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world of denim

Monforts Reference Customers

INCLUDING TECHNICAL ESSAY

Flexible finishing, for instant market **response**

Huge capacities for the vertically-integrated production of fabrics and garments have been built up particularly on the Indian subcontinent over the past decade, and especially for denim.

It should come as no surprise that the energy, chemicals and water-saving finishing technologies of Monforts have been viewed as essential investments for the vast majority of these companies as they continue to grow.

A considerable denim industry has arisen in the region around Pakistan's largest city, Karachi, for example. It includes Monforts customers such as Artistic Fabric & Garment Industries (AFGI), Artistic Milliners, Denim Clothing Company, Denim International, Kassim and Soorty.

As just two examples of the size and scale of such companies, and their importance to Pakistan's economy, Artistic Milliners has the ability to produce some 66 million metres of fabrics and over 21 million finished garments a year, while Soorty employs some 22,000 people across its cotton growing, fibre conversion and textile and garment operations.

The region around Pakistan's second-largest city, Lahore, is just as dense, with major denim manufacturers and Monforts customers, including Azgard-9, Naveena and US Denim, to name but three - and all of these companies are huge employers.

The European Union is Pakistan's most important trading partner and textiles and clothing accounted for 82% of its total exports to the EU in 2016.

From January 2014, Pakistan has benefited from generous tariff preferences - mostly zero duties - under the EU's GSP+ arrangement, which aims to support the country's sustainable development and good governance.

In order to maintain GSP+, Pakistan has to effectively implement 27 core international conventions on human and labour rights, environmental protection and good governance.

This makes sustainable manufacturing central to all of the companies involved.

India's denim business with the EU is more long-established and includes Monforts customers such as Arvind, which has one of the largest denim capacities in the world, with a current capacity of 140 million metres of denim per annum.

UCO Raymond Denim, created in 2006 following the merger between Raymond Denim of India and UCO of Belgium, with a combined annual capacity of 47 million metres has manufacturing plants in Giurgiu, Romania, and Yavatmal, India.

Major denim manufacturing hubs and Monforts customers are located elsewhere of course - in Brazil, China, and Turkey, as well as long-established operations in Europe, the USA and Japan - but the vibrancy of the industry is largely down to the companies of the Indian subcontinent. They are now all working closely, and on a global scale, with the leading brand designers, fibre manufacturers and technology suppliers to ensure that once any new trend emerges, they have the flexibility and know-how to respond to it extremely rapidly.

This edition of World of Denim, of course, celebrates the latest achievements of all Monforts customers, wherever they are based. We will continue to support our customers in all aspects of their business.

Roland Hampel,
Managing Director

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Denim's new **Big Three**

As China's labour costs have risen and its domestic market continues to take priority, international brands are increasingly looking to the Indian subcontinent for their denim. International Textile Journalist, Adrian Wilson reports.

Huge, vertically-integrated capacities for the production of denim have been built up by companies in the three major manufacturing countries of the Indian subcontinent - Bangladesh, India and Pakistan - over the past decade. As the trusted supplier of advanced finishing equipment, Monforts has supported the growth of many of them with the supply of machinery, training, commissioning and ongoing service support.

An annual 1.24 billion denim garments, primarily pairs of jeans, were estimated to have been sold in 2016, with a retail value of $56 billion. North America is the biggest market for denim, buying 39% of the total, followed by Western Europe's 20%, 10% in Japan and Korea and the rest of the world purchasing the remaining 31%.

Xintang's eclipse

For many years China completely dominated in the supply of denim to the major export markets, with around 3,000 companies based around the Guangzhou town of Xintang alone supplying some 800,000 pairs of jeans every day.

Xintang became the most vibrant denim market in the world with initial investment from Hong Kong and an accommodating local government policy framework. The region became a magnet for cheap migrant labour from China's inland provinces and the buyers from the international brands flocked to the region.

But then things changed. On the back of its international success, China's labour costs have climbed five-fold in the past decade and the government started to withdraw backing for companies solely concerned with commodity manufacturing for lower margin exports. On top of this, was a severe pollution problem which began attracting unfavourable headlines around the world.

As a result, buyers from the international brands started to look elsewhere, resulting in China's denim exports contracting significantly.

Bangladesh, India and Pakistan, as well as Brazil, Turkey and Vietnam have all benefited from this.

Bangladesh EU's Number One

In fact, in 2016, Bangladesh overtook China to become the largest supplier of denim to the European Union, with exports to the 28-nation bloc worth over $1 billion, while its exports to the USA are climbing rapidly towards the level currently achieved by neighbouring Mexico and China.

This progress has been made possible in part due to the $1 billion investment of the country's 30 denim mills to provide an annual capacity of 435 million yards of denim fabric annually, according to Mostafiz Uddin, Managing Director of denim exporter Denim Expert.

"The denim sector will play a significant role in achieving the country's $50 billion export target by the end of 2021," added Mostafiz Uddin, who organises denim exhibition in Bangladesh.

Because the garment industry in Bangladesh had already attracted damning publicity for its lack of concern for health and safety and the generation of waste in its practices, the new denim manufacturers have been committed to ensuring their mills comply with all of the international standards for environmental processing and worker protection.

Leading Bangladesh denim manufacturers include Monforts customers such as Noman, Thermax and Turag - all advanced modern mills which have been built as part of the country's vertical integration of its manufacturing framework.

Denim producers participating at the show enjoying the benefits of Monforts finishing lines included:

Artistic Fabrics & Garment Industries
Artistic Milliners
Arvind
Alantic Mill
Azgard-9
Çalik Denim
Cone Denim
Denim Clothing
Denim International
Kassim
Kipaş
Mou Fong
Soorty Denim
Tavex Europe
Textil Santanderina
Toray International
UCO Raymond
US Denim Mills
Vicunha

Karachi's ascendance

The Punjab region around Karachi, as Pakistan's largest city, is also now dense with denim manufacturers. They include Artistic Milliners, which now has the ability to produce some 66 million metres of fabrics and over 21 million finished garments a year.

Denim Clothing Company, which only commenced operations in 2005, has quickly risen to become a trusted supplier to leading brands with a capacity of 18 million garments annually, while Soorty's finished denim fabric capacity alone is 66 million square metres.

Then there is Artistic Fabric & Garment Industries (AFGI), which in recent years has expanded its capacity to 50 million metres of fabric and 25 million garments per year, Kassim, which makes a further 30 million metres of denim per year, and Denim International, which is currently expanding capacity to around 10 million denim garments annually.

All of these companies are huge employers. Soorty, for example,

employs some 22,000 people across its textile and garment operations.

The situation is similar in the region around Pakistan's second largest city, Lahore, where major player include Azgard-9, Naveena and US Denim.

Flexible manufacturing

All of the major denim manufacturers in Pakistan work closely with leading European, US and Japanese designers and fibre manufacturers and are equipped with the latest technology and the flexibility to ensure that once any new trend emerges, they can jump on it extremely rapidly.

Every conceivable variation of stretch denim, for example, is incorporated into their ranges, and the same goes for athleisure, vintage and distressed looks. Branding and marketing is extremely sophisticated and sustainable credentials are almost uniform, taking in the use of Better Cotton Initiative cotton and recycled PET, extreme efficiency in water, chemicals and energy usage, and garment finishing with laser and ozone treatments.

Both Artistic Milliners and Denim Clothing Company have in recent years also opened hubs in globally central Dubai, as an additional customer-centric service to the designers of the international brands, equipped with all of the latest technology for working closely and confidentially with them on unique, high-end collections.

Export allowances

The European Union is Pakistan's most important trading partner and textiles and clothing accounted for 82% of its total exports to the EU in 2016.

From January 2014, Pakistan has benefited from generous tariff preferences - mostly zero duties - under the EU's GSP+ arrangement, which aims to support the country's sustainable development and good governance. In order to maintain GSP+, Pakistan has to effectively implement 27 core international conventions on human and labour rights, environmental protection and good governance.

India doubles capacity

India has an overall denim fabric manufacturing capacity of around 1.3

billion metres in 2017 - double what it was five years ago - with investments buoyed by an abundance of cotton and low fibre prices.

As a result, India's industry is currently suffering from some over-capacity, with around 900 million metres of denim actually produced, of which 250 million metres is currently exported.

With annual growth currently at 12-15%, however, excess capacity will gradually become utilised, but further investments are likely be subdued in the next few years.

Cross border value

India has also been impacted to a certain extent by the vertical integration of garment manufacturers in Bangladesh who were previously customers.

At a recent conference in Dhaka, however, India's High Commissioner to Bangladesh, Harsh Vardhan Shringla, called for the two countries to work together by creating and strengthening cross border value chains.

"Manufacturing is increasingly shifting to countries in south and southeast Asia due to the cost advantages offered and rapid economic growth and rising disposable incomes are contributing to fast growth in apparel consumption in the developing countries," he said. "India and Bangladesh need to work

together to take advantage of these opportunities."

The readymade garments sector in Bangladesh has seen impressive growth now accounting for more than 80% of the total exports earnings of the country. After India granted duty free quota free access to Bangladesh in 2011, garment exports to India have more than doubled to $136.4 million in 2015-16 from $55 million in 2011-12.

India continues to supply a substantial amount of the cotton and manmade fibres, yarn and fabric and chemicals for the Bangladesh garment industry and as the industry strives to meet its target of exporting $50 billion per year by 2021, its linkages with the Indian textiles industry will be critical, the High Commissioner said.

"Besides being the top cotton producer in the world, India possesses huge capacities for producing yarn and fabric, and is also amongst the largest manufacturers of manmade fibres, yarn and fabric," he said. "As a neighbour, India is ideally positioned to supply these inputs at lower prices and with lower lead times to the Bangladesh garment industry."

Ahmedabad tradition

The three leading vertically-integrated manufacturers of denim in India - Arvind, Aarvee and Nandan - are all based in Ahmedabad, the largest city in Gujurat, where back in May 1861, Ranchhodlal Chhotalal founded the first Indian textile mill, the Ahmedabad Spinning and Weaving Company, followed by the establishment of a series of textile mills such as Arvind, Bagicha and Calico.

Both Arvind and Nandan have annual denim capacities of around 110 million metres, with Aarveen currently producing about 85 million metres each year.

Arvind's major products include ring denim, indigo voiles, organic denim, bi-stretch denim and Fair Trade certified denim, in addition to regular light, medium and heavyweight denims. They are finished in indigo in 100% cotton and various blends.

Brands for India

In addition to retailing its own brands like Flying Machine, Newport and Excalibur within India, the company supplies to licensed international brands such as Arrow, Lee, Wrangler, and Tommy Hilfiger.

It was the success of Arvind which prompted the Chiripal Group to enter the denim market back in the 1970s and Nandan now exports denim to 28 countries and has 3,000 employees.

Its branded customers include Polo, Ralph Lauren, Calvin Klein, Target, Armani Exchange and Tommy Hilfiger.

Another major denim exporter is UCO Raymond Denim, which was created in 2006 following the merger between Raymond Denim of India and UCO of Belgium and has a combined annual denim capacity of 47 million metres.

There remains an enormous opportunity for such manufacturers to exploit their own brands in India as incomes in the country rise and the middle class grows.

The country's GDP is currently between 5-7% annually and is also characterised by a young demographic. The current expansion of both shopping malls and e-commerce suggests growth will be significant in the next decade.

Going for **gold** in a **new era**

The commitment to sustainability of Karachi-headquartered Artistic Fabric & Garment Industries (AFGI) has seen it recently achieving LEED Gold certification for its latest buildings from Pakistan's Leadership in Energy and Environmental design programme, run by the United State Green Building Council.

The company - which was formed in July 2015 with the merger of Artistic Fabric Mills (ADM) and Artistic Garment Industries (AGI) - scored the highest LEED points in Pakistan to date.

As one of the leading suppliers of premium denim fabrics and garments in the world, AFGI has in recent years expanded its capacity to produce 50 million metres of fabric and 25 million garments per year along with some of the most innovative products for top denim brands globally.

Its garment unit consumes half of the fabric produced and the rest is exported to the international denim markets.

The company has also recently installed a new Monforts sanforizing unit and also employs a Montex stenter in its finishing department.

The company first started operations in 1949 with a small retail shop and expanded its operations into multiple garment factories. In the 1990s, there was tremendous growth and the company used this opportunity to narrow its focus on denim fabric and garments leading to the creation of a specialized vertical operation and a culture of denim.

"AFGI has one of the widest ranges of denim in the world, including many that don't feel or look at all like denim for the fitness and Athleisure markets," said Design and Product Development Director, Chiara Taffarello.

"AFGI is also now equipped with a highly efficient waste recycling machine supplied by one of the leading European suppliers of the technology. The in-house shredding equipment is certified under the Global Recycle Standard (GRS) to help process post-consumer waste jeans into new products."

"This is enabling the company to transform discarded jeans into new yarns, fabrics and garments."

"With this significant investment it is aiming to give new meaning to the term 'fully vertical' and play our part in moving the denim industry into a new era of sustainability."

"We aim to play our part in moving the denim industry into a new era of sustainability"

Design and Product Development Director, Chiara Taffarello

Every **shade** of **blue** from Azgard-9

Whatever you want from your denims, Azgard-9, headquartered in Lahore and with manufacturing in Kasur in Pakistan, say that they can supply it.

Azgard-9 was formed in 1993, has an extremely extensive range of different fibre types, fabric constructions and finishes which can be expertly tailored to an individual customer's needs.

On the fibres side, the company's PPET range - which stands for Premium Performance and Environmental Technology - combines high quality cotton with Lenzing's Tencel, Modal, ProModal and Viscose fibres in special dual core yarns.

"These dual core yarns benefit from high stretch and also have a high dimensional stability so that the jeans retain their shape and fit all day, every day," said Sales Manager, Zuhal Karaçyir at Denim PV.

"The super-stretch jeans combine supreme comfort and free movement, with the look and feel of authentic denim."

4-D stretch denims go a stage further by stretching and recovering both horizontally and vertically for complete freedom of movement.

Re-Birth is the company's denim offer based on recycled PET and cotton fibre, while the All Seasons range features Thermolite and Coolmax fibres for effective temperature management.

Special star-shaped, branched fibres - so called dendrimers - are employed to give Revulsion denims their water, oil and soil stain-proofing and with the Royal range, Lurex metallic yarns are engineered to provide gold and silver highlights.

Special finishes include the Polaroid UV protection range, treated with Rudolf AG's Rucco-Shield Ray, to absorb, reflect and transmit UV rays on the surface of the textile and act as an anti-ageing assistant for the skin.

The Sterilizer range meanwhile incorporates a silver treatment to kill odours.

From **origami** to **weft yarns**

With sustainability high on the agenda for denim fabric manufacturers, Japanese Washi paper is the latest natural fibre option now being employed in weft yarns for denim by Hong Kong-headquartered Mou Fung.

Traditionally made by hand, Washi is generally tougher than ordinary paper made from wood pulp, and is used in many traditional Japanese arts such as Origami, Shodo, and Ukiyo-e.

Its production involves a long and intricate process that is often undertaken in the winter, because pure, cold running water is essential to inhibit bacteria and prevent the decomposition of the fibres.

The cold water treatment also makes the fibres contract, producing a crisp feel to the paper.

Kozo, a type of mulberry, is the most commonly used fibre in making Washi paper.

The kozo branches are boiled and stripped of their outer bark, and then dried. The fibres are then boiled with lye to remove the starch, fat and tannin, and then placed in running water to remove the lye before being bleached naturally.

Mou Fung has developed a process for replicating this artisanal technique on an industrial scale.

"The fabric has a great dry hand feel and streaky effect that highlights the paper content," said Sales Manager Roy Yim. "It's a unique denim look and the jeans are completely washable and highly durable."

Pure Merino wool is another natural fibre being incorporated into denims by Mou Fung and proving extremely popular.

"We employ superfine wool fibres to provide a beautiful hand feel to the fabrics," said Yim. "In keeping up with the latest fashion and process technologies, our R&D department strives constantly to be at the forefront of the latest trends and we now have over 700 different denim constructions across our collections."

"Our customer base includes garment manufacturers from all over the world and we produce denim fabric for the basic casual wear labels as well as the latest high-end designer wear labels."

With two Montex stenters and two Monforts sanforizers at its plant in Zhuhai, China, Mou Fung has been successfully producing high quality denim since 1970.

ÇALIK DENIM

Dazzling on the red carpet

A key highlight of the Interactive Denim Autumn/Winter 208/19 collection unveiled by Turkey's Çalik Denim, was the new Circular 100 fabric range featuring Lycra dualFX technology to create a better alternative to traditional jeans leggings fabric.

> "The look is permanent wash after wash"
>
> **MD Hamit Yenici**

The specific fabric construction of Circular 100 - suitable for athleisure in addition to jeans - has been developed to create a unique silky and soft touch inside, while offering elasticity and flexibility for increased comfort.

"Our aim is to create a new standard in denim," said Çalik MD Hamit Yenici. "In the past, bi-stretch fabrics had a natural tendency to grow in the seat and knee areas after repeated wear. Circular Elastech with Lycra dualFX technology provide a genuine full range of motion, while conforming to the wearer's body to enhance freedom of movement."

"Jeans created with Circular 100 are lightweight, have a soft hand feel, and offer a 'barely there' feeling when worn. The super stretchiness Circular 100 offers is due to its high elasticity in both weft and warp directions, which enables the wearer to move freely without limits. The fabric's vertical elasticity also provides an amazing high waist fit."

Versatile Circular 100 fabric aims to enable designers to create jeans with a variety of looks that can be achieved by using different laundry treatments.

Unlike conventional high elasticity denim fabrics, Çalik's new bi-stretch fabric comes in wider width (around 120 cm), features low shrinkage (around 2%), presents less creasing, thanks to its vertical elasticity, and shows no elastane slippage for a premium look.

Invista's Lycra dualFX technology brand was developed in response to a market demand for high-stretch denim fabrics that keep their shape. It is based on several patented technologies from Invista relating to dual core and bicomponent yarns.

Typically, as fabric stretch increases so does the tendency for fabric growth or shrinkage. By combining Lycra fibre and Lycra T400 fibre together in one fabric, the company says it achieved the best of both worlds - the high stretch of Lycra fibre and the recovery power of Lycra T400 fibre, for increased design flexibility.

Çalik's Red Carpet denim a striking component of the Interactive Denim collection - dazzling luxury look fabrics enhanced with metallic yarns in a range of colours.

"These shiny fabrics resemble updated 80s disco pants and the look is permanent wash after wash," said Yenici.

"They have a soft hand feel both inside and outside today's advanced stretch yarns ensure you don't have to sacrifice complete comfort as you did back then."

KASSIM

From **Serge** de Nîmes to **next-**

The general theme of heritage meeting new technology that is currently prevalent in the denim industry has been taken to its logical extremes - in both directions - by Karachi, Pakistan headquartered Kassim.

As far as tradition goes, the word ‘denim’ is generally acknowledged as having derived from Serge de Nîmes, a fabric originally made from wool and silk around the French village of Nîmes as far back as the 16th Century.

The local weavers were attempting to reproduce the cotton corduroy that was famously made in the Italian city of Genoa at that time, but instead developed an alternative twill fabric in which the weft passed under two or more warp threads and the warp threads were dyed in indigo.

It was this fabric that, having moved from Bavaria to gold rush-era San Francisco, the trader Levis Strauss would have tailored into trousers and attached rivets to, in order to meet the needs of US workmen - making history in the process.

Now, in collaboration with high-end brand Ateliers De Nîmes, Kassim has recently woven the first denim fabric for over a century in the French village where it all started for the Made in Nîmes collection.

The weavers of Nîmes back in the 16th Century, however, would have had little inkling of what uses the successors to their fabrics could be put 500 years later.

Performance denim-body monitoring

Following the success of athleisure - the tailoring of denim for activewear - Kassim has also teamed up with the young Belgian company Bainisha to introduce the concept of sensor-containing, body-monitoring Smart Jeans.

The health of a lot of people, especially the elderly, can be improved by capturing motion and analysing posture and gait on a medical data level - outside of the lab during day-to-day life.

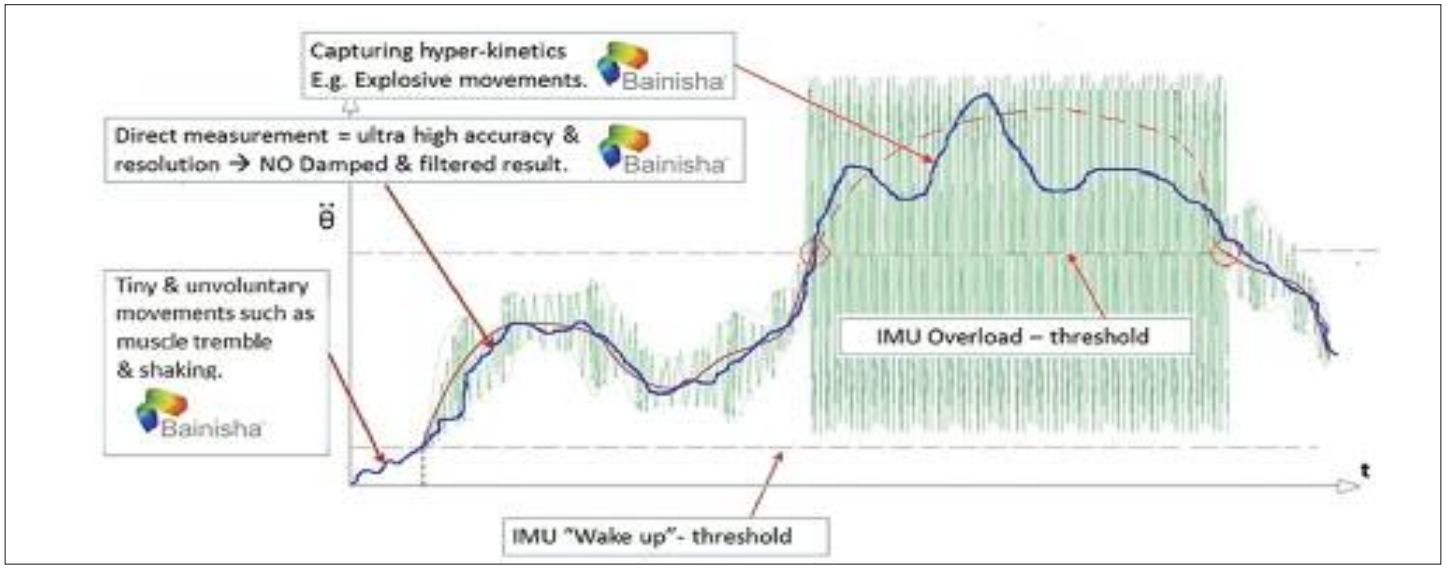
The jeans contain a self-adhesive sensor at the knee, attached by a textile cable connector to an RF transmitter in the pocket, all of which is totally unobtrusive, and from which considerable data can be obtained.

In medical applications, the sensor technology can be used in a post arthroplasty assessment rehabilitation process to detect low level anomalies such as not walking symmetrically or wrongly distributing weight, in order to help reduce or avoid knee or hip re-operations.

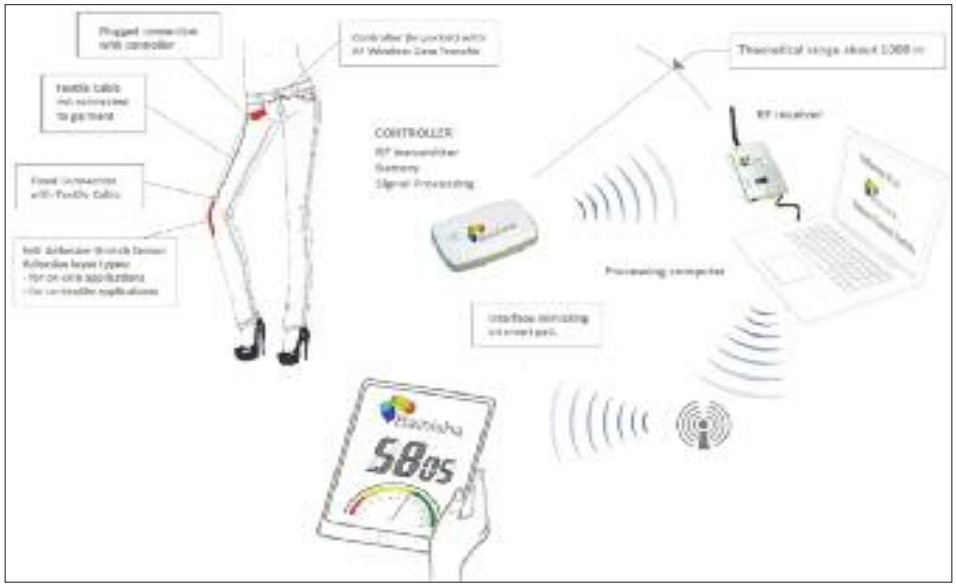
In enhancing fall prevention among the elderly, it can detect the very slow change in gait patterns over a longer period, by comparing data from a daily walking routine

Then there is ‘high definition comparative gait analysis’, which can be carried out by the software to distinguish between particular types of slow gait degradation.

Based on a large body of supporting evidence, this can detect the very earliest indications of Alzheimer’s disease.



generation of denim



The stretch sensor, with a thickness of 30 microns, has high wear comfort.

Using only medical level adhesive patches, the sensors are 100% bio-compatible and can also be used for the analysis and monitoring of diabetes, scarring, infections etc.

The ultrathin, multi-layer polymer technology employed for its displacement sensors ensures measurements are direct, with no mathematical filtering required.

They are also very precise and extremely fast, resulting in an unprecedented high definition resolution of the data.

This previously unattainable resolution allows extremely small differences in gait to be detected.

"The number one requirement for medical quality human body motion capturing is an 'absolute body reference frame'," said Kaat van de Vyver.

"This means that the sensor must at all times remain at its exact original location without even the slightest risk of shifting or drifting."

"Since our Second Skin Patch is 'locked' to the body of the wearer, this requirement is firmly met."

It helps, of course, that Kassim's denims are also extremely comfortable.

"Bainisha was founded three years ago to bring our ideas from bio-mechanical lab analysis into day-to-day life - not only in the medical world, where we use the technology to monitor Parkinson's disease and to detect early signs of Alzheimer's, but in general day-to-day activities," explained co-owner The health of a lot of people, especially the elderly, can be improved by capturing motion and analyzing posture and gait."

"The health of a lot of people, especially the elderly, can be improved by capturing motion and analyzing posture and gait on a medical data level - outside of the lab during day-to-day life. "We are using our partnership with Kassim jeans as a way of telling our story."

Is the **world ready** for the return of **flares?**

Over the past couple of decades denim jeans have fluctuated everywhere between extremely baggy to ultra-skinny fit, but flares have yet to enjoy a full-blown renaissance.

> "Some kind of return to flared cuts might be imminent"

Adeel Baig, General Manager of Marketing and Merchandising

"We're getting a lot of enquiries now, about the possibility of manufacturing flares, and with every other retro style being incorporated into today's collections, it looks like some kind of return to flared cuts might be imminent," said Adeel Baig, General Manager of Marketing and Merchandising for Denim International.

So called 'bell-bottomed' trousers were first worn by American sailors for practical reasons - they made it easier to snag a man who had fallen overboard and were also easier to remove when wet.

They first emerged in fashion in the 1960's, but it wasn't really until the 1970's that they really took off on the consumer mass market, with Mary Quant - a pioneer of flared designs in her collections - and every youth movement from hippies to glam rockers to football hooligans adopting them.

With the turn of that decade, they virtually disappeared, seldom to be seen again. So maybe now is the time?

Denim International, part of the Agha Group, will certainly be ready to meet demand for whatever new or vintage style comes along next, having invested in extremely modern manufacturing equipment including a slasher and rope dyeing system together with Monforts finishing equipment.

The company's washing division has expertise in environmentally friendly abrasion, acid and enzyme washing, sandblasting, stonewash, brushing and whiskering.

"In addition to asking for flares, for summer 2018, buyers are looking for a lot of embellishment - multi-coloured designs, Arabic motifs, embroidery and hand worked effects," said Baig.

"Our ranges cover all the in-demand styles for denim, including high fashion super stretch, camouflage, resinated finishes, peach-skin effects and deep indigo designs."

"We are currently in the process of expanding again, and will have the capacity in place to manufacture 800,000 denim articles every month - including jeans, shorts, dungarees, jackets, shirts and skirts - by September 2017."

Santanderina's **eight steps** to sustainability

Five separate fibre production routes and three sustainable finishes are exploited to the full in the R/Turn collection of smart recycled denim fabrics from Textil Santanderina.

> "The use of recycled cotton from used clothing reduces our reliance on virgin cotton"
>
> **Creative Director, Jordi Ballus**

This includes organic cotton, grown using responsible methods that have a low impact on the environment - specifically crops that aren't treated with pesticides, insecticides or herbicides.

"Organic cotton is non-allergenic and 100% plant-derived with controlled traceability," said the company's Creative Director Jordi Ballus, "while the use of recycled cotton from used clothing reduces our reliance on virgin cotton."

Santanderina is also a part of the Better Cotton Initiative (BCI) for ensuring a fair price is paid to sustainable farmers, while its polyesters are Seaqual, a polyester yarn made from plastics both captured from waste from the sea and that regenerated from plastic bottles, as well as PET recycled from waste fabrics.

"The energy required to make ePET is actually less than that needed for virgin fibre and it also prevents the waste fabrics going to landfill," said Ballus.

"The latest addition to Santanderina's sustainable fibres is Refibra, a new product made as part of the Tencel Recycling Initiative from cotton waste fabrics. This combines the best of two worlds, blending Tencel, the most ecological wood-based fibre, with recycled cotton. We have a strong partnership with the Tencel fibre maker Lenzing."

Indeed, many Santanderina denims are composed of 100% Tencel. Once woven, the Tencel denims are enzyme washed in a chemical-free process taking only between 20-30 minutes.

Ecolandye is one of the three new Santanderina ecological dyeing processes, described as an efficient and responsible method for exploring new colours and wash effects while achieving a 20% reduction of water use and minimizing waste water generation, along with a 40% energy reduction in a completely formaldehyde-free process.

The Vital method is meanwhile virtually a waterless dyeing process and results in a 40% reduction in energy consumption, while Naturedye is a range of new renewable and eco-friendly dyes made from leaves and non-edible nutshells.

"We are very strong on ecological finishing concepts and our high capacity production system is both versatile and self-sufficient," Ballus concluded.

"We have a vertical production process with controlled traceability and our four plants are equipped with state-of-the-art textile machinery, naturally including finishing lines supplied by Monforts."

MOROCCAN INVESTMENT DEVELOPMENT AGENCY/TAVEX EUROPE

Tavex taps in to **Morocco's**

The Moroccan Investment Development Agency, Invest in Morocco, was a first time exhibitor at Denim Premiere Vision.

A special exhibition of jeans conceived by legendary designer François Girbaud under the theme 'Cleaning the Planet' and exclusively manufactured in Morocco underlined the North African country's current ambitions for the growth of its industry.

Hicham Boudraa, CEO of Invest in Morocco, said that with a population of 34 million people and located just nine miles from Europe, the country has achieved GDP growth of 4.5% over the past five years and is a very attractive location for overseas investors.

"There are no restrictions on capital investments by non-residents, who can enjoy free repatriation of profits," he said.

"Current initiatives underway, as part of Morocco's industrial strategy to create 500,000 new jobs by 2020, include Africa's first high speed train line and we also have the largest ports in Africa on two coastlines."

"On top of this are 16 airports and a number of specialised industrial zones and there are currently 54 separate free trade agreements in place."

Morocco's textile industry achieved $3 billion in export revenues in 2016. It is comprised of some 1,600 companies employing 175,000 people and its sales represent 15% of GDP.

Expansion

The denim industry alone achieved exports worth $600 million in 2016, which are going mainly to France and Spain, but the country is eager to expand its reach.

new initiative

The co-operation with François Girbaud served to highlight the creativity and flexibility of the sector, and also its commitment to sustainability.

Girbaud was a pioneer of the sandblasted and acid washed processes thirty years ago but today is actively promoting the use of sustainable manufacturing and finishing techniques.

"In the past I made mistakes by promoting chemical treatments, acid washing and stonewashing which generated water waste and pollution," he said. "Many people copied me, but they were wrong to do so."

"We didn't know any better back then. Now I really hope they will copy me again, in order to put things right.

"While consumers don't want their denims to look brand new, preferring them to look lived in, frayed at the edges, extensively faded or even full of holes, today's finishing technology allows the production of all of these effects with efficient and eco-friendly production processes."

Tavex, headquartered in Madrid, Spain, already has a major denim manufacturing operation in Morocco and has now equipped it with photovoltaic and solar energy generating systems, as well as an extensive wastewater treatment system, as a result of the Ecosystem Denim programme.

At Denim Premiere Vision, Tavex launched its Erossion range of denim fabrics designed for improved performance in the wear cycle and equipped to deal with the changes fabric surfaces undergo as a result of washing and use.

Erossion fabrics are designed to gradually take on new shades of colour and are shaped by continuous friction and movement, giving each pair of jeans their own personality.

The company also continues to enjoy success with its T-Wellness denim programme which is based on three components.

Ecosystem Denim

Through the formation of a specialised Denim Cluster, Morocco now aims to integrate all components of the industry to create a sustainable denim manufacturing infrastructure and an additional $1 billion in sales.

To support this, its government is making generous subsidies to companies investing in sustainable technologies through its Ecosystem Denim programme. The aim is to directly connect environmental standards with expansion into international markets.

FEATURE ARTICLE

Fifty shades of

The denim industry couldn't wish for a better ambassador to the world of art than Ian Berry.

Having been named one of the best 30 artists under the age of 30 in the world, his work has now been seen in many countries, and with a number of sell-out solo shows in London and Sweden, he has also exhibited across Europe and the USA.

Debbie Harry, Jennifer Saunders and Giorgio Armani are among the celebrities who've been so impressed with his work they've personally commissioned portraits from him.

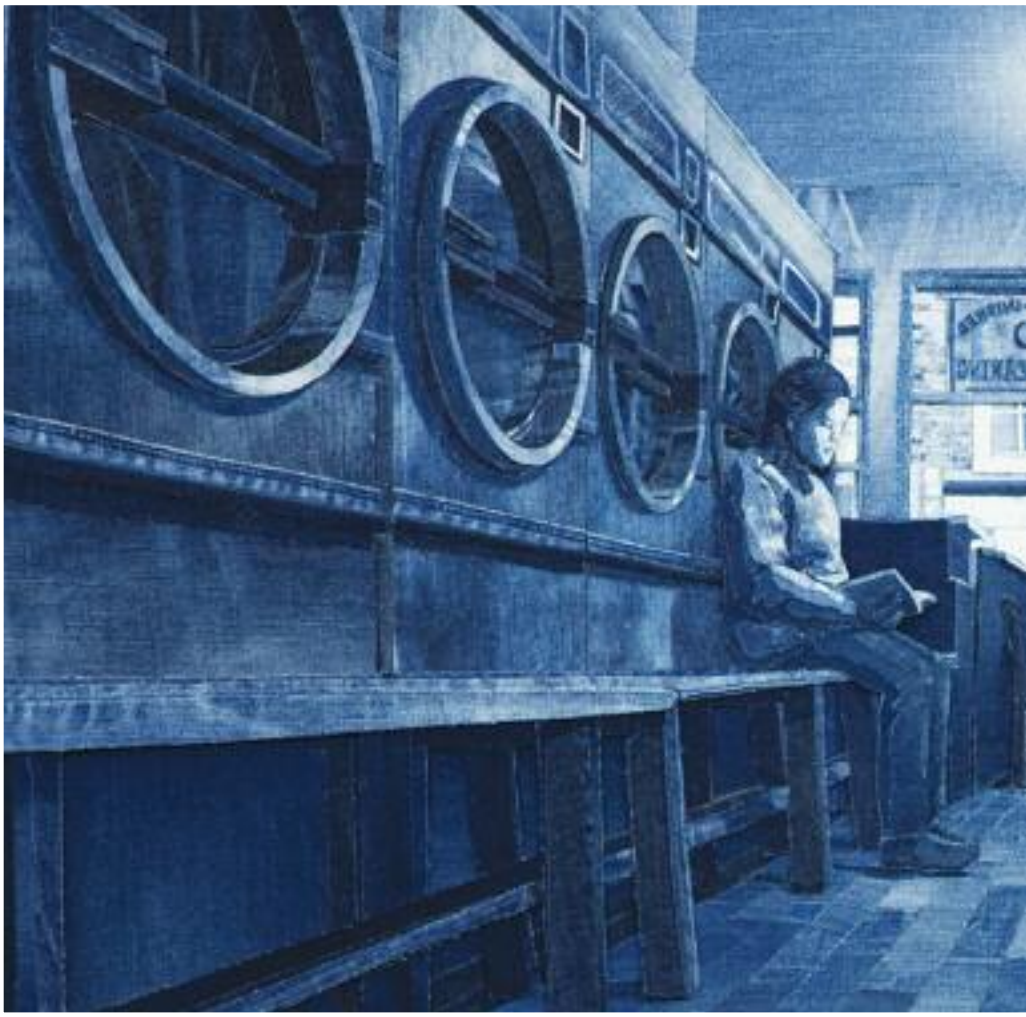
At first glance, many would assume his extraordinary images to be blue-tinted photographs or indigo-toned oil paintings - and not only when viewed online or in print, where much of the depth and detail is lost.

Even up close and at a touching distance, it's not immediately apparent that they consist of many intricate layers of delicate denim fabric in every conceivable shade of blue.

Denim is Berry's paint, but he's remarkably frank about his method of working.

"Like a painter would use light to dark shades, I just use different shades of denim," he says.

"My studio is full of pairs of denim jeans and when I'm preparing a new



blue

piece it takes weeks to organise them into a palette, but it helps when I'm actually working. People think it's really technical, but basically it's me, my hands, scissors and glue."

The results, however, are remarkably detailed portraits and urban landscapes which over many weeks he cuts, stitches and glues into position, using only the varying shades of the fabric to provide contrast and shadow.

"My starting point is finding a scene and urban environments have lots of layers and different textures," Berry says. "I can make the same picture out of seven different pairs of jeans and it will change the mood each time."

"So many pairs of hands have gone into crafting a pair of jeans and they've played a part in what I'm using in my work too. And for such a ubiquitous fabric, denim is actually really interesting because there's no other material that has such a story, certainly in terms of pop culture."

"Like a painter would use light to dark shades, I just use different shades of denim"

Ian Berry, Artist

Blurring the **boundaries**

Soorty's Denim Active concept - which blurs the boundaries between casual wear and sportswear - had already attracted considerable attention in 2017, even before being showcased at Denim PV.

"Denim Active was recognised with the Hightex Innovation Award at the new Keyhouse event, which took place as part of the Munich Fabric Start in March," said Muhammed Mansoor Bilal, the company's Senior Marketing and Product Development manager

"It's made with Coolmax EcoMade technology, and helps keep the wearer cool and dry by moving moisture to the outside of the fabric where it can quickly evaporate. And, since the Coolmax EcoMade fibre is made from 97% recycled resources such as plastic bottles, it means less material going to landfill."

"The addition of a special Lycra fibre also provides 360 degree stretch in this lightweight fabric, so it combines a unique denim aesthetic with the softness and comfort of a specially engineered, second skin silhouette, making it suitable for a variety of activities."

Soorty is a major producer of denim fabric and jeans, now employing some 22,000 people across its operations which are centred on Karachi in Pakistan, and with a new, award-winning garment making-up department and office in Bangladesh, as well as a design studio in Amsterdam.

Following a systematic expansion programme, the company now has three Montex stenters as well as three sanforizing units. This brings the company's finished woven denim capacity to a monthly 5.5 million metres.

Soorty also recently became the first company in Pakistan to install the new EcoApplicator with which it has been achieving very substantial finishing cost savings.

Building on this, the company has launched its Zero Water Blue capsule collection highlighting its environmentally conscious technologies, including zero waste water indigo rope dyeing and waste water finishing.

"We are now employing the Eco Applicator in both pre and post processing with no sizing or mercerising now required," Mr Bilal said.

ARTISTIC MILLINERS

Responsible new ranges at Artistic Milliners

Technological advancements in fabric and garment finishing have brought a radical transformation to the denim industry, introducing a range of new techniques that are more responsible to the environment, said Karachi, Pakistan-based Artistic Milliners.

Artistic Milliners is one of the world's largest, vertically-integrated denim fabric and garment manufacturers with a capacity of 6 million metre fabric and 1.8 million finished garments per month. It has been in business for over 40 years and is equipped with a complete low energy and water-saving denim finishing line from Monforts, as well as an additional sanforizing unit.

The company's Artistic Lab has recently opened in Dubai - as the gateway between East and West - and offers customers and partners the opportunity to stay one step ahead of the competition through close collaboration, involving designers and brands in incubation workshops for new products.

These are conducted with the world's leading chemical suppliers, laundries and machine manufacturers specialising in waterless dyeing, robotic spray coating, laser finishing technology and much more.

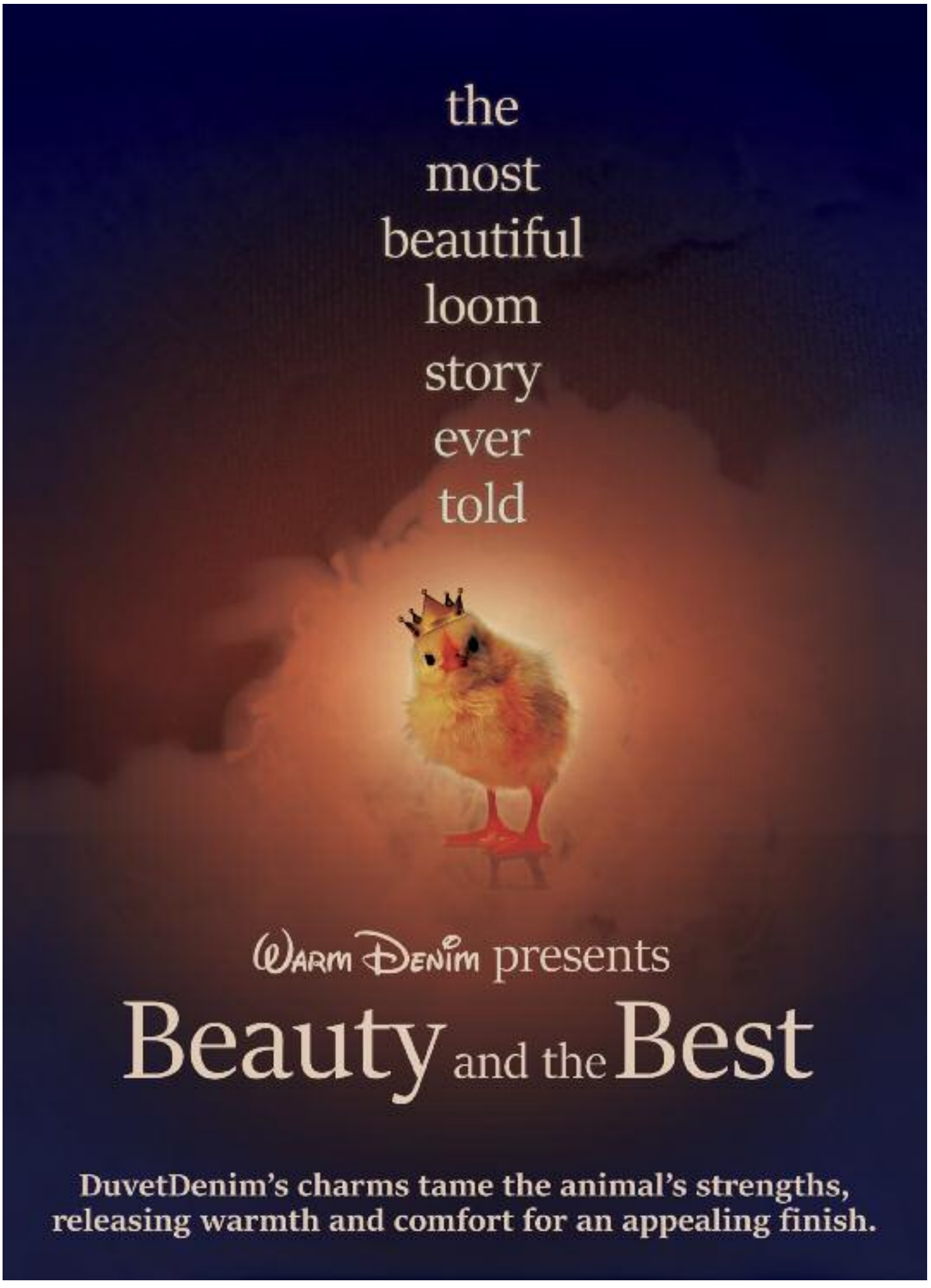
The finishing options that can be achieved with Monforts technology meanwhile include active freshness, easy care properties, washing durability and garment longevity.

Urban Commuter, The Conformist and Sunday Jeans were the three product ranges introduced in Paris for Artistic Fabric's Autumn/Winter 2018/2019 collection.

"Urban Commuter is smart denim at its best for active lifestyles," said Senior Development Manager, Muhammad Adnan.

"The Conformist jeans adapt to the body and follow its movements without any constraints, with no push or pull in any direction, while Sunday Jeans are soft both inside and out and ideal for just lazing around in."

"The collections showcase our latest sustainable wash concepts, whether for the creation of authentic vintage denims or those with the ultimate soft hand feel."


the
most
beautiful
loom
story
ever
told
Warm Denim presents
Beauty and the Best
DuvetDenim's charms tame the animal's strengths,
releasing warmth and comfort for an appealing finish.

Getting **down** with **denim!**

Feathers provide great insulation and millions of tons are plucked from birds every year and wasted, so it's a surprise that nobody's thought of incorporating them into fabrics.

Until now, that is, with new Duvet-Denim from US Apparel and Textiles.

"At the moment, most poultry feathers end up in landfills, where they decompose very slowly," said the company's Head of Design Mohsin Sajid. "The down feathers are fluffy because they don't have the little hooks at the end of all their branches that exterior feathers have."

"They are mostly beta-keratin protein strands which are already twisted and cross-linked and they're strong, water-resistant and long lasting. The down feather branches float free, trapping air to provide more insulation - they're warmer than wool and cheaper too - and they also provide a pleasing nap character in the denim."

All relevant certifications in respect of safety and compliance have now been obtained for the DuvetDenim range, he added.

Another waste product nobody has been able to do much about until now, is the very fine fluff generated during the traditional ball warping process, which the company is now incorporating into its FluffWear range.

These innovations are just two from a broad range of new fashion denim fabrics introduced by the Company for its Autumn-Winter 2018-19 season.

"Most of our latest creations, such as HeritEdge+, produced on antique selvedge looms, demonstrate how tomorrow's technologies can deliver comfort, performance and sustainability benefits, while channeling the greatest denim styles of the past," said Sajid.

"These are fabrics that the denim fashion pioneers would have loved, but with a level of comfort and performance that would shock them."

Invista's Lycra XFit technology is responsible for the freedom of movement with controlled shrinkage, great recovery and excellent shape retention that characterises these modern classics.

Other new denim options being introduced by the company include: *PerForma officewear jeans with a slight bi-lateral stretch across the bias for comfort, with attractive body and drape.

*PlanetHero, a range of new denim fabric and process options that let designers and buyers choose sustainability, fashion and value.

*OrigIndigo, with saturation that slowly suffuses with every wash to gain charm and originality.

"They also provide a pleasing nap character in the denim"

Head of Design, Mohsin Sajid

ReMastered with Monforts

The ReMastered Collection was inspired by authentic and traditional clothing which was reinvented for the 21st Century and put together by Cordura and international design studio Monsieur-T, in combination with four leading-edge denim manufacturers - Arvind, Artistic Milliners, Cone Denim, and Kipas.

All four of these mills trust in the efficient and resource-saving finishing equipment of Monforts, as well as being users of Cordura, the polyamide family of fibres for hard-wearing and durable fabrics invented by DuPont and now belonging to Invista.

Cordura is marking its 50th anniversary this year by embarking on a "50 for 50" global roadshow to launch an array of new fibre and fabric innovations, end-use applications and collaborations, which naturally took in a stop at this year's Denim PV in Paris.

"We've worked hand-in-hand developing cutting-edge fabrics with our mill and supply chain partners," explained Cindy McNaull, global brand and marketing director for Cordura.

"Our roadshow features stories from both the past and present to celebrate their achievements. The theme draws on our heritage while promoting tomorrow's innovations in advanced fabric technologies."

The pieces created for the ReMastered collection borrow from the functional shapes and authentic details of iconic utility garments, taking inspiration from workwear, motorcycling, and even military uniforms.

Arvind

The fabrics for the collection produced by Arvind were well washed and worn, as if hammered hard in the line of duty. The range was highlighted in a 1940s-style Belgian coverall with authentic detailing borrowed from the versatile work uniform of the traditional army mechanic.

Artistic Milliners

Heavy duty, indigo blue, specially-engineered 15 osy Cordura denim was uniquely remastered by Artistic Milliners for a heritage workwear outfit that mixes 1960's-style Swiss fireman's jacket, with a classic pant and a traditional German work apron.

Finishing is the key to sustainable coating applications and greatly reducing water usage, Artistic Milliners, which is based in Karachi, Pakistan, believes.

As one of the world's largest, vertically-integrated denim fabric and garment manufacturers, the company has been in business for over 40 years and is equipped with a complete denim finishing line from Monforts, as well as an additional Monforts sanforizing unit.

Cone Denim

Taking inspiration from across Europe and different decades of the 20th century, a 1960s-style Dutch utilitarian field jacket combined with retro French motorcycle pants was reimagined by Cone Denim with red-edge selvedge denim.

Famously, Cone's White Oak manufacturing plant in Greensboro, North Carolina was granted the US rights to manufacture all of the shrink-to-fit selvedge denim for authentic Levi 501s over a century ago.

Heritage products are still made today in this special mill which is equipped with lovingly restored and maintained 1940s Draper shuttle looms.

They are installed on a special wooden floor which is very necessary for absorbing their vibrations, explained Kara Nicholas, Cone's Vice President of Product Development and Marketing at Denim PV.

"We have to make some of our loom parts in-house and hunt around for others, but we've actually managed to expand production and added new looms we've acquired," she said.

"The character really does come out in the fabrics produced and it's been tremendous fun working with Cordura on the Re/Mastered Collection."

Kipas

A canvas fabric was custom dyed in British Khaki by Kipas to create a heritage work outfit featuring a 1920s-style classic French workwear pant, a reinvented Fireman's jacket and a German brewery apron.

Kipas, headquartered in Kahramanmaraş, Turkey, has been producing denim since 2002 and is a vertically-integrated operation with an annual output of 25 million metres sold to customers in over 35 countries.

ARVIND LTD

Trust your senses

Azurite is a soft, deep blue copper mineral produced by the weathering of copper ore deposits. Known since ancient times, its blue is exceptionally deep and clear which has resulted in it being the colour of low-humidity desert and winter skies.

> "Based on indigo dyeing in both the warp and weft yarns to create a fully saturated look"

Chief Manager of Design, Samar Firdos

Azurite is an apt name for the patented technology in India range of premium, saturated Indigo fabrics now being introduced to the denim market by India's Arvind.

"The technology behind Azurite is based on indigo dyeing in both the warp and weft yarns of the denim to create a fully saturated look we know is delighting many people," said the company's Chief Manager of Design, Samar Firdos.

"We're employing it as just a single component in our latest trend story that draws on the senses, with three key themes - Intuit, Aesthesee and Indigene."

"As far as trends are concerned, the world of fashion is simply moving and changing too fast. If we attempted to claim that we knew what people will be wearing in a year or two from now, we would be fooling both ourselves and our consumers."

"Our approach instead, is to identify the macro trends that influence our lives for months, years and even decades - what impacts on the mind and heart, the body and the soul, beyond what is just transient."

Naturally, this approach has to incorporate sustainable approaches to production and in the past few years, the company has, for example, significantly reduced its water consumption.

It is also using Better Cotton Initiative (BCI) cotton, along with biosulphur dyes and a vegetable indigo dye for authentic wash down and natural ageing, in a process certified by GOTS.

Further, the manufacturing process of a single pair of denim jeans usually creates between 6-9kg of industrial greenhouse gas emissions. Arvind is now able to supply carbon neutral products by supporting UN-certified climate mitigation to off-set its carbon emissions. Arvind also recently installed India's first Monforts Eco Line denim finishing machine for faster production, greater savings in energy, and better flexibility in design and innovation.

The Eco Line, which can handle fabric widths of 1.8 metres and operate at high speeds of up to 80 m/min, is operating alongside four Montex foam finishing stenters, which are also able to handle this same width of material.

The Eco Line system reduces energy losses and energy use, increases thermal transfer and keeps the drying energy on the textile material longer, so that it can be used very efficiently.

As a result, energy savings of up to 50% can be achieved. Exhaust air energy can also be reduced to a minimum, which has a positive effect on the emission load into the atmosphere.

Arvind's current annual denim capacity is 110 million metres, with prominent products including ring denim, indigo voiles, organic denim, bi-stretch denim and fair trade certified denim.

In addition to retailing its own brands like Flying Machine, Newport and Excalibur, it supplies to licensed international brands such as Arrow, Lee, Wrangler, and Tommy Hilfiger.

It's all **about** the **indigo**

Super rich indigo denims reminiscent of those produced from traditional plant dyes are being promoted in vintage red selvedge weaves in the Old School Japan range, which is part of the Spring/Summer Collection put together by India's LNJ Denim.

> "Looser weaves in combination with coarser warp or weft yarns are employed to fully capture the rich dyes, resulting in a saturated richness of shade"
>
> **General Manager Raj Kumar Jain**

"Here, it's all about the different cast and level of the blues starting from the richest shade possible, achieved with a 16-dip process, and washing down to really attractive lighter hues," said General Manager Raj Kumar Jain.

Looser weaves in combination with coarser warp or weft yarns are employed to fully capture the rich dyes, resulting in a saturated richness of shade. Soft-faced bold twills release the dark indigo quickly on washing, to create a three dimensional vintage look.

Loose slubs further contribute to the natural hand-made appearance.

Indigos in stripes, checks, dobbies and artisanal duck weaves have also been assembled in the Working the Land range, introducing differentiated denims informed by historical workwear.

By contrast, smooth, light and billowy denims for creating oversized fluid silhouettes characterise the Lightness of Being range, with blends of Tencel and linen adding unique qualities to cotton weaves.

LNJ's commitment to the environment is highlighted in the Taking Care collection, based on both rigid and stretch denims created from the company's in-house post-consumer waste operation. In addition, advanced processing equipment, including Monforts finishing ranges, ensure water, chemicals and energy usage are effectively minimised.

LNJ's Raw Tailoring denim range further benefits from finishing treatments that completely prevent fading and shrinkage for constantly clean and sharp tailored items that don't require washing and can simply be put in the freezer to remove odours.

TORAY INTERNATIONAL

Toray International lightweight **miracles**

As a 21st Century multi-faceted Japanese corporation, Toray International success was built on the production of rayon filament yarns back in the 1920's.

> "Fabrics can be up to 20% lighter and provide the same performance and comfort,"
>
> **Yoshiki Yamada, Manager of Stretch Materials**

Headquartered in Tokyo, Toray then developed expertise in polyester, polypropylene, polyamide and acrylic fibres, before expanding into many other areas, including high-performance films, engineering plastic resins, carbon fibre composite materials, electronics and information-related products, high-performance membranes, pharmaceuticals and medical products.

Fibres and fabrics, however, remain a mainstay of the organisation today, and its advanced fibres - along with decades-long mastery of all aspects of textile manufacturing and finishing - are the mainstay of its products for the denim sector.

A key success in recent years, explained Yoshiki Yamada, Manager of Stretch Materials for the organisation's Textiles Trading Department, has been Miracle Air fabrics.

These are based on hollow fibre technology and have been widely marketed.

"Miracle Air fibres are now finding favour with many other brands around the world for the combination of extremely light weight and very comfortable garments with stretch that can be produced from them," said Mr Yamada.

"They are especially suited to denim, where fabrics can be up to 20% lighter and provide the same performance and comfort."

Impressive examples on show at Denim Première Vision included one of the traditionally-delicate Japanese ladies' macs in washed-out denim, weighing just five ounces and comprised of hollow polyamide Miracle Air fibres and cotton, with a super-soft finish, as well as a quilted and extremely warm denim jacket, weighing-in at just ten ounces.

UCO RAYMOND DENIM

New possibilities for vintage

The Athleisure market for denim continues to thrive, with four-way-stretch jeans currently doing very well in the market, according to UCO Raymond Denim.

> "Jeans with the look of denim but the comfort of jogging bottoms"

Export Sales Manager Sanjay Chavan

The company was created in 2006 following the merger between Raymond Denim of India and UCO of Belgium. With a combined annual capacity of 47 million metres, it now has manufacturing plants in Giurgiu, Romania, and Yavatmal, India, with the optimised and flexible service to meet the global requirements of large international brands.

The production of differentiated ring spun denim, speciality denim and other niche products for the global fashion market, based on a global production and local service strategy.

"Jeans with the look of denim but the comfort of jogging bottoms are proving extremely popular. In general the market appears to be looking back to the 1970's in terms of style, only with the comfort that's made possible with modern fibres and finishing techniques that simply wasn't possible back then," said Export Sales Manager Sanjay Chavan in Paris.

"Stretch, of course, has had a huge influence and while 100% cotton jeans might have that vintage look they have the modern fit and feel."

Another popular trend in the market is for Blue-Black denims which fade down to grey for another retro look - the marbled effect - he added.

UCO Raymond also makes a large collection of lightweight fabrics, chambray constructions, luxury indigo fashion fabrics and clean casual citywear qualities.

Over 80% of its collection consists of stretch qualities and the company has also been a pioneer in pigment and leather coating on indigo and colour denim, creating 3D effects or clean gummy and glitter looks.

Brazil takes a sustainable lead

Vicunha Textil processes some 100,000 tons of cotton a year and for the past decade has been supplying Better Cotton Initiative (BCI) to the European market.

> "Vicunha is carbon neutral providing full traceability"
>
> **Deborah Turner, Vicunha Europe**

Vicunha Textil processes some 100,000 tons of cotton a year and for the past decade has been supplying Better Cotton Initiative (BCI) to the European market.

This forms just one component of the company's commitment to sustainability because with five manufacturing plants in Brazil the company's environmental footprint would otherwise be considerable.

"Brazil's denim industry is huge compared to that of Europe and Vicunha is one of the largest mills in Latin and South America." said Deborah Turner, of Vicunha Europe.

"As part of its Reduce Re-Use Recycle programme, the company runs a biodegradable waste water system and has also introduced new dyeing and finishing lines, including Monforts technology, to significantly reduce the water used in these processes."

"It also operates heat exchange systems and recycles and re-uses chemicals, with, for example, 100% recovery of caustic soda, which is separated from the water so that both can be re-used."

"In addition, cotton is recycled i n-house and any waste is fully recovered, re-spun and woven back into fabrics. Once the fibres become too short to use, they are turned into

briquettes to fuel the boilers. The boilers are further fired on cashew and coconut shells that are abundant in the region and would otherwise go to waste."

"No chemicals", she added," are released into the atmosphere with C02 emission harvested and used in the water treatment plant as part of the water cleaning process."

Vicunha is carbon neutral and also provides full traceability, operating a bar code system that allows the fabric to be traced right back to the field in which the cotton was harvested.

In its latest product development, the company has teamed up with Israel-headquartered fibre producer Nilit, to offer denims incorporating three new polyamide 6.6 yarns - Aquarius, Body Fresh and Breeze.

Aquarius yarns are engineered to wick away moisture via special micro-channels, to keep the wearer feeling dry and comfortable. Its hydrophilic properties are intrinsic and will not wear off even after repeated washings.

Body Fresh provides effective antibacterial action, reducing the growth of bacteria that can cause body odour, and Breeze is a cooling yarn to help maintain a comfortable body temperature when the temperature rises.

The effect of Breeze derives from a combination of its flat cross section, special inorganic micron particles in the polymer and a special texturizing process to create low bulk yarns to provide maximum breathability and ventilation.


DENIM
CLOTHING
&COMPANY

DENIM CLOTHING COMPANY

Doing **denim** in the **desert**

Saving 4 million litres of water a month

> The Studio saves approximately four million litres of water a month compared to conventional set-ups

Sales Manager Shabeeb Muzaffar

As a young company which only commenced operations in 2005, Denim Clothing Company has quickly risen to become a trusted supplier to leading brands and retailers building its output to some 2 million garments per month in just half a decade.

"We are a fully integrated company, from owning our own cotton fields through spinning and weaving to dyeing," said Sales Manager Shabeeb Muzaffar. "Initially we specialised in high fashion as our core business but have expanded considerably in recent years."

All of the Karachi, Pakistan-headquartered company's cotton is cultivated to Better Cotton Initiative standards and certified by GOTS, as well as its fabrics meeting Öeko-Tex requirements.

"We are also doing recycled PET and cotton blends and employing special fibres such as Coolmax and Thermolite," said Muzaffar. "Among recent developments are ultrasoft materials which have been achieved through modification at the fibre level to increase the density of the fabric."

In addition to a showroom in Manchester, UK, Denim Clothing Company's Desert Studio in Dubai has proved highly successful since opening four years ago.

"The idea was to develop a smaller-scale advanced, design, research and development and manufacturing plant that was located centrally to all customers around the world, where we could work closely and confidentially with them on unique, high-end collections," Muzaffar explained.

"At Desert Studio, we are conducting highly interactive sessions with our clients where they develop their specific product line, experience each stage of production within a highly transparent system and can often shorten the lengthy processes of making collections."

"There are no restrictions at all on our customers and we typically work with their technicians and designers for a week to ten days. There has been an overwhelming response to this concept, to the extent that we recently increased the potential output capacity from an annual 40,000 pieces to 200,000."

"It's equipped with all of the latest technology for waterless laundry, such as laser, ozone and e-flow, because obviously, water consumption is a priority when you're doing denim in the desert."

"So it seemed fitting to locate our advanced laundry there. We estimate that Desert Studio saves approximately four million litres of water each month compared to conventional manufacturing set-ups."

ATLANTIC MILLS

Sustainability is the key

"The longer you wear our products, the better they get," says Amrin Sachathep, director of Thailand's Atlantic Mills Company (AMC). "Denim that can marry tradition and innovation is what's winning in the market today, and mills who have figured this out are dedicated to the cause."

AMC's background, prior to starting up its manufacturing operations in 2002, was in trading fabrics, which has provided the company with an intuitive grasp of what consumers are looking for.

Since 2002, the company has progressed from selling just ten fabric styles to building up one of the largest denim libraries available and currently produces an annual two million metres of premium denim for brands across the globe.

"Although we perhaps don't emphasise it enough, our quality is due in part to our focus on sustainability," said Sachathep. "We know it's important to use chemicals which are not harmful to the environment and we spend extra to ensure this - AMC is actually certified to produce baby products."

In addition, 100% of the company's cotton is supplied by the Better for Cotton Initiative (BCI) which endeavours to guarantee that farmers in developing countries are guaranteed fair working conditions and payment, while 100% of the company's water in its finishing machines is recycled. Post-consumer recycled denim from damaged jeans is also shredded and regenerated into new yarns.

At Denim PV, AMC highlighted its extended options for women in a bi-stretch collection and a warp-only stretch providing more comfort. The company's warp-only stretch denims recreate that original Levi's 501 look with the comfort available today and the bi-stretch products are offered in a full range of indigo - deep dark blue casts, black, grey and PFD (prepared for dyeing).

"These fabrics provide a nice opening price opportunity for brands, without sacrificing softness and a luxury look," said Sachathep. "Our fabric range goes from a more futuristic light-weight, high-stretch and natural soft-touch to heavier, classic unwashed indigo denim for the denim purist."


AMC
AMC

TECHNICAL APPLICATION

Eco Denim Line reduces Mexico's Tavemex

Tavemex SA de CV of Mexico has become the second denim producer in the world to install a Monforts Eco Denim Line, and the first to use the technology for finishing denim fabrics of up to 300 g/m².

The first installation was to a Vietnamese producer of lightweight denim fabrics.

Tavemex, which is based at Tlaxcala in Mexico, was recording an 80 % reduction in water usage within a month of completing the installation of the Eco Denim Line. For Tavemex, the investment in the new technology comes at a time of fundamental change for the company.

Previously known as Tavex, the company was part of a multinational enterprise that originated in Spain and had denim-manufacturing plants there and in Morocco, Brazil and Argentina, as well as Mexico.

Tavemex is now however an independent Mexican-owned concern, with its prime market being the United States.

Tavemex's installed capacity is now 2 million metres per month, Part of current production is gradually being moved from the existing stenters to the new Eco Denim Line.

"Our main reason for investing in the Eco Denim Line at this time was to satisfy those of our customers who have been requesting us, more and more, to use less water in dyeing and finishing," said Arturo Ornelas Elizondo, Tavemex's Industrial Director.

"They themselves have been trying to use less water in their garment production, to the point in some instances of softening fabrics to break the starch and avoid using water."

"Their need is to meet stringent environmental standards, and also to respond to strong customer demand for more environmentally friendly products."

"We use our own well for water supply, so the water cost is relatively low, but we are saving more than 80% on water usage, and this will enable our customers to label their products in the stores respectively."

Usually denim is processed through a number of cylinder dryers that are steam heated, and stretched in a large stretching unit that applies high force to the fabric in order to achieve the necessary weft.

The Monforts Eco Line innovation uses a modified Thermex Hotflue Chamber that generates the necessary moisture and temperature for making the denim stretchable, whilst incorporating a soft stretching of the fabric by using many rollers instead of only the one or two in a traditional stretching unit.

This consequently saves on the volume of water needed to generate the steam, and also saves on the amount of energy required to convert the water to steam.

water usage by 80% for

Tavemex installation is finishing denim fabrics with new Eco denim line and is already achieving 80 % water savings.

The Tavemex factory uses fuel oil for its steam supply, being located too far from a natural gas supply to pipe in gas, and Mr Elizondo said that the Eco Denim Line is projected to save energy.

"We are still in the process of transferring the production from the traditional stenters to the Eco Denim Line, but we estimate that ultimately we shall save between 20 and 30% on steam generation" he explained.

The denim is treated much more gently with the Eco Line, and according to Mr Elizondo the highest fabric quality can be achieved, certainly to the same standard as with the steam cylinders.

The new installation includes an Eco Applicator, which applies the chemicals, replacing a conventional padder. This reduces the drying needs and therefore energy consumption, due to the fact that the Eco Applicator applies less moisture to the fabric.

Less water usage also means less wastewater, and again although this has little effect in financial savings, the environmental aspects are very beneficial.

"This will also give us the opportunity to improve our

wastewater plant to the latest European standards."

Mr Elizondo added that the response of Tavemex's customers to this new installation has been very favourable.

"They started to ask us for ways to reduce water usage about four years ago," he said. "We worked with our chemicals suppliers to reduce the water during the dyeing process, but although giving us an advantage, it was still not enough."

"Now however the reduction is dramatic. It is creating new marketing advantages for our customers."

The new company ownership means that Tavemex, once part of the world's largest denim producing conglomerate, is now an independent Mexican producer facing stiff competition. The company is confident that the Eco Denim Line will help them stay at the forefront.

Left: Arturo Ornelas Elizondo, Industrial Director; right: Adalberto Avendano, Denim Finishing Manager

Monforts Denim Ranges

A Concept for Denim Finishing Possibilities

By Dipl. Ing. Kurt van Wersch, Senior Consultant

Part 5: Denim - Stretching, skewing and compressive shrinking

The rapidly changing fashion trends constantly make new demands on textile finishers with ever newer specifications, particularly for the finishing of denim. Finished denim fabric in wide-open form is a further opportunity for the finishers for the future.

Definition of Shrinkage and Sanforisation

Shrinkage:

Textile producers and finishers understand "shrinkage" as any form of negative change in dimensions of textile products under the influence of water and/or heat.

Sanforisation:

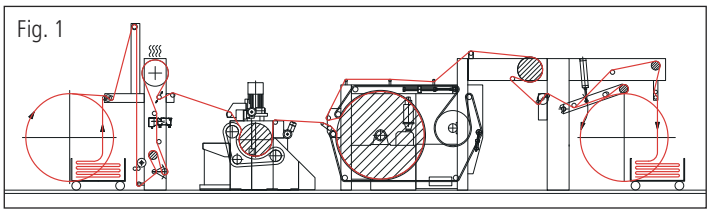
Textile producers and finishers use the term "sanforisation" to refer to pre-emption of shrinkage by suitable mechanical and/or hydrothermal finishing processes.

Shrinkage potential after different treatment processes:

- Woven fabrics: Grey fabric, depending on fabric weight up to 10%
  Grey denim (after stretching) up to 18%
  Washed denim fabric up to 10%
  Bleached fabric approx. 5%
  Dyed fabric approx. 5-8%
  Shrunk (Sanforised) fabric less than +/- 1%
- Knitted fabrics: Dyed fabric approx. 7-15%
  Shrunk (Sanforised) fabric less than 5%

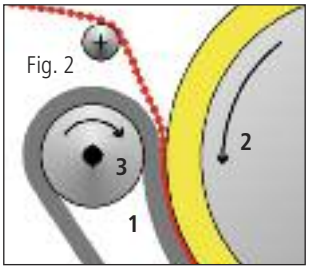
The heart of a shrinkage range is the rubber belt shrinkage unit, while felt calenders are used as dryers. [Fig.]

Fig. 1



The principle of compressive shrinking (saforising) is shown in Fig. 2.

Fig. 2



1. The fabric is dampened with water and steam
2. Pressing rubber belt 1 against the cylinder 2 causes an elastic elongation of the rubber belt (pressure zone)
3. The extent of elongation is determined by pressure roll 3
4. The fabric is fed into the pressure zone
5. After the pressure zone, the rubber cloth relaxes again and goes back into its original form, taking the fabric with it
6. Consequence: Shortening of the warp threads and hence compression of the weft threads. Shrinkage has taken place and is stabilised by tension-free drying.

Fig. 3 shows an original rubber belt shrinkage range

Fundamentals of Denim Finishing

Denim (grey fabric) is characterised by one special feature. Although sanforised denim twill fabric no longer shrinks, it does have the characteristic that the finished legs of jeans tend to twist during washing. This means that treatment to prevent the "twisting" is also necessary here. Denim grey fabric is therefore subjected to the following treatment processes on special denim finishing ranges.

The sequence comprises four classic steps:

- Singeing (2x on the blue side)
- Stretching (longitudinally to set the desired fabric width)
- Weft straightening (pulling the weft threads to prevent twisting)
- Compressive shrinkage

Fig. 3

Today, however, only a fraction of the denim production is processed directly from grey fabric. Denim open-wide fabric can be washed, desized, mercerised or over-dyed before shrinking.

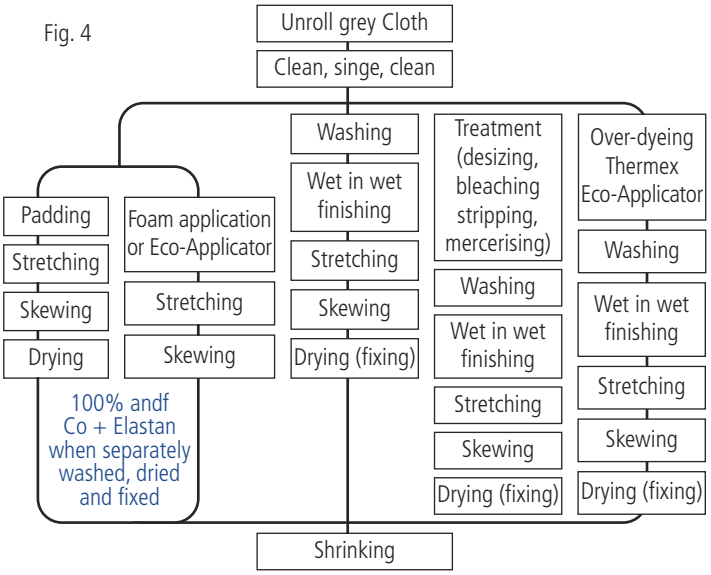
Fig. 4 shows the treatment possibilities and processes.

All the treatments always finish with the shrinkage process.

Steps before the shrinkage process are:

A washing test should be performed prior to each fabric batch to be shrunk in order to determine the shrinkage potential. The fabric shrinkage in warp and weft direction and the degree of skewing are measured. The washing shrinkage in warp direction and the degree of skewing provide indicative values for the setting of the denim shrinkage range.

Fig. 4



Classic Denim Ranges with Stretcher and Weft Straightener

Monforts denim ranges are tailored to the customer's needs and are in operation with practically all leading denim producers. Sophisticated denim concepts are offered, from individual machines through to full-scale finishing ranges

The "classic" configurations include:

a) Padder-stretcher-cylinder dryer-shrinkage range version

b) The energy-saving foam applicator-stretcher-shrinkage range version, whereby

c) even today the foam applicator can be replaced by the Matex ECO Applicator. This also eliminates the need for a foam mixer.

Fig. 5 shows the principles of the three range variants

A denim fabric comes from the weaving shop e.g. with a grey width of 157 cm and is later to have a finished width of 151 cm. In order to achieve this value, the fabric is stretched with high force (for a 14.5 oz/yd² article, up to 4000 N and sometimes even more) so that its width is reduced. At the same time, the rolls in the stretcher are inclined in order to create the weft skewing. In grey fabric, the weft skewing can be as much as 8% (approx. 12 cm).

Fig. 6 explains the weft skewing, shows optimum values and what is tolerable and not tolerable.

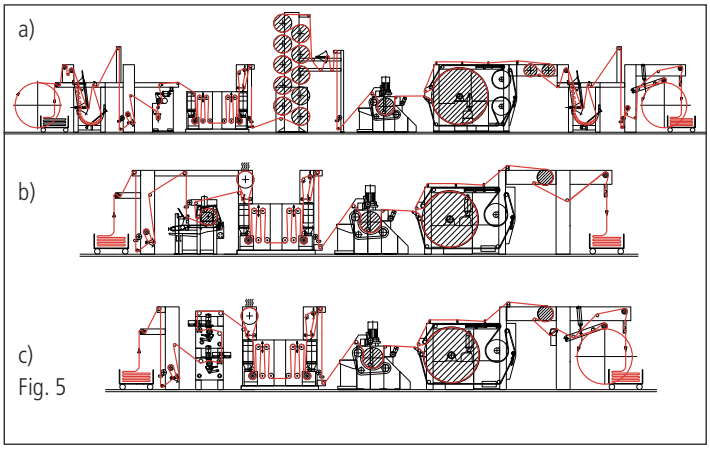
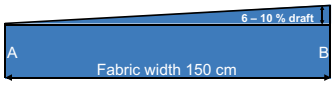
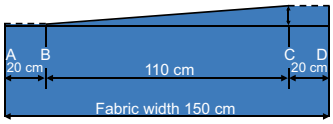


Fig. 5

Optimum weft skewing
A = First selvedge thread
B = Last selvedge thread



Tolerable weft skewing
No skewing between A and B
No skewing between C and D
Max. 20 cm tolerated



Non-tolerable weft skewing
The piece is not tolerated if the distance A-B and C-D is larger than 20 cm and the skewing is in the opposite direction to the twill.

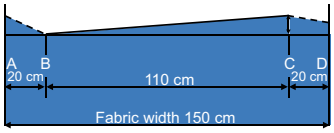


Fig. 6

Two stretcher types are used in "classic" denim finishing ranges:

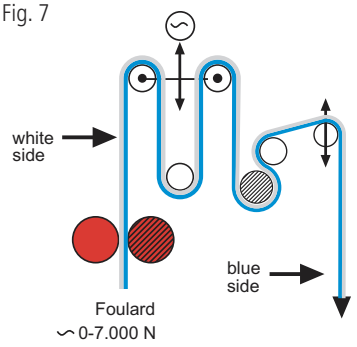
- Simplex stretcher and
- Duplex stretcher

This type of stretcher is still frequently used today by Monforts competitors [Fig. 7].

A disadvantage of these stretchers is:

The stretching tension is built up between the padder and the tension roller of the stretcher, placing extreme loads on the rubber coating of the padder rolls.

Fig. 7



Monforts therefore changed over to the duplex stretcher from any early stage.

This stretcher has 2 independent holding points separate from the other range components. The force required for stretching and skewing is built up between the draw roller pair and the tension roller pair of the stretcher [Fig. 8].

This range type with foam applicator (1) and steaming drum (4) was the first step towards saving drying energy by eliminating the cylinder dryer.

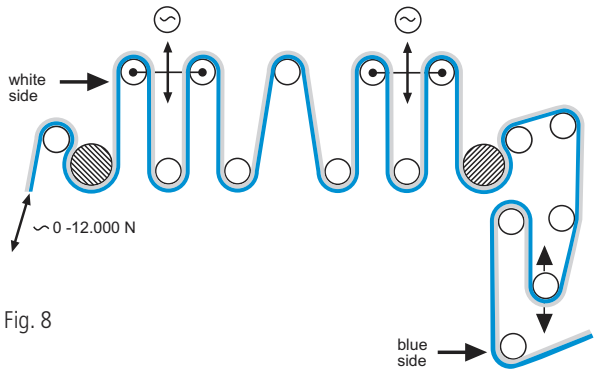


Fig. 8

Modern Denim Ranges with Stretcher and Weft Straightener

Innovative further developments of the Monforts denim ranges have led to new ecological and economical denim finishing ranges being successfully marketed today.

Fig. 9

Fig. 9 shows the "Eco" version of a present-day denim finishing range.

Several ecological and economical features are implemented in this range concept. Special aspects are:

- An Eco-Applicator is employed as liquor application unit. The Eco-Applicator is a minimum application unit that applies the finishing liquor in a controlled manner to both sides of the fabric. The minimum moisture is sufficient for stretching and skewing the fabric.
- The ThermoStretch stretcher is used as stretcher and weft straightener for drying, stretching, skewing and thread counting, aided by a structure detector with SD 1 camera technology. The camera measures and controls the fabric width and the skewing. As an option, the weft threads are also counted by the SD 1 camera [Fig. 10].

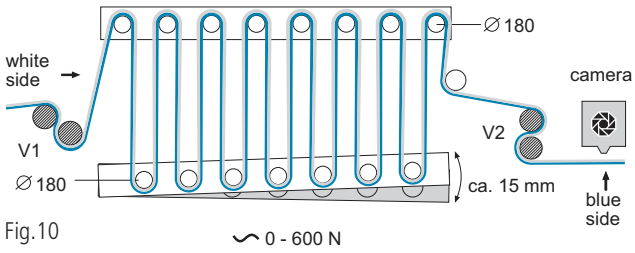


Fig.10

This range configuration allows speeds of 35-40 m/min to be achieved with a 14.5 oz/yd² article (unwashed). Lower denim weight classes and washed open-wide fabric can naturally be run correspondingly faster.

Fig. 11 shows the Eco version as a "high-speed machine" or "double rubber".

This version that has been proven for years comprises two rubber calenders and two felt calenders and thus achieves a production speed of 70-80 m/min with a 14.5 oz/yd² denim. Here again, lower denim weight classes and washed open-wide fabric can naturally be run correspondingly faster.

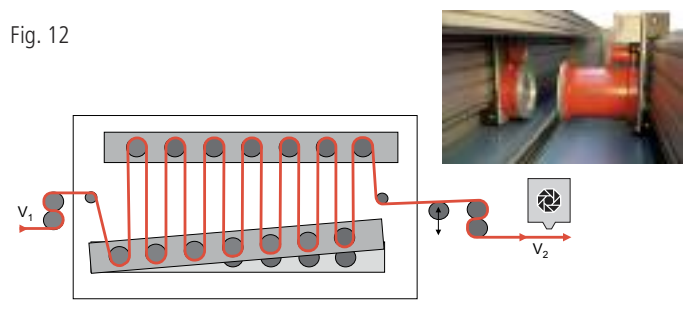
Fig. 11

Description of the ThermoStretch Stretcher and Weft Straightener

The ThermoStretch stretcher is a modified hotflue with reinforced and adjustable rolls with a diameter of 180 mm. The stretcher can be heated and the fabric moisture at the exit is regulated to suit the shrinkage process.

Fig. 10 shows schematically the function of the stretcher and weft straightener.

Fig. 12



With their differently controlled speeds V1 and V2, the two tension rolls determine the longitudinal tension in the fabric, and hence the reduction in width, monitored and controlled by the Pleva SD 1 camera. The camera also measures the weft thread position, and monitors and controls the skew by skewing on side of the roll package in the ThermoStretch stretcher.

Further explanations, [Fig. 13]

As the ThermoStretch has a large number of guide rolls and can also be heated, the damp fabric can be stretched with a longitudinal tension of 200-300 N (instead of 4000 N as in the past).

The skewing of the rolls is adjusted in millimetres (rather than in centimetres as in the past), resulting in crease-free running of the fabric.

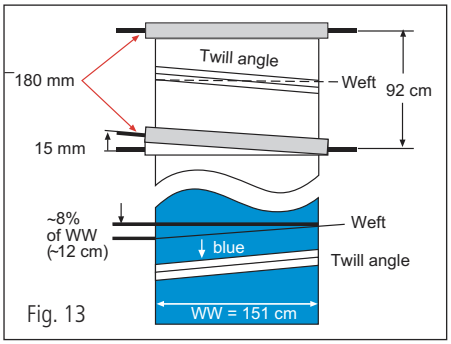


Fig. 13

The warm and damp stretching process requires far less force, making it gentler on the fabric and resulting in a better fabric appearance.

Furthermore, the residual moisture in the fabric is measured and controlled so that it arrives at the actual shrinkage process with a controlled and constant moisture content.

The benefits of these innovations are:

- Greatly reduced stretching forces
- Extremely low load on the fabric during the stretching process
- Skewing of the rolls in millimetres rather than in centimetres
- No creasing of the fabric during the passage
- Skewing takes place in a large number of small individual steps
- Higher production speeds on Eco Applicator ranges
- More precise residual moisture measurement and control upline of the rubber calender
- Wider range of possibilities for fabric treatment
- Remarkable differences in the fabric quality by comparison with competitors' products thanks to innovations and modern technologies

Cost Savings from Use of "Eco Versions"

It is interesting to compare the state-of-the-art denim ranges with the new Eco versions. If we consider the costs for denim finishing in € per running metre, we observe the following: The Eco versions are always less costly, as can be seen from Table 1. (These cost calculations are based on prices in Germany and represent only a trend. Country-specific deviations are possible)

Processing - Cost-comparison:

State of the Art: (Padder – Duplex - Can-Dryer - Sanfor)

35-40 m/min 0,184 € / m
70-80 m/min 0,157 € / m

Eco-Version: (Eco-Applicator – ThermoStretch - Sanfor)

35-40 m/min 0,132 € / m
70-80 m/min 0,117 € / m

Result:

35 - 40 m/min Eco-Version, 28,0 % less costs
70 - 80 m/min Eco-Version, 25,5 % less costs

As can be seen, the Eco range with one rubber calender and one felt calender is more economical by 28% during the production of a 14.5 oz/yd² article, and the costs per metre of finished fabric on the Eco range with two rubber calenders and two felt calenders are 25.5% lower.

The Eco versions offer the user the following benefits:

- More controllable process
- Better fabric quality
- Less steam energy
- Less electrical energy
- Lower water consumption
- Less use of chemicals
- Lower costs per running metre

Finishing of Elastic Denim Fabric

Elastic denim fabric has already established itself in the denim industry with growing market shares. Many premium denim brands employ modern stretch denim. These articles today have a more natural appearance and are no longer as "glossy".

These articles require a few treatment steps more than for normal classic denim finishing. The finishing process is therefore slightly more costly, but the prices that can be achieved are also somewhat better than for the classic denim fabric.

Apart from elastic texturised PES, e.g. "xpand" from Trevira (D) with approx. 20% stretch, yarns of elastane fibres with approx. 40% stretch are frequently used to maintain the form stability and to improve the wearing comfort.

Of the elastane fibres Dorlastan®, Lycra®, Linel®, Glospun®, Roicka®, Teplon®, etc. can be used.

From its molecular structure, elastane is a fibre with a polyurethane hard segment and a polyether or polyester soft segment, whereby the "soft segment" is responsible for the properties of the fibre. As a large number of these fibre types are encountered, it is essential to observe the information provided by the respective fibre producers with respect to controlled shrinkage and good fibre fixing. The producer should be consulted on the deviation ranges of the elastane fibres to be used in order to create optimum conditions for finishing. When selecting the finishing parameters (pH value, treatment time and mechanical influence), care must be taken from the point of view of the elastane fibres that the intended finished product data of the article are not impaired.

For denim articles, cotton blends with different percentages of elastane are used.

The Behaviour of Weft-elastic Denim Fabric

A classic denim fabric without elastane content normally has a grey width of 157 – 159 cm. The washing tests on such articles show on average

a shrinkage of: - 15% in warp direction
and - 6% in weft direction.

The weft-elastic denim fabric with elastane content can have a grey width of e.g. 180 cm and also shrinks during the washing test on average

by: - 15% in warp direction,
but by - 34% in weft direction.

This means that the fabric still had a width of approx. 119 cm after washing. And that with a desired finished width of 151 cm. The weft-elastic denim fabric therefore always has to be stabilised.

It is stabilised, i.e. heat-set in order to achieve

- A desired stretch,
- A desired weight per square metre,
- A desired finished width,
- A desired improvement in the dimensional stability, and
- to avoid cold creep shrinkage

Fixing ranges at 180 to 200°C lie in the order of 15 – 60 sec dwell time. (The fibre manufacturer's recommendations have to be observed here.)

Within this range, the fabric reacts under optimum conditions. The times cited in this articles are empirical values from the respective finishers.

The Discontinuous Finishing Method for Weft-elastic Denim Fabric

After singeing, the weft-elastic denim grey cloth (180 cm fabric width) undergoes hot washing on a washing machine where the fabric is washed and the majority of the size removed. The fabric is then predried, padded (liquor application) and then dried and fixed on a stenter. Drying and fixing temperature190°C, stentering width 152 cm. The third finishing step is the compressive shrinkage process.

The fabric to be shrunk is sprayed with water, passed over a steaming drum, skewed on a weft straightener and then fed to the rubber calender with a defined rubber blanket pressure before finally being dried on the felt calender. Instead of the spray system, the Matex ECO-Applicator can also be used for a selective moisture application. The fabric width before the rubber calender is 150 cm, the fabric width after the felt calender is also 150 cm.

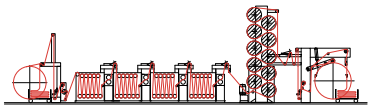
The washed shrinkage values after treatment showed:

Residual shrinkage in warp direction: - 1%
Residual shrinkage in weft direction: - 1.5%

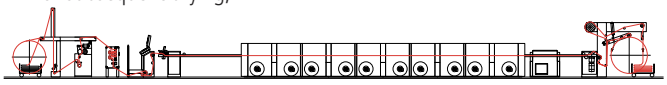
and thus lie within the range of the international standards, e.g. of Levis, Lee, Wrangler, Maverick, Mustang, General. etc.

These respectable residual shrinkage values are achieved in three separate finishing steps

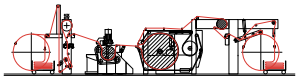
Fig. 14



a) Washing and partial desizing on a washing machine with subsequent drying,



b) Liquor application, weft straightening, drying and fixing on the stenter



c) Shrinking on the compressive shrinkage range

Fig. 14 shows the three steps of the discontinuous finishing process

The Fully Continuous Finishing Method for Weft-elastic Denim Fabric

When planning new denim finishing ranges, the wish is frequently expressed to be able to finish non-elastic and weft-elastic denim fabrics on the same range.

For non-elastic denim fabric, washing compartments have been part of the denim range for many years. For weft-elastic denim fabrics, however, not only the washing process but also the fixing process to stabilise the fabric is required.

The following points favour the use of the fully continuous method for the finishing of weft-elastic denim fabrics:

- Higher utilisation of the range
- Higher production speed
- Lower space requirement
- Lower personnel costs

The fully continuous finishing method for classic and elastic denim fabrics

The most modern, most ecological and most economical denim range version is shown in Fig. 16.

This range allows fabric webs of 100% cotton and of cotton blends with elastane to be finished. Different setting parameters are selected, depending on the quality.

The fabric passage is as follows:

After unrolling, the grey fabric is cleaned and singed. In the following washing compartments, the fabric is partly desized and the first shrinkage in the length and width of the fabric web takes place. Other processes can also be integrated, depending on the number of washing compartments.

A high-performance squeezing unit optimally dewaters the fabric web for a wet-in-wet process. Minimal amounts of finishing liquor are applied with the ECO-Applicator. A concentration check of the finishing liquor (as is necessary with the wet-in-wet process with two padders) can be eliminated here. When using the ECO-Applicator, the finishing liquor is not diluted.

The fabric is then predried in the cylinder drier unit. Residual drying, stretching and skewing are performed on the ThermoStretch stretcher and weft straightener. The

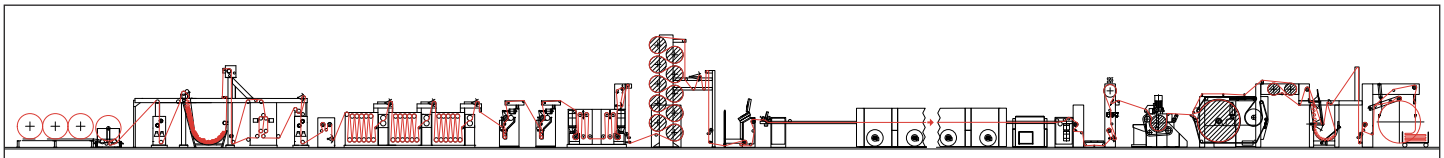


Fig. 15

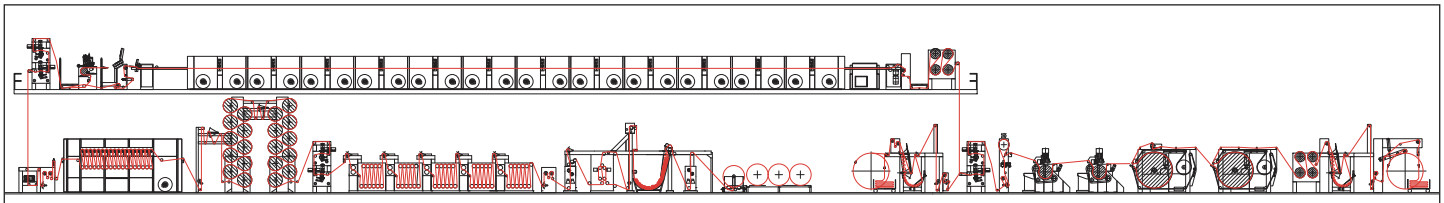


Fig. 16

Fig. 15 shows a range configuration for normal denim articles with the possibility of continuous finishing of large production quantities of weft-elastic denim fabric.

Description of the fabric passage through the range

After unrolling, cleaning and singeing (1) the fabric is washed (2), squeezed and padded again (3) (a suction bar can increase the moisture difference for the second padder passage). The Matex ECO-Applicator can also be used instead of a second padder. While non-elastic denim fabric, stretched and skewed (4) is fed from the cylinder drier (5) with controlled residual moisture to the width control via the stenter (6) and then to the rubber and felt calender (7), the elastic denim fabric has to be heat-set on the stenter.

After the fixing process, the over-dried fabric is cooled and moistened again (8) so that the fabric again has the moisture necessary for shrinking.

The delivery combination (9) with scray and Sochor winder ensures strain-free winding of the shrunk, weft-elastic fabric.

Compared with the discontinuous method, the investment costs for the fully continuous method are slightly higher, but this is the less expensive method in the costs per metre.

fabric is thereby carefully stretched in stages by passing it over rollers while skewing and stretching in small steps. The process takes place in a defined temperature and moisture climate and achieves better fabric appearances.

Compared with the conventional denim stretching technique this means: Significantly lower stretching forces, less fabric tension, better "look and feel", Higher production speed and simpler residual moisture control.

The fabric width, skew and number of filling threads is monitored by a special camera and the measured values are converted into corresponding control pulses for the range control.

The following stenter with upline Matex ECO-Applicator and a coating range is then used either for finishing, drying of the coating or surface stabilisation (fixing), depending on the article. The machine settings depend on the process to be employed. The fabric arrives at the range for the compressive shrinking process with a controlled residual moisture content or with moisture application using the Matex ECO-Applicator. Two rubber calenders and two felt calenders ensure a high production speed with gentle use of the rubber blanket and effective energy consumption. Two rubber calenders and two felt calenders are required e.g. to produce denim of 14.5 oz/yd² and 1 - 2% residual shrinkage with at least 70 m/min.

Low-tension guidance of the fabric during rolling is important for the end of the process.

Hier können Sie eine deutsche Version des Artikels laden

Competence in Denim Finishing

monforts

THINKING AHEAD
FOR SUSTAINABLE SOLUTIONS

Proven success.

The Monforts range combinations for denim finishing are now even more cost-efficient and eco-friendly: The Monforts ECO Applicator is now used for liquor application.

Drying, stretching and skewing functions for the denim fabric are performed by a modified Thermex-Thermo-Stretch unit. This configuration allows fabric speeds of up to 40 m/min to be achieved with 14.5 oz/yd² denim on the "single rubber" version.

The "double rubber" version comprises two compressive shrinkage units and two felt calenders in line. Together with the innovative Thermex stretching unit, fabric speeds of up to 80 m/min can thus be achieved with 14.5 oz/yd² denim.

On both range versions, the denim fabric is stretched and skewed far more gently than with conventional range combinations. Ask our denim technologists.

We will be happy to advise you.

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VDMA

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