ITMA 2007 Review: Implications for the "Nonwovens Industry"*

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INTRODUCTION

ITMA 2007 was another pleasant surprise, thoughtfully organized and fairly complete. I expected the opposite given the pre-show publicity about the show. Compared to ITMA 2003, it appeared that many more nonwoven companies were present; nonwovens were prominent in almost every venue. It was estimated that visitors from 149 countries came to ITMA '07 exhibition, another landmark…

What you will read below came about as a result of a short trip to ITMA and the discussion is focused on the Nonwovens Sector only and deals with one person's impressions of the technologies in this area alone.

Historically, the nonwovens industry is organized differently and separately from the textile industry. While the nonwovens and the textile industries share some common heritage, the nonwoven industry has grown to present a broad array of engineered fiber and polymer based products that are driven by high-speed, low-cost, innovative, value-added processes. This has led to the adaptation of technologies from pulp and paper industry, extrusion industry and the like to bring about the desired products at reasonable costs, and consequently a separation from the more traditional textiles which has been primarily focused on apparel.

Today's segments of the industry include raw material suppliers, roll goods producers, the converters/fabricators of the end use products, machinery industry supporting the previous three categories, auxiliary material suppliers, winding, slitting, packaging equipment makers, etc. Even this segmentation does not offer as clear a picture as one might imagine, because the picture is further clouded by varying degrees of vertical and horizontal integration(s) in the industry. Globally, the picture is further complicated by the local market and economic nuances. In terms of market segments, the industry is focused on medical and hygiene, filtration, wipes, automotive, industrial and interlining – the only segment directly related to apparel. This segmentation has come about because the industry has looked at itself at the macro-level from two distinct but entirely overlapping perspectives: process technologies and markets. The two are intimately tied together through overlaps. For example, needlepunching technology is important to both automotive and geotextile applications. Or, the filtration market is served by wet-lay, needlepunched and meltblown technologies, amongst others.

A separate section was not set aside for nonwovens as was the case in ITMA '03. Unlike ITMA '03, many of the major nonwovens equipment suppliers were present at the show. The ones present were Autefa, Bematic, Fleissner, Dilo, Groz-Beckerrt, Hills, Inc., Laroche, NSC nonwoven, Reiter, Cormatex and some new comers to the world of nonwovens such as Truetzschler. Among the ones absent from the show were most of the spunbond/meltblown machinery and auxiliary machinery suppliers (e.g., Reifenhauser, Celli, Parkinson, and many others). While the nonwovens sector had a more significant showing at ITMA '07, it was still much less significant that the INDEX and the IDEA shows. These shows however, are not limited to machinery exhibitions only and include raw material suppliers, roll goods producers, the converters/fabricators of the end use products; the machinery industry supporting the above mentioned three categories, auxiliary material suppliers, winding, slitting, packaging equipment makers, etc.

In North America and Europe, the SpunMelt technologies (spunbond and meltblown technologies and their composites) dominate, while in the rest of the World, the staple fiber process technologies dominate.

A global view of the growth potential of nonwovens technologies is given by John Conley[1], in *Figure 1*. Conley suggests that SpunMelt technologies will continue to grow while the carding technology will continue to decline. Today, this is potentially true of lightweight disposable products where the SpunMelt products can compete favorably with the carded products. Recent and continuing advances in the high

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speed carding technology however, will allow this technology to continue to compete in certain markets such as hygiene and other lightweight products, and the advances in crosslapping technology and higher weight nonwovens through chutefeed systems will encourage the use of such technologies for heavier weight products. We believe that the high speed carding technology and its associated processes are not maturing technologies that are holding their own. Note however, that the composite (pulp-based) airlaid products are finding applications in "co-form" process technologies as opposed to stand-alone systems utilizing pulp and latex binders.

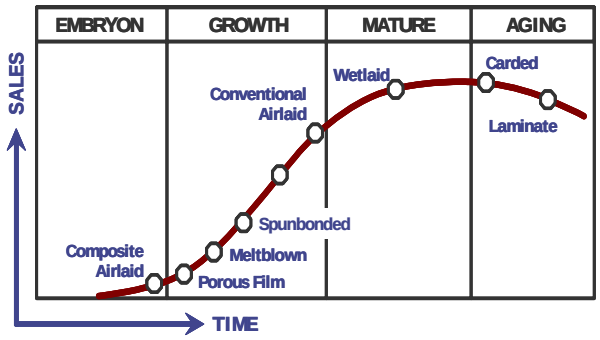

Figure 1. Projected Lifecycles of Different Process Technologies

Another key difference between textile machinery makers and nonwovens machinery makers has been the degree of vertical integration in these two segments. Starting in the late 80's and early 90's, we began witnessing alliances and mergers. Some of these took the form of horizontal integration: buy-out of parallel or competing technologies. Some took the form of vertical integration which encouraged one stop shopping: the buyer could purchase complete manufacturing lines to produce nonwovens for specific markets. In the latter case, the machines from different parts of the alliance, merger, or partnership were better integrated as well. More of this was evident at ITMA '99, and much more so at ITMA 2003 and ITMA 2007. I consider this a positive move for the growth of both the machinery and the nonwovens industry. The best example of this is the NSC nonwoven group that now provide 'cradle to grave' sales and services for complete lines using staple fibers as well as an alliance with other companies such as Reiter to complete the offering.

OVERALL IMPRESSIONS AND MOST SIGNIFICANT PROCESS TECHNOLOGIES

The report below will try to bring together the recent developments in some key nonwovens companies who were present at ITMA. It is not intended to be an exhaustive review of the process technologies offered for the nonwovens segment; these were reported for ITMA '03 and '05 and the reader is referred to these earlier write ups. Note also that the following is presented in no particular order and merely tries to catalog the recent innovations reported at the show.

A notable trend was the availability of "cost-effective" process technologies for nonwovens. Historically, the cost for nonwoven processing equipment has been far greater than those for textiles. This was partly due to the degree of customization required for nonwovens equipment and the cost of engineering. Several companies were exhibiting a lower cost (and lower tech) version of their technologies for solutions that do not require the same degree of quality control.

Truetzschler was very prominent at the show with probably the largest stand at the show; Truetzschler now offers the standard traditional textile processing equipment and is one of the newcomers to the world of nonwovens. With their acquisition of Erko and Fleissner, they have added the capability to offer a full array of process technologies for staple fiber nonwovens including but not limited to carding, needle punching, hydroentangling and thermal bonding (thru-air). Fleissner was exhibiting separately (but in close proximity to the Trützschler and Erko-Trützschler booths.

The Truetzschler systems have become the industry standard for fiber opening, mixing and feeding. They are being use throughout the World in conjunction with other equipment such as those offered by other machinery makers. With their entry into nonwovens, one will expect the same level of excellence and Truetzschler will be a company to watch over the coming years.

Perhaps the most important feature of a Truetzschler opening and feed system is the **SCANFEED** system (*Figure 2*).

Figure 2. Truetzschler SCANFEED system

This system is equipped with a self regulating fiber distribution system along the width by means of a stream of air. The SCANFEED is also equipped with a web profiler that monitors and controls the machine uniformity of the feed thereby ensuring product uniformity.

The tuft feeder SCANFEED TF works according to the proven double trunk principle. Via the distribution line, a fan blows the tufts continuously into the large upper trunk (material reserve trunk). The distribution in width in the fillhead has clearly been improved by optimizing the air current conditions. Air outlet combs at both sides of the upper trunk separate the tufts from the air. The material condenses through the permanently effective positive pressure.

The filling height in the upper trunk remains constant and regulates itself pressure-controlled. If the air outlet combs are more covered, the pressure rises. This leads to a reduction in the amount of material fed. By contrast, free comb surfaces result in a low pressure and an increased amount of material fed.

The feed roll at the lower end of the material reserve trunk seizes the tufts and feeds them to the opening roll. To ensure a safe guiding and clamping of the material, the feed tray consists of individual spring-loaded elements which automatically adapt themselves to the respective fiber mass. The large-dimensioned opening roll, clothed with special needles, opens the material in a very gentle manner. Several fans – spread about the width – doff the fibers from the surface of the roll by means of a constant air stream and blow them into the bottom trunk (feed trunk).

A constant air stream in the feed trunk is the precondition for the self-regulating distribution in width. The feeding principle of the bottom trunk functions in a comparable way. The feed roll is pressure-controlled. The basic speed of this roll is determined by the following machine (roller card). As the air takes the line of least resistance, air currents to the free comb surfaces of the feed trunk develop. By this, a self-regulating distribution in width is obtained. In the feed trunk, too, the comb covering (and thus the air pressure) regulates the amount fed.

The built-in circulating air fans of the SCANFEED TF are adjustable. This adjustment allows an adaptation of the condensing air stream to the fibers. Coarser and more crimped materials, for example, require a higher pressure and a stronger air stream.

The web profile control is the only leveling unit that improves web evenness both in length and width. VPR is an optional supplement to the tuft feeder SCANFEED TF.

With the web profile control, usually a homogenization of the web in width and length is obtained. It is also possible, however, to produce selective web cross-sectional profiles. When feeding a roller card, for example, it is often wanted to reinforce the edges in order to compensate the fiber loss in the side areas of the roller card.

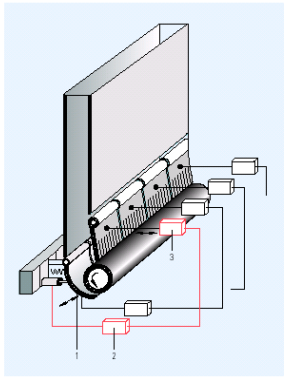

Figure 3. Truetzschler Web Profiler

The challenge for the carding technology has been to compete for productivity and product characteristics with spunbond products both in the heavy (needlepunched) and light basis-weight (thermally bonded) range. Operationally, the challenge translates into learning how to control the card-web structure, its uniformity, both lengthwise and crosswise, and its throughput rate. The Truetzschler systems are a step in the right direction.

At this ITMA, **Fleissner** focused on exhibiting the utility and versatility of the Fleisssner-AquaJet technology and exhibited samples filtration media for hot gas filtration as well as samples for sportswear and other applications (in competition with needle punching).

An intriguing set of samples related to the production of innovative fabrics by ANT NanoTechnic (a Korean company) who is using the technology to produce completely new products for synthetic leather, sportswear, functional fabrics, nanofiber webs, filter production, automotive interior fittings and furniture industry. It was reported that The Fleissner spunlace technology was used for bonding spunbonds and staple fiber webs from splittable conjugate fibers, and

also for incorporating electrospun nanofiber webs into a knitted fabric.

Another focus area related to the use of hydroentangling for incorporating pulp into webs. Fleissner exhibited several interesting pulp composites for applications in the wipes, medical and absorbent product sectors. In a pulp/spunbond or pulp/carded web composite, pulp offers absorbency while the spunbond or the carded layer provides strength and leads to a more functional and cost-effective solution.

Fleissner also unveiled their **LeanJet** spunlace line of machinery for customers who wish to enter the wipes market with a limited, but still economical production output. Fleissner announced that six machines had been sold and over the past twelve months.

Perhaps the most notable innovation at this show by Fleissner related to their new **SteamJet** technology (developed and patented by STFI) unveiled at ITMA '07. Fleissner exhibited samples produced on their 1 m wide pilot line at a speed of 200 m/min. SteamJet technology does not replace hydroentangling, and complements it. The main difference compared to the spunlace process is the use of superheated pressurized steam to bring about bonding by a combination of fiber entanglement and thermal bonding. Subsequent drying is not required since this is a 'dry' process. Note that Steam jets cannot have the same level of entangling energy and therefore, will be limited initially to lower basis weights and will be of use to products that would be difficult to dry.

A similar technology has already been commercialized in Japan by Kuraray. Watch for a new array innovative products appearing in the marketplace over the next few years as this technology matures.

The **NSC group** was also present at ITMA '07. The NSC group is composed of eight companies, each known for their own unique strengths.

There were a significant number of innovations visible at the NSC nonwoven booth, both in processes, as well as in new machine engineering.

NSC's Asselin-Thibeau company has specialized in integrating nonwoven lines for 30 years, and the multiple innovations on the different components of a line are all designed to work in synergy with each other to make a first quality finished product, with optimum aesthetics, performance, and fiber yield.

One of NSC's core technologies – the **Asselin-Thibeau ProDyn®** system (originally introduced in at ITMA '99) applies only to Crosslaid products but has become the established method to produce totally flat, controlled basis-weight fabrics for hydro entangled, needled or through-air bonded fabrics. NSC achieves this by varying card doffer, and crosslapper input speeds in a systematic manner to create the web-weights as needed at different points in the fleece.

NSC claims over 75 **ProDyn®** systems are already sold worldwide and delivering fabrics with regularities measured around 1% CV, or better. The technology primarily applies to fabrics of 80 gm/m2 and upwards, and uses a scanning X-Ray transmission gauge to measure the output of the line - then provides an upstream (closed-loop) control to continuously optimize weight distribution and basis weights.

The electronics part of this proprietary process is an essential part of the system's user friendliness and success.

Two innovative additions to the **ProDyn®** system were introduced at ITMA '07 – **Iso-ProDYN®** and **BattCruise** are intended to consistently orientate the fibers at all points in the finished fabric to maintain constant tensile properties from center to sides of the fabric. This is a flaw of drafting, or of earlier profiling systems and will be particularly beneficial in making fabrics for automotive molding, geotextile or other iso-tensile applications where buckling and/or shear dominated failures are controlled and minimized or eliminated.

A radical innovation was the design of the new **Thibeau Excelle®** card which puts all the accessory card cleaning systems inside – rather than outside - the drives and adjustment points. Operator convenience and accessibility is unparalleled. This is combined with a completely sealed airflow system and transparent design which allows total visibility of the carding process, and virtually eliminates the need for card cleaning. Claimed improvements in fiber usage and downtime are financially interesting. The **Excelle®** design is equally applicable to either direct lay or Crosslaid systems. **Like most good ideas (often referred to as "no brainers"), this design concept will now become self self-evident and will be imitated by other machinery makers.**

Many significant advances have been made in the **Asselin A50 series** Needleloom development – with dedicated adaptations for high speed deliveries, for fine-denier light-weight, or for very dense needling, and for recycled waste materials.

A major NSC objective of the last several years has

been to produce aesthetic, harmonic and pattern-free needled fabrics using randomized and dense needle patterns, and combining specific patterns – and also to increase fabric production speed. This they achieve by using a very novel **Intermittent Advance System** which had demonstrated capability at well over 100 m/min with relatively low stroke speed. The same aesthetic objective has been applied to structured, velour surface fabrics to eliminate the characteristic rectangular impression of the brush bed in the finished fabrics. To overcome this problem - which is inherent in traditional velour loom design, NSC introduced an **Asselin A50-SDV/HD** which incorporates wide, random needle patterns, with a patented new stripper plate design and angled brushes to eliminate any harmonics with the brush bed. As a bonus, this technique also permits greater productivity and line speeds can be increased by 25% with better quality of fabric. It is now economically practical to put a velour loom in-line with the basic fabric formation - saving not only in fiber materials, but greatly in downtime and in manpower requirements.

To improve needling uniformity on wide needlelooms, Asselin recently introduced a **Dynamic Frame Management** system – a sort of self-leveling system to make sure penetrations depth is equal in the center and on each edge of the fabrics under all loom operating conditions and penetrations. This appears particularly useful for heavily needled, dense, fabrics.

Several more specialized innovations were also being presented for **Papermaker Felt** lines with particular emphasis on a completely new preneedler, draft reduction and control through the very wide preneedled fleece up to 14.5m wide, and to improve uniformity.

NSC nonwoven and Rieter were also presenting at ITMA, as they did in IDEA-2007 their joint promotion of **NSC** and **Rieter-Perfojet** hydroentanglement lines. Personnel from each company was on hand to present joint solutions. NSC and Rieter-Perfojet have a long history together of successful hydroentanglement lines throughout the world on a wide variety of fiber types and applications. To complete their range of machines for these high speed direct lay, or hydroentangled fabric lines as well as to cover Spunbond line and thermobond lines. NSC was showing for the first time their **Monomatic "EasyWinder".** EasyWinder is a fully automatic, autodoffing winder for medium speed applications up to 200m/min, with a very sensitive tension control and a bobbin drive system containing approximately 50 different built-in tension profiles to permit handling of all delicate, low strength fabrics without crushing or ovalizing of the mother rolls.

At the other end of its capabilities the **EasyWinder** is also perfectly prepared to handle denser spunbond materials without defect or distortion. The **EasyWinder** is a modular unit which is offered either as an in-line Mother-Roll winder, or as an in-line Slitter-Winder, or as an off-line Rewinder-Slitter and can later be reconfigured into another role without wasting any of the components. It will be particularly attractive to the smaller developing business who are upgrading existing lines and whose needs are evolving.

Rieter was displaying next to NSC group. The most significant developments related to their entry into the meltblowing and spunbonding and the coupling of hydroentangling with spunbonding. Rieter refers to this coupling as **SPUNjet®.** Rieter offers new solutions for the production of superior quality spunlaid nonwovens under the brand name SPUNjet®.

Spunlaid nonwovens are generally appreciated for their good uniformity and mechanical properties at low and even very low basis weights. The spunlaid nonwovens are often the first choice for low basis weight hygiene nonwovens. It is also well known that bonding via a thermal calender has drawbacks such as lack of bulkiness and softness, degradation of filaments at the bond periphery, loss of permeability due to compaction and partial melting of the fibers. The utilization of high kinetic and very fine water jets for the bonding of continuous filaments webs overcomes most if not all these drawbacks. Rieter estimates that compared to similar webs thermal bonded, SPUNjet® nonwovens demonstrate 25% to 30% higher tensile strengths, 50 to 80% more bulk and up to 75% higher tear strengths. The web of unbonded filaments is directly picked-up on the surface of the forming conveyor of the spunlaid section without draft. This allows the use of low pressures, and the conservation of the natural isotropy of the spunlaid webs.

Rieter also offers systems for incorporating pulp into webs. Their inline machine configurations cover two and tree layers products construction.

To be a major player in the nonwovens largest markets – medical and hygiene – requires the ability to offer spunbonding and meltblowing lines separately and/or together. Rieter decided to play a major role in these markets and now offers SMS technology. The first and foremost step was to deliver stand-alone spunbond and meltblown lines.

Rieter offers spunbond and meltblown machinery separately. Over the past six years, Rieter Perfojet has strengthened its position in becoming a serious market player in spunbond. Over the last three years, Rieter Automatik has dedicated a complete team, based in Grossostheim, Germany for its meltblown activities. **EMBLO® technology** is what Rieter Automatik has named their meltblowing technology. Several lines – including repeat orders – are already operational.

Beginning of 2007, Rieter has taken another important step toward a strategy to demonstrate their SMS capability in their pilot facility. Rieter Perfojet will house a meltblown tower, from Rieter Automatik, in line with the existing spunbond Tower. Bringing EMBLO® and PERFObondTM together will complete the loop. Watch for innovative developments from Rieter.

Groz-Beckert was also quite prominent at ITMA. They exhibited a number of key technologies for both felting and hydroentangling as well as for weaving. Below, we only refer to their technologies for nonwovens.

While Groz-Beckert is a newcomer to the world of hydroentangling jet strips, they have already introduced several innovations in this area. The most notable being the introduction at ITMA of their **HyTec GEBEDUR** Jet Strips with long service life.

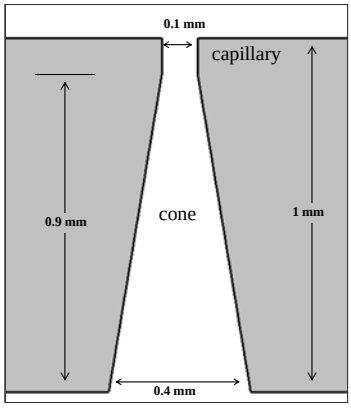

Figure 4. A typical hydroentangling orifice
Source: NCRC

A typical jet strip may have as many as 1600 to 2000 orifices per meter. The quality of each orifice is critical to the quality of the final product. Defects in orifices can result in streaks in the final fabric. A typical orifice (*Figure 4* shows a 100 micron orifice – most orifices range from 80 to 140 microns today) is in the form of a cone-capillary nozzle and is used in the cone down configuration.

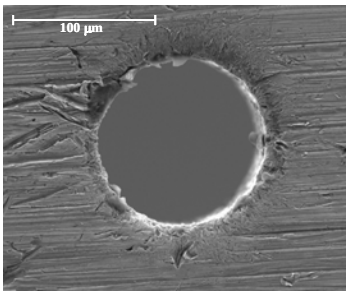

Figure 5. An eroded orifice edge – diameter = 127 µ
Source: NCRC

Premature loss of the edge sharpness of the capillary edges can lead to turbulence in the water jet and hence to irregularities in the water curtain – see *Figure 5*. Fluctuations in the energy impact of the bonded-fiber fabric result in irregular stripe markings on the finished end product.

The HyTec GEBEDUR jet strip combines long service life with unmatched quality leading to uniform product quality. The durability is achieved by providing resistant surfaces controlling the wear at the edge of the capillaries. Consequently, the orifices retain their edge sharpness for longer periods. More importantly, this longer life results in better and more consistent products over the life of the jet strips.

Benefits of HyTec GEBEDUR jet strips are:

- long service life due to reduced capillary edge wear
- improved resistance to damage and scratching during strip changes and cleaning processes
- uniform product properties over a long period
- resistant to external conditions, e.g. damage from being hit, dropped or bent

Another innovation by Groz-Beckert was the unveiling of their new Groz-Beckert *Master System*, a complete system designed for more efficient, reliable needle board handling. The Groz-Beckert Board *Master System* comprises three components: Needle *Master*, GEBE*Scoot* and GEBE*Store*.

Figure 6. Needle *Master*

Figure 7. GEBEScoot

Figure 8. GEBEStore

The basis of the system is the Groz-Beckert Needle *Master*, a semi-automatic device for the insertion and removal of needles in needle boards for the needle punching industry. Compared to the current manual methods of replacing needles, this partially automated processes help to minimize the time required for fixing damaged needles in needle boards or switching to a new set of needles. The optimum care of the needle board taken during needle insertion and removal is also expected to result in an increased board life. The precision and quality of the needle replacement process are in full compliance with stringent board and needle precision requirements. A process patent application is pending for the Groz-Beckert Needle *Master*.

The GEBE*Scoot* is a high-lift truck featuring a special board fixture developed by Groz-Beckert for the safe, simple transport and handling of needle boards from the storage location to the Needle *Master*, to the needle loom and back.

GEBE*Store* is a needle board rack specially adapted to the other components for simple admission and removal of boards into and out of storage using the GEBE*Scoot*.

The ergonomically designed and CE-compliant components make for fast, reliable and timely needle board handling.

The **DiloGroup** with DiloTemafa, DiloSpinnbau, DiloMachines and DiloSystems was exhibiting the latest developments in nonwovens machinery and technologies at ITMA ‘07.

DiloGroup was exhibiting a total of 32 machines and components of which 14 were stated to be new developments.

DiloGroup demonstrated three web forming and needling lines. The first was a high-performance line, including a totally new needling technology which is called **Hyperlacing** for the production of light weights to be used in the medical and hygiene sector.

The second was the **AlphaLine** as an economic alternative for the medium capacity range and the third was the **Fiberlofter** line, an ***aero-dynamic*** web forming and needling line.

The fiber preparation by opening and blending consists of **DiloTemafa** components including two bale openers with increased throughput capacity, based on new software for the weighing process, followed by a re-designed carding willow to provide higher throughput using an enlarged working width.

The fiber from the **Baltromix** opening and blending line is pneumatically conveyed to the completely new dosing opener **DON** which has a very large upper trunk as a reserve silo with a fine-regulating system of the flock level. The fiber flocks from the upper trunk are pre-opened and released to the lower trunk including a fine-opening station. The finely opened flocks are transferred to a newly developed card feeder named **VentoFeed** of the **HyperLine**.

Figure 9. Dilo HyperLayer

The **DiloSpinnbau DeltaCard** is a universal double-doffer card where breast and main section are connected via the Delta arrangement of three transfer

rollers, one being a random roller, for increased throughput and improved fiber blending. The double web is conveyed to the **DiloMachines HyperLayer**. The **HyperLayer** resembles the old camelback in appearance, but it is claimed to be the only crosslapper to accept in-feed speeds of around 200 m/min.

The **Profiline CV1** web control device at the in-feed side of the crosslapper delivers light-weight areas of web to be positioned exactly at the batt edges as a pre-compensation for later re-thickening of these edges during the needling process. Profiline CV1 controlled by the newly developed **Proximax** unit, an x-ray scanning system for the batt profile as part of a closed-loop system. The accurate lapping action of the Hyperlayer in conjunction with **Proximax** gives the highest precision of weight distribution in MD and CD directions. This automatic regulation and batt forming process provides a high potential for fiber savings. The more the batt weight is controlled to be even across the width and in running direction, the lower can be chosen the final product weight with associated savings of raw material, the highest cost factor in a textile mill.

The **DI-LOOM HVASCL** is a universal **Hyperpunch** double needle loom for both-sided needling which includes the new **EPMC Hyperpunch** feature with ***elliptic phase*** motion control. This innovation is a compact solution to provide the Hyperpunch feature for a reduction of batt dimensional changes in the needle loom in a more economic way, at the same time allowing higher needling speeds of up to 2,200 strokes/min.

The **HyperLine** web forming and pre-needling line delivers highly uniform and light-weight pre-needled batt to be further processed by the **Hyperlacing** technology which applies the revolutionary **Cyclopunch** needling units. The **VentoFeed**, **Hyperlayer**, **EPMC Hyperpunch** unit and the **Cyclopunch** machines are trade fair-first units.

The Dilo **HPCL Hyperlacing technology** was developed to provide an alternative to other bonding methods such as hydraulic spunlacing systems. With this needling concept it is now possible to needle batt as light as 35 g/m² with high-density needling to deliver nonwoven material highly resistant to frictional surface forces when used as wipe or medical material. The **Hyperlacing** units use four needle boards – two down-stroke, two up-stroke –, each equipped with around 20,000 needles/m of working width. The needles have barbs with an extreme fineness of 0.02 mm barb depth. This **Groz-Beckert** needle transports only one fiber per stroke with one barb per needle. The single fiber transport feature provides entanglement of virtually any fiber in the fibrous batt at high stitching densities. With several **Cyclopunch** units in a **Hyperlacing line** very high throughput speeds of over 100 m/min. are possible.

The **Cyclopunch** needling unit applies a completely new needle beam kinematics which guides the needle on a circular path and in a translatory way. The needle stays always vertical to the fleece plane and is moving in two directions, up and down and horizontally forward and backward. While penetrating the fleece the needle is moving with the material, thus allowing extremely high throughput speeds.

This **Hyperlacing** needling technology is a highly attractive bonding method for the production for light-weight fine fiber nonwovens in a very economic way with one sixth of the energy consumption of a water entangling line, with no fiber losses and no water consumption.

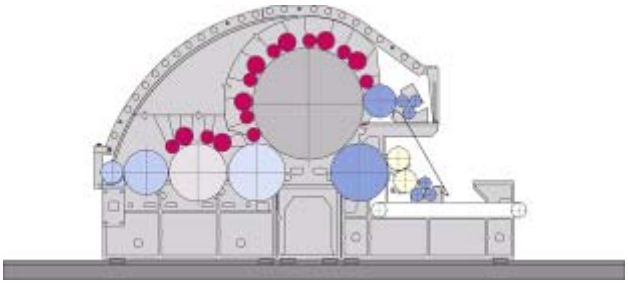

Figure 10. AlphaLine

In some sectors of the nonwovens industry staple fiber web forming and needling lines are used to provide medium range fiber throughput and speed. Therefore **DiloGroup** has developed the **AlphaLine** as a compact and economic solution for such needs where machines of reduced complexity and with a highly attractive price/performance ratio are required.

The **DiloSpinnbau AlphaFeed** and **AlphaCard** provide such a solution using far fewer drives and electronic controls, smaller rollers, simpler mechanical means for roller adjustment and simplified features for the installation and the housing of the machines. The medium range up to approx. 80 m/min. of web speed does not require suction and filtering stations to control the air flow in the card. The **AlphaCard** is a standardized design available in a working width of 2.5 m.

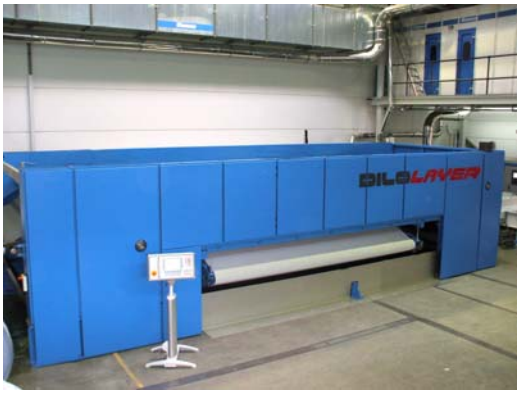

Figure 11. DiloLayer

The **AlphaCard** is followed by the **DiloLayer**, a newly developed horizontal crosslapper for universal application. Various models of the **DiloLayer** series allow a speed range of up to 160 m/min. web in-feed speed. At the same time this is a crosslapper of very high layering precision and good economics. The **DiloLayer** unit at ITMA 2007 had an in-feed width of 2.5 m and a layering width up to 3.5 m.

The **AlphaLoom** series is a new range of needle looms with medium capacity and good economy for universal needling applications.

Technical felts for moulded car parts are increasingly produced from recycled and natural fibers and blends with glass fiber. For the web forming of such products airlay machines offer an economic advantage at high throughput capacity and a medium evenness level. Besides the range of high-performance aero-dynamic web forming units for the fine fiber range **DiloGroup** therefore offers also the newly developed universal **Fiberlofter** for medium to high product weights between 300 and 3,000 g/m² with a production capacity of up to ca. 1,000 kg/h/m working width.

Also for the automotive sector **DI-LOUR** velours are enjoying a revived interest as a car interior decoration product with low weight and good moldability. The **DI-LOUR II-SLG** is a high-capacity structuring machine with excellent pile formation due to a new needle board design.

Amongst other exhibitors, one would note Laroche, Cormatex, Bematic and others offering highloft nonwovens production system using airlay and/or chutefeeds systems unique for recycled and natural fiber nonwovens utilizing fibers hat cannot be easily handled by carding. Cormatex was exhibiting their simple (but elegant) chutefeed system processing Bast fibers at the show. With sustainability becoming a global issue, watch for the developments in this area. The limiting factor today remains the lower basis weights achievable on such systems. With the technology being improved continuously, the anticipation is that the boundaries will be pushed and newer products will appear between now and the next ITMA by using these technologies. Automotive, bulding, home furnishing and Geotextiles would be areas that would likely be targeted.

Hills was showcasing some of their new and exciting developments. Hills began many years ago by offering filament and staple extrusion lines in both homo-component as well as bicomponent configurations. Their bicomponent technology is unique, flexible and expandable. Hills began offering both meltblown and spunbond equipment some years back, and their spin beam and bicomponent/multicomponent technology has been used together in systems offered by Nordson and Reifenhauser and others.

The latest development in the area of melblowing was the Hills' 100 plus holes per inch meltblowing die. Typically, most meltblowing spin beams have ~ 30 holes per inch. The increase to 100 holes per inch has two significant implications:

1. at the same throughput (g/hole/min), the production can be significantly improved reducing the need for multiple beams at significant cost savings,

2. at lower throughputs (g/hole/min), the production can be the same or higher, yielding however, significantly smaller fibers. Because of the increased surface area, a composite made up of a sub-micron meltblown web can be lower in weight leading to significant cost savings.

We look forward to continued innovations by Hills. It is this kind of technology that has led to the development of many revolutionary products. The developments in the area of multi-component fiber extrusion coupled with needling and hydroentangling are worth watching. Equally important is the availability of water dispersible polymers such as Eastman's EastONE™ series of water dispersible polymers that enable the use of such technologies without any significant environmental concerns.

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Editor: We cordially invite you to share your technical observations from major exhibitions and other international events. Please submit your comments, and letters to the editor at http://jeff.edmgr.com. Please be sure to provide us with your name and contact information.

[1] Conley, J. T., "Airlaid Comes of Age," *Nonwovens World* , pp. 52-56, June-July 1999.