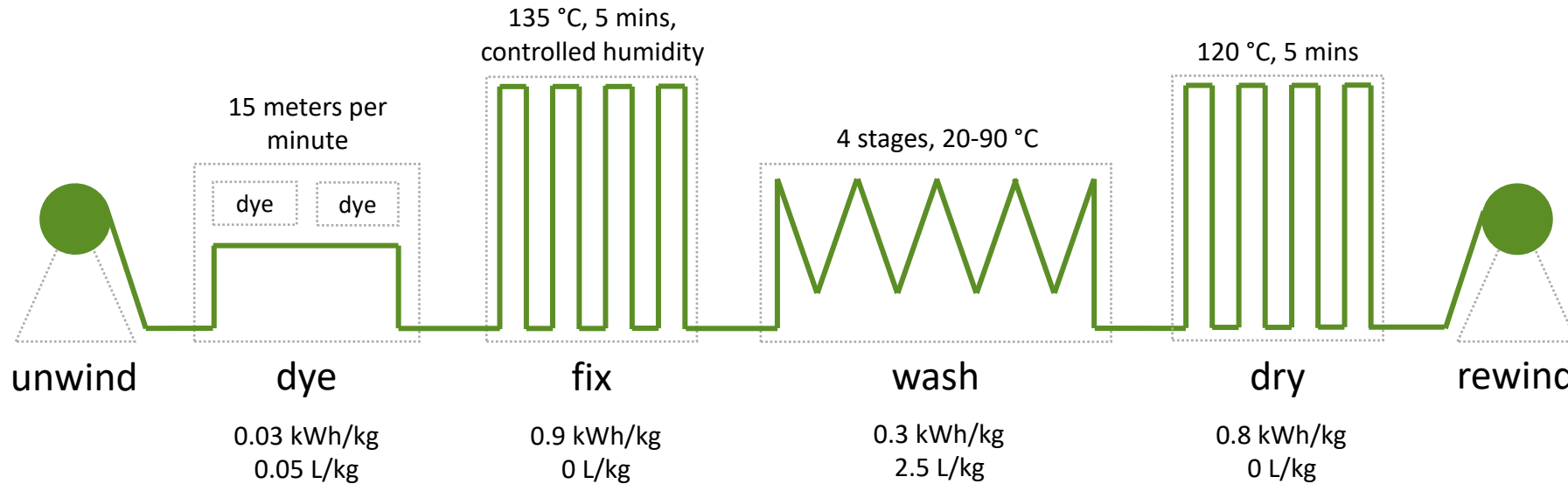
- Endeavour cotton dyeing vs. exhaust dyeing
 - 95% less waste water vs. exhaust
 - 70% less energy vs. exhaust
- Endeavour cotton dyeing vs. CPB
 - 85% less waste water
 - 40% less energy
- 62% Rayon 38% Viscose
- Weight: 90gsm
- Dye: Dystar Levafix Blue
- 100% Cotton Drill
- Weight: 245gsm
- Dye: Dystar Levafix Blue

Half the cost of traditional dyeing. Big increase in profit.

- Capital payback <18 months
- Op-ex cost reduction: \$0.27/kg vs \$0.80/kg of dyed fabric (China) due to significant labour, energy and chemistry saving
- 20 x profit per Endeavour dyeing system compared to jet dyeing - due to increase in productivity/lower cost



Standard Endeavour cotton: Process overview



Parameter	Specification
Performance	$\Delta E \leq 0.5$, fastness $\geq 3/4$
Total waste water	2.6 L/kg* (-95% vs. exhaust dyeing)
Total energy	2.0 kWh/kg (-70% vs. exhaust dyeing)

Alchemie Endeavour cotton dyeing vs exhaust and CPB

Standard Endeavour Cotton process

Total waste water	2.6 L/kg* (-95% vs. exhaust dyeing)
Total energy	2.0 kWh/kg (-70% vs. exhaust dyeing)

Benchmarked versus exhaust dyeing

Total waste water	59 L/kg
Total energy	6.9 kWh/kg (0.3 kWh/kg electricity, 6.6 kWh/kg steam)

Low-energy Endeavour Cotton process

Total waste water	2.6 L/kg* (-85% vs. CPB dyeing)
Total energy	1.1 kWh/kg (-40% vs. CPB dyeing)

Benchmarked against cold pad batch

Total waste water	15 L/kg
Total energy	1.9 kWh/kg (0.3 kWh/kg electricity, 1.6 kWh/kg steam)

Benefit summary

- Dramatically lower water and carbon footprint
- Improved working environment for dye house staff
- Profit advantages through lower operating costs/higher throughput
- Shorter on-demand production runs
- Competitive advantage of enabling brands to meet sustainability goals



Transforming the textile industry with a clean-tech digital manufacturing revolution

Alchemie 



“Our goal is to stop the fashion industry producing over 500 million tonnes of CO₂”