

researchers as it has very similar antibacterial properties to gold and silver but is much cheaper. That's why material chemists are focusing their attentions on exploring the possibility of using copper as the ultimate antimicrobial agent. However, prior to this breakthrough, techniques for binding copper to materials like cotton for medical and antimicrobial textile production had limitations. Now, using a process called 'Polymer Surface Grafting', the research team has tethered copper nanoparticles to cotton and polyester using a polymer brush, creating a strong chemical bond. The researchers say it is this bond which has led to excellent washable properties and durability. These developments could finally see copper-covered uniforms and textiles commercialised in the future. The researchers tested their copper nanoparticles on cotton as it is used more widely than any other natural fiber and polyester as it is a typical polymeric, human made material.

## U.S. Textile Industry Calls for China 301 Tariffs on Textile & Apparel End Products

National Council of Textile Organizations (NCTO) President & CEO Auggie Tantillo testified as a witness at the Office of the U.S. Trade Representative's (USTR) public hearing on proposed China 301 tariffs in Washington.

"The U.S. textile industry strongly supports the Trump Administration's Section 301 case to sanction China's rampant intellectual property rights (IPR) theft," said NCTO President & CEO Auggie Tantillo.

"The U.S. textile industry urges the Trump administration to include textile and apparel end products in any Section 301 retaliatory tariff action against China," Tantillo added as he noted that China's predatory, illegal trade actions, including IPR theft, have contributed to the loss of millions of U.S. manufacturing jobs, including hundreds of thousands in textiles.

"China's domination of global textile markets has clearly been aided by its rampant theft of U.S. textile intellectual property. From the violation of patents on high performance fibers, yarns and fabrics to the infringement of copyrighted designs on textile home furnishings, China has gained pricing advantages through blatantly illegal activities. Putting 301 tariffs on Chinese textile and apparel exports would send a long overdue signal that these predatory actions will no longer be tolerated," Tantillo finished.

## Green Theme participating in Planet Textiles

GreenThemeInternational (GTI), the creators of sustainable and water-free textile technologies, is participating in the Planet Textiles 2018 Sustainable Summit in Vancouver, Canada. During the one-day summit, GTI will be featured as a 'real world example' of technologies that are helping to minimise water and chemical use in textile processing. During the one-day summit, GTI will be given a platform to submit its own innovative, compelling and entirely new manufacturing ideas with its 'real world' business experience. The mission-aligned businesses and organisations will bring together business trailblazers in the sustainable textile industry from North America, Europe and Asia to share and implement radical new environmental initiatives and business models in the textile supply chain. "GTI is pioneering water-free textile finishing which entirely eliminates water and harmful chemicals from the process—and has a zero waste stream," said GTI's president, Martin Flora. "To achieve this simple goal requires rethinking traditional processes and implementing new technologies."

## May 31 deadline for registration of chemicals under REACH

May 31 is the final deadline for companies to register all chemicals manufactured, imported or placed on the EU market above one tonne per year, under REACH—the European Regulation on Registration, Evaluation, Authorisation and Restriction of Chemicals. Without registration, substances cannot be manufactured or imported into the EU beginning June 1, 2018.

REACH applies to nearly all chemical substances, including textile chemicals. This key EU legislation on chemicals aims to improve the protection of human health and the environment, promote alternative methods to animal testing as well as ensure the free circulation of substances in the internal market while enhancing innovation and competitiveness of the EU chemicals industry.

In line with "the polluter pays principle", REACH shifted the burden of proof to industry, making it responsible for the safety of chemicals along the supply chain.

REACH requires new forms of cooperation among companies, enhancing communication along the supply chain, as well as developing tools to guide and assist companies and public authorities in its implementation.

minds,” said Australian Wool Innovation CEO Stuart McCullough. “Thanks to the support of leading brands and retailers, along with educational activities, Wool Week aims to reconnect consumers with the versatility and natural benefits of Australian wool and encourages conscious purchasing decisions.”

“Australian wool has a great story to tell. As global consumers become more concerned with the story behind a product - where, what and how it was made - the fibre’s natural, renewable and biodegradable properties are today more important than ever before. I applaud all retailers, brands, woolgrowers and consumers who have once again thrown their support behind our annual campaign and are ultimately increasing demand for this luxury fibre,” concluded McCullough.

## Archroma working with House of Denim Foundation

Archroma, a leader in colour and specialty chemicals, has joined hands with the House of Denim Foundation, a non-profit organisation that initiates projects to make the denim industry cleaner. Under the partnership, Archroma will make yearly financial contribution to the Foundation’s Denim City and will share its expertise and network with House of Denim.

House of Denim works to make the denim industry cleaner, dryer and smarter through education, research and innovation, enterprise and networking, under the motto “Towards a Brighter Blue”. House of Denim has established the Denim City in Amsterdam, an innovation campus for the denim industry with facilities such as the Blue Lab, the Academy and the Jean School.

Archroma has made remarked contributions to the denim industry with cutting-edge dyeing technologies and products that bring together creativity, performance and sustainability. Archroma offers a complete solution package combining eco-advanced colours, auxiliaries and finishes, such as its ADVANCED DENIM, a sulfur dyes based concept allowing massive water and resource savings, used by brands such as Patagonia.

## SSM part of eight major expos in four months

SSM (Schärer Schweiter Mettler AG), a leader in yarn processing and winding and Swiss developer of patents

in electronic yarn guiding systems, has participated in eight exhibitions in four months this year. In Colombia, Bangladesh, Japan, Russia, Indonesia, Vietnam, Turkey, and Pakistan, SSM displayed its solutions for yarn processing and winding.

The exhibitions in Colombia, Bangladesh, Russia, Indonesia, and Pakistan took place on joint booths of the SSM representatives. During the shows, SSM met many existing and also potential new customers who showed interest in their products. Thanks to the great effort and support of the SSM agents, the exhibitions have been a great success. For Japan Yarn Fair and Saigontex, SSM had their own booth with the kind support of their local representatives. There, the main focus was given to the high range of possibilities SSM customers could profit. With final packages, wound on SSM machines, as well as knitted textile samples the visitors could feel the difference. The biggest appearance of SSM was at the ITM in Istanbul, where they combined the sample bobbins and textile (made on the TG30-ETC) with the winding and yarn process machines, such as DP5-T for creating slubs and neps, the XENO-AC for air covered yarns or the XENO winding and doubling machines including DIGICONE 2 for higher dyeable package densities. Last but not least, the PWX-MTC, SSM’s latest machine for rewinding of highly elastic yarns on muffs or hanks, was displayed.

Overall, SSM had a successful appearance on the shows around the globe in the first four months and they are looking forward to the exhibitions to come, in order to serve the market with their latest and best solutions for the textile industry

## Infection outbreaks at hospitals could be reduced by copper-coated uniforms

Material scientists at The University of Manchester, working in collaboration with universities in China, have created a ‘durable and washable, concrete-like’ composite material made from antibacterial copper nanoparticles. They have also developed a way of binding the composite to wearable materials such as cotton and polyester, which has proved a stumbling block for scientists in the past. Precious metals, such as gold and silver, have excellent antibacterial and antimicrobial properties, but their commercial use in textiles is prohibitive due to extremely high costs. That means copper is the material of choice for



# World Textile News

## Garment products dominate across textile businesses: FESPA

Garment products dominate across all textile businesses, with sports apparel, textiles for garments and fast fashion topping the growth applications leader board, according to the FESPA 2018 Print Census. Digital adoption for textile is slower than in other segments and production is still dominated by analogue processes across all textile-related segments. The 2018 Print Census was developed to arrive at a more detailed picture of the growing textile segment. Respondents include screen print businesses with a focus on textile applications, dedicated textile producers and direct-to-garment businesses.

Among printers focused on textile, 56 per cent have made digital investments, and 19 per cent plan to do so in the next two years, aiming to reap the benefits of reduced time to market, customized creative collections, prototyping, and a positive impact on environmental footprint by reducing water and energy consumption. Screen and textile printers expect digital's contribution to textile printing revenues to grow by 12 per cent in the next two years. About 83 per cent of respondents stated that they are optimistic for the future of their business, as per the FESPA report.

## Woolmark to celebrate Wool Week from May 24

Woolgrowers, fashion designers, retailers and consumers will unite to celebrate The Woolmark Company's

WoolWeek Australia beginning May 24 to June 3. With Australia producing 90 per cent of the world's fine apparel wool suitable for the high-end fashion market, some of the country's biggest labels and retailers are supporting the campaign.

This initiative arose from the global Campaign for Wool; Wool Week champions the eco-credentials of the fibre, making it the perfect choice for today's conscious consumer.

Westfield will also join the campaign as a major partner, releasing its wool-focused winter campaign in time for Wool Week at 39 centres across Australia and New Zealand celebrating the growers who produce the fibre and the designers who use it. Championing Merino wool in fashion, activewear and homeware, the campaign showcases wool's natural benefits and takes customers back to the source of the fibre, filmed on a wool-growing property near Goulburn, NSW, owned by Dave and Skye Ward.

Nine Westfield centres across Australia and New Zealand will come alive during Wool Week, hosting exclusive events and activations including extreme knitting workshops, visual merchandise displays showcasing retailer wool product, interior design workshops, and fashion exhibitions. Westfield Sydney will host artist, Natalie Miller, who'll create a live knitting installation, whilst Westfield Doncaster will showcase a collection of International Woolmark Prize garments, in a celebration of the world's best emerging fashion designers, Woolmark press release said.

"The Woolmark Company's Wool Week is an annual celebration which puts wool at the forefront of shoppers'

averaged 2.5 million bpd in 2017, BMI Research said.

Iran is home to the world's largest reserves of gas and is the Middle East's third-largest oil producer. When some US-European sanctions on Iran were lifted in 2016, it managed to reinstate its production capacity to pre-sanctions levels and boost its exports to Europe and Asia.

But President Trump's withdrawal from the agreement is set to cause Iranian economic growth to decelerate. Barely a fortnight since the decision was announced, French oil major Total said this week it may have to sell its stake in a \$4.8 billion Iranian gas deal to avoid being penalised by the US sanctions. Total has a 50.1 per cent stake in the 20-year South Pars project, alongside China National Petroleum Corporation, which holds a 30 per cent and Iran's Petropars which has a 19.9 per cent stake.

## Another wasted opportunity for Iran's economy

Iran is loaded with economic potential, but as President Donald Trump pulls out of the multi-stakeholder P5+1 agreement, it is difficult to see whether that potential will ever be realised. Iranian officials are trying to put on a brave face.

Central Bank Governor Valiollah Seif said that pressure from Washington will not cause collateral damage to this emerging market economy, but that may be wishful thinking. A great deal will depend on two key factors: whether other signatories to the agreement will have a stiffer backbone and resist pressure to bow out of the deal and whether global companies with large exposure to the US market believe planting a flag in Iran is worth all the potential risk.

France's Total, the largest western energy company to invest in Iran, has indicated that it will not proceed with its joint-venture unless the US provides a waiver. Joe Kaeser, chief executive of Siemens, outlined the hard realities, trying to balance business and values is nearly impossible at this juncture.

"I always made it clear there is a primacy of a political system and if this primacy is that "this is what we are going to do", then that is exactly what we are going to do and everything else we need to take from there," Kaeser said. Siemens garnered 20 per cent of its \$98 billion global revenues from the US and while Iran's market of 83 million consumers is no doubt enticing, he is working on the assumption new business cannot be pursued. "So as far as we can see right now, all ongoing orders which have been placed ahead of time can still be served but there no new orders which we can take," added Kaeser.

The potential bounty in Iran is sizeable. The country sits on 9

per cent of the world's proven oil reserves, double that level in natural gas and an estimated \$1 trillion in untapped mineral assets. Amir Hossein Zamania, Deputy Petroleum Minister, told me last July that the government was aiming to raise \$200 billion for oil and gas development alone by 2025 and they seemed determine to stay the course.

But there is much more at stake than energy assets. Boeing and Airbus were looking at combined orders of up to \$40 billion for 210 jetliners. Iran was beginning to shape a new infrastructure policy with badly needed rail lines and train orders. It's often overlooked, but Iran is a formidable car manufacturer and the 13th biggest steel producer in the world. As one fund manager suggested, it's like Germany, loaded with natural resources. Promising indeed, but major players like BP decided to let the wrangling over the nuclear agreement run its course before making a move; which two years into the lifting of sanctions looked very wise.

"We did have a history, the company was founded there back in 1908, but there's only so many places you can invest, with a disciplined capital framework, and that one just looked difficult to us," said Bob Dudley, BP's Chief Executive.

The Iranians have watched their GDP shrink by 10 per cent during sanctions and household incomes falling even further, at an estimated 15 per cent. President Hassan Rouhani promised a pot of gold at the end of the rainbow to the Iranians when the nuclear agreement was signed. Worker protests on May 1 were just the latest indication of their frustration. But they are not venting solely about international economic isolation, but a lack of domestic reforms which the International Monetary Fund suggests are long overdue.

While the US is the largest economy in the world with a central bank that governs the global trade in dollars, one should consider the other signatories to the deal will unlikely turn their back on Iran.

China for one seized the opportunity during sanctions to invest in Iran's oil sector. At the end of April, Russia's President Vladimir Putin met with Rouhani and signed a multi-layered agreement for the development of oil and gas. They will not want to hand back their chips in a high stakes game of political influence.

European governments are pledging to stay engaged in Iran but how that is manifested is still not clear.

During my interview with Kaeser of Siemens, he shared a rare personal view of the move by the White House. It's certainly designed to rein in what the US President says is an expansionist Iran, but the German chief executive told me the region may not be better off.



# Iran Textile News

## Iran envoy for enhanced trade ties with Pakistan

Ambassador of Iran to Pakistan, Mehdi Honardoost, has said that Iran and Pakistan should concentrate on trade and economic activities to further improve bilateral relations. "Iranian Free Trade Zones have great potential for Pakistani businessmen and they should avail this opportunity through joint ventures," the envoy said.

The Iranian ambassador said that Iran and Pakistan have multi-functional and multi-aspect relations. Both countries should adopt new approach. He said that though trade between the two countries is growing gradually but still it is below the potential.

He said that business organizations of the both countries should be given wake-up call so that they can play their due role for the strengthening of trade and economic ties between the two countries.

He said that Iran can help meet energy demand of Pakistan. He said that negotiations for establishment of banking channel and currency swap are well on the way. He said that China Pakistan Economic Corridor is a big achievement that would also help reduce tension in this region. LCCI President Malik Tahir Javaid said that the bilateral trade has not reached its desired level which was promised during the visit of President Hassan Rouhani between the two countries and there is a dire need to close the communication gap among the business community on both sides.

He said that the balance of trade has always been in favour of Iran because oil was the major item of import from Iran.

Malik Tahir said that Pakistan's exports to Iran are not picking up. From the last three years, these have been well below \$ 50 million. There are many avenues such as meat, fresh fruits and

vegetables and textile products that can increase economic activity with Iran.

He applauded the efforts of Iranian ambassador for initiating direct flights from Lahore, Karachi and Islamabad to Tehran and Mashhad. He urged the Iranian ambassador to bring forward the telecommunication companies from Iran, since the talk time from Pakistan with Iran cost almost 3 times as compared to other countries.

## Iran's economy to deteriorate following the re-imposition of US sanctions, BMI says

Iran's economy is expected to slow this year as oil exports and foreign investment inflows ebb after the US withdrawal from the nuclear agreement and subsequent expected re-imposition of sanctions on the country, according to BMI Research.

"Already-limited foreign investment inflows will be further discouraged by elevated political uncertainty and risks of US penalties and reputational damage," said the report by BMI Research, part of the Fitch Group.

BMI Research downgraded its Iranian real GDP growth forecast to 3.1 per cent in 2018 and 0.8 per cent in 2019, from 4.3 per cent and 4.5 per cent previously, following President Donald Trump's decision to end US participation in the nuclear deal that came into effect in 2016.

Iran is likely to experience depreciatory pressures on the rial and rising inflation as a result of lower foreign currency inflows that will constrain domestic investment and consumption.

US sanctions are also likely to cause a drop in Iranian oil exports by around 500,000 barrels per day from late 2018, after having



## Press release: ITM 2018

### Marzoli: successful participation at ITM 2018

Between April 14<sup>th</sup> and April 17<sup>th</sup> the international textile community gathered at Tuyap Convention Center in Istanbul for ITM 2018. Marzoli, the European manufacturer of the full line of machines for spinning of short staple fibers, attended the event and during the 4 days of the show recorded an outstanding number of visitors from the domestic and the international market.

“The number of visits at this edition of the show has been incredible. The importance of the show, the constant commitment of Marzoli towards each one of its clients and potential customers, the great work of our partners in promoting our presence at the show and the machines exhibited at our stand have underpinned this success”, Francesco Gozio, from Marzoli’s marketing department states.

Marzoli during the show exhibited the following machines: the card C701, the comber CM7, the spintester MST and its 2 software platforms for the control and the optimization of the entire spinning line.

For the card C701 the show was the occasion to highlight its outstanding geometry. The carding area of 3.74 sqm, thanks to the diameter of the main cylinder of 1 meter, the carding angle of 284° and the working width of 1.5 meters, allows a better distribution of the fiber and a lower carding density. The 32 revolving flats in working position guarantee outstanding carding effectiveness and their settings and carding gaps are held constant through the cast iron structure. All these highlights were readable on the graphics printed on the covers of the card displayed at the show.

The CM7 was showcased to let the visitors of Marzoli’s stand appreciate its speed and excellent quality outcomes made possible by, among other features, the state-of-the-art kinematics, the lighter nippers, the accelerated motion of the circular comb and the standing pendulum movement of the nippers. The spintester MST, a state-of-the-art spinning machine with independent drives all controlled electronically to guarantee the highest flexibility standards, was exhibited with Marzoli compact system, Mac3000. This revolutionary apron compact system with auto-cleaning effect of the holes of the apron has an independent suction system with frequency controlled motor fan which allows to set the right compacting effect for a wider range of fiber types and yarn counts.

In the control room installed at the stand, visitors were invited to learn more about Marzoli’s software platforms: YarNet and MRM.

YarNet is the software designed by Marzoli to register and elaborate all production data and technological parameters of the machines in real time in one simple, intuitive and well-structured interface and to allow the user to interact directly with each and every machine of the spinning plant by downloading, editing and uploading any production recipe.

MRM is the IoT software that analyzes the symptomatic data gathered by processors and sensors installed in critical parts of the machines to constantly monitor their efficiency. The client can access the software platform to see the information for predictive maintenance of the machines and the overall efficiency of the plant. Optimization tools are available to help the user identify possible opportunities to boost energy savings and efficiency rates.



# Mimaki®

## **TIGER-1800B** Industrial high speed textile inkjet printer



## **‘Earn Your Tiger Stripes’ with Mimaki Tiger-1800B Production- Class Textile Printer**

The Mimaki Tiger-1800B production-class textile printer now makes high-volume digital printing, which could only have been achieved with analogue printing possible, while offering personalization and high quality as well. End-users are expanding their boundaries with Tiger stripes that give them a different identity.

Mimaki, a leading manufacturer of wide-format inkjet printers and cutting systems for the signage/graphics, textile/apparel markets, responds to the high volume production requests of the textile and apparel industries with its comprehensive product portfolio. The Tiger-1800B attracted a great deal of attention from apparel professionals, and brought a fresh breath to digital printing. Being the first model to respond to the high volume production requests only possible with analogue printing to date, The Tiger-1800B offers low cost, flexibility, efficiency and customization advantages of digital printing to mass manufacturers.

With a printing speed of up to 385 square meters per hour, this production-class textile printer is available in direct to textile printing (reactive ink) and sublimation (heat transfer) versions. End-users can benefit from the possibility of working with dozens of fabric types produced from natural or artificial fibres, the possibility of mass production as well as sample printing, and cost reducing features such as technical applications and apparel printing with Tiger-1800B. Their motto ‘Earn Your Tiger Stripes’ foretells new opportunities and limitlessness in production.

press  
release

# Mimaki Eurasia: The Name of Success at ITM 2018



Participating in Turkey and the surrounding region's most important textile technology exhibition ITM 2018, Mimaki Eurasia, attracted a lot of interest during the exhibition with their digital printing solutions. The press meeting, which was held on the first day of the event, was very crowded thanks to the full participation of domestic and foreign media.

Mimaki Eurasia has announced that it has obtained successful results from Turkey and the region's largest and most important exhibition for textile technology ITM 2018, where they have directly participated for the first time. Mimaki succeeded in attracting great attention with both solutions presented and their concept in Hall 6, 604B and C at the exhibition held in TUYAP from April 14th to 17th. Welcoming visitors in the same booth with their textile dealer A.I.T. and DigiMania, Mimaki showed the textile industry 'digital opportunities' during the 4-day exhibition.

Innovative textile printers as well as the special area where the applications were exhibited became the focus point in Mimaki Eurasia booth, in which the decision makers, investors and designers from the textile industry showed great interest. Developed for direct inkjet printing, the Tx300P-1800 and Tx300P-1800B enable very efficient and cost-effective textile printing. Suitable for a wide range of applications from fashion and clothing to home textiles, promotional prints to PoS products, the Tx300P series offers flexibility and competitive advantage to its users.

Another outstanding solution for the Mimaki Eurasia booth was the TS500P-3200 transfer printer. Mimaki's newest wide format transfer paper printer combines high productivity with speed and quality. The Mimaki TS300P-1800 offers high quality in sublimation printing and a two-year full guarantee.

## Mesh

Mesh is a fabric which includes a certain amount open spaces; a typical mesh is about 85 percent material and 15 percent holes although different mesh fabrics will vary in weight and hole size. Mesh is beneficial in sportswear as it provides good comfort and stretch and allows air to circulate and reach the skin meaning that it is ideal for ventilation areas of a garment, especially for places where heat accumulates very, ideal for sportswear. Both are the same fabric but with slightly different hole shape.



## Neoprene

Neoprene is a foam like synthetic rubber made from polychloroprene chemicals. It doesn't fray, is a good insulator and is water resistant. There are two types of neoprene: open cell and closed cell. Closed cell neoprene is cheaper and is the most common type; it consists of nitrogen filled separated bubbles and allows a small amount of water to pass through which is heated by the body. This type of neoprene is lined and is suitable for people who will stay continually active in the water so that body heat continues to keep the layer of water inside the suit. For very cold conditions and for activities where there is waiting around, open cell neoprene is the appropriate option. Open cell neoprene is raw (unlined), softer and more flexible than closed cell which is rigid and strong. Open cell is made up of interconnected air spaces and works by clinging tightly to the body. It can contain up to 98% still air inside it giving good insulation to weight properties. Open cell is more insulating and depending on the thickness and type, can be used for deep sea diving and for staying in the water all day. Neoprene is used for water sports and is now very fashionable for casual sporty type clothing and swimwear. Our neoprene is 2mm thick and the front and back of the rubber is covered with a polyester and spandex material.

## Waterproof

Water resistant fabrics are used in outdoor sports to protect from weather elements. If a fabric is waterproof then it is likely to be wind resistant also. Some fabrics are water repellent meaning that they do not allow the ingress of only a certain

amount of water. If a fabric can resist a water pressure of at least 13,000 pascals then the fabric can be classed as fully water proof. PU coating is one way of waterproofing a fabric and is suitable for jackets and tracksuit bottoms.

Below is one of our lighter weight water resistant fabrics. This 100% polyester 4oz fabric has a polyurethane coated back and is ideal for water proof clothing such as raincoats and jackets.

## Micro fibre

Micro fibre fabrics are essentially fabrics made from extremely

fine fibres. A fabric can be classed as a microfibre if its fibres have a linear density of less than 1 denier. You can make a comparison of how fine this actually is when you think of how thin 15 denier tights are and therefore how small 1 denier is in comparison; also a micro fibre is 100 times finer than a human hair! Microfibre fabrics are usually made from polyesters, polyamides or polypropylenes; they are made from manmade fibres because they are so small that natural fibres cannot be this small. The fineness of the fibre means that many more fibres are needed to make up a yarn.

Microfibre fabrics make useful luxury sport fabrics due to their all round brilliant properties including being lightweight, having a luxurious drape and are breathable whilst still being resistant to rain and wind. You can order a sample of our polyester microfibre fabric which is ideal for trench coats and sports jackets.

## Sports fleece

There are a few variations of fleece which come in different weights and have different naps, some longer or more textured than others. The fabric pile traps a lot of still air making it an insulating fabric. Fleece fabrics are used in sportswear often for tracksuits, hoodies and zip tops. The fabric does not fray making it very easy to sew (unless it is extremely thick) and the grain line runs parallel to the selvedge. Two of our fleece fabrics, practical for sports clothing include which is a tightly knitted fabric with some 'give' to it and has a fine brushed nap. Another is the hoodie fleece fabric which is similar but slightly stretchier and has a moderately softer and thicker nap.



Dr. F Nayeb Morad



# Fabrics for Sportswear

Sports fabrics are technical materials which help to keep the wearer comfortable during exercise. The type of fabric required will depend upon the intensity of the exercise and the activity. Yoga clothing should use fabrics with good stretch ability for easy movement which will likely require the fabric to be of a knitted construction. Apparel for long distance running will keep the wearer in good comfort if it has excellent moisture wicking properties to enable sweat to transfer from the inside to the outside for the garment. Performance clothing for outdoor sports in the winter or snow sports ought to use breathable fabrics with very good insulating properties.

## Thermal Insulation

Fabrics with good thermal conductivity are not good insulators, therefore these fabrics will be cooler to wear. Air is one of the worst conductors of heat which is why the more still air a fabric can trap, the warmer it will keep you.



## Water Vapour Transmission

When high intensity exercise takes place, sweating will occur to evaporate heat off the skin. If clothing is not breathable than there is nowhere for the moisture to escape. This causes moisture to build up inside the garment and on the skin

resulting in the body getting hotter. Another consequence is when exercise decreases and heat stops being generated from the body, the moisture (which is less insulating than still air) will then increase heat loss rapidly, especially in a cold environment. From this we can conclude that clothing needs to prevent rain and wind from getting in but at the same time allow moisture from the inside to escape out. This process is known as water vapour transmission and fabrics which are able to do this are known as waterproof breathable fabrics.

## SPORTS FABRICS

### Lycra

Lycra is Du Pont's brand name for elastane. It is a synthetic fibre which is always combined with another fibre in a fabric. Lycra is not used as the majority fibre for the reason being that even a small amount (as little as 2 percent) can provide considerable stretch and give fabric a better drape. Lycra is renowned for its ability to be stretched four to seven times its original length and will still return to its normal state and length when released. Other admirable properties of Lycra include its resistance to sunlight, sweat and improvement of comfort, ease of movement and shape retention when used in a fabric. Lycra by itself looks like a continuous filament, yet actually contains lots of tiny filaments put together, which are made up of stretchy and rigid molecules to make it both soft and strong. Elastane can also be used in sportswear for compression garments which are used to improve blood circulation, reduce lactic acid and DOMS and it can also be used to help hold a garment up. When considering buying Lycra, heavier weight Lycra fabrics will be less see-through when stretched. We supply Lycra fabrics including an 80% Nylon, 20% elastane fabric in lots of brilliant colours. Another fabric we have which is very similar but not as shimmery is PBT (polybutylene terephthalate). This is a type of polyester with stretch and tactile properties very similar to Lycra. It is also resistant to salt water, chlorine and colour fading which is why this fabric is suitable for swimwear.