

ZUSAMMENFASSUNGEN / ABSTRACTS 1998

Resorbable textiles for medical application|Resorbierbare Textilien für medizinische Anwendungen

Dauner-M|Planck-H

Resorbable polymers offer the possibility to produce implants which must not be explanted in a second operation after successful healing. Further, new transplants can be designed in vitro made of the patients own cells. During the cultivation they need the synthetic scaffold as a surface for the cell seeding which gives the structural shape for the transplant. This field of application will be demonstrated by two projects which have been performed by public grants and by direct or institutional support of the industry: 1. A process for the manufacturing of filament yarn reinforced osteosynthesis implants has been developed under the frame of a BRITE/EURAM-project. The partners came from European research institutes and two companies. The development included polymer synthesis, fibre spinning, sample production, chemical and physical characterisation as well as an animal test. 2. The processing technology for resorbable nonwovens has been designed granted by AiF. Further refinement will be achieved in a BMBF-project and in co-operation with the industry. Both a plant for spun bonded nonwoven and the equipment for a melt blow process has been built with particular respect to the specific needs of resorbable polymers for implantation. Taking into account the reduction of strength by water uptake the values of the tensile strength of the spunbonded non-wovens of the crystalline homopolymers are comparable to technical materials (PA, PET e. g.). The tensile strength of the fibre sprayed non-wovens is fixed by cohesion during processing due to the residual solvent. The online process is an economic process for the manufacturing of non-wovens without using lubricants and adhesives. These non-wovens are mainly used for tissue engineering. Companies have requested to test their polymers for spunbonded non-wovens with the production-like equipment.

Protective clothing for live working at a nominal voltage up to 800kV|Schutzkleidung für das Arbeiten unter Hochspannungen bis 800kV

Herzberg-C|Diedrich-M

At present, during repair and maintenance high-voltage plants are switched off. Now, repair and maintenance of conductions and switching stations are carried out without switching-off the current. Thus, power supply of consumers is improved. For live working, a protective suit is required which meets the high DIN EN 60895, 1998, demands. This protective clothing must be extremely conductive and shielding when exposed to electric fields. In addition, the person wearing this protective suit must be protected from inadmissibly strong electric fields and dangerous currents flowing through. For the protective clothing, metallized fabric is utilised. This textile material is conductive and is part of a three-layer material structure. The seams must be designed in such a way that the electric current can flow unhindered and pass the seam region. As the protective suit covers the total body including the head, feet and hands, a Faraday screen is formed. This protective suit was developed in co-operation with the VEGA (Vereinigte Energiewerke AG) and the Institute of High Voltage and High Current Engineering at Dresden University of Technology. The materials show a very good conductivity. The measured values of electric resistance of laminated and non-laminated materials do not significantly differ as compared with the limit resistance and are clearly below this limit of 1 Ohm. The demands on protective clothing for live working are discussed.

MULTEXCOMP - Multiaxial textile preforms for complex structural parts|MULTEXCOMP - multiaxiale textile Prepregs für komplexe Strukturteile

Willems-W-H-M

In the framework of the BRITE/EURAM Project 'Multexcomp' several textile technologies are developed and their applicability for composites in various application fields is investigated and evaluated. The textile technologies are: braiding (Daimler-Benz, Ottobrunn), knitting (Stoll, Reutlingen), stitching (Aerospatiale, Bordeaux), multiaxial warp knitting (Hexcel, Lyon), warp knitting of spacer fabrics (Müller, Wiehl). The application fields are: ground transportation/structural elements for body-in-white (Daimler-Benz, Ottobrunn), aerospace/helicopter gear-box housing (Eurocopter, Marignane), marine/various structural elements (intermarine, Sarzana). An important task is the development of textile structural design and manufacturing concepts for the various exemplary components and their evaluation with regard to performance and costs. In parallel to the basic textile developments and the evaluation in the various application fields, micro- and macromechanical simulation tools for 3D-reinforced composites are developed at the Katholieke Universiteit of Leuven (Verpoest) and the University of Zaragoza. The universities are also responsible for testing and data-base generation and for the design of the exemplary components. The project is managed by the consultant company Willems & van den Wildenberg (Den Haag/NL). Each partner of the project is presented together with its main role and objectives in the project. The project has run for 2.5 years, and will continue until October 1999. This project is co-funded by the European Community under the Brite/Euram programme.

EU-Project (BriteEuram): Recyclable upholstery textiles for the automotive industry|EU-Projekt (BriteEuram): Recyclbare Sitzbezugsstoffe für die Automobilindustrie

Coll-Tortosa-L|Garcia-Lopez-E

One of the problems of the automotive industry till the year 2000 is that of recycling their components when vehicles end their life cycle. This problem specially affects the upholstery of car seats, characterised by a textile structure composed by some laminate layers of PET or PA fabric with expanded polyurethane foam. The upholstery of these seats cannot be recycled and used again to produce new textiles applicable to new vehicles. The problem is being investigated in a European Brite-Euram Project which tries to develop a new type of textile structure in which the intermediate layer of

expanded polyurethane foam is substituted by a new textile three-dimensional construction using the Kunit-Malimo technique. The objective is to achieve a bulky textile product, transpirable, with 100 % of textile fibres of the same type of the polymer as the fabric composing the useful face of the three-dimensional structure, in order to obtain a fully recyclable product. The first results attained on developing the new type of upholstery will be presented. A presentation will be made, as the co-ordinator of the project, of the past experiences lived since the original idea of the project was conceived until its final configuration: search for financial resources in R and D European programs, search for partners, composition of the consortium, structure and management of the project, etc. The new upholstery have been laminated by conventional laminating, melt laminating and direct adhesion without carrier, melt laminating and direct adhesion with adhesive carrier, transfer calender laminating with adhesive carrier. Of a wide selection of upholstery samples used by the automotive industry, the three most representative fabric types such as woven, circular weft knitted and warp knitted fabrics were selected. The deformation behaviour, the compression energy, the resilience, and the seam breaking strength of the new products were discussed.

On line control and inspection of fabric finishing by means of a new vision sensor system|Die Online-Kontrolle und -Inspektion bei der Komplettierung von Strumpfhosen durch ein neues visuelles Sensorsystem

Sanfeliu-A|Llorens-A

A sensor system for control and inspection tasks in production machinery is presented. The objective of the sensor is twofold: in one way it can be used to control machine workstation using vision information and in the other way it can be used to inspect defects in the manufactured products. The system is based on several vision sensors which acquire, process and analyse images. From the results of the image, the sensor sends signals to the production machine. This vision multisensor has been used to inspect defects in the production of pantyhose. The system consists of a vision sensor head to acquire line images when the pantyhose is in movement. This module includes a linear C-MOS camera and a laser device for illumination, and it is remotely connected to the hardware and software module. The sensor head has small dimensions in order that it can be placed in narrow placements in the pantyhose machine, and close to the detection area (from 30 to 80 mm). The distance between the sensor head and the hardware and software module is of 2 meters. The hardware and software module makes the pre-processing task on the image and extracts the features. This module is composed by digitizers and microelectronic modules where the image processing algorithms have been implemented. The third module is a PC where the high level detection methods are implemented. The PC has also a connection to the PLC of the textile machine. Examples of the detection such as holes in pantyhoses, correct position between the leg and the panty for assembling operation, spikes, and bad seams are demonstrated by means of defect photographs.

Comparative production of dissolving pulps by Acetosolv-, Formacell-, and Milox-pulping|Vergleichende Produktion von Zellstoff durch die Acetosolv-, Formacell- und Milox-Aufschlu methoden

Puls-J|Parajo-J-C|Sixta-H|Fink-H-P|Ercolani-U

Several new pulping concepts have been developed in Europe in the last decade. With an annual production averaging some 3.5 million tonnes between 1990 and 1995, dissolving wood pulp accounts for only 2 to 2.5 % of the total wood pulp production. In contrast to normal Kraft pulping these new processes, namely Acetosolv, Formacell, and Milox offer the advantage to hydrolyse hemicelluloses and to include the option for manufacture of dissolving pulps as a feedstock for cellulose derivatives and cellulosic fibres. All processes under consideration can be run as mini-plants, due to simple solvent recoveries. They may manufacture specific pulp grades, possibly in integrated systems, and offer a new impetus for an economic production of high purity cellulose in Europe. Acetosolv-, Formacell-, and Milox-pulps will be produced from industrial Beech, Eucalyptus and Aspen wood chips. Starting from published pulping conditions the processes will be adapted to the production of high purity pulps. In addition the traditional acid sulphite process will be investigated as a reference. By using the same starting material the performance of the different processes can be compared. For each of the processes different bleaching concepts have been developed. These sequences will be adapted to different pulps allowing a judgement on the impacts of different bleaching agents, as well as on the influence of alkaline extractions. The impact of pulping- and bleaching parameters on the physical and chemical characteristics of pulp will be investigated and directly compared to sulphite dissolving pulps. Selected pulps will be used for the production of cellulose acetate and viscose fibres. In addition N-methylmorpholine-N-oxide as direct solvent for cellulose (NMMO process) will be used for the production of regenerated cellulosic fibres and blown cellulosic films.

&Cooperative research in Europe - A challenge for the future|Kooperative Forschung in Europa - eine Herausforderung f r die Zukunft

Carl-C

Improvement of the competitiveness of the European textile and clothing industry is a key interest. An important part will be played by the results of research and development and its transmission to the market. Still the European textile and clothing industry keeps the largest potential of technical know-how in the world. The major changes have been taken place in the past: 1. To derive innovation (products, materials, processes, etc.) research co-operations (industrial, national, European) are getting much more important because of the increasing complexity of research. 2. European research co-operation becomes crucial by the drive of getting the best partners together. The European Commission and Euratex (European Apparel and Textile Organisation) have responded immediately to the market change and support both financially and by service European research projects of the textile and clothing industry. How to get involved and where to find the right information, partners and contacts will be described. The challenges of the European textile industry such as getting the best know-how which is available, learn the cultural differences and be flexible, and training by research projects for researchers to be international are discussed. European projects have at least two or three partners from different countries. Partners should not shareholding each other less than 30 %.

Preferred partners are of the EU countries but Non-EU countries can participate. Project criteria are social objectives (employment, health, environment), prospective (growth, competitiveness, technical), and European added value. If a project idea is born it is necessary to find a research centre which is able to write the project, to care about the bureaucracy and to co-ordinate all the partners.

Key Success Drivers Analysis - What are success strategies in the textile pipeline?|Key Success Drivers Analyse - Was macht Unternehmen in der textilen Kette erfolgreich?

Wagner-W

The textile chain has been polarised dramatically in recent years: winners and losers can be identified in similar segments. The KSA (Key Success Drivers Analysis) study analyses typical success strategies within the chain in detail. The following questions will be answered: Who are the winners and losers in the European apparel industry and retail? Which similarities can be identified with respect to success strategies? Are there differences between countries concerning successful strategies? What is the probability for success when choosing one of the typical strategies that are defined in the study? Which trends can be expected and what are the consequences for industry and retail? The study is based on the analyses of 220 leading European apparel manufacturers and retail corporations. The winners in the European apparel industry are Diesel, Claremont, Wolford, Gerry Weber, Burberrys, Hermes, Nike, Reebok and Max Mara. All of them have innovation abilities well above average with the respective implementation discipline. Almost all are consumer-oriented and have an above-average degree of brand awareness positioning. An excellent brand strength is the consequence. Of the 10 European losers all are unfocused; assortment range and target groups are not sufficiently focused, often combined with complex corporate structures. Most of these companies have a weak innovation potential or lack of implementation abilities. The winners success drivers are not the losers biggest weak points. The combined use of success drivers determines the success or failure of a company. Furthermore, strategy types such as internationally verticalised brands, international producer brands, customer-focused companies, national/regional producer brands, as well as brand portfolios are discussed.

European education for textiles via E-TEAM: the best you can get|Die europäische Textilausbildung mit dem E-Team: das Beste was es gibt

Kiekens-P

The textile industry in Europe has a lack of students in order to remain competitive in a global world where 'high tech' is the word for survival. In order to fulfil this need The European Masters Program in Advanced Textile Engineering has been developed in the years 1996-1998 with full support of the Socrates program under DG XXII of the European Commission. The target group of students are graduates with a higher education of at least three years of studies after secondary studies. The program highlights advanced topics such as materials science, production technologies, product engineering and design, technical textiles, management and European languages and cultures. This program covers two years of 4 semesters which are spread over 3 to 4 different locations of the European Universities. Altogether about 40 professors of Textile Departments of major European Universities are involved in this joint initiative which is supposed to boost the textile industry in Europe. The course is to start from September onwards and the first European graduates will get their degree mid 2000. This initiative is taken by AUTEX, which stands for Association of Universities for Textiles. It is beyond doubt that E-Team means an evolution in teaching methods known so far. This joint initiative of 13 universities over Europe will be considered a milestone and as such will (probably) be followed. The programme creates huge expectations and it is up to the organisers to fulfil these expectations. Ultimately, there is only one goal: to provide the textile industry with people it needs to protect its future. EU-Members and associate members of the AUTEX are listed. The E-Team programme and schedule, the programme subjects, and the E-Team partners are presented. The training in the session 1998-1999 will take place at Tampere (SF), Aachen (D), and Minho (P).

Towards 2000: Developments in the european man-made fibres industry|In Richtung 2000: Entwicklungen in der europäischen Chemiefaserindustrie

Purvis-C

The recent trends in the European man-made fibres industry, the key issues now facing the industry and the strategies of man-made fibre producers in dealing with such issues are outlined. Special attention is given to the role of Turkey and Central and Eastern Europe - increasingly integrated regions of the European trading area. The presentation concludes that, by successful adoption of appropriate strategies, the European man-made fibre industry is moving toward the 21st century in good shape to meet the challenges which await it. The EU man-made fibre industry has an turnover of ECU 12.5 billion. The R and D expenditure are about ECU 330 million. In the wider European trading area the turnover of the man-made-fibre industry is ECU 15 billion. The West European output of polyester, polyamide, acrylic, cellulose, and polypropylene are presented in diagrams. Nevertheless, the consumer expenditure on textiles as well as the share of man-made fibres in consumption is growing only slowly. The West European textile and apparel output has declined, meanwhile the textile imports are set to grow, as quotas phased out. The European costs are high by international standards (labour costs, labour regulation, taxes, environmental protection, transport etc.). The industry is burdened by substantial over-capacity. New strategies such as restructuring, innovation, customer service, market targeting, and globalisation are discussed. The European man-made fibres industry is successfully meeting the challenges which face it. It is moving towards the 21. century in good shape to meet the intense global competition which awaits it.

Zum ökologischen Vergleich von Outdoor-Bekleidung|Ecological comparison of outdoor wear

Marzinkowski-J-M

Anhand verschiedener Bewertungskriterien wird immer wieder versucht, Wege zum umweltgerechten Herstellen von Textilien aufzuzeigen. Ungeachtet dessen ist bei den Konsumenten einiger westeuropäischer Länder die Meinung weit verbreitet, daß ausschließlich Textilien aus natürlichen Faserstoffen 'ökologisch clean' sind. Das dies je nach Blickwinkel für die Umwelt nicht unbedingt vorteilhaft ist, zeigt ein Vergleich. Eine Jacke, hergestellt ausschließlich aus Polyester-Materialien, wird zu den Kriterien 'nachwachsende Rohstoffe' und 'recyclinggeeignet' verglichen mit einem Mantel, der als 'Baumwollmantel mit Wollfutter' verkauft wurde. Wer entscheidet, welche Bewertung vorzuziehen ist? Der Konsument hat kaum die Möglichkeit, diesen komplexen Zusammenhang zu durchschauen und entscheidet im Allgemeinen nach einer anderen Rangfolge von Motiven. Für den Hersteller von Textilien spielen neben dem in erster Linie beabsichtigten Markterfolg die ökologische Randbedingungen der Herstellung eine zunehmend wichtige Rolle. Hierbei sind produkt- oder prozeßbezogene Bilanzierungen zu den Umweltfaktoren sinnvolle Entscheidungshilfen bei der Auswahl von Materialien und Verfahren. Gleichzeitig hilft ein geeignetes Umwelt-Managementkonzept, den Spielraum bei der Gestaltung neuer modischer Textilien offen zu halten. Der Baumwollmantel mit Wollfutter wurde mit einem Ecolog-Anorak aus 100 % Polyester verglichen. Der Markenname Ecolog steht für ein mehrstufiges Recyclingkonzept, das mit der Zeit zu einer nahezu vollständigen Wiederverwendung der für diese Textil verwendeten Rohstoffe führen soll. Daher ist Sortenreinheit eine unbedingte Voraussetzung. Der Baumwollmantel kann dagegen aufgrund der aufwendigen Trennung der einzelnen Materialien und der innigen Fasermischung der Hauptkomponenten nicht wirtschaftlich recycelt werden.

Hohlraumreiche Monofilamentgelege als komfortverbesserndes Belüftungselement im Rucksack|Filament based nonwovens with comfort-improving ventilation for the rucksack

Korte-H

Rucksäcke haben, neben modischen Kriterien, in erster Linie technischen Anforderungen Stand zu halten. Eine dieser Anforderungen ist, die Feuchtigkeit durch Schweiß, die bei körperlicher Belastung zwischen Rücken und Rucksack entsteht, abzuführen. Mit Enkamat, einem etwa 20 mm dicken Flächengebilde aus hohlraumreichen Monofilamentgelegen, kann diese Funktion erfüllt werden. An den Kontaktbereichen zwischen Rucksack und Rücken wird die Polsterung mit Enkamat ausgestattet. Die hohlraumreiche Schlingenstruktur wirkt kapillarbrechend gegenüber Feuchtigkeit. Während des Tragens des Rucksacks wird durch die Körperbewegung ein Pumpeffekt auf das Filamentgelege ausgeübt, wodurch eine gute Durchlüftung der Hohlraumstruktur erzeugt wird. Feuchtigkeit durch Schweiß wird sofort beim Entstehen abgeführt. Dadurch wird die Oberflächentemperatur der Haut physiologisch sinnvoll schon während der Belastungsphase herabgesetzt und weitere Schweißbildung reduziert. Neben Details der Konstruktion am Rucksack werden der Aufbau der Enkamat-Struktur und weitere Einsatzgebiete dargestellt. Durch das 'Aircontact'-System wird durch breitere Auflageflächen sowie durch signifikant niedrigere Feuchtwerte und eine niedrigere Temperatur im Mikroklima zwischen Haut, Kleidung und Rucksack ein deutlich höherer Tragekomfort erzielt. Durch Einschlagen der Ränder des Monofilamentgeleges wird verhindert, daß sich, durch das Konfektionieren entstandene, freie Filamentabschnitte durch die Oberfläche bohren und so zu Hautreizungen beitragen können. Für die Herstellung hochwertiger Autositze wird unter der Bezeichnung 'Recaro Vent' ebenfalls Enkamat eingesetzt. Hohlraumreiche Monofilamentgelege eignen sich dazu, einen Luftaustausch zwischen dem menschlichen Körper und an ihm anliegenden druckbelasteten Flächen herzustellen.

High-tech-running-clothes: on the borderline between comfort and function|High-Tech-Laufbekleidung: an der Grenze zwischen Komfort und Funktion

Grapentin-C-D

The development of specific running outfits requires intelligent concepts that meet the demands of high wearing comfort. This can be achieved by creating innovative material properties. Tao Technical Wear process Emera windliner membranes and Sympatex Professional membranes of Akzo Nobel Co. These laminates are ideal in terms of wind and waterproofness and, if properly used, ensure a high wearing comfort. The highest comfort is still achieved through the established principles of layers. This consists of running underwear, the actual running clothing and the jackets on the top of that, which protect one from extreme weather. The presented products are designed to allow a runner to move safely in traffic even in darkness. This is a highly functional running jacket on which a flashing light can be attached to the back. Emera windliner is a brilliant material, the best concerning wind protection. It is 100 % windproof, light, 1/100 mm thin, extremely elastic and optimally breathable. Sympatex Professional is a pore-less polyester membrane with hydrophile zones. With Sympatex Professional the seams of the clothing are welded, which guarantees 100 % waterproofness. The laminates even withstand a 100 m high water column. Since the laminates do not have any pores, the breathability won't be reduced neither by dirt and salt crystals nor by washing detergent.

Sportswear for extreme conditions|Sportkleidung für extreme Bedingungen

Hardarson-S

Sportswear is a textile application where fashion and technology compete for influence. At stake is the attention of consumers, and commercial success. The more extreme the sport, the better the chances for technology to take the high ground and command the consumers respect. It is demonstrated that resistance to different forms of abrasion is a crucial performance element in sportswear. Examples are taken from high altitude climbing, motorcycling and caving to profile the importance of abrasion resistance and strength. It is acknowledged that breathability and waterproofness have captured much more attention than strength and durability in recent years. It is argued that, in general discussion, too much emphasis is on breathability and waterproofness, and not enough on durability. We will consequently describe the different test methods for abrasion resistance and discuss their merits and weaknesses. Test methods such as Martindale test (prEN 530), modified Wyzenbeek test, Fz abrasion test, the Cambridge standard for abrasion, the rotary abrasion test (Schopper Test) as well as the Frank Hauser test (DIN 53863-2) are discussed. There are two groups of

fabrics: heavy fabrics for motorcycle clothing, and lighter fabrics for mountaineering, caving and other extreme sports clothing. The ranking of tests can change from one test to the next. The relative performance of two fabrics can change significantly from one test method to the next (for example light PET fabrics vs. the light Cordura fabric). In the case of heavy polyester fabrics even the two specialised motorcycle tests cannot agree. It can be concluded that regarding test methods there is a lot of work to be done.

Die Bedeutung der Chemiefasern bei der Entwicklung funktioneller Sportsocken|Significance of man-made fibres for the development of functional sports socks

Mehnert-H

Der Begriff 'Funktionelle Sportsocken' in dem hier angewandten Sinn beinhaltet im wesentlichen die Aspekte Funktion zur Optimierung bekleidungsphysiologischer Aspekte und Funktion unter Berücksichtigung der sportspezifischen Anforderungen. Beide Aspekte sind naturgemäß eng miteinander verknüpft; sie können sich ergänzen und bedingen einander. Bekleidungsphysiologie sollte bekanntlich die Wechselwirkung zwischen (menschlichem) Körper und Klima/Umwelt mittels intelligentem Einsatz von Textilien positiv gestalten helfen. Während der zweite Punkt, sportspezifische Anforderungen, oft über die ergonomische Konstruktion des Sockens Beachtung findet, werden die thermophysiologischen Notwendigkeiten fast ausschließlich über den gezielten Einsatz geeigneter Garne - eben und vor allem auch Chemiefasern - berücksichtigt. Dabei ist zu beachten, daß Rohner sich stets von der Philosophie leiten läßt, sozusagen die Chemiefasern in den Dienst der Naturfasern zu stellen, diese in ihren bekanntermassen guten Eigenschaften zu unterstützen, also keinesfalls ein Trend 'weg von der Natur'. Die Socke Ski Thermo Tech zeigt eine besondere Wärmedämmung und ist sehr dünn. Dies wird durch Einsatz der Faser ThermoStat von DuPont erreicht. Dabei handelt es sich um eine 5-Kanal-Faser, eine Hohlfaser, die den Körper mit einer warmen, isolierenden Luftschicht umgibt, die Strahlungswärme isoliert und die Feuchtigkeit transportiert. Die Socke Trekking Fibre Tech hat einen Wollanteil von weniger als 50 % und einen Polypropylen-/Polyamidanteil von 43 %. Zusammen mit 15 % Dacron kann das Produkt als 'recommended for Gore-Tex shoes' ausgezeichnet werden. Weiterhin werden die Anforderungen an Mountainbike- und Runningsocken diskutiert.

Practice oriented testing of waterproofness in ready-to-wear clothing|Praxisorientierte Prüfungen von wasserdichter Fertiggkleidung

Rossi-R|Weder-M|Rüedi-M

Breathable materials are widely used for sports- and leisurewear. The quality of these membranes or coatings has partly been highly improved during the last few years and the waterproofness of surface materials is usually sufficient. The making of the clothing will therefore be decisive for weather protection. For instance, the seams should be properly sealed, the zippers sufficiently covered or a hydrophilic lining should not wick any water to the inside of the clothing. The manufacturers offer constantly higher hydrostatic head values but it is doubtful if these values really allow a statement on the suitability of a rain jacket in practice as the rain drop has a dynamic impact on the clothing and therefore cannot be compared with a static pressure. For this reason, EMPA developed different test methods to be able to analyse practice related problems. Until now, the waterproofness of ready-to-wear jackets was tested with the 'James' test method in the rain tower with a cloudburst rain (450 J/sqm.h). Two further rain types have now been defined to test watertight as well as water repellent clothing. The new precipitations in the rain tower simulate a persistent rain and a drizzle. It can thus be determined exactly how long a clothing can be worn and remains tight in the three different rain types. The test method 'James' gives the possibility to test clothing under near to practice conditions. With the three rain types, the performance of the jackets can be analysed for different precipitations. Not only the waterproof but also the water repellent properties of clothing can be assessed. Standardised tests as the hydrostatic pressure or the Bundesmann rain shower test allow good quality controls on the watertightness of surface materials. But they give only limited information about the weather protection of a ready-to-wear clothing. The waterproofness drastically changes during use of the clothing. None of the six tested jackets, which had been used for one year on average remained tight longer than 15 minutes in the cloudburst.

Physiological wear properties of Lenzing Lyocell|Bekleidungsphysiologische Eigenschaften von Lenzing Lyocell

Eichinger-D|Bartsch-P|Schafheitle-P|Kreuzwieser-C

Lenzing Lyocell is a cellulosic fibre based on pulp which is extracted from wood - a natural and renewable raw material. Garments made of Lenzing Lyocell show a high wear comfort as typical for the other cellulosic fibres as well. The comfort of leisure and sportswear is determined by the thermo-physiological properties of the fabric, which include the capability to transmit heat and humidity. To assess the thermo-physiological properties of a Lenzing Lyocell weft knitted fabric as used in leisurewear the characteristic parameters like heat-insulation R_{ct} and steam permeability resistance R_{et} , have been measured with a skin model. To compare fabrics with different constructions the steam transmission index I_{mt} , was calculated. Moreover the ability of water- and humidity-uptake, water transportation and drying time were determined. The investigations have been carried out on Lenzing Lyocell interlock and a cotton interlock of comparable construction. Compared to cotton, Lenzing Lyocell has a lower heat transition resistance and a higher water vapour permeability so that it was possible to prove the subjective cooling sensation, which means that Lyocell is a 'cool' fibre. Without taking the other skin sensory properties into consideration, the conclusion can be drawn that differences result with respect to physiological wear properties. The measured values underline the very frequent subjective impression of an 'article of clothing' with a cooling effect.

UV protection by textiles|UV-Schutz durch Textilien

Böhringer-B

More leisure, different ways of spending one's free time as well as the depletion of the ozone layer in the stratosphere have led to a substantial increase in UV exposure, especially for the population of the Western industrialised countries. The resulting premature ageing of, or even injury to, the skin may be prevented by using appropriate means of UV protection, including sun-protective textiles. The preferred physical method for determining the sun protection factor of textiles is presented. This is currently the subject of a European standard being worked out by a WG of the TC 248. It is demonstrated by some examples of commercially available woven fabrics (PET, silk, cotton, viscose) that textiles do not automatically afford protection against the sun, but that textiles offering high wear comfort during the summer must be specially designed for this purpose. The requirements for sun-protective textiles and the relevant factors of influence are described. The effects of different factors, such as yarn selection, fabric construction, dyeing, finishing and washing, are explained for a fabric under development. An important indicator of the degree of protection of the skin is the UPF. It has been defined for textiles similarly to sun cremes, indicating how many times longer one may be exposed to the sun, before the first signs of reddening of the skin are observed. The UPF depends on the spectrum of erythemogenic activity, spectral distribution of solar radiation, transmission through specimen, band width in nm, and wave length in nm. Akzo Nobel had decided to develop a light-weight viscose outerwear fabrics with a high UPF (>30) for use in summer-weight garments. The warp consisted of Enka filament yarn of 110 dtex f 40 and the weft of spun yarn of Nm 60. Pigmenting the yarn with titan dioxide, with all other conditions remained unchanged, had a marked effect on the UPF.

UV-Standard 801. Zertifizierung des UV-Schutzes unter Praxisbedingungen|UV standard 801 - practice oriented certification of UV protection

Zippel-E

Mit dem UV-Standard 801, herausgegeben von der 'Internationalen Prüfgemeinschaft für angewandten UV-Schutz', wurde ein unabhängiges Prüf- und Zertifizierungssystem zur Bewertung der UV-Schutzwirkung von Textilprodukten unter den in der Praxis vorkommenden Beanspruchungen des Materials entwickelt. Bei Bekleidung wird der UV-Protection Factor weit über andere derzeitige Prüfansätze hinausgehend in gespanntem sowie befeuchtetem Zustand für geschuertes/gereinigtes sowie Neumaterial ermittelt. Die Zertifizierung erfolgt nach dem niedrigsten ermittelten Faktor in den Stufen 2, 5, 10, 15, 20, 30, 40, 60, 80. Das geschützte UV Standard 801-Label kann als Anhänger am Verkaufsprodukt aber auch dauerhaft als Einnäheticket angebracht werden und soll den Verbraucher über die erzielten Schutzzeiten nachhaltig informieren. Die Prüfgemeinschaft kooperiert zur Verbesserung der Verbraucheraufklärung über Hautkrebsrisiko und Vorsorge mit europäischen Krebshilfeorganisationen und unterstützt deren Aktionen auch durch Abführung eines Geldbetrags je ausgestellttem Zertifikat. Eine Kennzeichnung ist sowohl für Standardkollektionen im Bereich der Freizeit-, Sport- und Bademode als auch für speziell ausgerüstete Sonnenschutzartikel sinnvoll.

AMICOR - Antimicrobial fibres|AMICOR - eine antimikrobielle Faser

Service-D

Amicor is the trade-name of a family of antimicrobial fibres developed by Courtaulds Fibres. During the early developments it was realised that no single antimicrobial compound would give the broad range of antibacterial and antifungal activity that is required and therefore a family of products was developed. Using the unique features of the Courtelle process a fibre that can be blended with natural or synthetic fibres to give aesthetically pleasing and functional garments with life long antimicrobial protection was developed. Application on footwear, sportswear, home textiles and industrial end-uses will be discussed. Microbes occur in virtually ever environment from polar ice caps to arid deserts. Background levels of bacteria and fungi are nearly always present with clean skin having a population of typically 100 to 1000 microbes per sq. cm. At these levels microbes pose neither a health nor an odour problem. Bacteria and fungi thrive on hot moist conditions. It is when bacteria reach excessive levels that problems occur with odour, discoloration and possible infection. The efficiency of the Amicor fibre is determined by sterile area around the fabric devoid of microbes. The antimicrobial activity of Amicor blended with another fibre decreases with decreasing content of Amicor. This relationship is not linear. Good levels of activity can be achieved with blend ratios as low as 20 % for Amicor AB and Amicor AF and 30 % for Amicor Plus. Antimicrobial fibres with dual activity (antibacterial and antifungal) incorporated into the structure act as an effective, safe and durable way of controlling a wide range of microbes that are responsible for odours, fungal infections and food sources for higher order pest. Acrylic as the host fibre gives many advantages including a porous structure for slow release, easy dyeing and processing, excellent moisture management, etc.

LEACRIL TECNA: A new high abrasion resistance and high comfort acrylic fibre for sportswear|LEACRIL TECNA: eine neue Acrylfasern mit hoher Scheuerfestigkeit und hohem Tragekomfort für Sportbekleidung

Tedesco-R|Cavallini-M

Acrylic fibres especially when produced through a wet spinning process, the most common one, have a very pronounced structure made by a bundle of fibrillae oriented along the fibre axis but with a very poor cohesion among them. Due to this structure the fibre has excellent mechanical properties against stress applied along the fibre axis but has poor mechanical resistance to the stress perpendicular to the fibre axis. Studying the parameters that influence the fibre structure during the single steps such as extrusion, coagulation, fibre orientation and heat setting, for the wet spinning process, it has been possible to develop Leacril Tecna, a fibre with enhanced wear resistance and excellent resilience. Leacril Tecna does not absorb sweat and dries very quickly for better comfort thus making this fibre ideal for sports socks. The enhanced resilience moreover protects the foot from shocks and skin abrasions. The fibre has a tenacity of 28 cN/tex, an elongation of 52 to 56 %, a loop tenacity of 24 cN/tex and a loop elongation of 54 %. In the world sock market, Italy has an important position as second biggest producer after the USA. In Europe, the Italian production represents 54 %

of the total, while exports are 68 %. Of a total fibre consumption in the socks market of 70000 tons, acrylic fibre represent 12 % equivalent to 8340 tons.

Neue Stoffe und Technologien für den 'Active Sportswear' Markt|New fabrics and technologies for the active sportswear market

Shiotani-T|Hayakawa

Perspiration is a vital physiological function of the human body, and quick removal of perspiration is an important subject for the development of active sportswear fabrics. Toray developed the new high performance fabrics effective for quick removal of perspiration. Moisture-permeable waterproof fabrics are just suitable for ski wear and rain wear. For these uses, the 'Entrant' series were developed and widely in marketing. Recently a new coating-type fabric, 'Entrant' G 11 - XT was developed. It offers a superb balance of water penetration resistance and moisture permeability. In addition, it has a low dew condensation characteristic by a balanced combination of two types of newly developed polyurethane resins. The 'Fieldsensor' can be used for active sportswear, particularly for the summer season. This is a 100 % polyester knit fabric, and effectively absorbs perspiration and also quickly dries. Capillaries (or small fibre spaces) are arranged so that they decrease in size from the inner to the outer layer. This unique structure allows perspiration to be rapidly absorbed by the fabric's inner layer and transported to the outer layer by capillary action. Sportswear is required to fulfil wide-ranging needs; aesthetic features such as an attractive appearance and a pleasant look as well as functions that improve athletes' performance, provide extra comfort and promote health to wearers. In that sense, fabrics for sportswear are high-tech materials that must offer high levels of aesthetics and functions at the same time. There are many possibilities for technological breakthroughs in the future. Toray continues its effort to introduce superior fabrics with higher levels of functions and comfort for sportswear.

Sliding abrasion resistant fabric - PASMO|Das abriebfestes Gewebe - PASMO

Yoshikazu-Takatera

An abrasion-resistant fabric made of polyester was developed. It has been found by the electron microscopic observation of the sliding abraded part of a fabric that the main causes of damage are the breakage by stretching and shearing, the crushing, the fibrillation and the thermal melting of a yarn. The improvement in abrasion resistance was achieved by improving the following yarn characteristics and fabric characteristics. The optimum spinning speed and false-twisting method were selected to improve the strength, the modulus at a medium elongation, the heat-resistance and the fibrillation resistance of a yarn. Then a fabric was designed to have a high density structure to prevent the intrusion of sand particles and small stones into the texture and also the fabric surface was made smooth to minimise the frictional resistance on the ground. The practical sliding abrasion resistance performance was evaluated by putting a bag-shaped specimen on a dummy body, dragging the body around a ground and counting the number of circulations until a hole was opened on the specimen. The developed fabric has a life about twice as long as that of conventional fabric. This developed fabric has been tested by 4 teams among them 12 Japanese professional baseball teams as well as various schools and colleges. The technology discussed is anticipated to have a rosy prospect for development, not only sports wear but also in the clothing and non-clothing articles required to provide a great resistance to abrasion. The product was first placed on the market under the trade name of PASMO in 1987, and has expanded in both production volume and application. It has recorded brilliant business achievements and has generated a patent right as unique technology.

Chancen und Potentiale von Lenzing Modal in Sport- und Freizeitbekleidung|Use of Lenzing Modal fibres in fashionable sports and casualwear

Leitner-J|Kampf-R

Die Anforderungen der Konsumenten an die Qualität von Sport- und Freizeitbekleidung steigen ständig. Funktion, modische Ästhetik, optimaler Tragekomfort, sind einige Grundforderungen, die der moderne Konsument an hochwertige Artikel dieses Marktsegments stellt. Modalfasern werden aufgrund der steigenden Qualitätsanforderungen in zunehmendem Maße wegen ihrer charakteristischen Eigenschaften in hochwertiger Sport- und Freizeitbekleidung mit großem Erfolg eingesetzt. Die spezifischen Eigenschaften von Modalfasern wie hervorragendes Saugvermögen, hohe Dimensionsstabilität, permanente Weichheit, angenehmer Griff und bleibende Farbbrillanz sind der Grund weshalb Modalfasern sowohl rein als auch in einer Vielzahl von Fasermischungen in den verschiedensten Konstruktionen in modischer Sportbekleidung, sportiver Wäsche, Trainingsbekleidung bis hin zur Bekleidung für Aktivsport in steigendem Maße eingesetzt werden. Einige charakteristische Anwendungen von Modalfasern im Segment der Sport- und Freizeitbekleidung werden vorgestellt. Aktuelle Marktuntersuchungen prognostizieren weltweit für die nächsten Jahre einen weiteren Anstieg der Verkaufsziffern für Sport- und Freizeitbekleidung. Das erhöhte Gesundheitsbewusstsein und Fitnessimage wird neue Freizeitaktivitäten im sportlichen Bereich kreieren, die saloppe, komfortable und modisch attraktive Bekleidung fordern. Kombinationen von Synthesefasern mit atmungsaktiven Materialien sind auf Grund von Funktion und Tragekomfort am Markt sehr erfolgreich und werden weitere Marktanteile gewinnen. Sportbekleidung wird nur zu einem geringen Ausmaß für aktive sportliche Betätigung eingesetzt. Das Gros der Sportwear wird als Casual und Freizeitmode getragen und muß daher gleichermaßen modischen und funktionellen Anforderungen entsprechen. Modalfasern sorgen für eine optimale Regulierung des Feuchtigkeitshaushaltes.

The modal-contact collection|The Modal-Contact-Kollektion

Jover-G

It is not just about image, about the fashionable appearance of the fabric, but rather about the creation of a new physical experience with the material. Touch is a key creative element in the Modal-Contact collection. Through touch, in the physical contact with the material, the textile 'speaks' to the consumer, to their memory and all their individual experiences, gained, learnt and recorded over time

through the sensation of touch. Touch is a gateway into the personal universe of the consumer and yet at the same time a means of expression exterior to this very same universe. Appealing to the sensation of touch is not just a creative strategy. It also involves establishing a suitable communication channel so that the consumer is able to perceive what the product is suggesting: a new tactile experience. If vision is the sense of seduction, of instant and immediate attraction, touch is a more appropriate way of communicating intimately and personally with the consumer. The central concept which articulates all of the Modal-Contact project is the word 'contact'. A word which contains in its origins the meaning which interests people so much, that of tactile. Today and further more in facing up to the year 2000, it is necessary to work with fibres with flexible quantities, capable of interacting with others combining the best of each, fibre which can mix and enrich each other so as to bring about new qualities. Modal is a ductile fibre, flexible and generous which shows extraordinary qualities when mixed.

Development of performance fibres and fabrics - A proactive approach|Die Entwicklung von leistungsfähigen Fasern und textilen Flächengebilden - eine proaktive Vorgehensweise

Rigby-D

An overall view of the performance fabric market will be presented, including some quantitative estimates of market size in this currently poorly defined market. The different approaches to the market taken by the large and heavily promoted clothing (and shoe) brands (e. g. Nike) and other clothing suppliers will be contrasted and the different strategic marketing approaches to them required by fibre and fabric producers will be described. Finally, some important technical trends in fibres and fabrics, and how they provide performance, aesthetic and cost benefits to different types of consumers, will be described. New technologies can be divided into three categories: (i) current and already well-used (e. g. breathable, waterproof barriers), (ii) sleeping: existing, but under-exploited, and (iii) emergent, new technology (e. g. UV protection). Questions such as (i) who are most influential decision-makers in a segment, (ii) how to recognise early a significant shift in technology in order to join in and accelerate its commercialisation, and (iii) how to improve the ability to forecast the future needs, etc. are discussed. The approach to thinking about new product development outlined above recognises the increasingly connected nature of the textile supply chain which is now more than ever before driven by end-user needs. There are increasing pressures for supply chain members to collaborate, and particularly to innovate, to produce the required results. It is no longer adequate for fibre producers to sell their products to the next processor down the chain in the hope that he will invent new products and ensure future sales. Some, but very few, fibre companies have understood and acted on this; but most have not. The new approach will result in a consumer-based, strategic system for market targeting and new product development which can be used by all members of the performance garment supply chain, either separately or together with their commercial partners.

European accreditation of protective wear in sport|Die europäische Akkreditierung bei Sportschutzkleidung

Simmons-A

There is a risk of injury associated with most types of physical sport. This can be reduced by safe practice and adherence to the rules. However some risks can never be completely eliminated and therefore it is sensible for participants to use personal protective equipment (PPE). Since the introduction of the European Personal Equipment Directive 89/686/EEC, suppliers of PPE for sporting purposes have been obliged to mark their products with the 'CE' mark. It is now illegal to place an item of PPE on the market in a European state unless it carries the CE mark. However, as the PPE Directive is a general piece of legislation, it does not include safety tests and performance levels appropriate to each type of product. These are generally specified in European standards, developed by European technical committees. These standards describe in detail how a particular type of product should be tested and what performance should be met in the test to achieve a satisfactory pass. The PPE Directive places a number of requirements on PPE suppliers. For instance, they must keep a comprehensive file detailing the design and testing of the prototype. The supplier must also ensure that written instructions are supplied with each product describing in detail what type and level of protection is offered, how the product should be cared for and used and the name and address of the supplier. The tests necessary to certify an item of PPE typically cover all of the following main categories: innocuousness, ergonomics, protective coverage, marketing and instruction, and protective qualities. Two important protective qualities are protection against impacts and abrasion. Protection against abrasion often takes the form of hard outer surfaces, generally made of plastic, which are difficult to wear down. Leather and man-made materials incorporating abrasion resisting properties are often used for this purpose. A wide range of protective sports PPE products are available.

The role of marketing in active sportswear and equipment|Die Bedeutung des Marketings bei funktioneller Sportbekleidung und Sportartikeln

Redwood-M

The development of the sports industries of the world has been a dramatic feature of the last fifty years and has been paralleled by the introduction of scientifically understood skill to the process of marketing. Much of what has been achieved by both industries has come about through the powerful way in which the sports industries has used marketing tools, pushing them to, and sometimes beyond their limits. This has allowed the sportswear and equipment industries huge opportunities for growth and competitive product development. Research into new materials, which was previously always carried out to meet military needs, is now often led by the possibilities of their beneficial use in sports. The lecturer will discuss these developments and use experiences in the golf industry to demonstrate how sport has allowed man made fibre to take a major part in this development and overcome traditional negative attitudes to things which are 'synthetic' or 'man made'. The sport market has been a great growth area and offers attractive future potential. In 1980 Titleist and Foot-Joy Worldwide launched a golf glove with the name Sta-Sof into a commodity market in which the main differentiation had been size: small, medium and large. Within three years this became the leading glove sold in the USA and within five years the leading glove sold in the world. The main reason for this success is based on the excellent product quality. Secondly, there is evidence of a new evolution in sports market. This is driven by the increasing dominance of larger companies, with large marketing

budgets. Now the big sports outlets are increasingly dominating the market. This is leading to changes in the channel structure. The challenge to the man-made fibres industry that comes with the coming of the new millennium is to advance the technology and give the consumer great products, but doing so to add some leadership marketing alongside. Having a great product does not always mean you always win.

The Tactel effect - the role of fibre branding in marketing|Der Tactel-Effekt - die Rolle des Fasermarkennamens im Marketing

Noakes-R

Trends in the active sports and leisurewear markets are influenced by a variety of factors, ranging from sports star personalities to creative product design and retailing. All this is supported by innovation in new materials and fibres. The proliferation at retail of highly promoted brand names of every description is increasing, each competing to capture the buying interest of consumers. How can a fibre brand add value in amongst such powerful retail, garment and designer brands? Fibre brands are useful at retail for two major reasons. One is that the growing awareness and interest from consumers in the function and performance of fabrics is allowing the fibre brand to become a powerful vehicle for communicating specific end-use benefits as well as the quality of materials. Secondly, breakthrough research and development by fibre producers is an increasingly important means of creating new merchandise categories, adding to retail competitiveness by being 'first in the market'. Fibre brands linked to such innovation add an extra to the supportive selling story. The Tactel brand strategy is based on DuPont's potential for fibre innovation, with a communication program transmitting the excitement of new fabrics which are specially developed for the many demanding end-uses in sportswear. New 'Tactel effect', for example Tactel HT for extreme sportswear, are launched into the textile chain and supported by an integrated program of promotional and point of sale materials to help the retailer. Both Lycra and Tactel are part of DuPont's strong portfolio of ingredient brands in active sports and leisure wear. It also includes polyester-based performance fibres such as thermostat and Coolmax. DuPont's strategy is not in any sense to compete with manufacturer and retailer brands but to complete them. The timing for this 'focus on fibre' in active sports and leisure wear has never been better. DuPont is making a significant investment in consumer marketing programmes to create awareness of the benefits fibres such as Tactel HT bring to high quality performance sports and outdoor wear.

Technologieentwicklungen für Sportbekleidung aus der Sicht des Konfektionärs|Technological development for sportswear from the point of view of the garment producer

Geyer-J

Die Produktpalette von Meier Sportswear umfaßt Sportbekleidung für alle Jahreszeiten und reicht von der Sommer-, Tennis-, Outdoor- und Golfbekleidung bis zur Ski- und Snowboardbekleidung. Für diese Kollektion steht, bei ständig wachsenden Anforderungen an Styling und Schnittführung, die Funktionalität im Vordergrund. Es wird darauf eingegangen, wie die wesentlichsten Anforderungen in den verschiedenen Sportarten durch den Einsatz und die funktionsgerechte Verarbeitung von innovativen High-Tech-Materialien, Garnen, Membranen, Wattierungen usw., erfüllt werden können. Von den Garnen werden insbesondere hohe Festigkeiten und Scheuerfestigkeiten gefordert. Dies wird am Beispiel des Garntyps 'Tactel HT' demonstriert. Tactel HT bietet ein gutes Verhältnis zwischen Reißfestigkeit und Masse und eine Verbesserung der Abriebfestigkeit um 50 bis 250 % im Vergleich zu Standard-Nylon und -Polyester und ermöglicht dadurch Masseeinsparungen beim Stoff von 10 bis 35 %. Die Vorteile von Membrankleidung wie Wasserdichtheit, Winddichtheit, Atmungsaktivität, Strapazierfähigkeit, Pflegeleichtigkeit usw. werden diskutiert. Bei Membranen handelt es sich um Folien, die zunächst einzeln hergestellt, dann auf ein Textil aufgebracht und schließlich in die Bekleidung integriert werden. Mikroporöse Membrane lassen Wasserdampf hindurch und weisen Regentropfen ab. Beim Insertlaminieren wird die Membrane mit einem Vliesstoff oder einer Wirkware kombiniert und hängt lose zwischen Ober- und Futterstoff. Insertlaminats werden vorwiegend in modischer Bekleidung verarbeitet. Die Vorteile des Insertlaminats liegen in der hohen Gestaltungsfreiheit der äusseren Hülle, in der geringen Nahtanzahl, im weichen Griff sowie in der einfachen Versiegelbarkeit der Nähte. Für die Oberstoffe von Membrankleidung werden hauptsächlich Gewebe aus synthetischen Fasern wie Polyamid und Polyester verwendet.

Der Anspruch des Sportbekleidungshandels an die Industrie. Die zukünftigen Potentiale der Zusammenarbeit|Demands of the sportswear trade on the industry - future potentials of co-operation

Jost-K

Active pure sports are the engine for the innovative product developments and the technological innovations in the function-oriented clothing market. As not every consumer is an active athlete, but wide and growing sections of society (if they can afford it) highly appreciate a sporty personality, the European sportswear market continuously grows. The trading sector is an important connecting link between the industry and the consumers and by means of integrated sponsoring and event marketing increasingly contributes to the growing importance of a fitness-oriented body culture. This is why new markets can be opened up and products with a higher added value can be sold. In order that the partly high investments by the industry (3 - 4 stages) and the trade sector (1 - 2 stages) effectively can be used, it is necessary to move closer to each other and practise know-how sharing. Tomorrow's products are multifunctional, but at the same time they have especially been tuned to the corresponding consumer group. This is why the production of high-tech materials even gains a higher significance and will be able to extend its market share. The success will very much depend on the joint means of communication with the consumer which implies an understandable message to the same effect over all market stages. The active selling of brands, which includes price and quality as well as the important image components, is also a basic prerequisite for the further extension of the sportswear share in the total market. In 1997 the market potential of the sports textile market had an amount of DM 190 billion (USA 92, Europe 58, Japan 20 billion DM). In 1997 Germany has with 20.45 % the largest market share in Europe, followed by Great Britain (17.31 %), France (16.7 %) and

Italy (12.75 %). In function-oriented sports market an increase of 30 % until 2010 is predicted, with an annual growth of 1 to 4 %.

Application properties of PA microfilament yarn as related to texturing process parameters|Der Einfluß der Prozeáparameter beim Texturieren auf die anwendungsbezogenen Eigenschaften von Polyamidmikrofilamentgarn

Boubeaud-O

There is an ever increasing demand for PA microfilament yarn especially in hosiery and circular knitting applications where large percentage will be textured. Microfilament yarn offers softer properties than conventional yarn as a consequence of its fine filaments of roughly 1 dtex. However, fine filaments are more sensitive to mechanical and thermal strain which occurs during false twist texturing. To achieve optimum conditions for the texturing of the yarn a study of thermal exchange during the process and modelling of application properties were carried out. Optimum temperatures are even more important for processing microfilament yarn than for customary filament yarn. A heat exchange model was fitted to experimental values. The yarn surface temperature profile and the temperature gradient inside the yarn were studied. A comparison was made with a standard yarn. The interaction of texturing parameters on the yarn surface temperature was also taken into account. Mechanical properties and dyeing affinity of the textured yarn were modelled with four main texturing parameters: draw ratio, D/Y ratio, heater temperature and texturing speed. Good mechanical properties make further textile processing more successful and lead to the final product having better properties. Importance was also given to the yarn dyeing affinity which was studied with different classes of dyestuffs.

Advanced modelling and process control for PA microfibrés production|Modernes Modellieren und Prozeákontrolle bei der Polyamidmikrofaserproduktion

Paravella-L

In the last few years Nylstar has developed the automation systems in a massive way in recorder to give a competitive and timely answer to a market which demands diversified products with a shorter lifetime than it was in the past. All the improvements made in Nylstar so far have smoothed the way for the implementation of the Automated Factory as an 'Automation Integrated System'. We generally note that when the complexity of the automatic systems increases, the expected benefits decrease; that is to say that a clear gap emerges between the potential performance of complex technological systems and the company 'Physical-Technical' body poorly consistent with the required integration. This situation of low-exploitation of the technological potentialities cannot be simply solved by increasing the hardware integration, but also by remodelling the management system which controls the production as regards organisational culture and by introducing the High Integrated System (H.I.S.). In order to integrate the system and filling up the two levels which contain information and strategies, it is necessary to unify the two process parts, the continuous and the discontinuous one, since they represent in a different way the production events and create uncomparable data. The product can be characterised using both the punctual data of the continuous process variables and the punctual data of the discontinuous process in a suitable data base. The hardware integration of the system allows to have a central platform with all the specific data of the product. All the mathematical and statistical methods for the analysis and the interpretation of the process can be applied in the computer processing the data collected in the data base. Furthermore, an effective customer-driven control strategy, the so called 'Learning Machine' can be implemented.

Schmelzklebefasern und deren Anwendung|Fusible fibres and their application

Fust-G

Copolymer fusible adhesive fibres are well known in various forms. From the application technological point of view they are used in a wide variety of applications using thermobonding and heat-fusing processes. The variety on offer and the competition ratio between fusible adhesive fibres and bicomponent fibres has changed. This creates the repeated question for end-users of which fusible adhesive is better suited for which application. Ems can offer experience of fusible adhesives based on copolyamides and copolyester with their products Griltex granules and powders. Grilon and Grilene fusible adhesive fibres and also with the specialist Grilon fusible adhesive monofilament and multifilament products. In this presentation we have tried to characterise the products according to their possible applications and to give typical examples. The objective of the presentation is to provide an improved structuring of the product group with its many different kinds of fusible fibres. Thermoplastic granules are melted to create a coating for a substrate or for the formation of a thread or for surface applications. In addition to the three classical application methods for transfer of powders to the textile substrate, the double dot method has now made a breakthrough. Grilon CK is a fusible monofilament for sealing selvages. In the case of filter fabrics, Grilon CK is woven into a monofilament basic fabric. Furthermore, the applications of Grilon K 85 (fusible multifilament), Grilon C 85 (adhesive multifilament twisted from two polymers), Grilon VLT/PES (combi-yarn), CoPA/PA 6 (bicomponent fibres) and Grilon K 140 (solid-profile fibres) are presented. Co-polyamides and co-polyesters can be applied for hot melt coating for interlinings as well as for adhesive films for laminating automotive fittings etc.

The chemical and physical properties of polyamides: an overview|Die chemischen und physikalischen Eigenschaften von Polyamiden: ein Überblick

Wilson-M-P-W

The linear aliphatic polyamides, or nylons, are a commercially very important class of polymer, characterised by repeating (CO-NH) carbonamide groups. In addition to the along-chain covalent bonds and between chain van der Waals forces, hydrogen bonds between carbonamide linkages have a major impact on polymer properties. In the overview the influence of chemical structure and the density

of hydrogen bonds on the properties of polyamides will be discussed and related to their commercial applications. This will include behaviour in melt, and degradation together with solid state properties such as crystallisation and static electrification. Key success of polyamide fibres include characteristics such as spinnable from the melt to wide range of sizes and shapes, adequate thermal stability for textile and carpet uses, semi-crystalline nature which allows setting of crimp and twist, readily dyed under atmospheric conditions, excellent abrasion and fatigue resistance as well as good recovery from high strains. Within the class, polyamides 6 and 6.6 are absolutely dominant, especially in fibre applications. Basic polymer properties do have a major influence on fibre properties, and come through when aesthetic or technical performance demands are high. In this respect the hydrogen bonds in polyamides contribute significantly to the advantages of polyamides.

Neue Polyolefinfasern - Neue Anwendungen und Eigenschaftsprofile|New polyolefin fibres - New applications and properties

Schobesberger-C-P

For more than a quarter of a century, Asota is producer of polyolefin fibres in the single fiber denier range from 1.0-400 dtex (360 den). In classical textiles, apart from carpets and rugs, fibres with deniers less than 7 dtex are mainly used. Based on the experience with polyolefines (polypropylene, polyethylene) collected over decades, a wide range of PO-fibres was developed. Today fibres from microdeniers up to dyeable, antimicrobial, fire retardant, high UV-resistant and even fibres including barriers against dust mites are offered. These properties can often also be combined. Additionally, different combinations of strength and elongation, adjusted to the demands of processing and the end-use, are possible. Beside this more than 4.500 spun-dyed colours are available on individual request. Further it is to point out that deliveries of small quantities (less than 1 t) are guaranteed. It is the target to demonstrate the applications of polyolefin fibres out of this wide range of possibilities. This will be shown by textiles for battery separators, mattresses and bed wear as well as shoe liners, animal baskets, wiping cloths up to socks and functional underwear.

Neue Spinnverfahren auf Faserflächen 'making a little go a long way'|New spin finishes on fibre surfaces 'making a little go a long way

Williams-M

The desire to run textile processes faster, and the more stringent demands of modern end-uses, mean that spin finish properties are more critical than ever in providing surface effects. Improving the degree and evenness of spinnings coverage on fiber surfaces is critical in optimising performance of existing chemistries and in achieving lower application levels. The ability of a spin finish to spread quickly and evenly over the surface of a textile filament or fibre is becoming increasingly recognised as one of the key requirements of high performance products. This is true for spin finishes for polypropylene as it is also true for other synthetic fibres. The results of further practical experience and of studies which consider laboratory results will be described. The enhanced surface coverage (ESC) spin finish system as applied to polypropylene textile substrates is presented. The function on the ESC spin finish is to provide a higher degree of uniform surface spreading. At a given additive level, large differences in ESC efficiency can occur with different base spin finishes. The simple spin finish drop test on polymer films demonstrates that there is no universal ESC spin finish. Typical application levels of ESC spin finishes on polypropylene fibres will be in the range of 0.2 to 0.5 %. The spin finish distribution can be determined by the Secondary Ion Mass Spectrometry (SIMS). The extreme ppm sensitivity coupled with the chemically confirmed secondary ion fragments makes the technique suitable for this application. The ESC technology may be applied to polypropylene staple fibres, polypropylene POY yarns as well as spun-laid nonwovens.

Herstellung von feinen Polypropylenfasern|Production of fine polypropylene fibres

Schweitzer-A

Die verschiedenen Einsatzgebiete der feinen Polypropylen-Fasern verlangen teilweise völlig unterschiedliche Fasereigenschaften. Um diese Forderungen zu erfüllen, wurden in den letzten Jahren verschiedene Technologien entwickelt. Beispielsweise stehen für Hygienefasern die Eigenschaften zur thermischen Verfestigung bei gleichzeitig hoher Verarbeitungsgeschwindigkeit im Vordergrund, während bei Fasern für den textilen Bereich hohe Faserfestigkeit und Lichtbeständigkeit gefordert werden. Die dafür verfügbaren Anlagenkonzepte sollen nicht nur die Forderungen nach entsprechenden Faserqualitäten erfüllen, sondern auch die Gesichtspunkte zur wirtschaftlichen Herstellung und Flexibilität für unterschiedliche Produkte berücksichtigen. Für die Herstellung von feinen Polypropylenfasern kommen grundsätzlich zwei Verfahren zur Anwendung, das konventionelle Spinnverfahren und das Kompaktspinnen. Beim konventionellen Spinnen wird das Faserkabel mit einer Abzugsgeschwindigkeit von bis zu 2000 m/min in einer Spinnkanne abgelegt. Die Abkühlung der schmelzflüssigen Fäden erfolgt aufgrund der hohen Geschwindigkeit über eine längere Kühlstrecke. Es kommen rechteckige oder ringförmige Spinnköpfe zum Einsatz. Das Kompaktspinnverfahren umfaßt nur eine Stufe. Das kontinuierliche Verfahren bedingt eine niedrigere Spinnungsgeschwindigkeit, die von der Streckgeschwindigkeit und der Bedienbarkeit der Streckstraße begrenzt wird. Unter Thermobondierfasern werden solche Fasern verstanden, die für die Weiterverarbeitung zu Krempelvliesen mit anschließender Verfestigung auf einem Kalandrier geeignet sind. Zur Herstellung dieses Fasertypes werden beide Anlagentechnologien verwendet. Textile Fasern werden nur mit der Kompakttechnologie produziert. Besonders feine Fasern benötigen einen hohen Farbstoffanteil mit negativen Auswirkungen auf das Spinnverhalten und den Faserpreis.

Faser aus Metallocen-Polyolefinen|Fibres of metallocene polyolefines

Gleixner-G|Vollmar-A

Progress in polyolefin fibres was always tightly connected with developments in catalyst technology. Since the start of the production of isotactic polypropylene at Montecatini in 1957, four generations of

Ziegler-Natta-catalysts laid the foundations for the continuous rise of polyolefin fibres. Whereas the so far industrially used Ziegler-Natta-catalyst systems are all heterogeneous, the discovery of chiral metallocenes as catalysts for the preparation of isotactic polypropylene in 1985 started an intensive development of homogeneous catalysts. Due to the well defined structure of their active centre they are also known as single site catalysts. Ten years of intensive research were necessary to realise the first production run of isotactic polypropylene with metallocene catalysts (m-iPP) in a full scale industrial plant of Hoechst in 1995. The first m-iPP grades ready for market in Europe with the trade name Hostacen excel by a narrow molecular weight distribution (M/M, - 2.5) and their extremely low content of atactic PP, the melting point is approx. 15 degrees C lower than that of conventional iPP, Vicatsoftening point and HDT are at the same level however. Asota as a pilot partner has had the opportunity to explore the potential of the new m-iPP grades for the production of staple fibres on compact spinning plants. The examples which will be given comprise a titer range from 2 to 110 dtex, various plant configurations and application areas from fine denier fibres for yarns and nonwovens to needle felt and tufted carpets. It will be shown that the special properties of m-PP can be utilised to achieve remarkable improvements of fiber and final product properties and in some cases of production technology too.

Market perspectives of the European polyolefin textile industry|Marktperspektiven für die europäische Polyolefin-Textilindustrie

Peckstadt-J-P

First of all, some general information will be given about the EATP (European Association for Textile Polyolefins) - its structure, goals, activities. The European Association for Textile Polyolefins is a vertically integrated association that defends the interests of the Textile Polyolefin industry. It represents Polymer Manufacturers, the Fibre Manufacturers, the Manufacturers of Fabrics and bags, in which geotextiles and technical textiles are included. A survey on the evolution of the European market of polyolefins in textiles is given. Actually, polypropylene represents about 35 % of the total use of man-made fibres and 23 % of the total fibres consumption for textiles. Alternatively, polypropylene textiles represent 26 % of the total use of polyolefins. Polypropylene accounted for 95 % of the polyolefin consumption in textiles in 1997, only 5 % in polyethylene. Before the end of the century, the production capacity of polypropylene will have increased by over 1000 ktonnes. If the consumption of PP will continue to grow there will be a period of pressure on the prices and consequently on profitability. For 1997, the consumption was as high as 1545 ktonnes, which equals about 26 % of the total PP-market. The share of PP textiles was evaluated with regard to the total PP production to examine consequently the segmentation with in the fiber industry and the different applications. Finally, the consumption of the different segments were discussed in order to set a trend for the future and indicate reasons for changes. Tufted carpets represent 77 % of the total surface of carpets and floor coverings in Europe. Comparing 1990 with 1997 a decrease for nylon, wool acrylic and polyester was observed. The only fibre that is increasing is polypropylene from approximately 160 million sq. m. to 250 million sq. m. but also relatively from 25 % to 35 % of the total. As the economy picks up in Europe, the construction industry should offer interesting growth opportunities for polypropylene in carpets as well as woven and nonwoven geotextiles.

Dyeing of polyester staple in cotton and wool system. Different approaches, problems and solutions|Färben von Polyesterstapelfasern im Baumwoll- und Wollsystem. Verschiedene Vorgehensweisen, Probleme und Lösungen

Ammirati-C-C|Iannone-A

Montefibre investigated two different approaches of dyeing low denier polyester staple fibers: by reducing both temperature of dyeing and development of superficial oligomers during, dyeing via blending polyethylene terephthalate with other polyesters, by producing dope dyed fibers. Blending of PET with a small amount of polybutylene terephthalate (PBT) permits to reduce the temperature of dyeing with the same dye yield, but it is inadequate to dye at atmospheric pressure and to reduce development of oligomers. Studies to evaluate performances of blends of PET with other polyesters are in progress. Producing low denier dope dyed fibers creates several problems in terms of matching colour and consistency and, due to high dosage of dye, in terms of extrusion stability and melt filtration. Montefibre found the optimum conditions for this process and is now able to produce a complete range of dope dyed 1.7 dtex polyester staple fibers for use in open-end spinning with the same characteristics and performances than standard semi-dull or bright fibers. The dyeability for polyester fibres produced from PET/PBT blends with PBT contents ranging from 0 to 30 % was investigated. The staple produced from PET/PBT blend shows a higher dye yield in comparison with the PET staple but however not so high to allow dyeing at 100 degrees C and then at atmospheric pressure with the respective advantages in energy-saving and in equipment complexity. Montefibre has developed its own production technology for mass dyed polyester staple (Terital TP). Fields of applications of Terital T15TP are open end yarns from 100 % polyester or from mixtures with mass dyed viscose and/or cotton, ring yarns from 100 % dope dyed polyester or from mixtures with raw white polyester for knitting, and blended yarns with cotton for shirting or with viscose for apparel etc.

Optimierung der Einstellung von Falschdraht-Texturiermaschinen mit Hilfe der Evolutionstheorie und neuronaler Netze|Optimization of a false-twist texturing-machine with neural networks and evolutionary algorithms

Veit-D

Computer-based neural networks are being used as a tool to determine relations between a large number of parameters that cannot be found using conventional analytical algorithms. In the first, so-called training stage, the respective parameter sets (e.g. machine settings vs. resulting yarn characteristics) are fed into the network which then learns the connections between them. Using the acquired knowledge, the neural network can then predict the expected yarn characteristics resulting from a new machine setting. This also works in reverse, so a neural network can also be trained to suggest a machine setting in order to achieve the desired yarn characteristics. This is being used to optimize the machine setting of a false-twist texturing machine with regard to the characteristics of the textured

yarn without having to carry out a large number of trials. Experimental results show the high accuracy of the predictions of the neural network. Following biological principles, the computer-based evolution theory can be used to determine a solution for systems of complex equations, that can neither be solved analytically nor numerically within a short period of time. By applying an evolution algorithm in the false-twist texturing process, the yarn course and the forces between yarn and friction-discs have been calculated. This can be used to optimize the disc geometry and subsequently to reduce the abrasive effects of the discs on the yarn which then allows higher production speeds.

Top-Chemie und Top-Technologie = PES-Stapelfaser mit optimalen Verarbeitungseigenschaften|Top chemistry + top technology = PES staple fiber with optimum processability

Mathis-R|Gross-D

The optimum processing of PET staple fiber on modern ring and open-end spinning machines is only possible when spin finish and fiber properties are in harmony. In the past the best possible results could seldom be achieved because the level of communication and co-operation between spin finish suppliers, fiber producers and spinning mills was often inadequate. A promising new approach is demonstrated by the exclusive co-operation between Henkel Textile Technology and the TTI (Textil Technisches Institut) of Akzo Nobel that has been active for some years. Henkel is a specialist in applied chemistry particularly in the field of fiber finishes and TTI has profound know-how both in PET fiber manufacturing and in PET fiber processing. Through this unique cooperation Henkel can offer an all-encompassing service package for unprecedented optimisation opportunities to PET staple fiber producers worldwide. On the one hand, newly developed spin finish combinations can lead to success thanks to the capability and competence of both partners working together to apply combined technologies to fibre production. On the other hand mill processing problems can be interpreted clearly and related to spin finish requirement parameters and thereby solved in a focused and scientific manner.

Properties and morphology of polyester blends and of fibers made therefrom|Eigenschaften und Morphologie von Polyester-mischungen und daraus hergestellter Stapelfasern

Oppermann-W|Hirt-P|Fritz-C

The introduction of poly(trimethylen terephthalate) (PTT) into the market in 1996 closes the gap in the homologous series between poly(ethylene terephthalate) (PET) and poly(butylene terephthalate) (PBT). Each of these fibers offers a unique property profile determined by its molecular and morphological features. In particular, marked differences in force-elongation behavior, resilience and dyeing properties exist. Blends of these polymers were investigated in order to explore the potential of improvement by combining different structures. The polyesters seem to be miscible in the melt and in the amorphous state, but they do not form mixed crystals. However, the crystallisation process and the overall crystallinity are not impaired in the blends. On the other side, longer residence times in the melt give rise to trans-esterification. Melt spinning of the blends is possible without problems. The fibers were investigated with respect to structural, mechanical and dyeing properties. Certain mixtures show a promising behavior. For instance, the modulus of PBT/PTT blend fibers is significantly higher than that of fibers made of the pure components. Blend fibres of PTT and PET can be manufactured without any problems in a certain range of composition, advantageous properties can be achieved. For instance, fibres containing only 10 % PTT in PET exhibit a marked improvement of elastic recovery without a significant drop of tenacity and modulus in comparison to pure PET fibres. With a PTT content around 30 %, dyeing properties of the fibres are far superior to PET and even better than pure PTT fibres. Blends of PTT and PBT have been investigated as well. As expected, the property change is not so big. The modulus of such blend fibres is significantly higher than that of fibres made of pure components.

Polyester additives and modifications for staple fibre and filament|Polyesteradditive und Modifikationen für Stapelfasern und Filament

Gries-T

Polyester resins are widely used as synthetic fibres on account of their various excellent properties and characteristics. Polyester types with different dyeing behaviour extend the product diversification. Polyester fibres have a poor affinity with cationic dyestuffs. Copolymerisation of an isophthalic acid component containing a sulfonic acid group makes it possible to use cationic dyestuffs for polyester staple fibres and filaments. Fashion trends as well as sportswear respectively leisure wear demand better and deeper dyeability using disperse dyestuffs. Commercial disperse dyes consist of large molecules which have to penetrate into the amorphous or oriented sections of the PET fibres. Toxic carriers, high temperatures or high pressure processes with the disadvantage of high energy consumption are used. As an alternative, comonomers can be incorporated. In random copolyesters comonomer units are distributed statistically. With increasing comonomer concentration crystallinity is lowered and the melting temperature of the polymer decreases. Manufacturers of polyester staple fibre can produce another type of PET that yields in higher quality and increased lifetime of polyester fabrics. To avoid pilling behaviour the fibres must be more brittle so that they can break off and will not form pills. To produce more brittle LP-PET than standard PET means to shorten the chain length and to achieve better spinning conditions of the low molecular weight PET chain branching agents (CBA) are recommended in certain concentrations to increase the melt strength. In PET fibres flame-retardant effect is achieved by the addition of special chemicals. The effect of these substances was based on the halogen radicals interrupting the combustion chain reaction. However, as halogen enables the formation of highly toxic dioxins, the compounds used today contain phosphorus. Commercially available bifunctional phosphorus substances containing comonomers for FR-PET are methylphospholane.

Maxflex. Steigerung der Flexibilität und Wirtschaftlichkeit von Spinnanlagen durch ein neues Additivzuspeisesystem|Maxflex. Increased flexibility and economy of spinning lines as a result of a new additive feed system

Schäfer-K|Stausberg-G

Additivbeimischungen gewinnen bei der Herstellung von Chemiefasern zunehmend an Bedeutung. Durch die gezielte Modifikation der Spinnpolymere kann das Eigenschaftsprofil und das Anwendungsspektrum der Chemiefasern beeinflusst werden. Eine Möglichkeit der Polymermodifikation ist das Einmischen von Additiven (Farben, Stabilisatoren, etc.) in das Spinnpolymer. Die Additive können bereits in Granulatform gemeinsam mit dem Granulat des Spinnpolymers dem Spinnextruder zugeführt werden. Bei diesem Verfahren muß auf allen Spinnpositionen die gleiche Mischung verarbeitet werden. Bei einem Additivwechsel sind längere Umstellzeiten einzuplanen. Mit dem neuen Maxflex-System werden die Additive separat aufgeschmolzen und erst unmittelbar vor der Spinnpumpe dem Hauptpolymerstrom zugeführt. Die Mischung von Additiv und Polymer erfolgt in einer speziell ausgelegten Pumpe (Promix-Pumpe). Das Maxflex-System erlaubt im Extremfall, auf jeder Spinnposition ein anderes Additiv zu verarbeiten. Umstellungszeiten werden minimiert. Die Flexibilität der Anlage wird gesteigert. Insbesondere bei der Herstellung von speziellen Produkten, die nur in kleineren Chargen benötigt werden, kann die Spinnereianlage durch den Einsatz von Maxflex deutlich wirtschaftlicher betrieben werden. Das Malflex-Einspeisesystem kann überall dort eingesetzt werden, wo Additive und/oder Pigmente eingemischt werden. Die Plastifiziereinheit und die Dosierpumpe des Malflex-Einspeisesystems können auch als eigenständiges Extrusionssystem zur Verarbeitung kleiner Mengen eingesetzt werden. Durch den Einbau dieses Systems in vorhandene Anlagen kann unter Umständen die Entwicklung eines neuen Produktes beschleunigt werden, ohne daß teure Vorversuche auf Pilotanlagen durchgeführt werden müssen. Das System kann durch geringfügige Modifikationen auch an andere Durchsatzbereiche angepaßt werden.

Polyester fibres and filaments production technology trends|Trends bei der Produktionstechnologie für Polyesterfasern und -filamentgarne

Gries-T

The ongoing increasing polyester filament and fiber consumption continues to promise a tremendous opportunity for business growth. But at the same time world-wide competition is increasing. Today it has become even more important to take the right decision in order to stay competitive in this market. The paper wants to point out the future trends and prospects of production technology. The intention is to elaborate technology concepts that are the basis for succeeding in this challenging economical environment. First, staple fiber technology is covered, followed by textile filament spinning. Whilst both products represent most cost-competitive commodities, a demand for a wide range of product applications still exists. The necessary technological prerequisites to bridge the gap between productivity and flexibility will be described. Both chapters start with a description of the economical demand for each process. Then, economical and versatile plant concepts are mentioned followed by crucial technical details. Large production units provide better economics efficiency. That means high capacities up to 200 tons per day, improved quality and high flexibility. A modular spinning system with an ideal heating concept, an easy spin pack handling, and an ideal cooling concept is recommended. Direct spinning offers the largest production capacities and the lowest production costs. A schematic flow chart of the direct spinning process is provided. To cut down production costs by increasing the spinning speed by 50 %, the modifier MOD 5 is introduced. This modifier is added into the melt phase (direct spinning) before melting the chips. Then the modifier is forming a distinguishable phase imbedded into the PET matrix. The effect can be controlled by the amount of modifier added.

A new printing process for durable information on the fabric label|Ein neues Druckverfahren für dauerhafte Informationen auf dem Stofflabel

Yamamoto-Y

Toray developed a new printing process for fabric labels with durable information which is suitable for distribution/delivery control and display of owner's name. The fabric labels and the printing process have the following advantages: softness, size and form stability, prevention of transparency, high density record ability adapted to barcode, high durability of information, and quick on demand. At the moment there is no perfect label on the market. The thermal transfer printers use pigments as colouring agents. The pigments reduce the durability of information by their low rubbing fastness. Though the printing process uses dye not pigment, it is a dry process including a printing step which needs no screen. The fabric labels suitable for the printing process were developed using ultra fine fibre. These group of fibres are softer than others. For quick production digital printing methods are applied. The systems involving the ink-jet printers seems to be very useful for the quick production of fabric labels. However, the ink-jet printing technology has an unavoidable problem, in that the cloths must be pre-treated by some agents to prevent running of inks with low viscosity. Toray used the thermal transfer printing method (TTP). A special drying process makes it possible to reduce the time from printing to the use of labels. The rubbing and laundry fastness of the fabric labels obtained by the mentioned process are much better than ones of the labels on the market. Practically, the fabric labels developed have a hot-melt type of thermo-plastic film attached to the cloths. However, the attachment does not require adding any special step to the drying process, because the attachment is done at the heating step in the process at the same time. Brother supplies the cassette into which the tape and the TTP ink sheet are charged for their labelling printers.

The study and development of the special polyester textured filament for wool-like fabric|Die Untersuchung und die Entwicklung von speziellen Polyesterfilamenttexturgarnen zur Herstellung wollähnlicher Erzeugnisse

JianChun-Zhang|MeiWu-Shi|Kan-Lai|Mu-Yao

A special polyester filament yarn has been developed and is used for the production of wool-like fabrics. The filament yarn consists of many fibres with different properties such as different linear

densities, different cross sections, different thermal shrinkage, different modules, different crimps etc. The special polyester filament yarn is produced by twisting and subsequent air-texturing of tangled textured yarns. The fabrics produced with these polyester filament yarns have excellent properties such as crease recovery under dry, wet and heat conditions, antipilling, lustre and handle. The multifilament has a clear sheath-core structure, in which fine fibres form sheath layer, which has soft and bulky wool touch. The number of sheath fibres is close to 50 % of the whole. The fineness of the filament yarn is 300 den. A few coarse fibres in the core can enhance the bending rigidity of the filament yarn. It is found that 5 % of coarse fibres with a fineness of 2 den is added to the filament yarn, the rigidity of the yarn can rise up to 180 %. The sheath is made of a few pentolobal cross-section fine fibre with filament loops and curls. But the core is made of a few coarse fibres of different cross-section. The process line for the production of such filament yarns as well as the spinning and drafting process is described. The tensile and elongation distribution, the crimp level of single fibre, and the thermal shrinkage of single fibre were tested. Furthermore, a woven and finished fabric has been produced using the presented yarn. The wool-like fabrics were evaluated by the KES and the FAST testing systems. The compressive elasticity of wool-like fabric is 44 %, and the compressive linearity is 0.435. The new product has rigidity in softness, good body and stiffness, wool touch and drape without fluidity.

Verzwirnen von Acrylgarnen auf Doppeldraht-Zwirnmaschinen. Einsatzgebiete und Eigenschaften|Production of plied yarns from acrylic fibres on two-for-one twisting machines, applications and characteristics

Beckmann-M

Die Verzwirnung von Einfachgarn aus Acrylfasern ermöglicht die mechanische Veredlung textiler Endprodukte und eröffnet zugleich vielfältige Variationsmöglichkeiten im Bereich der Konstruktion textiler Flächengebilde. Das Eigenschaftsprofil der textilen Endartikel wird in wesentlichen Punkten durch die Qualität der Fasertypen und die Art der Verspinnung/Verzwirnung bestimmt. Der Zwirn als resultierender Garnkörper besitzt hochwertige dynamometrische Eigenschaften, wodurch Maschinenstillstandszeiten in nachfolgenden Prozessstufen reduziert werden können. Des Weiteren erlaubt der Zwirnkörper und die damit verbundene mechanische Veredlung des Endprodukts eine differenzierte Verwendung von chemischen Zusatzstoffen in nachfolgenden Veredlungsstufen. Aus diesen Gründen werden weite Anwendungsgebiete erreicht und gleichzeitig höchste Qualitätsanforderungen erfüllt. In zunehmendem Maße sind ebenfalls individuelle und modische Aspekte zu berücksichtigen, die es erlauben, dem Produkt eine eigene, vom Standardartikel abweichende, Charakteristik zu geben. Die Auswahl der Fasertypen und die Art der Verzwirnung, integriert in ein Fiber-to-Fabric Design, unterstützen eine zielgerechte Produktentwicklung. Neben Modifikationen von Acrylfasern haben Verfahrensoptimierungen im Bereich der Doppeldraht-Zwirnmaschine Anteil am Erfolg, diesen Trends in zeitgerechten Entwicklungsformen gerecht zu werden. Verschiedene Ausstattungsvarianten von Doppeldraht-Zwirnmaschinen unterstützen die o. g. Anforderungen bezüglich mechanischer Veredlung, optimierter Integration in den Fertigungsablauf und bieten ein weites Feld für klassische und modische Designvariationen. Der Reibungskoeffizient kann mit einem entsprechenden Aviviersystem deutlich vermindert werden. Für den Verbraucher wichtige Eigenschaften wie Griff und Pillingneigung können durch die Verzwirnung verbessert werden.

A short synopsis of the new thermal regulating fibre - Outlast|Eine kurze Zusammenfassung über die neue thermoregulierende Faser - Outlast

Cox-R

The Courtauld's Fibres Acrylic Business Grimsby/UK, has been developing a range of functional fibres using its late injection technology. The development of Outlast fibre is one of a number of products that are now reaching the commercial phase. Outlast fibre contains within its structure, microencapsulated phase change materials, which phase-change at/or around body skin temperature. This technology has its roots in the Nasa Space Research Program and the technology rights are now the property of Outlast Technologies Inc. Outlast fibre is capable of making a significant impact to the whole concept of thermal insulation. It is capable of offering thermal regulation thereby creating a comfort zone between the body and the clothing. This paper will overview the technology, the manufacture and the performance of Outlast fibre. When a material changes its physical phase within a certain temperature range, the energy necessary to bring about this change is absorbed from the surrounding system and is used to breakdown the bonding which is responsible for the solid structure. This means that the measured temperature of the material that is phase changing remains constant until the phase change is complete. Only then does the temperature of the material begin to rise. By putting a resilient shell around the phase change materials (PCM) it can change from solid to liquid and back again within the confines of the shell. The initial development undertaken by Outlast was on coating conventional fabrics with suitable dispersions of the microcapsules. This resulted in a wide range of fabrics which are now commercially available. Under cold weather conditions, the micro PCM prevents the skin temperature from falling below the comfortable temperature. Fields of applications such as active and outdoor wear, athletic apparel, footwear, military enduses, industrial protective clothing, corporate protective clothing, bedding etc. are discussed.

A new antifacterial acrylic fibre|Eine neue antibakterielle Faser

Stevanato-R|Tedesco-R

It is common practice to impart antibacterial properties to synthetic or artificial fibres adding organic or inorganic additives combined with fibre in several ways. Many antibacterial fibres use organic molecules, semi permanent or permanent to many washing cycles, but with some drawbacks in the fibre production and in the final use. As an alternative to the organic additives, special zeolites or ceramic substrate containing silver or zinc ions have been proposed in the past and recently. A limitation in using such inorganic supports is the difficulty in producing low decitex fibre or in maintaining good mechanical and abrasion resistance properties of the fibre especially when wet spun. Montefibre has studied a new inorganic substrate for silver and zinc ions, different from the traditional silico-aluminate zeolites able to impart excellent antibacterial properties without altering the fibre spinnability and the abrasion resistance. This new inorganic substrate has a very fine particle size, below 1

micron, and is effective as antibacterial properties also when added to the fibre in low amounts so that the main properties of the fibre like dyeability, mechanics, wear and abrasion resistance, etc. are impaired.

The developing China's acryl industry|Die Entwicklung der chinesischen Acrylindustrie

Ji-Guobiao

The world-wide acrylic industry has rapidly developed with the annual increasing rate of 7.5 % in the 1970s. In 1987 the total output of acrylic was 2.56 million tons. In 1997, the total output of man-made fibre in China is up to 4.6 million tons, of which acrylic is 0.32 million tons, 84 % as wool type and 16 % as cotton type. The number of acrylic plants is 16, with a total capacity of 460000 t/a. Because of the large textile process capacity and demands, large amount of acrylic have been imported. In 1996 480000 ton acrylic were imported. The production of raw acrylonitril lags behind in China, with a total capacity of about 332000 tons. The average capacity of a Chinese acrylic plant is 23000 t/a. Acrylic has many applications in China's textile industry, main used for wool processing, including knitting yarn, as well as yarn for blankets, worsted fabrics, artificial fur, toy-pile etc. It is estimated that the capacity will get up to 600000 t/a, and the output up to 500000 t/a by the year 2000. By the end of this century, China will consume 550000 tons acrylic. There are 6 different production processes for acrylic in China now. It should be decided which of them can be more developed. The increase of the production capacity can be carried out by expansion and renovation the existing plants, to develop them into economic scale. Furthermore, a aim is to develop acrylic products with high additional values, more differences and functions, high quality etc. China welcomes the well-known acrylic companies and engineering companies jointly to develop Chinas acrylic industry to expand and renovate the existing plants.

The role of performance fabrics in building a sports apparel business|Die Rolle der Hochleistungsgewebe beim Aufbau einer Geschäftsstrategie für Sportbekleidung

Buirski-D

The corporate literature of many sports apparel brands on both sides of the Atlantic was studied. The first conclusion is the development of the clothing brand itself. This is especially successful if the driving force behind the name is the participant in a particular activity. Reactive research and development is just as expensive as end-product design and the cost today is prohibitive when confined to the needs of just one manufacturer. Spreading the financial load means accepting that competitors will also have the opportunity to benefit. Only in a very few instances it is obvious that a particular fibre or textile development is linked solely to one garment manufacturer. Where entrepreneurs are also end-users, a situation that is less likely to occur nowadays, specific performance will always be the driving force for the development of both products and the company. The second conclusion is that of pure entrepreneurial activity in the building of a sports apparel brand. And here the entrepreneur scans the availability performance enhancing fibres and fabrics in order to build his or her collection and concept. This is the case for the greater proportion of the sports activewear industry, where perceived gaps in various sectors of the market have been exploited with a mixture of venture capital and marketing ability. Proprietary sub-branding is becoming stronger and of greater importance. There are probably too many waterproof/breathable fabrics, all doing a very similar job, the majority capable of operating at levels way beyond the average moisture vapour output of the human body and therefore absolutely over-specified for the needs of the end-users. Brand consciousness is almost as important, both before and after sale. The consumer needs to have the purchasing decision confirmed in print, in magazines or on tv.

Feuchtetransport in funktioneller Unterwäsche|Humidity transport in functional underwear

Weder-M

Die geprüften Unterwäschemuster zeigen je nach Belastungshöhe unterschiedliche Eigenschaften. Es kann nicht automatisch dasjenige Muster als gut bezeichnet werden, bei dem die Feuchtigkeit sehr rasch von der Haut wegtransportiert wird. Für Sportbekleidung ist es sinnvoll, wenn die Feuchtigkeit möglichst effizient abgegeben wird. Das heißt, sie darf nicht zu rasch von der Haut weggesaugt werden. Der menschliche Körper muß bei größeren Anstrengungen die Körperkerntemperatur konstant halten und kann bei der zusätzlichen Wärmeproduktion praktisch nur noch über die effiziente Verdunstungskühlung von Schwitzwasser die Rektaltemperaturerhöhung abschwächen. Wird dem schwitzenden Sportler die Feuchtigkeit weggesaugt und an auch nur 1 mm weiter Außen liegende Bekleidungsschichten transportiert, so wird bei der Verdunstung der Feuchtigkeit nur noch ein Teil der Verdunstungsenergie der Haut entzogen, der andere Teil wird dem Mikroklima und der Aussenluft entzogen und hilft dem Sportler nur noch wenig. Durch das ineffiziente Kühlen muß der Körper sogar noch mehr Feuchtigkeit abgeben und belastet den Organismus zusätzlich. Erste Erfahrungen zeigen jedoch, daß einige Kunstfasermaterialien nicht die gleichen stabilen Langzeitwerte aufweisen wie die Naturfasern. Diese Untersuchung gibt nur einen kleinen Einblick in die gesamte Problematik des Tragekomforts verschiedener Bekleidungsschichten. Es zeigt sich ganz deutlich, daß zur Quantifizierung stationäre Bedingungen oft nicht ausreichen. Die Wechselmechanismen von Feuchte und Wärme sind zu komplex, um mit einer einfachen Methode eine Aussage über den tatsächlich zu erwartenden Tragekomfort zu wagen. Wie wichtig die Unterwäsche ist, zeigen auch die Messungen mit den unterschiedlichen Regenschutzmaterialien. In der Praxis sind beim Menschen meistens Kombinationen von flüssigem und dampfförmigem Schwitzwassertransport vorhanden, die die Weiterleitung der Feuchte übernehmen.

NewCell - das natürliche Filamentgarn für die Masche|NewCell - natural filament yarn for knits

Rimpp-W

NewCell-Garne (Lyocell-Filamentgarne) werden mit einem Einzelfilamenttiter zwischen 1,3 und 1,6 dtex ausgesponnen. Dies führt bei entsprechender Ausrüstung aufgrund der spezifischen Charakteristik von Lyocell zur geforderten Weichheit des Endartikels. Andererseits gibt die höhere Biegesteifigkeit von Lyocell die Möglichkeit, den erforderlichen Stand der textilen Fläche zu erreichen. Diese Kombination der beiden Eigenschaften macht NewCell zu einer besonders interessanten Option für die Herstellung von Maschenwaren natürlichen Ursprungs. Exemplarisch werden diese Eigenschaften in den Einsatzgebieten feminine Wäsche und Feinstrumpf beleuchtet. Bei NewCell wurde schon in einem sehr frühen Stadium das Augenmerk auf die maschenbildenden Prozesse gelegt, sind sie doch in allen Haupteinsatzgebieten wie Damenoberbekleidung, Lingerie und Feinstrumpf wiederzufinden. Als Folge der Kooperation mit führenden Unternehmen der Textilindustrie und der Konfektion werden nun NewCell-Garne in den Feinheiten 40 dtex f 30, 80 dtex f 60, 120 dtex f 90 und 150 dtex f 90 angeboten. Werden gröbere Garne benötigt, so lassen sich diese aus dem Basisprogramm durch Zwirnen und Fachen erzeugen. Als eine spezielle Griffvariante bietet sich texturiertes NewCell an. Abhängig vom Einsatzzweck steht das Garn ungedreht oder mit einem Schutzdrall von 100 bis 200 tpm zur Verfügung. Der Einsatz von NewCell für Rundstrickware, für den Feinstrumpfbereich, in der Wirkerei sowie in der Flachstrickerei wird diskutiert. In der Masche kommen die spezifischen Vorteile des natürlichen Filamentgarnes NewCell besonders deutlich zum Ausdruck. Maschenstoffe und die daraus zu fertige Bekleidung werden die Schwerpunkte bei der weiteren Entwicklung dieses Materials für die Damenoberbekleidung, für feine Damenwäsche sowie für Feinstrumpfwaren sein.

Fibrillation free Lyocell fibres an introduction of Tencel A 100|Fibrillationsfreie Lyocell-Fasern und Einführung von Tencel A 100

Eynon-T

Following the successful development of Tencel, the first commercially produced Lyocell fibre, the full potential of this new generic fibre has only been partially realised because certain textile applications could not be exploited due to the inherent fibrillation characteristics. A non-fibrillating version has been under development for three years and has been test marketed for the past twelve months. Tencel A 100, as it is named for the trade, will be commercially launched at Premiere Vision in October 1998. The chemistry of the Tencel A 100 fibre will be outlined as well as a summary of its properties and methods of processing into a wide range of fabrics. The development focus has been on knitwear and jersey fabrics, where enzyme treatment for fibrillation is more difficult and expensive to control than for woven fabrics. Knitted fabrics will be highlighted, as well as new 'clean finish' woven fabrics incorporating Tencel A 100 fibre in both 100 % and blends, that will be entering the market over the coming seasons. Non-fibrillating fibres will significantly extend the range of applications for Lyocell and move it one step closer to becoming a mainstream fibre for the 21. Century. Tencel A 100 is based on the current well known Tencel fibre. Many of its properties are similar. It has high dry and wet stability and inherently good dimension stability from the high modulus. It looks like the standard Tencel in fibre openness and spinning performance. But it does not fibrillate. This means that although a true Tencel peachskin cannot be achieved the other Tencel characteristics of drape, softness and bulk result in an attractive and unique finished fabric. Tencel A 100 will be easier to process than the standard Tencel product.

Processing of elastane yarns on high-speed weaving machines|Die Verarbeitung von Elastangarnen auf Hochleistungswebmaschinen

Wildhaber-J|Nef-U

The cut of a garment is a key factor in wear comfort. When a certain degree of comfort is missing, usually due to the dictates of fashion, stretch fabrics made of elastic yarns can compensate to some extent. Subjective appreciation of comfort is illustrated in respect of fabrics stretchable in the weft, in the warp, and in both directions. For the weaving of single yarns, or of twists spun or twisted with stretch yarns, a number of fundamental rules have to be observed in the warp and weft system; or an appropriately equipped high-speed weaving machine is needed. Thus the production of stretch fabrics is not excessively problematic and can be mastered relatively easily. Co-operation between yarn manufacturers, weavers and finishers is the foundation for efficient production of stretch fabrics, which are already widely used for leisure wear and sportswear. The following elongation values are meanwhile held to represent stretch comfort: menswear stretchable in warp and weft 18 %, ladieswear stretchable in warp and weft 20 %, and garment of all kinds bi-elastic 15 %. Elastane yarn can be processed in weft direction without any difficulties by adapting some of the weft insertion components of Sulzer Ruti weaving machines. In the production of weft stretch fabrics, fabric widths are dictated by the reed width and the finished width. To obtain adequate elasticity of the fabric, the weft and the warp thread density must be chosen accordingly. A high weft density will always guarantee good snap-back. Extensively high warp density may impair the snap-back in weft direction. The weft package is unwound via a weft feeder. To ensure the yarn package is not unwound too fast it is essential to use two weft feeders or weft mixers. Customary types of temples can be used to hold the grey fabric, ranging from needle ring type to full-width temples.

Elastic opportunities in ready to wear|Konzepte für elastische Oberbekleidung

Arizzi-S

The growing presence of Lycra elastane fibre in ready-to-wear applications is leading to an innovation of the entire segment. Abundant opportunities exist for the design of entirely new garment concepts or the addition of functional attributes which therefore did not exist. An analysis of the key fibre attributes is offered and a link to the enhancements which they can bring to final garment properties is made. The development of novel Lycra fibres tailored to specific applications within ready to wear is also discussed, with a focus on how the new characteristics have been achieved. A new development based on polyurea-urethane chemistry, called T-162C, is presented. The break properties of the new polymer was tested under critical weaving conditions on a double width projectile loom compared to T-146C (the conventional product): on average break reduction of a factor 1.5 to 2 could be demonstrated under test conditions. The performance improvement was confined in extensive trade tests in

weaving and in other textile applications using T-162C like circular knitting and hollow spindle covering. SAXS measurements were carried out on the polymer to determine the changes in morphology linked to the higher break tenacity. SAXS technique is particularly useful to study the orientation and size of the hard segment domains as well as the orientation of the aggregates of hard segments domains or stacks. From the time of its commercialisation in the late 50's LYCRA elastane has revolutionised apparel by transforming entire garment categories and enabling consumers to enjoy new standards of comfort during wear. The same mechanisms that reshaped such categories as hosiery and swimwear with the addition of LYCRA elastane are now broadly at work in Ready-to-Wear since the early 90's. Most recently woven fabrics are seeing the benefits of added functionalities which were not achievable before.

Manufacture and applications of elastane combination yarns|Herstellung und Einsatzgebiete von Elastan-Kombinationsgarnen

Strauß-T

The use of elastane filament yarns increased by the continual demand for form stable, carefree garments with a good wear behaviour. Particularly in the last years, there was a high increase of using these elastic fibres not only in traditional fields like corsetry or lace but also in hosiery, swimwear and outerwear. Caused by the conditions of some processes or special demands on the textile, bare elastane cannot be used. This production field needs the use of elastane combination yarns to realise elastic qualities. In this paper the common production methods of elastane combination yarns such as single and double covering, ring twisting, doubling and stretching on a DD twisting frame, elastic twisting by the hollow-spindle method, twisting on the 'Elasto Twister', core-spinning, siro-spun as well as air-covering will be described. Furthermore some indications will be given for using these yarns in different textile products, which can be partly deduced from the different yarn constructions. As manifold as the different production techniques and yarn constructions are the fields of application of the elastane combination yarn. The techniques for the production of elastane combination yarns are rather different from each other. As a consequence, there are various yarn constructions that influence the fields of application of the yarns. Given the positive development of the market for elastic textiles, we can expect a further increase in the production capacity of elastane combination yarns. And due to their different properties, each of the techniques will have its own market segment, whereby the market shares may well change with the further development and improvement of the machines and methods. Elastane combination yarns are specialities that must meet high quality requirements with regard to workmanship and function in the textile made of them. With the elastic fibre Dorlastan, Bayer Faser GmbH offers a product that enables the yarn manufacturers to always meet the requirements of subsequent processors and final users with any of the production methods.

Development of polyamide/polyurethane composite filament yarns for hosiery|Die Entwicklung von Polyamid/Polyurethan-Composite-Filamentgarnen für die Strumpfindustrie

Yasushi-Nakai

The characteristic request for pantyhose is a transparent sense, fit-ability and skin touch. The demand for pantyhose which use a better fit-ability support yarn is increasing. Therefore, Kanebo began the development of the filament for hosiery which has the cool sense and moderate fit-ability without spoiling the transparent sense. We thought that such a filament was to develop the material by which only 1 piece of material has elasticity. So 'Sideria' was developed which is the composite fibre of polyamide/polyurethane. Development point is the following. Composite fibre with polyamide/polyurethane ingredients break up immediately because the bonding is bad. Therefore, the stretch-back ability runs out. It was necessary to design a spin pack to get a special cross-sectional shape and the special cross-section to correct this fault. The melt viscosity difference is big between the polyamide and the polyurethane. Therefore, viscosity of the polyamide, and the kind and hardness of the polyurethane must be properly designed. When the filament is heat treated, the polyurethane portion shrinks, making the whole filament crimp spirally. The cover ring process is unnecessary. The knitting process is easy as the handling of a textured yarn and a cover ring yarn and moreover S, Z, twist is unnecessary. Pantyhose made of Sideria have moderate elasticity, a soft touch and a cool sense. Sideria has low count filaments. Therefore, pantyhose have a good transparent sense and excellent fitness without any slackening.

Melt-spun elastomeric yarns based on a blend of polyether ester and EPDM|Schmelzgesponnene Elastomergarne auf der Basis einer Mischung von Polyetherester und EPDM

Versluis-C|Willems-E

Elastomeric yarns or fibres are used to incorporate stretch into fabrics and include a wide variation of applications, such as hosiery, ladies lingerie, swimwear and active wear for ladies and gentlemen. Commercial products are largely based on natural rubber and synthetic polyurethane yarns. One of the recent trends in technology to produce elastomeric yarns is melt spinning. This technology is generally more cost effective than solvent spinning. To allow for adequate melt spinning performance and additionally retain the good elastic properties of crosslinked rubber, DSM has developed a fibre raw material based on crosslinked EPDM blended with a thermoplastic polyetherester carrier. A typical formulation based on 40 % polyetherester and 60 % EPDM demonstrated that good elastic properties combined with reasonable elongation at break can be achieved with winding speeds up to 1200 m/min. The yarns are potentially high temperature resistant and dyeable in combination with polyester. The spinnability depends very much on the shear rate. At lower shear rate (lower than 5000/s) acceptable spinning performance was observed. At shear rates between 5000 and 14000/s a high level of spinning breaks were noticed. In spinning the elastomeric blend it is very important to establish as low a draw down as possible. Drawing generally improves the elastic properties, particularly set, at the expense of elongation at break. Mechanical and elastic properties of elastomeric yarns are typically measured after 5 cycles at 300 % elongation. Stretch resistance is the tensile force necessary to elongate the yarn. The recovery power is the force exerted in yarn length resulting from cyclic stretching and relaxation. With increasing draw ratios the tenacity increased and the

elongation decreased. The properties of two typical CPE/EPDM yarns are compared to commercial rubber and synthetic elastomeric yarn.

Present market and development trends for elastane fibres. Western Europe (1991-97/2000)|Markt- und Entwicklungstrends für Elastanfasern. Westeuropa 1991-97 und 2000

Kramar-L

The main objective of the program was to verify the recent trends in the market for 'stretch yarns and fabrics' (focusing on apparel end-uses), to show the most relevant experiences (both on the positive and negative side) and to forecast the expected future trends. The study starts by assessing the present elastane fibres supply and consumption in main West European countries split by main end-uses (hosiery, warp/weft knitting, weaving and narrow fabrics), further broken down by type of elastane (i.e. bare elastane versus various types of covered elastane). By taking into account the different incorporation rates of elastane fibres the study then analyses the penetration rates of 'stretch fabric' by relevant main end-uses. Finally the study indicates the future possible trends, based on main advantages of stretch yarns and fabrics, including both 'traditional' (e.g. recovery properties, lightness of fabrics, etc.) and 'new' (e.g. comfort, freedom of movement, easy care and easy to wear, drape etc.) properties, allowing to provide better and innovative products to the final consumer. Total elastane consumption is expected to increase to almost 25 ktons by the end of the decade (corresponding to an average increase of almost 9 % per year), with highest growth rates in the weaving and weft knitting end-uses. The increase of covered elastane yarns is expected to be relatively higher than that of bare elastane. This positive trend is also based on the assumption that co-operation between elastane suppliers, yarn coverers and other users will continue to develop, in order to provide the final consumer better quality products at competitive price.

Herstellung und Verwendung neuartiger Polyanion-Polykation-Mikrofibrilmischvliese auf Basis von Cellulosederivaten|Manufacturing and use of novel polyanion-polycation fibrille microfibre nonwovens

Riedel-B|Taeger-E

A novel one shot process developed by TITK provides a simple and efficient method for spinning of polyanion-polycation fibre blends in form of textile or paper-like nonwovens from high molecular polyanions and polycations, particularly from such ones basing on cellulose and chitin. The fibre are spun mechanically from aqueous solutions using appropriate organic dehydration agents. A premature formation of polyanion-polyeation complexes is avoided. The blend ratio of the polyanion and polycation microfibrille fibres can be varied in wide ranges. An optimum dispersion was achieved. Only with addition of water the polyanion and polycation fibrille microfibrilles will react superficially. Thereby hydroactive polyelectrolyte complex-membranes will be formed along the contact surfaces of the oppositely charged fibrille microfibrilles causing a fusion of the fibrille microfibrilles. A close polyelectrolyte complex-membrane net will be formed encapsulating the polyanion-polycation microfibrilles and sealing the body of the nonwoven. Caused by this specific behaviour on the one hand and by the hydroactivity of these PEL-complexes formed only at the moment of application on the other hand the paper will deal with investigations into the use of these nonwovens in the hydrocolloid wound care as well as the application as a moisture regulator together with neutrum textile fibres in conditioned zones.

Die Fibrillationsmodifizierung bei Lenzing Lyocell-Fasern|Fibrillation modification of Lenzing Lyocell fibers

Köll-B|Firgo-H|Müller-E|Retzl-P

Nach dem Aminoxidverfahren hergestellte Fasern werden vom Fachmann vielfach mit deren Fibrillierungseigenschaften assoziiert. Im wesentlichen sind hier die vielfältigen Möglichkeiten zur grifflichen Gestaltung textiler Flächen aus Lyocell oder aus Mischungen mit Lyocell zusammengefaßt. Die Vor- aber auch Nachteile der Faserfibrillierung im Endprodukt werden beleuchtet. Neuere Untersuchungen zum Einfluß der Textilkonstruktion sowie bestimmter Hilfsmittel auf das Warenbild im Zusammenhang mit der Fibrillierung werden diskutiert. Weiter wird auf die Möglichkeiten zur Verminderung der Fibrillationstendenz von Lyocell-Fasern eingegangen. Neben der Ausrüstung lösungsgespinnener Fasern in der Flocke, im Garn oder der textilen Fläche mit Hilfe von AE4425 wurde in Lenzing mit der neuen, während des Faserherstellungsprozesses modifizierten Type Lyocell LF („Low Fibrillating“) eine neuartige Faser mit verminderter Fibrillationstendenz entwickelt. Auf einer Pilotanlage wurden die chemischen und technischen Grundlagen zur Fibrillationssteuerung im Zuge der Fasernachbehandlung geschaffen. Besondere Aufmerksamkeit wurde neben der Vermeidung von Scheuerkanten in Strangfärbeprozessen der Waschvergrauung nach wiederholten Haushaltwaschzyklen gewidmet. Die Farbaufhellung (Weiáscheuerung) wird durch die progressive Fibrillierung unbehandelter Lyocell-Artikel verursacht. Eine besondere Bedeutung bei der Beurteilung von Maschenware und Geweben kommt der Auswahl der an Lyocell angepaßten textilen Hilfsmitteln in der Appretur zu. Da die Qualitätsanforderungen an Lyocell-Artikel meist einem besonders hohen Standard genügen sollen, müssen entsprechende Risiken möglichst gering gehalten werden.

Characteristics of cuprammonium rayon 'Bemberg' and non-woven fabric 'Bemliese|Eigenschaften von Cuproamminiumviskose 'Bemberg' und der Vliesstoff 'Bemliese

Okamura-H

Bemberg is a regenerated cellulosic fibre made from cotton linter with the aid of copper and ammonia. Viscose rayon which is well known as the cellulosic continuous filament is widely used as many materials for lining, lingerie, dress fabric, etc., because of its cellulosic properties such as hygroscopic, anti-static, soft, and ecological. In addition to such properties, Bemberg has useful characteristics such as fine denier, a skin layered structure and fibrillation tendency which is easy to be controlled. Therefore Bemberg is most popularly used in higher grade lining and graded as the most suitable material for higher quality dress fabric. Similarly, compared to cellulosic rayon nonwovens, Bemliese has additional useful characteristics such as lint-free, non-toxic and non-residue etc. That is because Bemliese is manufactured by continuous wet-spun-bond method and consists of filaments without binder. Therefore Bemliese is suitable for the electronics wipers, medical uses such as gauze, cosmetic uses and various kinds of disposable uses.

Innovations in acetate filament yarn products|Innovationen bei Azetatfilamentgarnprodukten

Aldridge-D

Cellulose acetate filament yarn has been in production for about 70 years and of course many things have changed since the first kilos of yarn were spun. But the acetate manufacturers through yarn and process improvements are still able to compete in their chosen market sectors where acetate has benefits to the consumer. This paper will briefly introduce acetate production processes and its key properties and end uses but will concentrate on some of the developments that have enabled acetate to keep up with some of its more recently invented synthetic fibre counterparts. The paper will discuss improvements made to keep pace with increasing loom speed and particularly for the modern air jet loom on which acetate is being woven at up to 1000 picks/minute. In colour fastness too there have been improvements to both yarn and dyeing techniques so that acetate is able to meet the high wash fastness standards set by the textile industry today. New development products in acetate are opening up new sectors where the particular properties of acetate can be of benefit. One new product produced by Novaceta is Silfresh, an antimicrobial yarn which is now being produced commercially and gaining acceptance by knitters, weavers and garment manufacturers.

Viskosefaser für die Hochleistungsverarbeitung|Viscose fibre for high performance processing

Weißböck-H

In den vergangenen Jahrzehnten löste der Druck zu laufenden Produktivitätssteigerungen in der Textilindustrie eine stetige technologische Weiterentwicklung der faserverarbeitenden Textilmaschinen aus. Dabei stiegen auch die Anforderungen an die Viskosefaser, die sich jedoch in den letzten zwei Jahrzehnten in ihrem Eigenschaftsprofil nicht wesentlich verändert hat. Es stellt sich nun die Frage, inwieweit die klassische Viskosefaser-S mit den stetig wachsenden Anforderungen der Verarbeitungstechnologie weiter mithalten kann und welche Möglichkeiten es gibt, das Eigenschaftsprofil der Faser entsprechend zu optimieren. In einem Lenzing AG-internen Entwicklungsprojekt wurde das Potential der seit nahezu 100 Jahren bestehenden Viskosefasertechnologie untersucht. Mit Hilfe des 'Quality Function Deployment' wurden jene Fasereigenschaften bestimmt, die auf die Verarbeitbarkeit und auf die Garneigenschaften den größten Einfluß haben. Daraus wurde das angestrebte Eigenschaftsprofil einer Viskosefaser für die Hochleistungsverarbeitung abgeleitet. Es galt nun den Viskosefaserprozeß sowohl chemisch als auch mechanisch so zu modifizieren, daß das gewünschte Fasereigenschaftsprofil erhalten wird. Mittels statistischer Versuchsplanung konnte die enorm hohe Anzahl an theoretischen Kombinationsmöglichkeiten auf ein durchführbares Ausmaß an Technikumsversuchen reduziert werden. Die Entwicklung führte zu einem Prototypen einer high performance Viskosefaser, die sich sowohl in den Faserdaten als auch in den Ring- und Rotorgarndaten und damit in ihrer Verarbeitbarkeit deutlich von der Standardtype Viskose-S absetzt. Das Ergebnis der Entwicklung im Technikumsmaßstab zeigt, daß in der Viskosefasertechnologie noch ein erhebliches Potential steckt. Die Herstellung einer völlig neuen Viskosefasertypen scheint technisch möglich.

Development of a trilobal cross-section polynosic fiber 'ARUSURA'|Die Entwicklung der Viskosefaser 'Arsura' mit trilobalem Querschnitt

Inatomi-S

Tufcel is the brand name of polynosic fibres which Toyobo has created and presently produces. Polynosic fibre is an improved viscose rayon which has excellent properties such as higher tenacity and lower shrinkage. Toyobo produces many kinds of polynosic fibres such as ease to dye and flame retardancy etc., in addition to regular polynosic fibre in the clothing and industrial use. Five years ago Toyobo developed a trilobal cross section polynosic fibre Arsura for the first time in the world. Technologies of development of the nozzles and the efficient filtration enabled to produce Arsura. The trilobal cross section gives the fabrics a dry and soft hand and also good bending repulsion. Toyobo's original technologies of spinning and dyeing and finishing have been producing many kinds of fabrics with various hands and appearances. Tufcel is produced in a fineness of 0.5 denier. The spinning technique 'Manard' is used for the production of multifilament yarns by electrostatic means. The multifilament yarns are opened by electro static which is charged by high voltage during drafting, spinning and then mixing with staple fibres. The compound yarns are taken up on the machine. Applying this technique to Arusura, has enabled it to develop fabric for various apparel applications. Now Arsura has 1.7 denier, making it too difficult to get thinner yarns of Ne 40 with 100 % Arusura because of its high repulsion property. But the Manard technique enabled it to spin thinner yarns. In this case knitted fabrics can be developed. By applying the Manard technique and mixing soft hand and moisture absorption of polynosic fibres with high tenacity or dimensional stability of man-made fibres, each weak point can be compensated.

New developments on viscose filament continuous spinning high productivity spinning machines|Neue Entwicklungen beim Erspinnen von Viskosefilamentgarnen mit

hochproduktiven Erspinnmaschinen

Rodari-L

The technology for producing viscose fibre has been well-known for some time and there have been no substantial innovations recently. However, the manufacturers of viscose filament have always shown a certain reluctance towards changes and innovations claiming that investments in this sector are very onerous and risky. To fulfil market requirements the needs and priorities of the manufacturers must be understood in order to assess how far these can be satisfied by the existing technologies. Due to the low productivity compared with synthetic fibres, the high specific consumption of raw materials and utilities, and the relative high labour costs, the investment needs to set such a plant today, as well as the running costs of the plant itself, are prohibitive. For this reason, there is an urgent need for modern machinery which combines high performance with reduced costs. At present there are two main technological trends with regard to viscose filament spinning: discontinuous and continuous technology. Noyvallesina has designed and manufactured a new continuous machine for the production of viscose filaments. This machine is currently installed in China and it has a capacity of 2500 t/y. The main characteristics of the new model such as more compact design, spindle driven precision take-up unit for two big bobbins, new washing system which guarantees a constant flow rate, increased capacity of treating and drying zone, as well as optimised machine design are discussed. The machine is fully equipped with inverters and it can be controlled and managed through a control panel placed beside the machine itself. The new winder design allows to have further automations (automatic doffing). The new NVS2 machine is immediately available and, thanks to the collaboration with Lenzing Technik Noyvallesina is in a position to give an all-round technological updating of traditional technology.

Key developments in equipment for the viscose fiber production|Wichtige Entwicklungen bei den Anlagen für die Viskosefaserproduktion

Reisinger-C

This paper reflects an intensive world-wide technological survey amongst viscose fibre producers carried out in the USA, Europe, Japan and other Asian countries. The study focuses on technological trends and potentials of the employed unit processes in the light of increasing competition from synthetic and natural fibres as well as emerging alternative cellulosic processes. In the conventional rayon production recent years have been characterised by the introduction and implementation of environmental programs including the closing of material and energy flows. Significant changes and modifications in the viscose process or machinery itself were only moderate and have been concentrating on cost saving investments and on product development to meet the market demands. Hence it is of importance to evaluate in which sections of the production process the technological status develops a new generation of treatment systems and in which sections the development status seems to reach a certain plateau. The survey was accomplished considering all major unit processes and represents the current state of the art as well as a wide spectrum of potential improvements on quality, capacity, flexibility, efficiency and a series of other indicators including the cross link of several process steps. As a conclusion there are significant indicators among technological leaders that an additional innovation cycle has been started to face future challenges and threats. Main directions point towards an increased flexibility of the equipment in order to broaden the product mix and towards a further production cost reduction on raw material and labour base.

Strahlenbehandlung von Polymeren, insbesondere von Cellulose|Electronic beam treatment of pulps

Fischer-K|Schmidt-I|Lunkwitz-K|Dorschner-H|Lappan-U

Bestrahlung von Polymeren mit energiereichen Elektronen führt zur Bildung von Radikalen, die Ausgangspunkt für Vernetzungen und Abbau am Polymer sind. Es werden synthetische Polymere vorgestellt, an denen vorwiegend Vernetzungen und Sekundärabbau stattfinden. Im Gegensatz dazu erfolgt an der Cellulose, bedingt durch das System der Wasserstoffbrücken, nur Abbau. Es treten keine Vernetzungen ein. Durch die Elektronenstrahlbehandlung werden in die wenig und hochgeordneten Bereiche neue funktionelle Gruppen eingeführt, die als Verordnungscentren die Zugänglichkeit nach der Alkalibehandlung erhöhen. Die sich daraus für den Viskoseprozess ergebenden Vorteile wie Absenkung des Schwefelkohlenstoffeinsatzes, Senkung des Alkaliverhältnisses sowie Erhöhung des Polymeranteils werden dargestellt. Eine Viskose, die aus elektronenstrahlvorbehandeltem Zellstoff bei reduziertem Schwefelkohlenstoffeinsatz hergestellt wurde, zeigt eine sehr enge Molmassenverteilung mit einer gleichmässigen Substitution. Die nachgewiesene Reduzierung des Partikelspektrums von Viskose, die aus mit Elektronenstrahlen behandeltem Zellstoff hergestellt wurde, und die sehr gleichmässige Substitution der Xantogenatgruppen längs der Kette sind die Grundlage für den gravierend verbesserten Lösungszustand der in der Viskose vorliegt.

Neues Verfahren zur Erzeugung hochreiner Dissolving-Zellstoffe|New method for the production of extremely pure dissolving cellulose

Sixta-H|Borgards-A

In einem Joint-Venture zwischen Klabin, dem größten Zellstoff- und Papiererzeuger Südamerikas, und der Lenzing AG wurde in der Nähe von Salvador, Brasilien, die weltweit modernste Dissolving-Zellstofffabrik, die Bacell S.A., errichtet. Seit Anfang 1996 werden dort hochwertige Zellstoffe aus lokal angebauten Eukalyptusarten nach dem Vorhydrolyse-Kraftverfahren hergestellt. Die angewandte Kochtechnologie, die weltweit als Visbatch-Verfahren zum Patent angemeldet wurde, stellt eine Gemeinschaftsentwicklung zwischen den Forschungsgruppen der Klabin, der Lenzing AG und der ehemaligen Zellstoffgruppe der VAI dar. Das Verfahren vereint die Vorteile der Verdrängungstechnologie und der Dampfvorhydrolyse und zeichnet sich durch kurze Umtriebszeiten, niedrigen Energieverbrauch, sehr homogene und hohe Produktqualität sowie einfache und genaue Prozeßkontrolle aus. Die Zellstoffbleiche erfolgt im Rahmen einer in Lenzing entwickelten sehr effektiven, vierstufigen TCF-Bleichsequenz, 00-A-ZQ-P. Während die zweistufige 0-Delignifizierung für die Entfernung des Hauptteils des Restlignins und damit auch für einen Ausgleich der

Qualitätsschwankungen des Rohzellstoffes sorgt, werden in der ZQ-P-Nachbleiche die Viskosität und der Weißgrad des Endproduktes eingestellt. Die als Solucell bezeichneten Dissolving-Zellstoffe zeichnen sich durch enge Molmassenverteilungen, eine erhöhte Resistenz gegenüber Abbaureaktionen und eine für Vorhydrolyse-Kraftzellstoffe ungewöhnlich hohe und gleichmäßige Reaktivität bei der Viskoseherstellung aus. Weiter werden auch Versuchsergebnisse zur Charakterisierung der übermolekularen Struktur diskutiert. Die hohe Produktqualität der Solucell-Zellstoffe manifestiert sich auch in den überlegenen Eigenschaften der daraus hergestellten Viskosefasern. In Kombination mit hemicellulosearmen Eukalyptusarten und der neuen Zellstofftechnologie ist es möglich, hochreine Acetatzellstoffe ohne die Anwendung der sehr aufwendigen Kaltalkaliextraktion herzustellen.