ITS PUBLISHING worldwide

INTERNATIONAL TEXTILE BULLETIN

2 May 2003

7/15/10

SPECIAL

ITMA SURVEY: THE EUROPEAN TEXTILE INDUSTRY'S EXPECTATIONS

SUCCESSFUL WOOL SPINNER

NEEDLEPUNCHED UPHOLSTERY FABRICS

IMPROVED MIGRATION IN WOOL DYEINGS

ITS

ITS

IMPRESSUM

Publishing House:
ITS Publishing
International Textile Service
Univer-Haus, Kesslerstrasse 9
CH-8952 Schlieren-Zurich/Switzerland
Telephone: ++41-1-738 48 00
Telefax: ++41-1-738 48 30
internet: http://www.its-publishing.com
e-mail: its@its-publishing.com

Publisher:
Andreas A. Keller

Editor-in-Chief:
Jürg Rupp

Deputy Editor-in-Chief:
Dipl.-Ing. Andrea Böhringer
(Finishing branch)

Mac Isaacs
(USA editor)

Advertising Manager:
Peter M. Frei

Advisory Board:
Prof. Dr. Gerhard Egbers
Prof. Dr. Joachim Hilden

Contributing editors:
Dr.-Ing. Peter Böttcher (D)
Ji Guo Biao (PRC)
Prof. Dr.-Ing. Heinrich Planck (D)
Freddy Gustavo Rewald (BRA)
Prof. Dr. Anton Schenek (D)
Prof. Dr. Roshan Shishoo (S)
Gail Taylor (HK/PRC)
Howard L. Thomas, jr. Ph.D. (USA)
S. Vishwanath (IND)
Derek T. Ward (GB)

Official Membership Magazine of:
The Textile Institute
GB-Manchester

Printing office:
NZZ Fretz AG
CH-8952 Schlieren-Zürich

Every two months. By subscription, see separate order card. With the acceptance of original articles for publication, the exclusive right to publish and translate is transferred to ITS Publishing. Reprinting or photomechanical reproduction, computer memorisation and reproduction through electronical media, wholly or in part, is permissible only with the approval of the publishing house.
No liability is accepted for unsolicited manuscripts sent in.

© Copyright 2003 by ITS Publishing,
CH-8952 Schlieren-Zurich, Switzerland.

CONTENTS

SPECIAL

8 **Challenge for the European textile industry**
Jürg Rupp

12 **Europe's yes to ITMA 2003**
Jürg Rupp

FORUM

24 **The vicious circle of over-capacity**
Heinz Bachmann

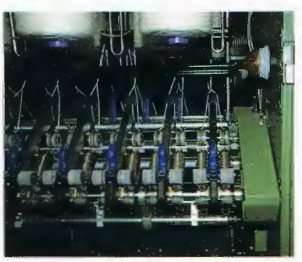
29 **Strengthened ITEMA Group**
Jürg Rupp

32 **Optimised processing cycles**
Sanjiv Khandelwal

YARN FORMING

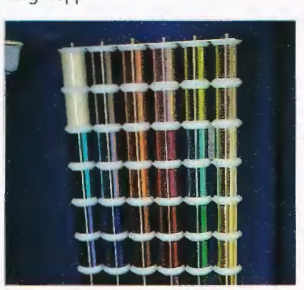
34 **Biotextiles: pipe dream or reality?**
Dr. rer.nat. Ulrich Girrbach

37 **Long-staple compact yarn pioneers**
Jürg Rupp



40 **Foreign matter detection system**
Jürg Rupp

43 **Copper wires for textiles**
Jürg Rupp



INTERNATIONAL TEXTILE BULLETIN

INTERNATIONAL TEXTILE BULLETIN • 2ND ISSUE 2003 – VOLUME 49

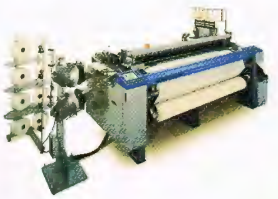
FABRIC FORMING

46 **The future of knitwear**
Derek T. Ward

51 **The Turkish home textiles industry**
Prof. Dr. Emel Önder
Prof. Dr. Fatma Kalaoğlu

54 **Advantages of needled woven fabrics**
Jürgen M. Strössner
Gustav Wizemann

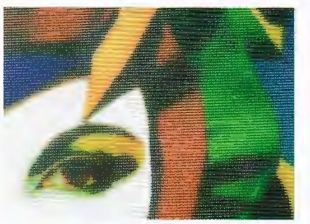
58 **Lower energy consumption air jet weaving machines**
Alex Landau



DYEING/PRINTING

60 **Improved wool dye migration**
Dr. Meritxell Marti
S. Serra
A. de la Mazza
J.L. Parra
L. Codech

64 **Inkjet printing pretreatment**
Dr. Ulrike Hees
Mike Freche
Dr. Michael Kluge
Dr. John Provost
Dr. Jürgen Weiser



FINISHING

68 **Textile weighting and stiffening finishing**
Prof. Dr. Wolfgang Schinder
Prof. Dr. Peter Hauser

72 **Advantages of infra-red predryers**
Jeffrey T. Dixon

74 **Improved elastic fabric treatment**
Prof. Dr. Joachim Hilden

75 **ITS-Charts: new products from the chemical industry**

THE TEXTILE INSTITUTE

77 News from the Textile Institute

ITS NEWSLETTER

The electronic ITS newsletter will inform you via its worldwide Textile News Network (TNN), every two weeks directly to your mailbox! Send an e-mail to its@its-publishing.com and kindly let us have your (personal) e-mail and postal address.

The future of knitting

Speaking at a knitting congress held in Manchester (GB), a senior knitwear technologist from one of the world's most famous retail organisations outlined to an audience of nearly 200 international delegates how the pace of change is increasing, and how many new elements are having an impact on knitting innovation.

Derek T. Ward

ITS Contributing editor

The congress was organised by the William Lee Innovation Centre. The newly formed centre has been created within UMIST to bring together multi-disciplinary expertise to form what is claimed to be Europe's first research, technology, translation and skills group focussing specifically on fibre architecture. The event drew 41 speakers from the global industry and various academic bodies.

Mervyn Davies *(Fig. 1)*, Marks & Spencer (GB), said retail customers have never demanded more than they do today, and their requirements have never been so diverse. He listed present day requirements, together with recent innovations, as including: garments that keep you safe; products that make you feel better; products that are more comfortable, especially if you are particularly sensitive; garments that fit better (virtually bespoke clothing); garments that make you more comfortable by heating up or cooling down; products that ease communication, even incorporating mobile phones; more environmentally friendly garments in terms of manufacture and disposal; those meeting the demands of a specific use, such as travel; new fibres derived from corn starch or even wool; and wool reconstituted to produce microfibres or films possessing all the natural attributes of wool – such as antibacterial, flame resistant performance and breathability.

Mr Davies said new knitting machinery technology, and the resultant innovative structures made possible, also facilitate the development of an increasing number of products for use in the medical and industrial fields.

Colour, weight, touch and handle

Other speakers covered more specific aspects of the contemporary knitting industry. Dr Massimiliano Zegna Barufa, of Zegna Barufa Borgosesia SpA (I), said colour, weight, touch and handle are the characteristic elements of a yarn, which itself constitutes the smallest yet most important component of knitwear. He described how research and development of the initial concept of a new yarn involves close contact with trade associations, trade fair organisations, boutiques de style, fibre supplier, boutiques and general markets to identify trends and to initiate new ideas.

He said: "Sensitivity, intuition, experience, creativity, and constant commitment are the main factors required for working in the spinning industry." He claimed these factors are the basis of a craft inherited from the culture and tradition of the Biella area of Italy. Giving two examples of the effect on knitwear design, he said "Cashwool", developed in the 1980's at a time when the market wanted something different from fluffy lambswool, offers almost limitless versatility. Available in mélange, solid and mouliné colours and machine-washable forms, "Cashwool" is used for men's and women's classic, performance knitwear and may even be used with other types of yarn. The second example given was Shamir ultrafine cashmere yarns. These were created in response to an almost niche market request and rescued the appeal of cashmere at a time when conventional yarns of this type appeared to be suffering a decline in quality.

Fig. 1: Mervyn Davies, Marks & Spencer: «The pace of change is increasing.»
Picture: DW

Innovative, high performance, high tech

In a paper reviewing recent developments in yarn technology, Antonino Piccolini, Fil Man Made Group (I), suggested yarns may be classified into three groups: innovative, high performance, and high tech items. He said, however, these terms are often the cause of confusion and misunderstanding.
He summarised the many ways of developing innovative yarns basically into six routes, although combinations of the six routes can also be used.

- By using a fibre based on a new polymer
- or a fibre produced by chemical modification
- or a new fibre produced by cross-section modification
- or a fibre with modified physical and mechanical features
- or by blending two or more fibres
- or a yarn produced by new spinning techniques.

Skechers EX1061-p.4
Skechers v Nike

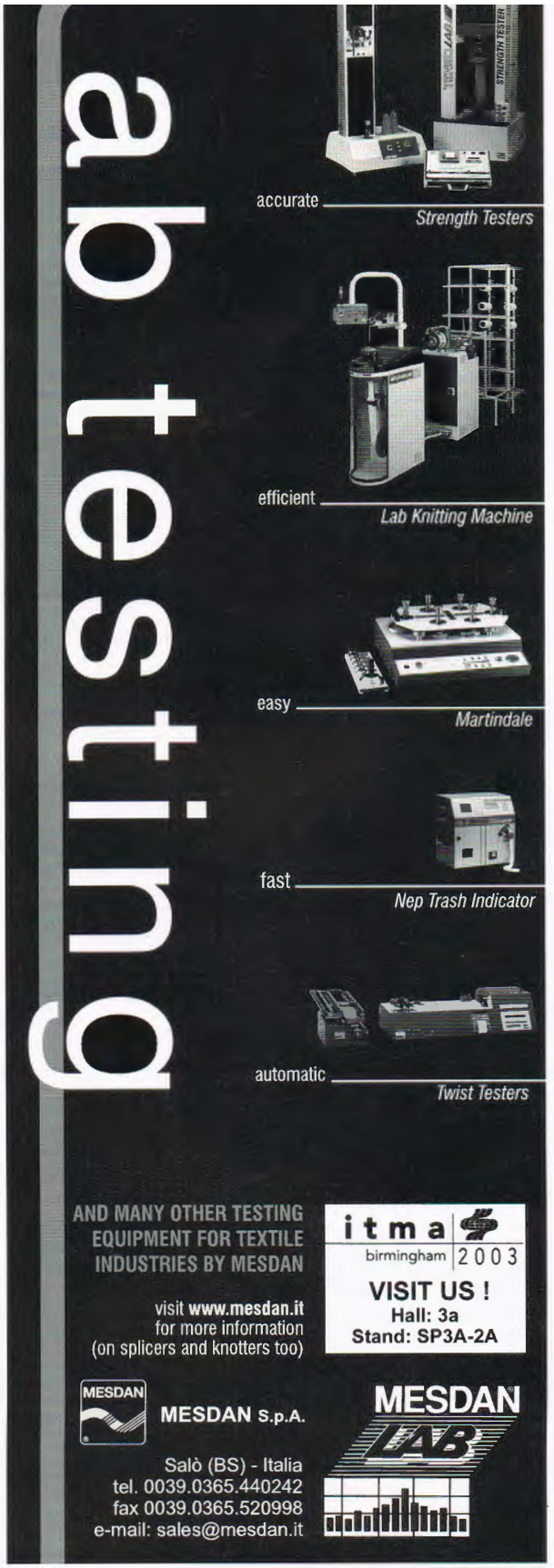
He defined a high performance yarn as being one with a "way of working or functioning clearly superior to the yarns normally intended for specific end-uses." This group included flame retardant yarns based on intrinsically flame retardant fibre, and anti-bacterial yarns based on anti-bacterial fibre.

High tech yarns were described as being usually based on "engineered organic synthetic polymers" such as para- and meta-aramids, although a number of fibres based on inorganic materials could be included. He mentioned how "Basofil" (melamine), "Zylon" (poly-phenylene-2,6benzobisoazole) and "Panox" and "Lastan" (both partially oxidized polyacrylonitrile) are already being evaluated for knitting applications although they are really still under development. Inorganic items such as carbon and various metallic fibres are also being used, alone or in blends. He noted that all the Formula-1 teams, pilots and mechanics, wear knitted underwear, socks and gloves made with high tech yarns. "The yarns are in continuous evolution, as are spun yarns based on meta- and para-arid microfibre"

In conclusion, Mr Piccolini said "Besides a marketing investigation aimed at identifying the requirements of the niche market at which the new yarn is aimed, the development of an innovative product requires expertise and, many times, significant financial effort, for the whole textile chain, including fibre producer, spinner, knitter, dyer and finisher, and manufacturer. The return on the investment is often long term."

Whole garment knitting

A paper delivered by Hidekazu Masui, Shima Seiki Mfg Ltd (J), suggested how the concept of whole garment knitting as a means to boost productivity has become more attractive in high labour cost countries at a time of increasing competition in global markets. He explained how Shima Seiki has worked for many years to overcome



Skechers EX1061-p.5
Skechers v Nike

the challenges involved in automating the process. Machine development progressed from simple chain-driven basic needle selection machines to the more sophisticated chain-driven jacquard selection stitch transfer units.

Although it had been possible for some time to produce basic shaped fully-fashioned panels, the restrictions imposed by slow production, lack of yarn control and take-down control, and the enormous amount of time needed to create the knitting machine programmes, severely hampered progress. However, in 1989, the introduction of the Shima Seiki SES122FF unit, a purpose-built V-bed, belt driven variable stroke knitting machine with individual electronic needle selection, comb set-up, digital stitch control, and many other innovations essential for the production of fully shaped panels, was a quantum leap forward.

Fig. 2: High fashion style created on modern Stoll flat knitting machines. Picture: Stoll

More major progress followed with the introduction by the Japanese company of a new concept in machine programming software. This not only dramatically reduced programming times, but also offered greater versatility in patterning and shaping technologies.

In 1999, Shima Seiki launched what the speaker described as the world's first purpose-built range of whole garment knitting machines. These employed highly innovative compound slider needles, individually selectable take-down mechanism, additional auxiliary transfer, sinker and needle beds, plus a unique programming system. For the first time designers and technicians could create new types of whole garment knitted items sufficiently attractive to help revive jaded market sectors.

Collaboration between the European branch of the Japanese machinery builder and Davenport Knitwear (GB) has resulted in the latter's purchase of 48 SWGX 12 gauge units and three SDS design systems. This equipment permits the GB knitwear manufacturer to respond to customers' constantly changing requirements, caused by rapid changes in fashion trends or even weather. Deliveries in units of 50 dozen can be made within three days, thanks to the ease with which style changes can be made on the equipment.

In a second paper concerned with the commercial reality of whole garment knitting, Ali Aytemiz, Aytemizler Textile Industry & Trade Co. Ltd. (TR), reviewed the machinery available, the need for greater designer familiarity and expertise with the concept, and the marketing arguments for its use. He said targeted ideals of standardisation of fabric and garment weight control, uniformity of measurements, and finishing, have very nearly been achieved. The latest technology offers to the customer the promise of comfort, particularly in close fitting garments, children's wear and underwear tops. Mr Aytemiz said "in the near future, variable stitch density will permit garments to be knitted in more realistic body shapes. Already, the trials we have carried out have received a very good response. The excess material which occurs in traditional knitwear can be avoided, resulting in lighter garments." He said material consumption and make-up costs are significantly lower compared with those of panel knitting. The resultant cost advantage will become an important argument. High quality stitch construction combined with the use of high quality yarns will be available to customers at more affordable prices.

Industrial textiles sector growing

A speaker from Clariant GmbH (D), in a presentation concerned with coating knitted goods for technical applications, said the global market for technical textiles is estimated to be currently worth 42 billion USD. Beate Plückhan forecast that by 2005 this value will have increased by almost 50% to 61 billion USD.

Fig. 3: Karl Mayer's Stephan Jung: "The possibilities of the "Rascheltronic" machine are now being appreciated beyond the underwear sector and into sportswear and upholstery sectors. Picture: Karl Mayer

In Western Europe, turnover is expected to increase in value from 11 billion USD last year (2002) to 12.9 billion USD in 2005. Technical textiles already account for 24% of the entire textile market in Western Europe and this percentage is rising strongly. However, the greatest growth potential is seen in Asian markets, followed by North America, and then Western Europe. The use of knitted construction in the technical textiles sector, already significant, is expected to increase by around 3% annually. She said their mass: performance ratio, and favourable cost in semi-finished

Skechers EX1061-p.6
Skechers v Nike

state, means they can be used advantageously in composites. They are already used widely in medical and hygiene, apparel, protective, and automotive textiles, and in geotextiles.

The speaker discussed the types of textile auxiliaries used as binders, cross-linking and water/oil repellent agents and flame-retardants commonly used. These included polymer dispersions, melamine resins, fluorocarbons, and polyphosphates. She then outlined the application processes employed for different types of products.

In conclusion, she said the technical textiles market demands positive developments to improve the properties of existing fibres and new fibre developments, more cost favourable production technologies, and new product innovations "to reinforce and support the application possibilities of knitted materials in this high growth-potential market."

Three-dimensional structures from flat knitting machines

According to Martin Legner, H. Stoll GmbH & Co (D) in contrast to that for most other types of textile machinery, the demand for modern flat knitting machines has grown immensely in recent years and a relatively high level of machines has been sold steadily *(Fig. 2)*.

In a paper dealing with the ability of modern flat knitting machines to manufacture three-dimensional structures for fashion and technical textile products, he suggested both economic and technical reasons underlie this apparent phenomenon. These reasons include knit-friendly fashion trends, high demand for modern machines from the Far East, growth of knitwear production in other regions such as China, Turkey, Arabian and Eastern European countries, globalisation of markets and increased prosperity in many countries, and the eagerness of established knitwear industries to adopt new design and production concepts.

He suggested flat knitting units, despite their relatively slow operation, offer "scope for design options which cannot be matched in terms of implementation simplicity as regards their styling and design versatility."

Fabric characteristics are also easily modified. Martin Legner described how, for example, a spherical shaped product can be generated by a three-dimensional knitting programme, without need of a special three-dimensional forming device. He emphasised that this is not the only form of innovative structures, which can be made. Others include voluminous knits, spacer fabrics, web or interface constructions, and tubular structures. He said all these possibilities can usually be created, even jointly applied, on the same machine.

Stoll knit-and-wear technology can be used to produce complete garments on a flat bed unit. The technology employs a three-dimensional knitting process. Using it to make a pullover, for example, three fashioned tubular pieces are joined by the use of knitting, transfer and linking actions to form a finished ready-to-wear garment. This technique is extremely versatile in that, in addition to the basic structure, simple jacquard and intarsia patterns, typical knitwear formations for shoulder, neck and collar, can be achieved.

Mr Legner said that, depending upon the required design of the knitted fabric, and by the possible use of machines with addition needle or transfer beds, such as the Stoll CMS 330 TC-4 and TC-R, complete outerwear garments can be made in finer gauges. He listed labour saving, optimised yarn consumption, minimised storage, logistic and reduced waste disposal costs as advantages associated with Stoll knit-and-wear manufacturing.

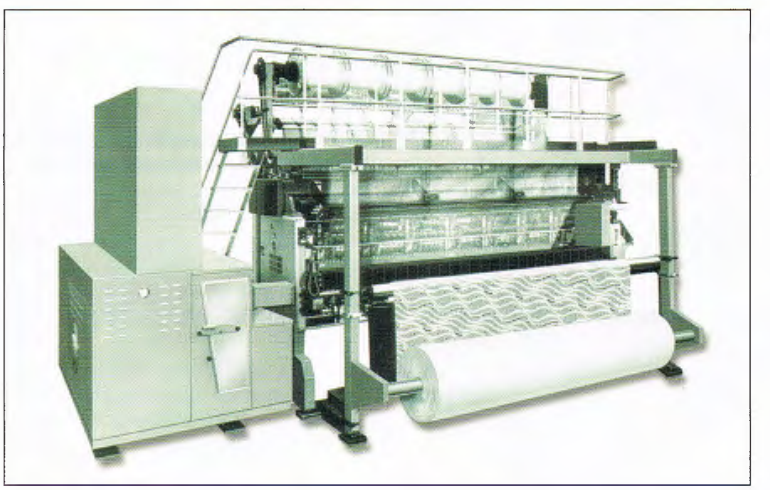


Fig. 4: Jacquard-patterned, elastic and rigid knitted constructions can be made on Karl Mayer's versatile "Cliptronic" units. Picture: Karl Mayer

Impact of new machine concepts

Stephan Jung *(Fig. 3)*, Karl Mayer Textilmaschinenfabrik GmbH (D) outlined how recently introduced machine concepts are assisting the global knitting industries to meet increasingly complex demands, such as that for high and higher quality products, for greater individuality in different markets, for meeting a variety of different working methods, and for overcoming various technical problems, such as those associated with reference

Skechers EX1061-p.7
Skechers v Nike

points for pattern centring and sample sizes.

Speaking about the Karl Mayer "Cliptronic" *(Fig. 4)* series of machines, for example, a variety of jacquard-patterned, elastic and rigid fabrics can be manufactured. Various machines from the range are being used primarily for making a wide variety of underwear and outerwear fabrics. "What they all have in common," he said, "is that the broché-knitted structures all have at their disposal relief-like pattern motifs which are not in any way restricted by repeats. These motifs can be specifically placed not only for design reasons but also from a functional point of view.

The fabric background can be designed independently from the patterning and can be formed by a complete jacquard bar." Detailing the wide versatility of the "Cliptronic" system, Mr Jung claimed that a manufacturer of ready-made garments is helped during further processing. Reference points for cutting and making-up can be established. "Stretching is increasingly function-oriented or limitable, more or fewer transparent zones can be created, and desired cooling functions can be introduced.

Further development of the company's "Rascheltronic" unit has added considerably to its patterning versatility when making fine jacquard-patterned, rigid and elastic fabrics. The advantages of this type of machine are now being appreciated beyond the underwear sector and into sportswear and the demanding upholstery sectors. Company logos can be incorporated, and function and design-oriented cooling openings (mesh inserts) can be included to achieve an optimum microclimate function while circumventing the necessity of expensive making-up operations.

Hong Kong metamorphosis

The seesaw history of the Hong Kong knitting industry was outlined by Anthony Wan, senior R&D manager, Fountainset Holdings Ltd (HK). The Hong Kong textile industry was originally set up after the Second World by textile tycoons fleeing from Shanghai. By 1976 textile exports reached an all time high, accounting for 65% of Hong Kong's total exports, with 27% of the available workforce engaged.

However, booming land values in Hong Kong persuaded the tycoons to move their spinning mills to nearby Asian countries. Knitting, weaving, dyeing and garment making operations, occupying less space, remained. By 1980 the value of textile exports had slumped to 42%, although textiles remained the biggest industry. By the middle of that decade customers started demanding higher standards for their apparel.

From the early 1990's, competition from neighbouring regions, Thailand, Indonesia, Malaysia and the Philippines, and more recently Pakistan and India, became much stronger. The financial turmoil of 1997 was another blow, operating against the Hong Kong dollar, which was pegged to the USD. At the time, textile technology education was focused on production; little attention was paid to R&D. Mr Wan said product development in the knitting sector usually consisted of the "knock off" of a sample supplied by the customer. More recently, the shift towards functional and lifestyle garments has convinced Hong Kong knitters to start their own R&D programmes and work closely with yarn spinners and chemical suppliers.

Today's Hong Kong textile industry is vastly different. The association of the electronic and computer industries with the textile industry has presented both challenges and opportunities. In the knitting sector, R&D is now seen as the key to success, together with better supply chain management and production planning. "Without doubt, Hong Kong's knitting industry will remain a major player in the supply of knitted fabrics. But the industry will find it difficult to compete on the basic items, as part of this business will be dominated by those located in the developing countries." Speed, quality, price and innovation are now being considered the vital necessities for survival.

For further details contact: kim.gandhi@virgin.net by quoting *ONS-No. 3-131*. ■

RÜEGG + EGLI AG Makers of Weavers' Reeds
150 Years Quality
Hofstrasse 98
CH-8620 Wetzikon
Tel. ++41 (0)1 932 40 25
Fax ++41 (0)1 932 47 66
Internet: www.ruegg-egli.com
E-Mail: contact@ruegg-egli.com
• weaver's reeds for all types of machines
• lease reeds in all forms
• narrow fabric weaving reeds for all machine types
• adjustabel (expanding) warping reeds
• spiral-spring grids in all widths
• grinding and buffing stones

Skechers EX1061-p.8
Skechers v Nike