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ITMA Sustainability Bulletin

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ITMA: The Countdown Begins

As we move deeper into the ITMA year we see everywhere the intensive R&D activity that is always a feature of the run-up to this landmark show. Most of this effort is focused on 'efficiency' and 'productivity' – broad terms that often signal the goal of reducing water, energy and material usage and are therefore at the heart of sustainability in the particular conditions of the textile manufacturing industry.

Sustainability as applied to the sourcing and application of materials is a topic we have been hearing a great deal about in recent years. In the markets for both natural and man-made fibres the origins of fibre have come under scrutiny, leading to the expansion of the organic movement, the establishment of a variety of 'eco' labels and the increasing application of synthetic fibres made from recycled polymers. In this developing

process, textile technologists are also being encouraged to consider what will happen to their products at the end of their lifetime, and recycling of textile materials is one of the topics that will feature in the newly added Hall 8 at ITMA 2015 in November.

No one will deny that the textile industry still has a long way to go in improving its overall environmental performance, but two initiatives in the Indian subcontinent – both featured in this edition of the Bulletin – show what progress can be made with commitment and collaboration. In one we describe plans for a space-age 'eco' factory, based on designs that mimic the structures of nature. In the other we report how Bangladesh plans to invest to solve its many textile related sustainability problems, but especially the efficiency of its dyeing and finishing sector.



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Sustainable Standard for Wipes

UL Environment, a business division of UL (Underwriters Laboratories), has launched a new standard, UL 2883, which establishes human health and environmental criteria for the certification of disposable wipes designed for a range of household and other applications (excluding personal care wipes).

ECOLOGO certification to UL 2883 will help end-users and professional purchasers identify sustainable wipes that reduce their impact on the environment and human health, and will allow manufacturers to differentiate themselves in a marketplace in which certifications are more and more impactful to purchase behaviour and brand perception.

"The launch of the first-ever UL standard for disposable wipes enhances our portfolio of standards for the janitorial/sanitation sector and allows us to offer more complete solutions to manufacturers," said Lisa Meier, vice-president and general manager at UL Environment.

"This standard includes key criteria relating to environmental leadership in the manufacturing and end-of-life impacts of disposable wipes, including energy use, water pollution and resource use."

The standard includes: all disposable wipes, both woven and nonwoven, made from either natural or synthetic materials and fibres, designed and used primarily for cleaning, dusting or sanitising surfaces or tools; or for targeted absorbency tasks, including those used for industrial, institutional and health service, food service, household cleansing and technical applications (automotive, for example). The standard excludes: reusable wipes and disposable wipes used for personal or skin care (baby wipes, facial cleansing wipes or wipes designed primarily to deliver a personal care or health product); wipes designed for use in the care of animals or pets (pet dental wipes, pet eye wipes); and wipes made from 100% wood pulp, as these are covered under the UL 175 Sanitary Paper Standard.

Oeko-Tex Revises Standard 100 Test Criteria for 2015

At the start of the year, the Oeko-Tex Association has updated the applicable test criteria and limit values for product certification in accordance with Oeko-Tex Standard 100. After a three-month transition period, the following new regulations will come into force on 1 April 2015 for all certifications:

- The limit value for the sum of nonylphenol (NP), octylphenol (OP), nonylphenol ethoxylates (NP(EO)1-20) and octylphenol ethoxylates (OP(EO)1-20) will be significantly reduced in all product classes. The complete exclusion of NP and OP, as well as alkylphenol ethoxylates from textile production is something the textile industry is striving for.
- The specifications for perfluorooctanoic acid (PFOA)

will become much more stringent, with the following upper limit value: product class I to IV: < 1.0 µg/m².

The limit value for perfluorooctane sulfonates (PFOS) will also change to < 1.0 µg/m² in all product classes.

- In the future, there will be differences in the check for chromium (VI) in leather and in other materials. The requirement for leather materials with regard to chromium (VI) will be < 3.0 mg/kg (ie. below the limit of detection) in every product class of the Standard 100. For other materials, the previous requirement of < 0.5 mg/kg will continue to apply.
- As is already the case in product classes I to III, only flame-retardant products that have up to now and by current technological standards been deemed



Sustainability Briefing

harmless to health and that are included in the list of products accepted by Oeko-Tex can be used in product class IV (decoration materials) in the future.

- The limit value for the total content of cadmium after total digestion of the test sample will be reduced to 40 mg/kg as standard in all product classes, meeting Washington state's 'Children's Safe Product Act' requirements for cadmium, the strictest law in this area worldwide.
- Formamide will be added to the standard as a new test substance for compact foams and foamed plastics such as EVA and PVC under the heading 'Solvent Residues'. The limit value will be 0.02% (200 mg/kg) in all product classes.
- The footnote for arylamines under the heading 'Other Chemical Residues' will be changed to provide further clarification that materials that contain the free carcinogenic arylamines listed in Annex 5 cannot be certified.
- Dihexyl phthalate, branched and linear (CAS no. 68515-50-4) and diisohexyl phthalate (CAS no. 71850-09-4) will also be included in phthalates/softeners in all four product classes.
- C.I. Pigment red 104 (lead chromate molybdate sulphate red) and C.I. Pigment yellow 34 (lead sulfochromate yellow) will be added to the list of colorants classed as carcinogenic and that are therefore prohibited in Annex 5 of the Standard 100.



Oeko-Tex Lab

Danish EPA to Reduce Hazardous Chemicals

The Danish Environmental Protection Agency (EPA) has entered into partnership with a number of textiles manufacturers with the aim to reduce the volume of hazardous chemicals used in the production of textiles. The main objectives of the group will be to help companies to set environmental criteria for chemical use by suppliers and to utilise existing technologies and identify new technology areas that reduce the use of hazardous chemicals.

The Danish Fashion Institute is accompanied by 28 other participants and held its first meeting at the end of January at their headquarters. Jonas Eder-Hansen, development director at the Danish Fashion Institute, said that the partnership will ensure it is relevant to small fashion firms as well as large companies. Clothing company Bestseller, which is one of the 29

participants, commented that the companies at the meeting discussed how they could achieve the partnership's goals in practical terms. New technologies and increasing the efficiency of existing technology was a focus for the group.

At the end of 2014, a chemicals cooperation agreement was established between Denmark and Sweden, which includes work on chemicals in textiles. Isabelle Navarro Vinten, head of the EPA's chemicals division, said that the experiences and results of the partnership will play a part in the exchange of knowledge with Sweden and the other Nordic countries.

A draft plan explaining how the partnership will proceed with its aims, and which chemicals it intends to target, is scheduled for release in October this year.



Lacoste Abandons Angora Wool

French clothing company Lacoste has confirmed that it is removing all angora wool products from its collection and has asked to be added a list of ethical retailers published by People for the Ethical Treatment of Animals (PETA).

"As part of the CSR policy, we can confirm that Lacoste has no plan to use angora fibres in its coming collections," the company said in a statement.

PETA director Mimi Bekhechi, said: "Angora production is cruel, and PETA urges the few remaining retailers, including Benetton, to learn from Lacoste's experience and show that cruelty to animals has no place in their stores." An investigation by PETA Asia has shown that rabbits often suffer during the shearing process and are wounded by the cutting tools. The organisation has also criticised the way in which the animals are housed.

Factory of the Future

Dutch technical-textile giant TenCate has opened its innovation centre, 'The Factory of the Future,' which will be the focus of a programme to develop environmentally friendly, smart production processes, aimed at nothing less than a revolution in the textile industry.

Within this process, TenCate will work with many regional partners in The Netherlands, including Norma Group and Gemini Electronics, as well as Italian textile printer supplier Reggiani Macchine. TenCate's ultimate aim is to save resources by creating an automated production process that is both in-line and on-demand, with digital technologies applied to the coloration and finishing of fabric. With its partners it has already developed a drop-on-demand textile printer, using UV-curable inks, which can print 400 million drops a second on fabric for outdoor applications. Its factory also houses a continuous-flow inkjet machine, which can apply

functional finishes at high speed. President and CEO Loek de Vries said: "Digital finishing is the key technological innovation of this century for the textile industry. The drop-on-demand and continuous-flow techniques enable several substrates to be digitally finished, using fluids such as inks and

coatings."

Shortly after the launch, TenCate Outdoor Fabrics announced an order for digitally finished tent and awning fabrics from Rent-a-Tent, for use in the manufacture of bungalow tents that will be rented to camping enthusiasts across Europe.



TenCate print for Rent-a-Tent



Adidas Scores High on 'Clean Capitalism'

Adidas is the only textile or luxury goods manufacturer to make it into the 2015 Global 100 – a league table of sustainability performance published by 'Corporate Knights', described as 'The Magazine for Clean Capitalism'.

The sportswear brand comes at No. 3 in the list, with a mean score of 72.6%, and is just behind biotechnology firm Biogen Idec and pharmaceutical company Allergan.

The absence of textile producers from the list is perhaps not surprising, as the criteria used

include both energy productivity (US\$ revenue/gigajoule) and water productivity (US\$ revenue/cubic metre), two commodities that the industry struggles to avoid. In fact, however, adidas beat the top-two ranked companies on both these measures but fell far shorter on 'innovation capacity', where it scored only 0.9%, against 22.9% and 16.9% respectively for the other two – a paradoxical comparison, given the high-tech reputation of this and other leading sportswear brands.

Other criteria used were:

- Waste productivity
- Percentage tax paid
- CEO to average employee pay
- Pension fund status
- Lost time injury rate
- Number of fatalities
- Employee turnover
- Percentage of women board directors
- Percentage of women in executive management

Clean capitalism pay incentives

Retailers on the list include Marks & Spencer (16) and HM Hennes & Mauritz (75). Textile enzyme producer Novozymes is there at 43.

Insight

Biomimetic Design for Indian Zero-Waste Textile Factory

Exploration Architecture, a company that specialises in biomimicry, has completed its design for a sustainable factory in Nagpur, India, that aims to address both the human and environmental challenges facing the country's textile industry. The innovative building should radically reduce energy and water usage and the design team's goal is to create a zero-waste factory that is also an inspiring environment in which to work.

Exploration said its client – whose identity is confidential, but which trades almost exclusively in high quality cotton for overseas markets, with a significant proportion of the output being either printed and dyed – is a

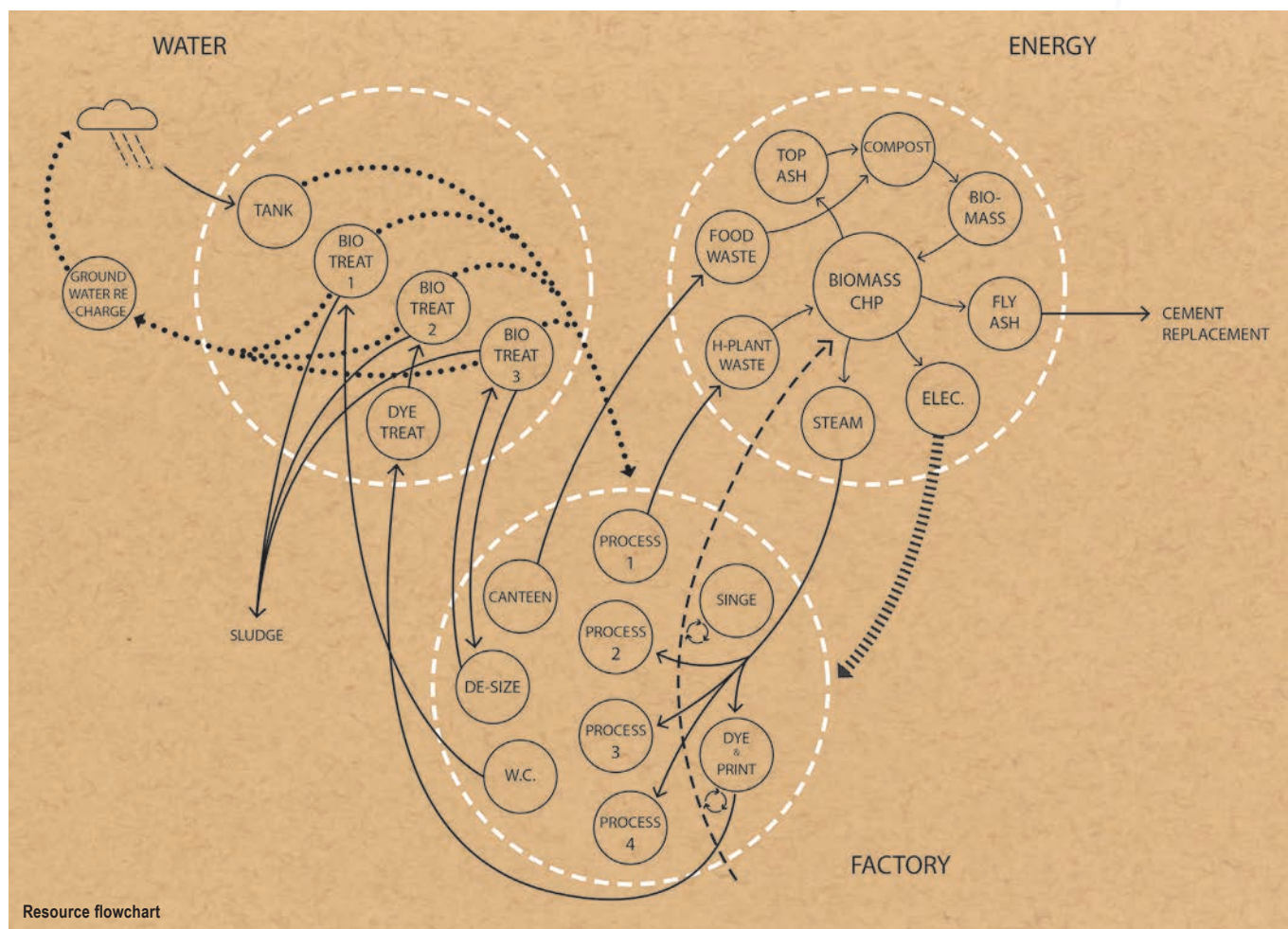
pioneer of sustainable thinking and challenged the architects to change the paradigm for factories in India: "The structure should be designed and engineered to use the least material possible and should provide a world-class environment for the 600 people who will work at the factory...

AND be a viable, sustainable and profitable business."

Textiles is a water and power intensive industry, which makes the project all the more difficult because the client's aim is to channel all waste into a circular or closed-loop system, in order to get as close to zero waste as



Impression of the proposed building



Resource flowchart

possible.

Commenting on their inspiration for the project, the unnamed client said: "I tried to find an architect in India that could design what I envisaged and came to the conclusion that I would need to look internationally. In fact, I only found two firms globally that I felt really understood closed-loop design and one of these was Exploration. A friend of mine who edits a design magazine actually gave me a copy of Michael Pawlyn's book *Biomimicry in Architecture* and it was this that convinced me of their specialist skills." The closed-loop system impacts on the development in a number of ways. The key drivers for the design of the building (including the materials) were as follows:

- Create the best conditions for

people working in the building

- Maximise the production of renewable energy
- Minimise the use of physical resources.

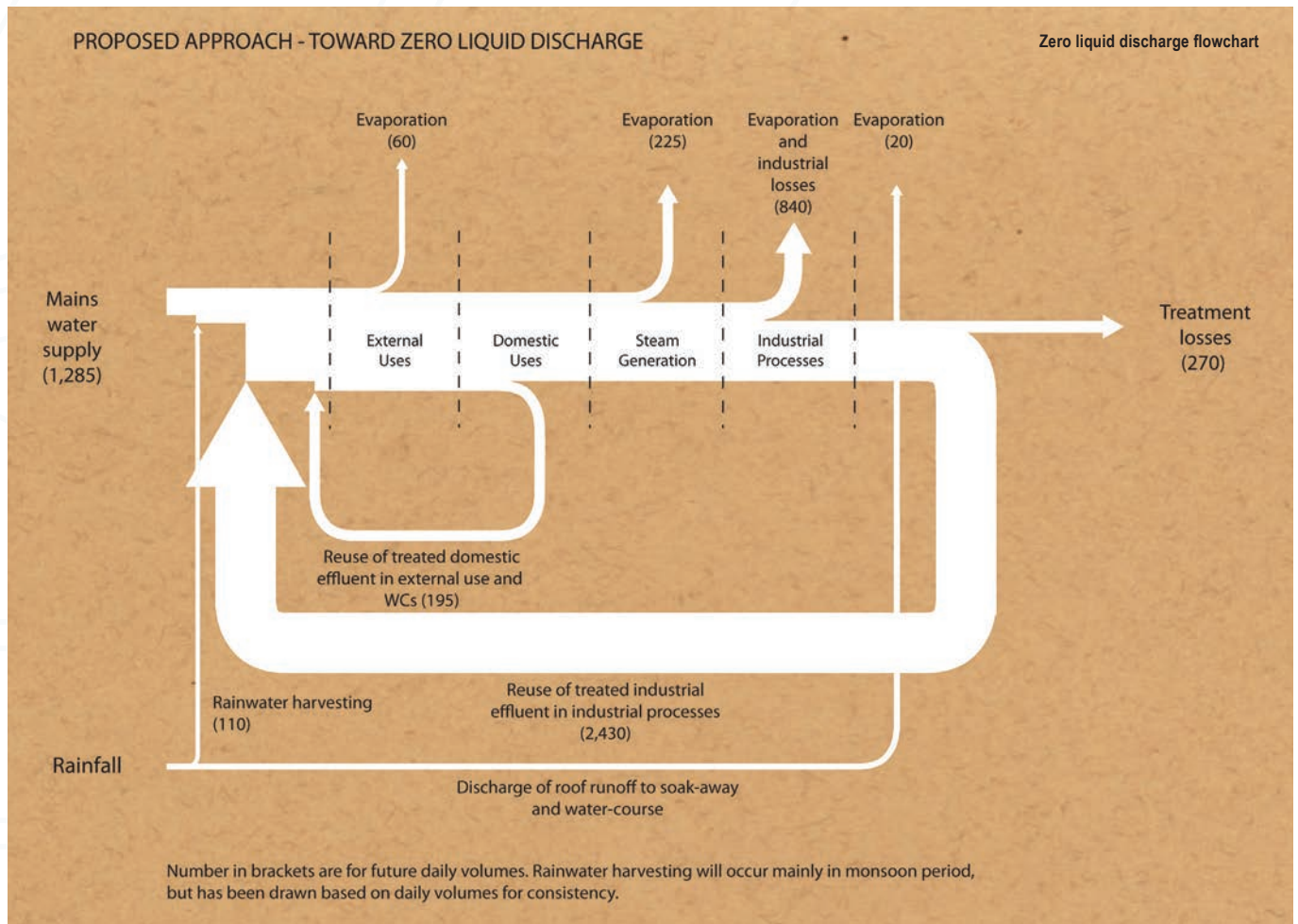
Michael Pawlyn, director of Exploration, and his team were selected for this project because of their renowned expertise in biomimicry and designing for zero waste. Mr Pawlyn explained: "While conventional industrial systems tend to be simple, linear and wasteful – employing long term toxins – biological systems are generally complex, interconnected, and have closed loop flows of resources that don't cause long term damage to the environment."

Inspired by the work of Janine Benyus, who has authored six books on biomimicry, the Exploration team used

biomimicry as a tool with which to rethink the textile process and devise solutions that should provide for long-term value creation.

For the building itself the team took inspiration from examples of hierarchical structures in biology such as the Euplectella glass sponge, which has informed the design of the primary structure (steel columns and trusses). In addition, a strict north-south orientation for the building has been chosen, allowing for roof-lights with glazing facing north to provide generous amounts of natural light throughout the working environment while the sloping solid surfaces of the roof-lights are perfectly oriented for photovoltaic panels.

Exploration said that the design team concluded that profiled aluminium



was the most appropriate roofing material because it is very lightweight, producing knock-on savings in the weight of the primary structure. It is also fully recyclable and maintains optimum water quality for the rainwater that is captured from the roof surface, for use in the highly water-intensive textile processes. Mr Pawlyn added: "We know from our work on ecosystem models that it is possible to get to zero waste and we have enjoyed the challenge of pursuing that goal." As with many areas of commerce, the textile industry is faced with near term increases in energy and commodities costs as well as steadily increasing levels of environmental compliance. By creating a low energy operation that approaches zero waste Exploration's client aims to meet the growing expectations from their supply

chain and ensure long-term profitability. Exploration explained that it recommended the client appoint biologists and chemists to work with a design team to look at the latest developments in sustainable processing. The client said it is keen to "produce a range of unbleached organic cotton, and even hemp fibre, products but at the moment we have not received sufficient market demand to justify the kind of quantities that we produce. Bleaching is still part of the process and it has proved to be very difficult to fully mitigate the negative effects of this." Project Associate Yaniv Peer furthered: "There are a number of functional challenges that we are seeking to address in this project including minimising energy consumption,

increasing resource efficiency, eliminating waste production through closed loop models of consumption and creating a great working environment with generous amounts of daylight and views out to nature. When completed this building will act as a shining example of how ecosystems thinking can radically reduce the textiles industry's impact on the environment whilst improving the company's bottom line." The client added: "Sustainability is the need of the hour, not least because large retail chains and brands and consumers are now demanding it but also, because increasingly it is becoming a winning business proposition. Following sustainable practices, even though involving extra initial capital expenditure, save the business running costs right from day one."



The textile producer concluded that some of the design measures have a very short payback period while others (such as the biomass cogeneration and the full daylighting instead of electric lighting) have a payback period of six

years. After the payback period the company expects to be more profitable than its competitors and is therefore likely to invest profits in expanding the facilities further. It also supports a number of charities,

including a tiger reserve. One of the biggest benefits it anticipates from taking a leadership approach is that it will become more resilient in anticipation of ever tightening environmental regulations and increasing utility costs.

Greenscape

Let's Make a Sustainable Effort for the World!

By Mikael Aremann, President,
Textile Machinery Association of Sweden (TMAS)

The Swedish contribution to the global textile industry may not be comparable to some other nations, but when it comes to contributing to a sustainable textile production process, then every machine producer, every country and every citizen, irrespective of size, can make an effort.

Many Swedish companies hold leading positions in various segments of the textile-manufacturing equipment and technology market. By representing the wider process, ie. everything from yarn feeding, through supervision to material-handling equipment, Swedish companies lead the way to sustainable production. This broad spectrum makes it possible to co-operate through the value chain, to influence the whole process in a sustainable direction. Technology and innovation lead the way to sustainable production. As companies we can always improve processes and invest more in research and development. As an example, the use of 3D printing often reduces the need for traditional samples or prototypes. These new types

of technology not only save the environment, but also resources, energy and production costs.

One way of working with sustainability is to use suppliers in the local region, to minimise transportation and reduce the impact on the environment. Another example is to implement an efficient material-handling system to minimise waste.

Even if we strive our best as machinery manufacturers, it is always a challenge to control how suppliers and sub-suppliers do, or do-not, contribute to sustainability! Automation within manufacturing has made it possible to bring some production back to Europe. This makes it easier to control a sustainable production system, achieving high efficiencies with affordable cost. Bringing production back to Europe also means a fast and stable supply chain – something that all customers appreciate. In Sweden there are several companies that have brought back production to Europe from the Far East.

Apart from technology and innovation,

green trade policies and customer demands are key drivers behind sustainable production. These aspects are to some extent out of reach for us as machine producers. We can see a demand from the bigger customers for sustainable production and energy efficient solutions, but the request for these solutions varies a lot between different regions.

Let us all make a sustainable effort during 2015!



Mikael Aremann,
President, (TMAS)



Technology Matters

Cooler Shades

Huntsman Textile Effects has introduced its eCool70 range of reactive dyes, consisting of AVITERA Brilliant Yellow SE, NOVACRON Brilliant Blue EC-B and NOVACRON Brilliant Turquoise EC-GN. eCool70 dyes are designed to make it possible for mills to achieve a range of brilliant shades while using less water and energy for better environmental performance, lower processing costs and enhanced productivity.

Huntsman says dyes for this specific shade segment have traditionally had low fixation rates, leading to moderate wash off, limited build up and bad reproducibility, which raises processing costs and reduces productivity. In contrast, Huntsman said that the new eCool70 concept offers a sustainable and high-performance solution with an attractive total process cost. Dyeing and washing-off can take place at 70°C, which is significantly lower than the 90°C that is necessary with conventional hot dyes. The wash-off cycle is also

reduced, which results in lower overall water consumption and shorter processing time to enhance productivity.

www.huntsman.com/textile_effects

Yarn Innovations

Solvay is celebrating several innovation awards, won during 2014 for its biodegradable yarn, Amni Soul Echo, and bioactive mineral yarn, Emana. Amni Soul Echo, the world's first biodegradable polyamide 6,6 yarn, won the Kurt Pulitzer Technology Award, from ENAIQ, the Brazilian chemical industry association. It also won an ECO Award from the American Chamber of Commerce.

Emana, which has been used in denim products, was among the winners of the international ICIS Innovation Awards 2014 in London, for which the criteria included environmental performance and sustainability. Emana is a polyamide yarn with bioactive minerals that benefit the body and skin.

www.solvay.com

Toxicity Prediction

REACH&Colours Italia and Milano Chemometrics and QSAR Research Group (University of Milano-Bicocca) have partnered to produce new software, designed to predict specific toxicological and environmental properties of dyes, on the basis of a Quantitative Structure-Activity Relationship (QSAR) approach.

REACH&Colours Italia collected roughly 4,000 scientific studies of dye properties and selected three criteria for statistical analysis: in-vitro gene mutation study in bacteria

(Ames test), skin sensitization and acute fish toxicity. The QSAR models were calculated on a structural similarity approach, with the addition of specific alerts to prevent false positives or negatives. The system predicts the degree of toxicity of a target substance and states the degree of reliability of the prediction, based on the number of similar substances and the average of their similarity to the target.

www.reachcolors.it

Energy Saving Spindles

Saurer Volkmann has developed an energy-saving spindle family for its carpet machines, under the framework of E³ technology (energy, economics and ergonomics). Spindle and pot package variants, together with drive and bearings technology, allow energy savings of up to 40% while delivery speeds of up to 120m/minute for uptwisting can increase production by up to 30%. In addition, creels with pneumatic support, threading systems, new pneumatic centrally adjustable creel yarn brakes and ball thread brakes, allow operating times to be reduced by up to 10%.

<http://www.volkman.saurer.com/en/start/>

MMF Energy Efficiency

Outdated filament spinning technologies in China account for 42% of total energy consumption and CO₂ emissions but can supply only 16% of total filament production, according to data presented by Oerlikon Manmade Fibers during a round-table forum in Beijing. Oerlikon's study, 'Sustainable growth through value innovation',



Brilliant Turquoise EC-GN



investigated potential savings to the Chinese textile industry if outdated machinery were to be replaced with modernised technologies. It concluded that the latest solutions would offer average power savings of 55% (WINGS FDY) and 40% (WINGS POY) compared to technology dating from the mid-1990s.

If these machines were to be replaced with the latest Oerlikon Barmag equipment, the energy consumption would be reduced by 78,000 MWh and the CO² emissions by 42,000 tons, according to Oerlikon.

www.oerlikon.com

Zero Discharge List

Archroma has added its portfolio of dyes and chemicals that are compliant with the Zero Discharge of Hazardous Chemicals (ZDHC) Group's Manufacturers Restricted Substance List (MRSL) to its ONE WAY Sustainability Calculator, allowing mills to pre-select products that will help drive down the level of impurities in the manufacturing process. The ZDHC MRSL sets concentration limits for the chemical groups banned under the ZDHC Joint Roadmap, an initiative first launched in 2011 by major apparel and footwear brands to lead the industry toward zero discharge of hazardous chemicals by 2020.

Archroma says all ONE WAY dyes and chemicals have been screened by its product stewardship specialists against more than 15 textiles eco-standards and criteria, including bluesign, Oeko-Tex, GOTS, 20 of the major Restricted Substances Lists (RSLs), and other relevant criteria such as high bio-elimination.

www.archroma.com



Bottle-to-POY Line

BB Engineering has unveiled its VarioFil R+ machine, the world's first bottle-to-POY (partially oriented yarn) line, which uses recycled PET bottle flakes as feedstock, to produce 150f48 dope-dyed black yarn.

As well as featuring a special extrusion system for bottle-flake materials, the line also includes the latest metering and blending technology for dope-dyeing and an advanced two-step melt filtration.

BBE is a joint venture by Oerlikon Barmag and Brückner Group.

www.bbeng.de/en

Sustainable Polyamide Microfibre

Italian yarn manufacturer Fulgar has developed a new polyamide 6,6 microfibre, Q-NOVA, which is 99% derived from recycled materials. Almost all articles produced with the company's polyamide, including knitted fabrics, lingerie, swimwear and sportswear, meet the most stringent human ecological demands necessary for certification in product class I (baby articles) for the Oeko-Tex Standard 100. The material is also said to be easy to dye and process.

<http://www.fulgar.com/en>





Looking Forward to a Green Bangladesh

Sustainability, both environmental and social, has become an issue that is gripping the Bangladesh textile industry. Back in 2011, Dhaka was the location for a conference hosted by the SDC titled 'The Dhaka Water Catastrophe 2020 – what can we do it about it?' The conference starkly faced up to the problem of water pollution in the country, with speaker Arthur Welham concluding: "Taking environmental initiatives in dyeing in Bangladesh is not only responsible, it's a no-brainer – you use less water, less energy and less chemicals, so save money."

The subsequent collapse of the Rana Plaza textile and garment-producing hub in Dhaka, in 2013 – killing 1,133 and injuring more than 2,000 workers – shocked many importers, consumers, NGOs and politicians into an awareness of need for social sustainability, as well as environmental sustainability, and this has catalysed change.

The Dhaka Apparel Summit, which was held by the Bangladesh Garment Manufacturers and Exporters Association and took place in December, 2014, focused on the sustainability of the textiles industry in relation to worker wages and industry growth.

Speaking at the event, Professor Richard P. Appelbaum, University of California at Santa Barbara, expressed the views of many when he said that the buyers and retailers

who place orders, at the top of the supply chain "should share responsibility with suppliers. Competing with cheap labour is not a good thing for the industry in future. Bangladesh should opt for high-end products."

This overall feeling has been reflected in the actions of some large textile firms in the country, such as Multifabs, which has grown by 20% year-on-year since its establishment in 1993. Mahiuddin Faruqui, managing director, described the working conditions at Multifabs as being both high and eco-friendly. Speaking in September 2014, Mr Faruqui said: "[Our] labour costs are fixed for 10 years and include overtime payments. At the end of the month, a Multifabs

worker gets a handsome salary compared with those in other firms. We have dealt with increases in labour costs by cutting wastage, minimising operation costs and increasing energy efficiency."

In addition to social sustainability, other companies have sought sustainable production through water conservation, with businesses such as DBL group embracing new technology that enables resources to be used more efficiently, while reducing its carbon footprint. DBL Group has managed to more than halve its water use in fabric dyeing, from 120 litres per kg to 55 litres per kg, compared with common consumption of 300 litres per kg, according to the company's Sustainability Report released last



Dr Atiur Rahman: More investment needed to fund sustainability



Professor Richard P. Appelbaum: Bangladesh should opt for high-end products



November.

With the need to encourage more Bangladeshi companies to adopt sustainable work flows, a Dhaka newspaper reported that the central bank has now set aside a US\$500 million fund for textile factories to help them adopt eco-friendly technologies and practices. The money will be an addition to the existing export development fund (EDF) of US\$1.5 billion and will be named Green EDF.

The discussion at which this news came out was organised by PRI (Policy Research Institute) on "access to finance: environmental sustainability in the textile sector", in association with the International Finance Corporation (IFC). Following comments from a number of bankers and economists, who stressed the need for such a fund for the textile sector, governor Dr Atiur Rahman concluded that the extra investment was very much needed.

It was reported in Dhaka that, at present, Bangladesh Bank is offering the EDF to exporters at a rate of LIBOR (London Interbank Offered Rate) plus 2.5% for six months. An

exporter can borrow a maximum of US\$15 million in foreign currency.

"The criteria for accessing the fund by the wet processing units, which are also export-oriented or providing supplies to the garment sector, should be considered in view of the overall sustainability of the textile sector," said Ahsan H. Mansur, executive director of PRI.

It is estimated that the textile factories in Dhaka currently consume 1,500 billion litres of groundwater annually to produce five million tonnes of fabric, with every kg of fabric gobbling up 300 litres against the global standard of 100 litres per kg of fabric. Mr Mansur continued that making funds available does not guarantee that entrepreneurs would use the resources: "Education and awareness is important. Besides, customs and supplementary duties should be eliminated for importing cleaner technology equipment and machinery."

In addition, the BB governor said the country's garment sector would not be able to reach the US\$50 billion export target by 2021 without adopting green technologies.

Mr Rahman called for a separate allocation in the budget to promote green financing in the textile sector: "Budgetary allocation makes it possible to provide low-cost funds."

The BB chief said the progress in the textile sector has also brought in multiple challenges in urban expansion, land use, workplace safety and environmental safeguards. For example, textile dyeing and finishing units in Bangladesh are still known to be hugely wasteful in water usage as they consume five times the best-practice benchmark.

Mohammed Abdul Jabbar, managing director of DBL Group, said that with an initial investment of US\$100,000, his company was able to reduce wastage of water, energy, steam, dye and chemical worth US\$500,000 within a year.

Faruque Hassan, a former vice president of Bangladesh Garment Manufacturers and Exporters Association, said the factories need financial support from the government and price support from buyers to go for eco-friendly practices. Green EDF is the first step towards that.