



MATERIALS INNOVATION

INVISTA white paper: sustainable synthetics

ROS HIBBERT, WGSN 30.07.09

With sustainability and responsible design still high on the agenda, the emphasis is shifting to reducing waste and upcycling from both consumer and post-consumer waste. As such, the textile industry is making big moves to include this into its mainstream business.



"Envelope wear" made of undyed Eco Circle polyester by Teijin, complete with envelope to return for recycling



Teijin recycled jersey, Première Vision, spring/summer 2010



COOLMAX® EcoMade fibre merchandiser

The recent **launch in the US of Teijin's 'Eco-A-Wear' recycled polyester textile programme** has **increased focus on the potential for creating high-performance fabrics from reclaimed synthetic waste**. From experimental research to practical commercial products, **progress is being made that should drive this area forward** in ways that are beneficial to all stakeholders.

Commercial offerings

Fibre and yarn producers are responding to the demand from brands and customers for **a more respectful approach to the consumption of finite resources and waste generation**. Research for the **INVISTA Apparel Planet Agenda** programme identified that 69% of men and 80% of female respondents have "more interest in companies with an environmental and socially responsible image".

Closely associated with the mid-20th century invention and commercialisation of synthetic fibres, INVISTA has recently **launched a more sustainable version of its successful wicking COOLMAX® fabric certification process**.



COOLMAX® EcoMade fabric swing tag



COOLMAX® EcoMade fabric



COOLMAX® EcoMade fabric



Plastic bottles, as seen at inplaceneews.wordpress.com



Recycled polyester filament, as seen at www.globaltextiles.com

COOLMAX® EcoMade filament fabric for outerwear, sportswear and legwear is **97% derived from reclaimed plastic bottles**, while maintaining the current brand qualification standards of the original product.

Collected plastic bottles undergo a transformation process that returns them to high-quality spun POY (partially oriented yarn). **Fourteen 20oz post-consumer bottles will make enough fabric for one large shirt.** During use, there is apparently less 'yellowing' when compared to other similar recycled polyester fabrics.

How COOLMAX™ EcoMade™ fiber is Made

- Plastic bottles go through a manufacturing process that transforms them into high-performance spun polyester yarn

1 PLASTIC BOTTLES Plastic bottles are collected	2 FLAKES Bottles are cleaned and ground into flakes	3 CHIPS The flakes are converted into chips	4 FIBER The chips are then made into fiber	5 YARN The fiber is spun into yarn suitable for apparel	6 SOCKS The sock fiber meets INVISTA standards qualifying for COOLMAX™ EcoMade™ fabric
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COOLMAX® EcoMade fabric

Made from recycled resources

COOLMAX EcoMade

THE ULTIMATE PERFORMANCE FABRIC™

- Transports moisture away from the body, keeping you cool and dry
- Made from recycled resources
- Evacua l'humiditat de vostre cos per que vos sentiu fresc i sec
- Fabriquat a partir de materials reciclats
- Transportiert die Feuchtigkeit vom Körper und verhilft Ihnen zu einem kühlen und trockenen Wohlbefinden
- Auk recycleten Ressourcen hergestellt
- Evapora el sudor de su cuerpo para mantenerlo fresco y cómodo
- Fabricado con materiales reciclados
- Trasporta el sudor fuera del cuerpo, manteniendo el cuerpo fresco y seco
- Realitzat amb material reciclat

Fiber-based moisture management properties that never wash off.

Skin
Moisture
Air
Evaporation

For illustrative purposes only. Fiber shape and content may vary. / Illustration non contractuelle. La forme et la proportion de la fibre peuvent varier. / Nur zu Illustrationszwecken. Die Faserform und der Anteil können variieren. / Con propósitos ilustrativos únicamente. La forma y el contenido pueden variar. / Immagine a solo scopo illustrativo. Struttura a contenuto ed ogni processo variabile.

www.COOLMAXfabrics.com. COOLMAX fabric is a trademark of INVISTA. Le fibre COOLMAX® est une marque de INVISTA. Der Stoff COOLMAX® ist eine Marke von INVISTA. El tejido COOLMAX® es una marca de INVISTA. Il tessuto COOLMAX® è un marchio di INVISTA.

Please recycle this tag. EC 33 02

COOLMAX® EcoMade fabric swing tag with detailed technology

explained

Both COOLMAX® EcoMade fabric and current COOLMAX® fabrics are made with a **special, unique four-channel cross-section that ensures high-performance permanent moisture-management**. The important communication message for the eco version is supported with swing tags and trade promotion initiatives.

Responsible thinking

Since 1995, when McDonough and Braungart first proposed their **Cradle to Cradle™** concept, much has changed. A more holistic approach, whereby a **product's life cycle is considered for its entire 360° impact**, is beginning to gain more attention. This philosophy aims to **reduce dependence on natural resources and eliminate waste by creating product life cycles that have only a positive impact on the environment, society and commerce**.

Sustainability now seems too general a term, and can be considered as having negative and suppressive connotations. Rather surprisingly, C2C™ is not about reduction, but instead **promotes new methods of production and business models**.



Eco Circle by Teijin



Recycled garment from Teijin's Eco Circle collection



Patagonia's Common Threads programme

Polyester is part of the C2C™ Technical Cycle, with the ability to be reprocessed and reused. Teijin has based its **Eco Circle programme, launched in 2002**, on this principle, and it now works with apparel and sportswear manufacturers to collect and reuse products to create new raw materials. Any accessories, such as **buttons or linings made from Teijin's Ecopet and Eco Circle fibres, can now also be part of the programme**.

The company maintains that **Eco Circle reduces energy consumption by 84% compared to the production of virgin fibre, and cuts emissions by 77%**, despite the additional impacts of transport and shipping reclaimed material.



Patagonia Common Threads Capilene layer

Howies sportswear from recycled polyester

Patagonia pioneered the use of recycled drinks bottles in fleece, and now its Common Threads recycling scheme in collaboration with Toray and Teijin, begun in 2005, continues to gather pace. The scheme sees the return for reuse of old Capilene base layers, fleece garments and many other items. **UK-based brand Howies** has also begun a similar programme, although it maintains that, as **its products are so well made and long-lasting, it actually currently has few garments returned.**



Introducing COOLMAX® EcoMade filament fabric
COOLMAX® EcoMade fabric merchandiser



COOLMAX® EcoMade fabric swing tag

Functional active sports fabrics produced from recycled or reclaimed polyester factory waste are now more generally available, in all the required woven and knitted constructions. **Singtex**, a major sports fabric supplier from Taiwan, now offers an extensive **collection of 100% recycled polyester fabrics and fleece, plus other fabrics that combine polyester with cocona or bamboo.**

This July's Outdoor trade fair in Friedrichshafen saw the launch of EPIC® by Nextec fabrics, which use recycled polyester. **EPIC® fabrics are water-resistant, windproof, breathable and washable,** created by a **patented encapsulation process that coats each fibre with an ultra-thin polymer.** The protection is inside the fabric, with the function added **without affecting the handle of the cloth.**



Singtex recycled polyester



EPIC recycled polyester base



EPIC weatherproof jacket

Concerns have been raised regarding the use of antimony, a heavy metal, as a catalyst in the production of polyester. This remains an issue when polyester is recycled. **Antimony-free polyester, such as Eco-Intelligent polyester by Victor Innovatex,** is claimed to be a **better option for environmental wellbeing,** and meets current C2CSM certification. Currently restricted mainly to interior textiles, **the antimony-free polyester has been used by Mountain Equipment in its Breeze fleece jacket.**



Mountain Equipment Breeze jacket



Plastic bottles awaiting collection, as seen on Nemo's Great Uncle's photostream, www.flickr.com

Responsible research

At the University of the Arts London, two **research students are examining how technology can facilitate the reuse of oil-based synthetic materials.**



Kate Goldsworthy

Kate Goldsworthy **combines design-oriented thinking with technical innovation to create polyester textiles with a life cycle-centred approach, right from the initial production stage,** in order to maximise their potential for upcycling. She points out that **existing systems for recycling require pure feedstocks in order to prevent 'downcycling'** - the production of lower-grade materials. Her approach is to use **mono-materials treated with laser-welding to resurface and embellish functional materials.**



Odette Valentine

The mono-material concept is also central to Odette Valentine's research. **Working with recycled polyester fleece, she is exploring the use of techniques such as ultrasonic bonding, to create surface dimension and pattern simultaneously with garment construction.** By exploiting the material's thermoplastic properties, she aims to produce a collection of **single-material sportswear from a recycled source, which can itself be recycled.**

Synthetic responsibility

Polyester is a key synthetic fibre, accounting for approximately **45% of global textile consumption**. As the world's most popular polymer, it is clearly essential to maximise the potential for reuse, particularly with regard to future oil prices and availability.

In its Planet Agenda, INVISTA highlights the fact that, in general, **garments made from synthetics are more durable and easier to care for** - both important facts in assessing the longer-term impact of clothing and sportswear. It also points out that the **environmental challenges facing synthetics are similar to those of most industrial processes: the consumption of non-renewable feedstocks, emissions and waste-generation.** It is evident that INVISTA is committed to making progress in all these areas.



COOLMAX® EcoMade fabric trade ads



Patagonia Common Threads shorts



COOLMAX® EcoMade garment

However, as Patagonia states in its Analysis of the Common Threads Programme, **"Recycling clothing is not a cure-all for our environmental challenges"**. By autumn 2009, the firm is aiming for 80% of its apparel to be recyclable. It hopes that, as demand grows for clothing made using recycled materials, more facilities will open to facilitate this, and that **the cycle will not slow, but make optimum use of all elements without compromising quality or functionality.**

Developments in certification are essential to bring clarity and confidence to the recycled textiles area. The Global Recycle Standard, from Control Union, has been introduced to verify the amount of recycled parts or ingredients in a given product. **It is essential for retailers and consumers alike to know**

which parts of specific products are made using recycled materials, and how these materials are processed throughout the supply chain.

Contact details and further research

Control Union

www.controlunion.com

DEFRA Sustainable Clothing Roadmap

www.defra.gov.uk

EcoFi (formerly EcoSpun)

Foss Manufacturing

Tel: +1 (603) 929 6000

www.eco-fi.com

www.fossmfg.com

EPIC Technology International

www.epicfabrics.com

Invista

www.invista.com

Howies Clothing

www.howies.co.uk

Kate Goldsworthy

www.kategoldsworthy.co.uk

MBDC

McDonough Braungart Design Chemistry

www.mbdc.com

Miroglio (Mirhon New Life)

www.mirogliogroup.com

Mountain Equipment Co-op

www.mec.ca

Oakdene Hollins Ltd.

Sustainable Technology Consultancy working with DEFRA

www.oakdenehollins.co.uk

Odette Valentine

www.braedburn.com

Patagonia

www.patagonia.com

Singtex

www.singtex.com

Teijin

www.teijin.co.jp

Toray

www.toray.com

Wellman International

www.wellman-intl.com

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