

endeavour

Waterless Smart Dyeing

Endeavour™ is the world's first digital dyeing process. It utilises advanced digital manufacturing technology to deliver a breakthrough in the cost structure, supply chain capability and sustainability of fabric colouration.

Key benefits



**MORE PROFITABLE
PRODUCTION**



**DYE ON
DEMAND**



**WASTE WATER
ELIMINATION**

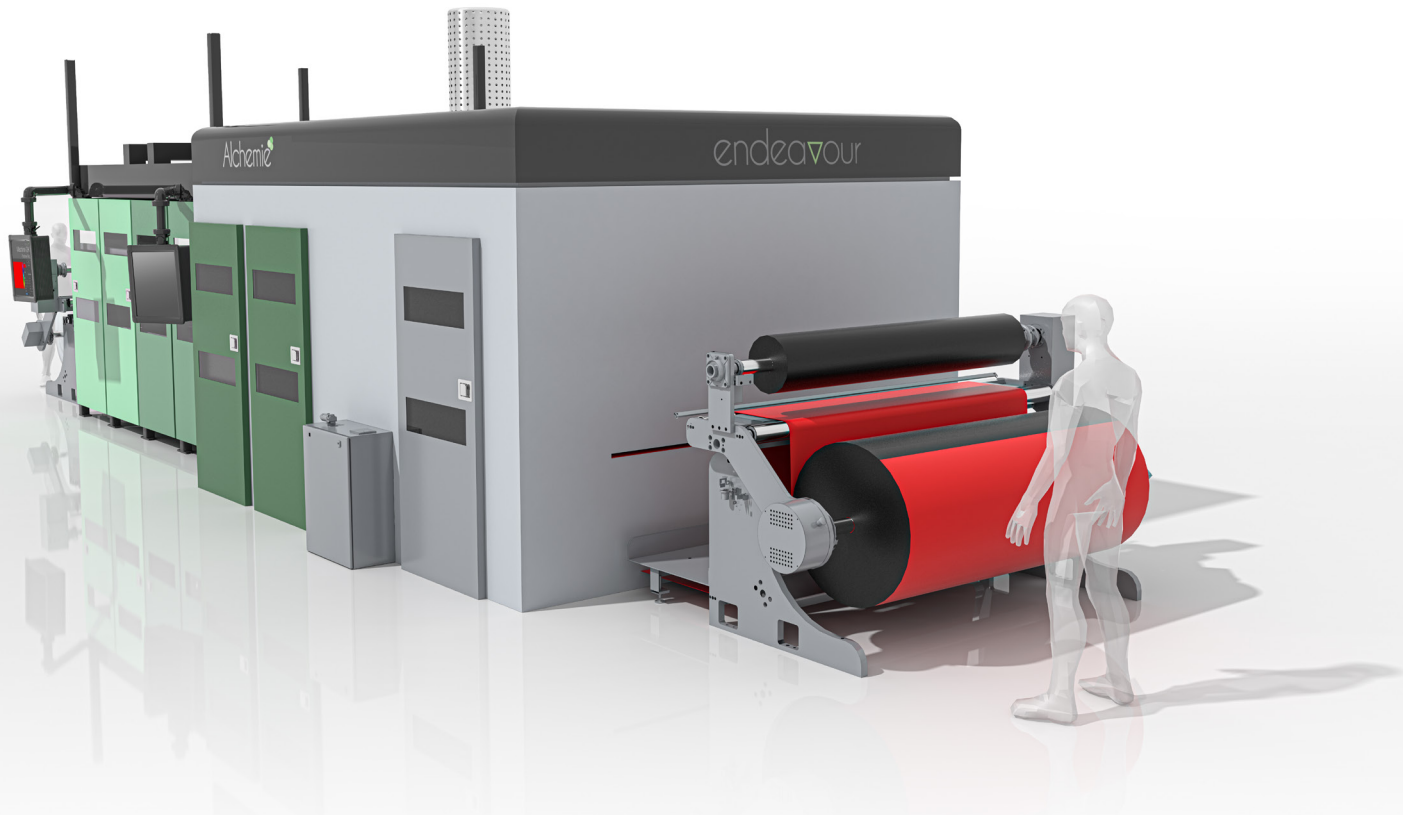


**REDUCED
ENERGY**

The high throughput roll-to-roll single-pass technology delivers dramatic manufacturing cost reductions and profitability benefits. As a digital on-demand process, it reduces minimum run lengths and enables rapid changeovers between colours and fabrics. Delivering ultimate supply-chain agility, Endeavour™ can transform manufacturing capabilities, by eliminating inventories and waste in the delivery of fabrics to market.

The process enables a step-change in the sustainability of textile dyeing: eliminating wastewater emissions and reducing carbon footprint by over 85%. Due to the elimination of wastewater, the Endeavour™ system can be installed in water-poor regions and enables on-demand dyeing in garment manufacturers.

A clean-tech low carbon technology, Endeavour™ significantly reduces the carbon footprint of textile dyeing, which is responsible for around 3% of global CO₂ emissions. In addition, the wastewater-free technology eliminates emissions from the dyeing process, which currently accounts for over 20% of world's water pollution.

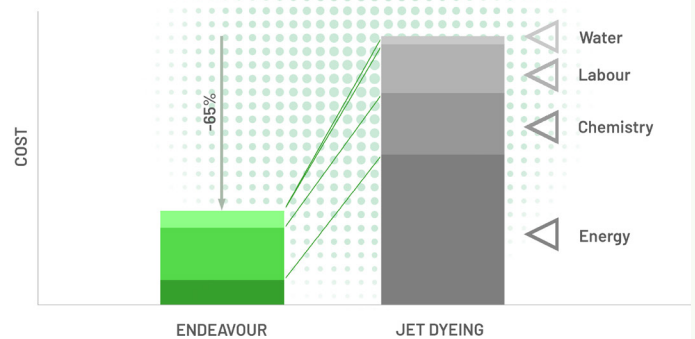


Key benefits of Endeavour™ digital dyeing

More profitable production

- The Endeavour™ process reduces operational costs by over 50%.
- Radically more flexible production delivers significant supply-chain savings.
- The typical capital payback time for Endeavour™ production lines is 12 months.

endeavour **>50% Lower Cost**



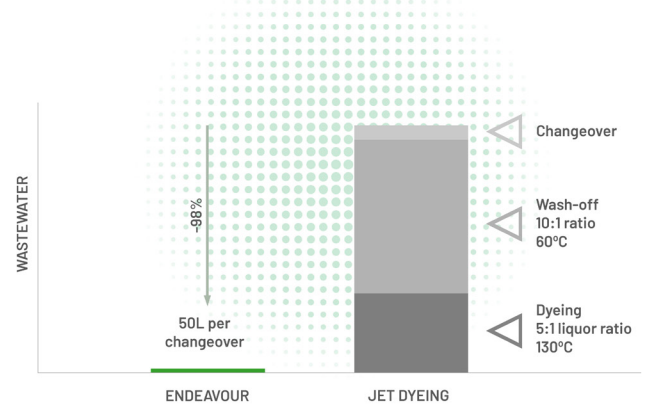
Enabling supply chain agility

- The Endeavour™ process digitalizes the dyeing process to enable on demand supply-chain agility.
- Integrates with supply chain management tools to reduce supply chain waste and retail discounting.
- Enables digital manufacturing and Industry 4.0 integrated manufacturing systems.

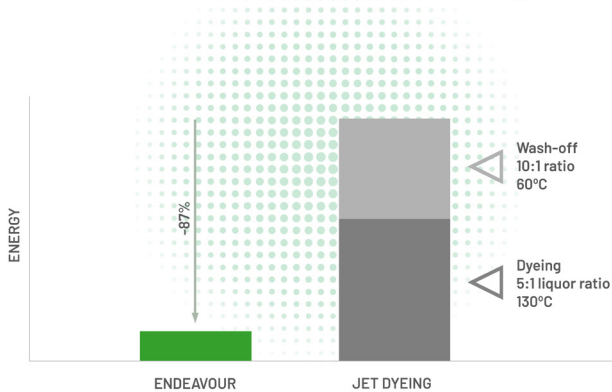
Eliminating wastewater emissions

- Textile dyeing and finishing is responsible for over 20% of global water pollution (World Bank Report)
- The Endeavour process eliminates wastewater from textile dyeing.
- Dyeing operations can now be co-located with garment production and located in water-poor regions.

endeavour >95% Less Wastewater



endeavour >85% Less Energy



Delivering a low carbon future

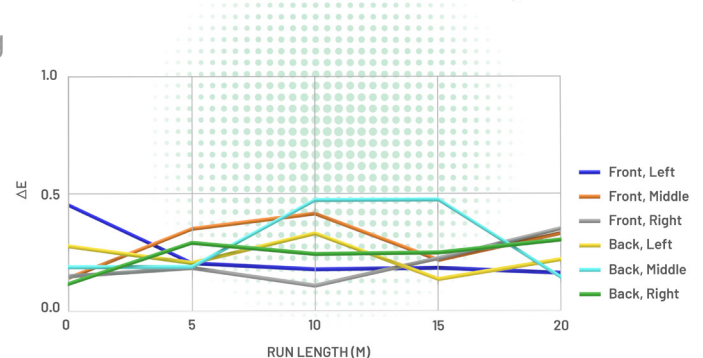
- Textile dyeing and finishing is responsible for approximately 3% of global CO2 emissions (Quantis Report 2019)
- The Endeavour™ dyeing process reduced the carbon footprint of dyeing by over 85%.
- Good for the planet and significantly reduces the cost of dyeing.

The Endeavour digital dyeing system has been proved to deliver high quality fabrics that meet industry quality expectations.

Colour consistency

Exceptional quality levels can be achieved, delivering colour consistency ($\Delta E < 0.5$) across and along the web and run-to-run.

endeavour. Colour Consistency

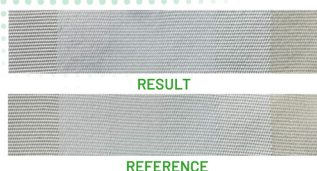


Fabric hand-feel

Our process is designed to deliver excellent hand-feel, which has been assessed by major Brands and designers to be equivalent to traditionally processed fabrics.

endeavour. Colour Fastness

	CROCKING (ISO 105-X12:2016)		WASHING (ISO 105-C06:2010 B2S)						
	DRY	WET	ATE.	COT.	NYL.	POL.	ACR.	WOOL	
Black	4	4/5	4/5	4/5	4/5	4/5	4/5	4/5	
Dark Grey	4/5	4	4	4/5	3/5	4/5	4/5	4/5	
Light Grey	4/5	4/5	4/5	4	4/5	4	4/5	4/5	



Colour fastness

Colour fastness of (>4/5) can be achieved with a wide range of fabrics and colorant chemistries. The Endeavour process utilises a unique combination of digital liquid application technology with precisely controlled fixation conditions.

The Endeavour™ digital dyeing technology:

Endeavour™ utilises an advanced digital colourant application and fixation technology to deliver single pass roll-to-roll solid colours to fabrics. The Endeavour™ digital dye applicator applies liquid colourants to fabrics using a unique non-contact high-energy jetting of nanodroplets, delivering exceptionally homogeneous colour throughout the fabric.

The colourants are fixed to achieve high levels of colour fastness using a proprietary digitally controlled process. Our digital fixation technique delivers exceptional colour fastness without the need for washing. Elimination of the washing steps also underpins the significant energy reductions associated with our digital dyeing process.

The technology is digitally controlled, which enables rapid changeovers, on-demand production and on-line colour quality monitoring and accurate shade control. The roll-to-roll process is high throughput compared to traditional bath-dyeing.

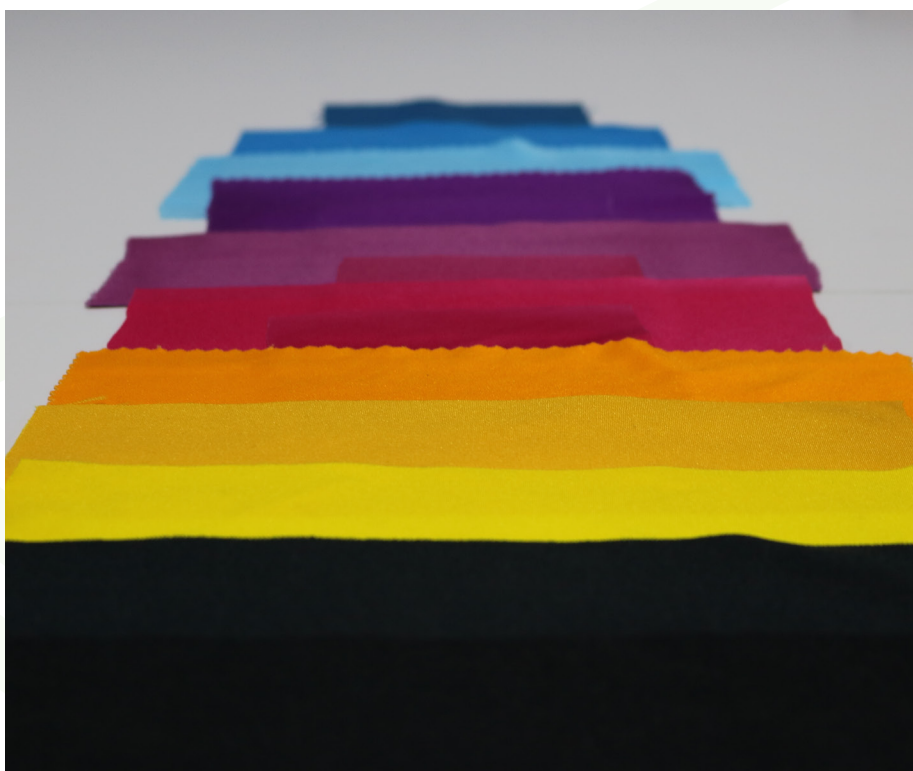
Colourant chemistry:

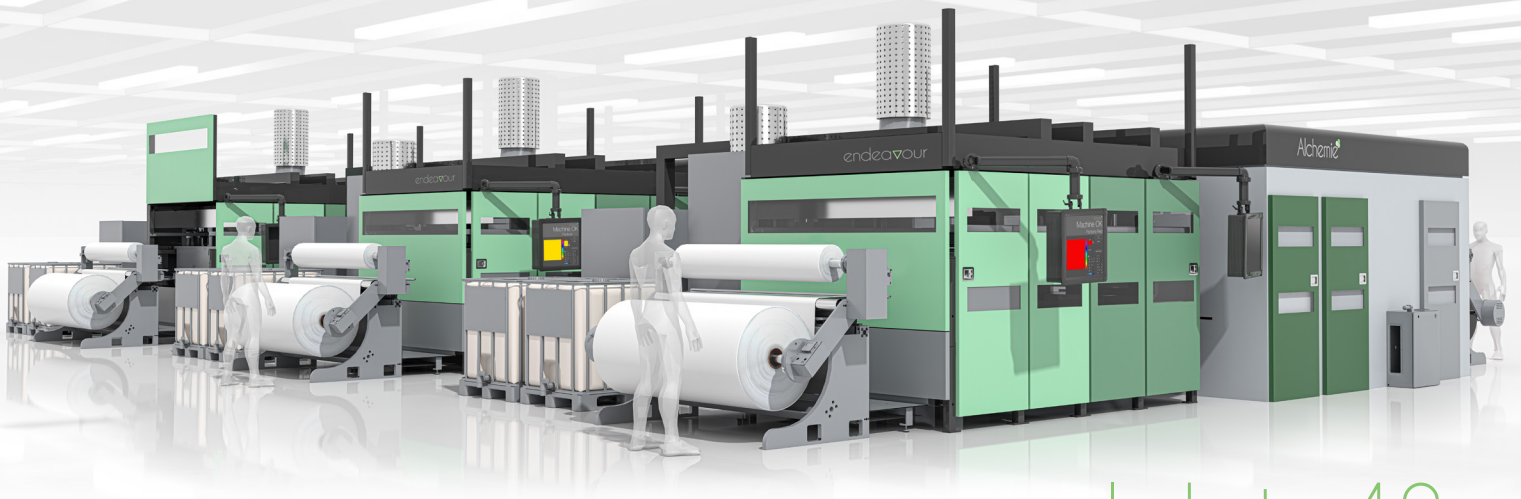
The Endeavour™ process is designed to be compatible with all colourant chemistries used in traditional dyeing. The system is an open platform and any approved commercial colourant chemistry can be used in the system. The system can also be used with reactive, acid dyes, Vat dyes and a range of speciality colourants to enable digital dyeing with a wide range of substrate types.

Colour matching using ColourHit™ technology:

The Endeavour process utilises advanced digital technology for colour matching and the technology is capable of precision colour matching and shade control and can be used with a wide range of fabrics. We have developed the ColourHit™ technique for rapid digital colour matching using a proprietary software platform that utilises a database of colour matches.

The Endeavour process includes integrated colour monitoring to enable real-time colour verification, which assures exceptional colour quality for every run. Making the system a truly “end to end” high performance sustainable dyeing solution with ultimate performance.





Industry 4.0

Factory of the future:

Endeavour™ production lines enable advanced digital manufacturing systems to be implemented. The machines are fully software controlled and connected to enable integration with automated supply chain systems and advanced Industry 4.0 production facilities. The Endeavour™ production line replaces between 3 and 10 traditional jet dyeing machines and the footprint and labour requirements are significantly reduced vs. the traditional dyehouse.

Machine models:

There are two Endeavour machine versions designed for high flexibility (HF) and high throughput (HT).

Technical specifications:

Endeavour HF		Endeavour HT	
Throughput (15 m/min)	>1500 m ² /hr	Throughput (50 m/min)	>5000 m ² /hr
Maximum web width	1.8 m	Maximum web width	1.8 m
Substrate basis weight	50 – 500 gsm	Substrate basis weight	50 – 500 gsm
Substrate	Polyester, cotton, polycotton, nylon	Substrate	Polyester, cotton, polycotton, nylon
Changeover time	< 15 mins	Changeover time	< 60 mins
Dimensions	12.6 m x 6.3 m x 3.5 m	Dimensions	17.5 m x 6.3 m x 3.5 m
Power requirements	415V 3 phase 50/60 Hz electrical supply	Power requirements	415V 3 phase 50/60 Hz electrical supply

