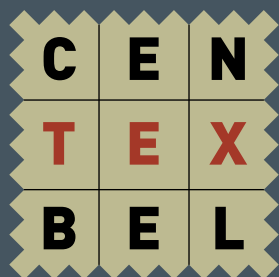
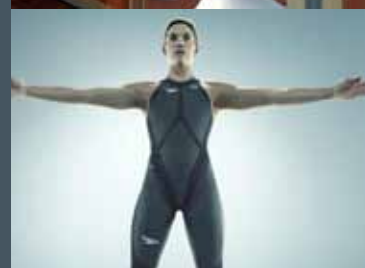


TECHNICAL TEXTILES



Centexbel INFO

Number 7 - September 30, 2010



Innovations in sports textiles

Table of contents

Introduction

Textile technology for great performances in sports and industry 3

Innovaties in sporttextiel

Innovations in sports textiles versus rules and legislation 4

Innovations in sports textiles for totally new sporting experiences 5

Innovations in sports textiles: a few industrial witnesses at the congress 6

Body in action

Comfort for amateurs, professionals and arctic explorers 7

Thermophysiological comfort improves sports performances 8

Comfort in sportswear: industrial developments at the sports congress 9

Wellbeing: a source for innovations in sports textiles 10

Safety with a maximum freedom of movement 11

Sustainable sports textiles

Sustainable developments in sports and sports textiles 12

Fibre-reinforced composites for “sports light” 13

Locally grown flax in high-tech applications 14

Sustainable coatings in sustainable (sports) applications 15

Special thanks to our sponsors



to our partners



and to Dixie Dansercoer

Colophon

Responsible editor

Jan Laperre, Centexbel

Contributions by

Stijn Devaere, Sandra De Decker,
Guy Buyle

Photography

Marc Van Hove

Layout

Eline Robin

Redaction board

Jan Laperre, Bob Vander Beke
Eline Robin & Ann De Grijse

© Centexbel 07/2010

Introduction



Textile technology for great performances in sports and industry

On June 24 and 25, 2010, **CENTEXBEL** and **FEDUSTRIA** organised the first international congress on “Innovations in sports textiles” in the beautiful venue of the Zebrastraat in Ghent-Belgium. During the congress, supported by the Belgian Olympic and Inter-federal Committee and the Belgian Sports Technology Club, it became once again clear that the future of the textile industry is inextricably linked with radical investments in research, innovation and sustainable development.

When looking closely at the different televised reviews of Eddy Merckx’s career (who turned 65 this year) it will strike us very promptly that the sports equipments technology witnessed a genuine revolution.

Not only the bikes of today are spectacularly light (a.o. thanks to textile reinforced composites), aerodynamic, ergonomic... but it is impossible to compare today’s (combination of) materials and manufacturing techniques of sportswear with the well-known Molteni shirts our greatest sports hero wore in the ‘60’s and ‘70’s of the previous century. Moreover, more and more companies are not only reckoning with efficient cost management (e.g. by means of virtual prototyping) when designing and producing sports textiles, but also with social and environmental aspects.

In his message at the closure of the 2 day conference, **JAN LAPERRE, DIRECTOR GENERAL** of **CENTEXBEL** emphasized that the future of our textile industry is embedded in research, co-operation and sustainable innovation: *“The functionalisation of textile products in combination with a far-reaching customisation (tailored-made production) clearly is the way we have to choose. Centexbel has the capacity to help companies in translating good ideas into concrete products. Although many textile companies have already found the way to our centre, there are still many opportunities for SME-companies to achieve great results in collaboration with Centexbel.”*

In the next chapters, we will discuss some important technological changes and remarkable points of attention in sportswear and sports equipment that have been presented at the CONGRESS ON “INNOVATIONS IN SPORTS TEXTILES”.

Contact:

Bob Vander Beke
 Director Sales & Marketing
 tel: 09/243 82 17
 gsm: 0475/52 41 50
 bvb@centexbel.be





Innovations in sports textiles

Innovations in sports textiles versus rules and legislation

In practically no other discipline, there are so many innovative products being marketed as in sports. Urged by an almost obsessive chase for new national, European and world records, and thanks to the economically interesting and growing market of sporting articles, the industry is looking for products boosting the athlete's performances. However, between dreams and deeds there are laws and practical objections... Not all innovations are accepted by the international sports federations (such as FIFA or IOC). Moreover, the manufacturers have – and rightfully so – to reckon with the international requirements in the field of health, IPR, human rights and labour conditions.

The first invited speaker at the congress, **ROBBERT DE KOCK** clarified the principles and points of view of the **WFSGI** or "World Federation of the Sporting Goods Industry". This federation represents the interests of the producers of sporting articles and acts as an interface between its industrial members, the sports federations and other international organisations such as ILO, WTO, and the UN.

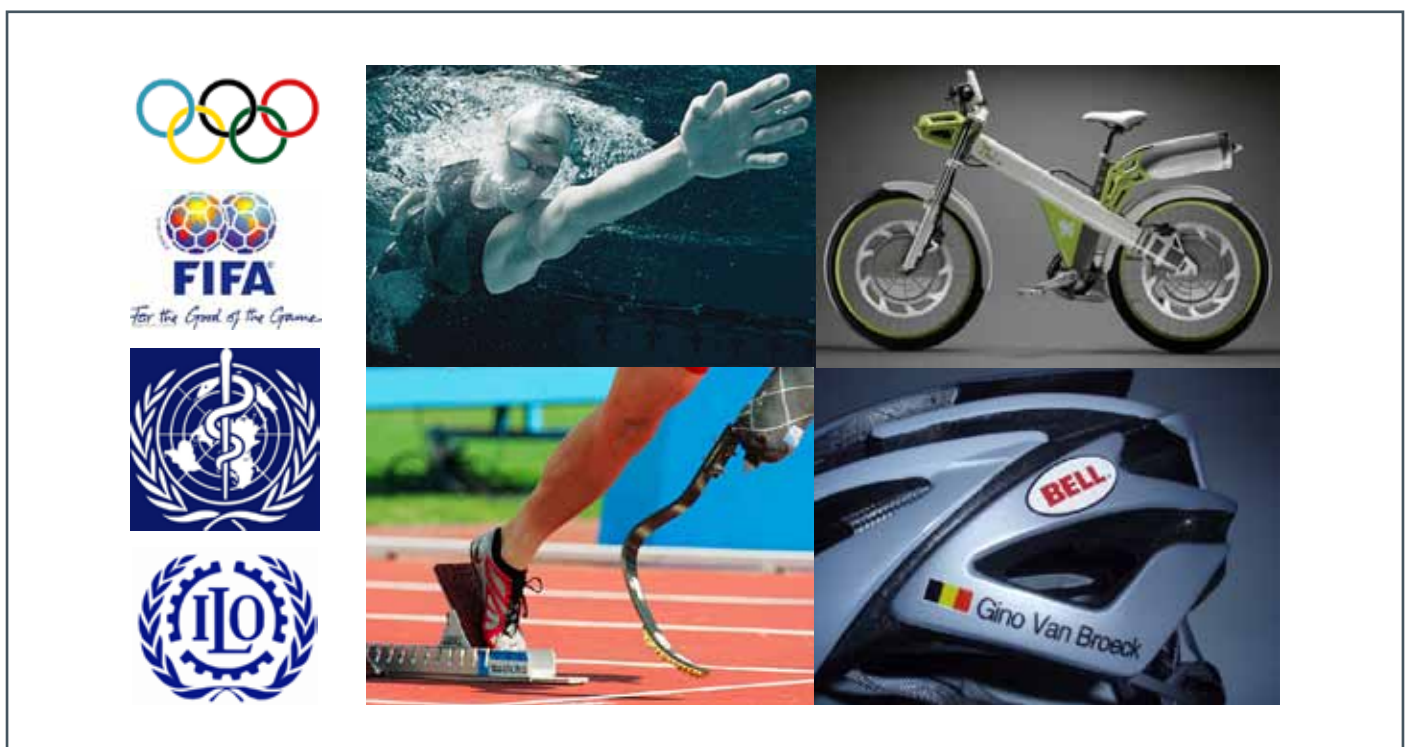
In his speech on "INNOVATION IN THE SPORTING GOODS INDUSTRY MATERIALS & TECHNOLOGIES AGAINST RULES & REGULATIONS" he stressed that the manufacturer has to ask the following questions during each innovative concept, technology or characteristic: what does the product do for the consumer and what is its biggest advantage to the athlete?

Whereas the athlete demands innovative products and the manufacturer is only too willing to fulfil this demand, the legislative and regulating organisations (sports and others) maintain a rather conservative attitude. They desire to preserve the "natural" state of sports, to keep it accessible to the amateur athlete, to keep it safe (standards) or to protect the market (restricting the import from third countries).

The Speedo swimsuit is a typical example of an innovative product that has been forbidden by the international swimming federation during the European swimming championships in August 2010. Next to restrictions on the material itself (permeability) the design of the suit is checked: torso, arms and knees may not be covered. Notwithstanding the ban on these record breaking swimming suits, the sport itself remains attractive.

Examples of strict limitations by the authorities are the REACH regulations in Europe and the new regulation on substances and safety of the US Consumer Product Safety Counsel.

How does the manufacturer have to proceed under these circumstances? Not by stopping to look for innovations, but by dealing in a creative way with these rules and regulations and by integrating them into the concept. Not by acting too hastily but by keeping a keen eye on the evolutions in products and sports.



Innovations in sports textiles



Innovations in sports textiles for totally new sporting experiences

Superfast sailing, playing golf in one's own living room, unequalled ball control at playing tennis, receiving feedback on your football skills through the field itself, training in your personally designed outfit... at first sight, all these sporting experiences have nothing in common. Yet, what unites them is textile technology.

One way or the other, these new possibilities are the result of R&D in textile materials, making use or not of developments in other fields, such as material sciences, composite technology or electronics.

Within the textile technology, innovations taking place in one or more steps of the entire production chain, are at the basis of new breakthroughs. Some examples:

RAW MATERIALS: new and improved products are being created on the basis of unconventional raw materials, such as basalt fibres or specialty polymers or by combining existing standard materials in an original manner.

EXTRUSION: entirely new yarns with special properties are produced by means of (nano-) additives, by experimenting with the composition, shape and size of filaments...

FABRIC STRUCTURE: there is a huge choice between knitted and woven fabrics, non-woven and 3D structures, very open or very tightly woven fabrics, laminating... determining the final performances of the fabric.

TEXTILE COATING AND FINISHING: special coatings result in increasingly better breathing yet waterproof fabrics or in an optimum cooling/thermal regulation of the body during sport.

MANUFACTURING: the integration of sensors and the production of mass customised products thanks to digitalisation and ICT reset the limits of finished textile products.

Centexbel is actively engaged in all these developments, involving textile companies in these innovations by initialising relevant research projects and by offering testing facilities to these companies. At this very moment, Centexbel's R&D programme focuses on the improvement of thermal comfort, the integration of sensors, fibre-reinforced thermoplastic composites, the development of special coatings, measuring and quantifying comfort properties...

Contact
 Guy Buyle
 Research scientist
 tel: 09/243 82 53
 gbu@centexbel.be





Innovations in sports textiles

Innovations in sports textiles: a few industrial witnesses at the congress

Belgian SME develops champion tennis chords for tennis champions

The Belgian company **LUXILON** produces high-tech monofilaments for several niche markets. Among its most famous products are the monofilaments applied in tennis rackets. **HERBERT DE BREUCK** explained that Luxilon collaborates with market leader Wilson. More than 70% of the top 100 ATP players and more than 45% of the top 100 WTA players are using these chords extruded from special compounds.

Recently, Luxilon has marketed the patented fibre Luxicool®. The fibre is performing excellently in the field of cooling and moisture management thanks to its polymer structure. Because these properties are a result of the structure, the effects are permanent and are not lost during cleaning. Two independent research centres have intensively tested the performances of these fibres.

With its product ThermoformLXN® the company has won the innovation prize at Techtextil 2009. This yarn receives its definite shape at a temperature of 65°C and may be used in quite a lot of different products ranging from composites, orthopaedic bandages to protective sportswear.

Being an innovating SME, Luxilon put a lot of weight on research and development (20% of its staff are involved in R&D).

The company participates in 7 different European research projects and is closely collaborating with Centexbel, other innovating companies (suppliers and customers)...

"Magic" fibre increases oxygen level in muscles and prevents sore muscles

The story told by **SETH CASDEN, HOLOGENIX (USA)** about the healing properties of the Celliant™ fibre is amazing. Were it not so, that the claimed properties have been corroborated by lab tests, one would ban it to the realm of sales television commercials.

Celliant™ is a sheath/core polyester fibre in which inorganic natural additives have been mixed in the core of the fibre, absorbing the energy emitted by the body and sending it back to the body as controlled wavelengths. Clinical studies have shown that these fibres, when constituting more than 40% of the woven or knit fabric, enhance the oxygen level in the muscular tissue.

Medical studies have given evidence that the fibres reduce pain. The experience of athletes in their turn teaches us that the fibres improve performances, reduce pain and make the muscles recuperate more rapidly. When wearing socks containing the Celliant™ fibre, your feet are feeling less heavy during long flights.



Body in action



Comfort for amateurs, professionals and arctic explorers

Both in daily exercise as in extreme sports, comfort is a very important parameter of sportswear. More and more people are actively practicing one sport or another and are sensitive to technological novelties and trends in sportswear. One of the most important parameters in the comfort experience is the regulation of heat and moisture.

Key-speaker and arctic explorer, **DIXIE DANSERCOER**, explained at the Centexbel sports congress the vital importance of a good thermal insulation and of the other (life saving) qualities he and his team expect of textiles. Being a warm-blooded mammal, a human being is incapable of surviving at temperatures below 50°C. But man is also inventive and will always find a solution. Inhabitants of the North Pole (the Inuit) imitate polar animals in their clothing. Also Dixie and his team have designed some ingenious textile solutions to optimise their survival chances and to have the expedition take place with an acceptable minimum of comfort.

They are asking the textile industry to come up with even better and eco-friendly solutions. One of the biggest problems of arctic explorers is the freezing of hands and feet, two parts of the body producing much sweat. This sweat wets the insulating glove or shoe, the moisture freezes, the thermal insulating property is lost and hands and feet will freeze. Also breathing produces a lot of moisture that will freeze immediately.

Other textile materials, such as fabrics for tents, tarps for sledges, backpacks, dry suits... are also contributing to the success of polar expeditions. At this very moment, Dixie is preparing a new and ambitious project (see www.aamexpedition.org). This project's success depends on the study of an appropriate textile to build prototypes of ultra light kites to pull the polar explorers and their equipment over thousands of miles.

Sports and physical movement are one and the same and release a lot of heat that has to be evacuated to prevent the body from overheating and to maintain the quality of the performances.

Prof. dr. Hein Daanen/TNO, one of the speakers at the closing plenary session on Friday June 25, explained the thermal action of the human body during sports and the influence of sportswear on this phenomenon. Just like all mammals, man is a warm-blooded creature. This means that he can only function well if the body temperature is around a constant 37°C. The heat balance of the human body is influenced by personal factors, such as physical condition and metabolism and by external factors, such as climate and clothing.



Body in action

Thermophysiological comfort improves sports performances



The sports congress dedicated one of the parallel sessions on Thursday afternoon entirely to the theme of “comfort”.

Thermal and moisture regulation are playing a dominant role in the comfort of sportswear and other types of clothing (outwear – workwear – protective clothing). Clothing that is incapable of evacuating the released heat and/or sweat of the sporting or working body is being experienced as a nuisance. Moreover, sports and work performances as well as concentration are diminishing, sometimes giving rise to dangerous situations.

Thermoregulating clothing is a rather new development belonging to the latest generation of textile materials that are capable of adapting themselves in a dynamic way to the circumstances in which they are worn.

They are produced for example by means of smart materials such as phase transition materials (better known as PCM).

To support these new developments and to evaluate the performances of these products objectively, Centexbel is studying a new adapted analytic method to be incorporated in European product standardisation.

By adapting the testing method to the properties of these new materials, fabrics and clothing made from these fabrics can be assessed on their real performance. This will enable both the manufacturer and the consumer to perfectly know what he may expect of the product.

Because a garment is worn on a moving, sweating and heat producing body, Centexbel uses a testing mannequin simulating all these bodily functions. The fact that clothing has a real impact on the thermophysiological comfort and hence on the performance level and safety of man is one of the key elements in the European research project “Safe@Sea” in which Centexbel is one of the research partners and in which we are looking to develop the best suited protective clothing for professional fishermen, a garment they will wear with pleasure and that will not disturb them at work.

In another European research project, called “NoTeReFiGa”, Centexbel and its European partners are developing a new thermoregulating fibre and garment based on PCM.



Body in action



Comfort in sportswear: industrial developments at the sports congress

MARTIN HARNISCH of the BEKLEIDUNGSPHYSIOLOGISCHES INSTITUT HOHENSTEIN – GERMANY discussed a research project on the properties of an innovating textile fibre appropriate for both recreational sports and daily use. The novel fibre combines the positive properties of natural and synthetic fibres to produce a garment that feels nice, that does not cling to the body when sweating, that vaporises sweat in a better way and shows less pilling.

ALEXANDRA DE RAEVE, UNIVERSITY COLLEGE OF GHENT, reviewed the factors influencing the thermophysiological comfort of sportswear. The insulating properties, the wind tightness, the possibility to vaporisation and water tightness of the materials used to manufacture the garment provide a certain micro-climate. This micro-climate is determined by the materials, the air layers between the materials through which the air can circulate, the stored or evacuated moisture... Heating elements incorporated into the garment may add extra comfort.

In 2007 DAMART (mostly known for its thermal underwear) created a new department called Damart Sport as a response to the new and more sportive lifestyle of today's people over fifty. According to CYRIL CHAIGNEAU more than half of the French inhabitants over fifty are actively practicing sports (cycling, walking, swimming). In order to create a good product adapted as much as possible to the needs and comfort requirements of this new target group, Damart has developed a brand-new software system in collaboration with INFLUTHERM (expert in thermal exchanges) and ENVEHO (expert in human physiology and textiles). This software processes the data of the thermal exchange between textiles, body and surroundings and calculates the body temperature, the body humidity (and also the temperature of the fabric) in relationship to the activity and textile characteristics.

ALAIN LANGEROCK explained the R&D policy of DEVAN CHEMICALS concerning chemical finishes to improve textile properties, such as moisture regulation, water repellency, odour control, thermoregulation (e.g. by means of PCM) and stretch recovery.

Heated clothing is a product that may be useful in many applications, such as outdoor garments and sportswear, clothing for industrial, military or humanitarian interventions, for elderly or disabled people... One of the main challenges is the integration of heat conducting yarns in clothing, a labour-intensive and complex chore. In his lecture on "Heated outdoor clothing" LIEVEN TACK explained how BEKINTEX, manufacturer of stainless steel heating threads and yarns has developed a new, robust and user-friendly product, based on the technology applied in heated car seats. This technology allows the easy integration of heating cables in the form of washable textile pads that may be sewn directly upon a coat's lining – thus very close to the body – and connected to a battery.



Body in action

Wellbeing: a source for innovations in sports textiles

The second parallel session on Thursday 24 July tackled innovating textile developments to improve the wellbeing and safety of the athlete.

Sore and fatigued muscles will recover more rapidly, according to **CHRIS SCHOONJANS** of **CONCORDIA TEXTILES** by wearing the 'recupTEX' fibre, a development of Concordia in collaboration with Bekaert Bekinox. The double-faced



Today, functional sportswear is mainly designed for professional athletes and young people. Although these products are very appropriate to support the health and wellbeing of the active ageing (users of sportswear over sixty), this target group does not accept this new technology very easily. Indeed, the design is not adapted to the morphology of somewhat older bodies or the user interfaces are poorly designed (e.g. displays are too small) so that the product is used in an incorrect or inefficient manner. **JANE McCANN** directs a collective research project at the **UNIVERSITY OF WALES** called, "Design for Ageing Well". This project is bringing together a cross-disciplinary team incorporating researchers from technical textiles, wearable electronics and Information and Communication Technologies (ICT), and social and health sectors, with active participation from end-users. The aim is to develop, through a user-centred design process, a functional clothing layering system, with integrated wearable technologies to support the wellbeing and quality of life of the active ageing. The design is based on the application of 3D body scanning, innovative smart textiles with embedded technology and novel garment engineering techniques.

Heart monitoring, sweat analysis, and electro-stimulation are three important applications of smart textiles in sportswear. **Lieva Van Langenhove** of the **UNIVERSITY OF GHEENT** emphasized the usefulness of electro-stimulation by means of textile structures. A series of electric impulses administered by electrodes applied on the skin stimulate the nerve tissue and muscles. It is not our brain that decides any longer on the contraction of our muscles, but the electro-stimulator. This process requires a well-balanced current distribution for current concentration will cause pain and even burns. Smart textiles offer a lot of possibilities in sports. To identify the appropriate applications, a good dialogue between end-users and product developers is needed.

fabric blocks about 99.99% of all electromagnetic radiation. Thanks to the stainless steel fibre, the product is perfectly washable. Clothing made from this fabric functions as a cage of Faraday by which the body will recover faster and muscles will not get sore so rapidly.

Every amateur biker has already suffered from a painful "derriere" after a more or less lengthy cycling trip. It is mainly the women who are afflicted by this ailment (saddle pain). After six years of intense research, says **PETER CROONEN**, **BIORACER** has succeeded in marketing Reskin, a wound-healing patch complying with all requirements: elastic, water-vapour permeable, low friction coefficient, comfortable, washable and reusable, it sticks to the skin and not to the wound, removable without pain, shower resistant... The patch is also used in other applications (nipple and heel protection, skin tears, skin afflictions of diabetics, eczema...).



RESKIN
TECHNOLOGY

Body in action



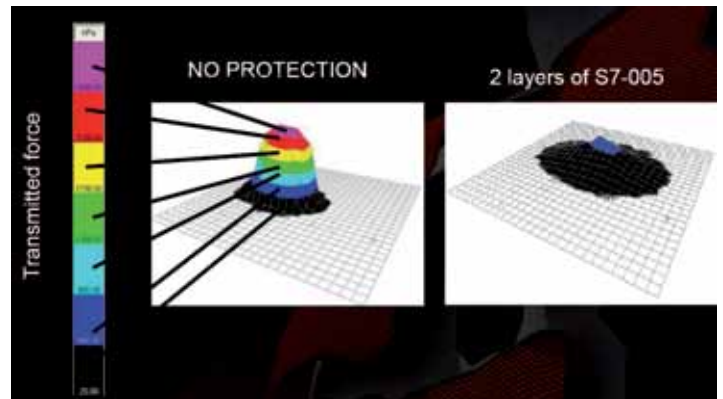
Safety with a maximum freedom of movement

Traditional hard body armour is usually very hard and therefore very uncomfortable to wear. **DOW CORNING** has developed a new kind of silicone polymer, allowing the company to create two new and comfortable textile products for impact protection. **BERTRAND LENOBLE** demonstrated the product's good impact protection properties, their flexibility and softness, thinness and lightness and their breathability and resistance to washing. The softness and flexibility allow a good fit and optimum freedom of movement. The breathability enhances the thermal comfort and thanks to their resistance to washing, it is possible to integrate the protection into the garment without having to remove it before each and every laundry cycle.



The second technology (TP-range) is based on a thermoplastic system in sheet form. The sheets are perforated for a better air circulation. These very thin sheets are very appropriate for back and sheen protectors. Besides sportswear, these products are suited to be applied in protective clothing, medical, security and civil defence.

The first technology (S-range) is based on a 3D spacer textile impregnated with silicone polymers. The open structure of the spacer fabric guarantees a natural breathability. Thanks to their softness and flexibility, the protection can be worn on the body allowing a maximum freedom of movement.





Sustainable sports textiles

Sustainable developments in sports and sports textiles

We may speak about sustainable development when three aspects are simultaneously being focused on: economic progress, social equality and environmental protection, or the so-called 3P's (Profit, People, Planet).

Sports is sustainable if it complies with the needs of the contemporary sporting community while contributing to improved future sporting facilities for everybody and to the preservation of the natural environment on which it depends.

The contribution of sports to the economy is beyond dispute: in 2004, sports (in general) generated 407 billion Euros or 3.7% of the BNP of the European Community. In 2008 the industry of sports and leisure products represented 500 billion Euros. A turnover equalling the one of the aviation industry while being 7 times as big as the one of the film industry and twice as big as the one of the automotive industry! The European sports industry employed 15 million people or 5.4% of the active population.

On the social level, sports contribute to more democracy, intercultural dialogue and to the social integration of minority groups, thanks to initiatives such as the Para Olympics or the Homeless World Cup. In the construction of sporting arenas, in the organisation of sporting events and in the production of sporting articles, the social-ethic and environmental aspects are getting more and more attention.

Sustainability policy becomes marketing tool

Huge manufacturers of sporting articles, such as **NIKE** and **ADIDAS** are aware of the commercial added value of sustainable development and are playing this card very explicitly. In this way, Nike has produced the shirts the Dutch and other soccer teams wore during the World Championship in South Africa from recycled PET bottles.

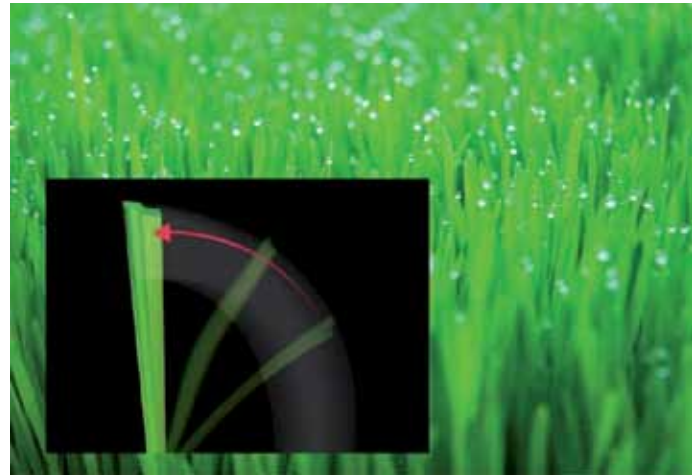
PHILIPP MEISTER of **ADIDAS**, one of the invited speakers at the closing plenary session of the sports congress, clarified the principles on which the sustainability policy of this global player is based: "offering the same quality and performances the consumer expects of the brand in accordance with his moral values and lifestyle choices."

Artificial turf: market acceptance through guaranteed quality

Thanks to the introduction of revolutionary new artificial turf systems, creating almost the same playing conditions as a natural field (sliding, coolness, moisture, bouncing of the ball, resilience, strength...), says **MARC VERCAMMEN** of **DESSO SPORTS SYSTEMS**, the market of the synthetic turf fields has witnessed a spectacular growth during the last decade. Football and rugby players are not only accepting the new fields, they are appreciating their playing comfort.

Unfortunately, the market is now jeopardized by its own success and more in particular by new manufacturers offering inferior products which damages the image of the product and hampers a further growth.

To solve this problem, industrial associations such as ESTO and STC and leading sports federations such as FIFA have defined a new series of quality requirements and have launched new initiatives aiming at a further quality improvement. Stijn Rambour of ERCAT (European Research Centre for Artificial Turf) gave a survey of the quality tests performed on artificial turf.



Cradle-to-cradle in artificial turf

Desso Sport Systems is a pioneer in the quest of sustainable solutions such as the reduction of water and energy consumption and the improvement of environmental efficiency. Artificial turf optimizes the use of limited surfaces and is more sustainable during its lifecycle than sports fields of natural grass.



Sustainable sports textiles



Fibre-reinforced composites for “sports light”

A few Belgian textile companies may rightfully be called a market leader in the field of fibre-reinforced composite materials for the production of sporting articles (bikes, tennis rackets...). It is interesting to note that traditional raw materials, such as flax fibres, mostly applied in clothing and upholstery textiles, have received a new and promising future in technical textiles.

Flax fibre reinforced composites have excellent mechanic properties, such as shock absorption, breaking strength... and are super light (e.g. in comparison with the better-known glass fibre). Flax fibres are renewable natural fibres that are locally grown and processed. In this way, the fibre performs very well in the field of technical performances as well as in the field of the application of sustainable materials.

In the March 2009 edition of the Centexbel INFO we have presented the many interesting innovating routes that composite materials may offer to the textile industry. At the sports congress, Sandra De Decker, researcher at Centexbel, discussed the possibilities and affinity to processing of fibre-reinforced thermoplastic composite materials in sports applications.

Fibre-reinforced synthetic materials or composites consist of a matrix and of fibres adding strength and rigidity to the final product. The flexibility of the material can be adapted to the demands of the final application thanks to the small fibre diameter and the varying length of the fibre. The synthetic matrix (epoxy, polyester, PP, PPS...) holds together the reinforcing fibres and transmits mutual forces. The matrix also protects the fibres against external (degrading) influences of chemicals, UV, moisture...

Thermoplastic materials are produced by applying heat and cooling. The forms are reversible enabling the production of intermediate sheets that are subsequently processed in 3D structures. In contrast to other procedures, the dimensions of the products are limited and at present, the knowledge about this new group of materials is still insufficient. One of the obstacles is the adhesion of fibre and matrix, a problem Centexbel is studying at the very moment.

In the case of self-reinforcing fibre composites, the matrix and the fibres belong to the same polymer group. Very strong PP tapes with a maximum tensile strength are the basic material to produce a woven structure that is consequently submitted to a critical thermal pressing process. During the pressing process, the yarns at the surface are partially melted and cooled. The core material that is not melted serves as the fibre reinforcement of the molten fraction. Self-reinforced composites are mainly applied in helmets, body armour, supporting parts of backpacks... One of the best-known end products made by this technique is the super strong and ultra light Cosmolite® suitcase of Samsonite.

Thanks to their excellent performances, more and more lightweight composites are applied in sporting articles.

As an alternative, bicomponent filaments or bicomponent tapes are used, combining two polymer grades with a different melting point so that the process becomes less critical in respect of time and temperature settings.

Motor sport is using a lot of carbon fibre-reinforced composites having a great crash resistance, a property that has proved to be lifesaving more than once. Today, the professional race and mountain bikes are made from carbon fibre/epoxy or from flax fibre-reinforced composites. With a frame of less than 1 kg, unprecedented performances are being recorded.

Another sports discipline happily using these new thermoplastic composites is hockey: in comparison to other (e.g. thermo-set, thermo-cured) composites, thermoplastic composites have a much better resistance to wear. The material is much harder and its resistance to bursting and invisible damage is about 600% higher. Moreover, the crash impact is better absorbed so that less vibrations of the hockey stick are transmitted to the arm. Finally, the bending of the material is much more consistent.

Sandra De Decker
 Research scientist
 Tel: 09/243 82 71
sdd@centexbel.be



Sustainable sports textiles

Locally grown flax in high-tech applications

Flax fibre-reinforced composites are increasingly being used in the composite industry. Flax is one of the most eco-friendly fibres cultivated today. All parts of the locally grown flax plant are processed and the fibre can be entirely recycled.

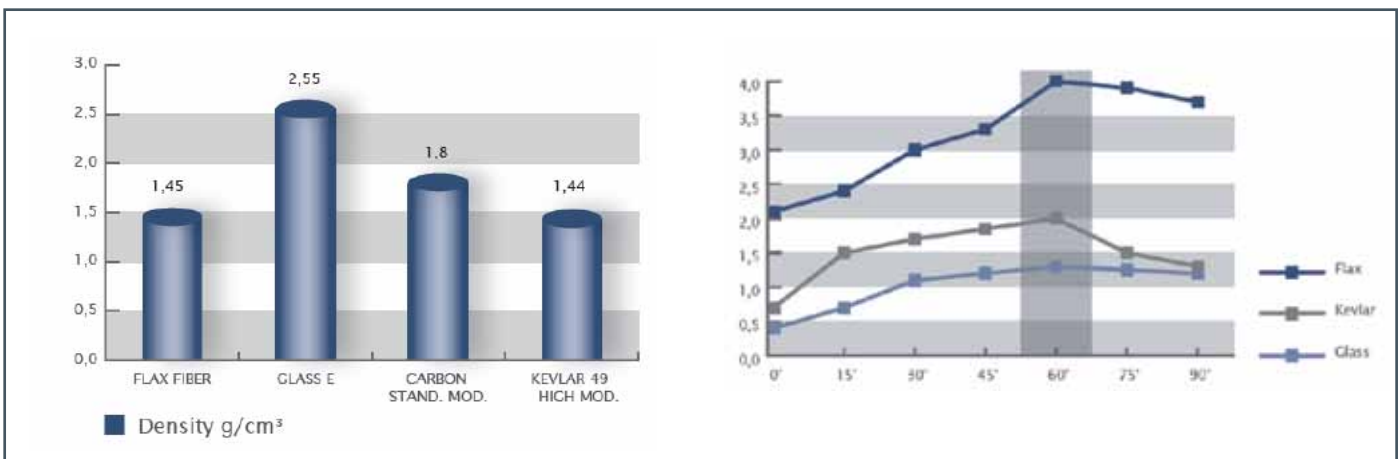
LIBECO-LAGAE & LINEO have developed a worldwide patented process for the production of a prepreg based on flax and thermo-curing epoxy (a prepreg = pre-impregnated fibres). This semi-product consists of a thin sheet of flax fabric impregnated with one or more thermo-curing polymers or resins.

DOMINIQUE ANDRIES explained how a strong binding takes place between the natural flax fibre and the resin in the production process.

Flax fibre composites have excellent properties, such as:

- a density of 1.45 – flax fibres are lighter than most fibres used to reinforce composites (left graphic)
- the mechanical properties are equal to the ones of glass fibres
- the thermal expansion coefficient is the same as the one of carbon

Because of these properties and environmental advantages, flax fibre-reinforced composites are used more and more in the composite industry. Their introduction in the production of sporting articles is rising rapidly: surf boards, boats, helmets, tennis rackets, golf clubs and even bicycles.



Sustainable sports textiles



Sustainable coatings in sustainable (sports) applications

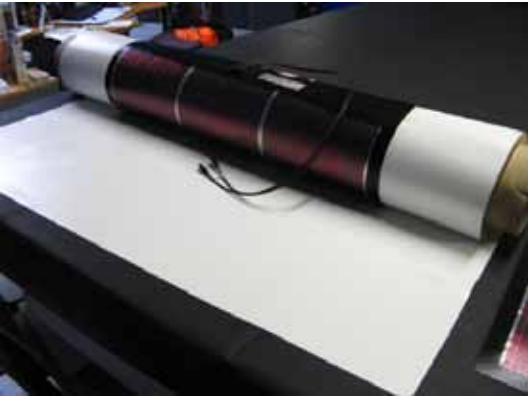
Since long, coated textiles are being used in different application fields, from tarpaulins for trucks and swimming pools, from tent-cloth to roof covers.

In addition to the generally known PVC, coating materials are made from several other polymers such as polyurethane and silicone. The textile material (reinforcement) generally consists of polyester, glass fibres and polyaramide. Certain parameters such as burning behaviour, resistance to wear, processability, transparency, good (self)cleaning properties are very important.

SIOEN INDUSTRIES, a market leader in coated textiles, has an active innovation policy setting great store by sustainability and ecology. **BERT GROENENDAAL** explained this policy with a few examples, such as the development of phthalate free sports and play mats (phthalates are prohibited in toys and childcare products (European Directive 2005/84/EC).

In the framework of the European research project Contex-T on tensile constructions in collaboration with Centexbel and others, the company has developed and commercialised a eco-friendly soil repellent lacquer for tent-cloths as well as a process to laminate flexible solar cells onto tent-cloths.

With an output of 150Wp per laminate, these tent-cloths produce enough energy to provide military bivouacs, medical and emergency posts with the necessary electricity. Moreover, these solar cells can be enrolled and thus transported very easily from one camp to the next.



laminated flexible solar cells



prototype with laminated flexible solar cells (Contex-T)



*light integrated in coated tarpaulins for trucks
enhanced night visibility*



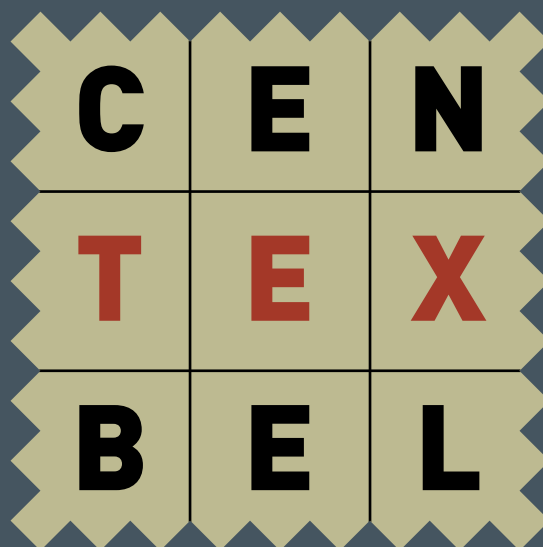
coated waterbag



start = soiled

+ 1 month = "self cleaning effect"

test results on self-cleaning coating (Contex-T)



your partner in high-tech sports textiles

CENTEXBEL GENT
Technologiepark 7
BE-9052 Zwijnaarde (Gent)
Tel. +32 9 220 41 51
Fax +32 9 220 49 55
e-mail gent@centexbel.be

CENTEXBEL VERVIERS
Avenue du Parc 38
BE-4650 Herve (Chaineux)
Tél. +32 87 32 24 30
Fax +32 87 34 05 18
e-mail chaineux@centexbel.be

www.centexbel.be