



SPUNLACE LINES

AUTEFA Solutions leads the way



AUTEFA SOLUTIONS –

Experience, Know-How and Competence
in Nonwoven Technology

AUTEFA Solutions leads the way

As a system supplier, AUTEFA Solutions represents companies with a long tradition and a history of years of successful participation in the market. Combining the experience of the companies AUTEFA, Fehrer, FOR and Strahm the company stands for high quality, durability and performance made in Europe.

AUTEFA Solutions creates innovative technological concepts for nonwoven products by utilizing the skills and practical experience of its employees. The customers benefit from the dynamic flexibility and specialist know-how of AUTEFA Solutions key technology sites in Germany, Austria, Italy and Switzerland.



STRAHM

FIBER PREPARATION	fiber opening and blending			
WEB FORMING	carding	aerodynamic web forming airlay	airlaid	crosslapping
WEB BONDING	needling	chemical bonding	thermobonding	hydro- entanglement
WEB FINISHING	drying	impregnating/ coating	embossing/ perforating	scattering
WEB HANDLING	winding	cutting	stacking	festooning



AUTEFA Solutions is part of China Hi-Tech Group Corporation (CHTC).

AUTEFA Solutions – advanced Spunlace lines for a growing market

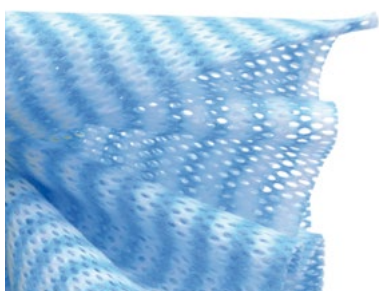
Hydroentanglement is the fastest growing bonding technology in the carded nonwoven business. The global Spunlace production is estimated to reach almost two million tons by 2020 (Source: EDANA). Nonwoven fabrics consolidated with high pressure water jets offer unique characteristics like softness, contamination-free, combined with acceptable strength values. In the past years more and more new applications have been found for Spunlace fabrics. Besides the traditional market for wipes and cleaning products also technical applications are gaining of importance. Since many years AUTEFA Solutions is one of the leading suppliers of Opening/Blending, web forming and drying equipment for this segment. With the development of an own hydroentanglement machine, AUTEFA Solutions close the missing link in the production process of Spunlace fabrics. With this important step, AUTEFA Solutions is able to offer complete lines in all leading nonwoven technologies.

ADVANTAGES

- Full line solution out of one hand
- Clear responsibilities
- One-stop-shop for machines and spare parts
- Technology support from bale to fabric
- In house production scale labline for application support

RAW MATERIAL & APPLICATIONS:

- Viscose
- PES, PP
- Bico fibers
- Bleached Cotton



Spunlace technology from bale to fabric

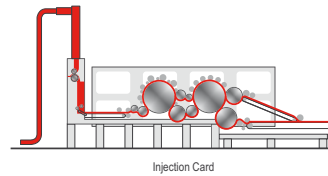
Reduced conversion costs

AUTEFA Solutions offers complete lines for the production of direct and crosslapped spunlace products. The web forming process, consisting of the unique Injection Card and Crosslapper Topliner series, is the key for high and consistent nonwoven fabric quality.

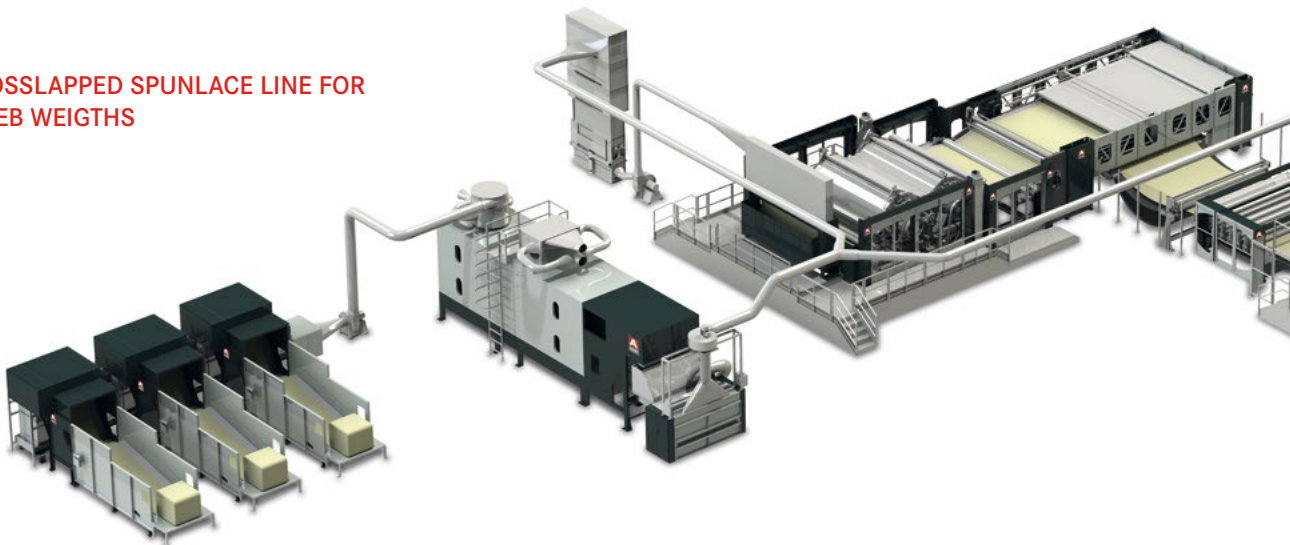
With the Hydroentanglement Machine V-Jet FUTURA and the Square Drum Dryer SQ-V, AUTEFA Solutions has developed an advanced and unique technology with special focus on energy saving. This new technology offers a significant reduction of energy consumption compared to any state-of-the-art line. The Hydroentanglement Machine V-Jet FUTURA leads to a reduction of the required water pressure of up to 20%. The Square Drum Dryer SQ-V adds another considerable share of energy saving. Compared to conventional drum dryers the SQ-V consumes around 35% less thermal energy for the drying process.

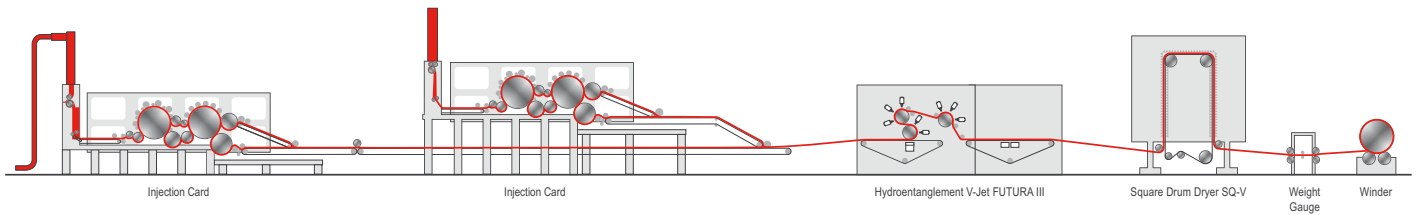
ADVANTAGES

- Lower energy consumption (kWh/kg)
- Highest productivity with Injection Card technology
- Best nonwoven fabric quality with Topliner CL4006CL
- EnRec Systems for heat recovery in drying process

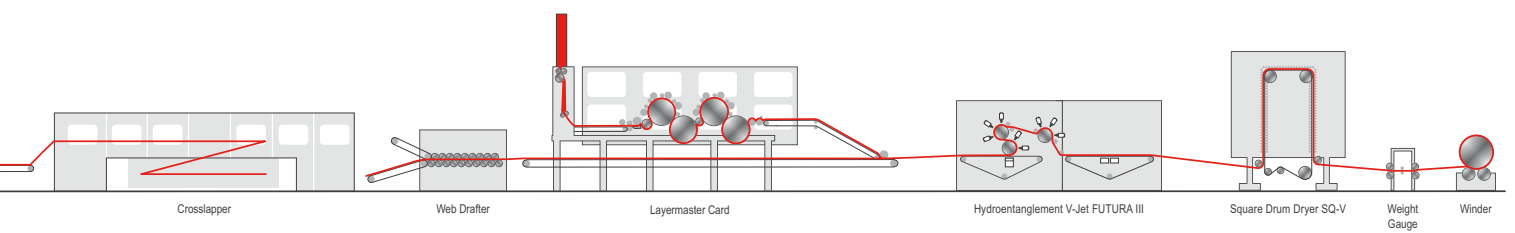


LINE 2: CROSSLAPPED SPUNLACE LINE FOR MEDIUM WEB WEIGHTS

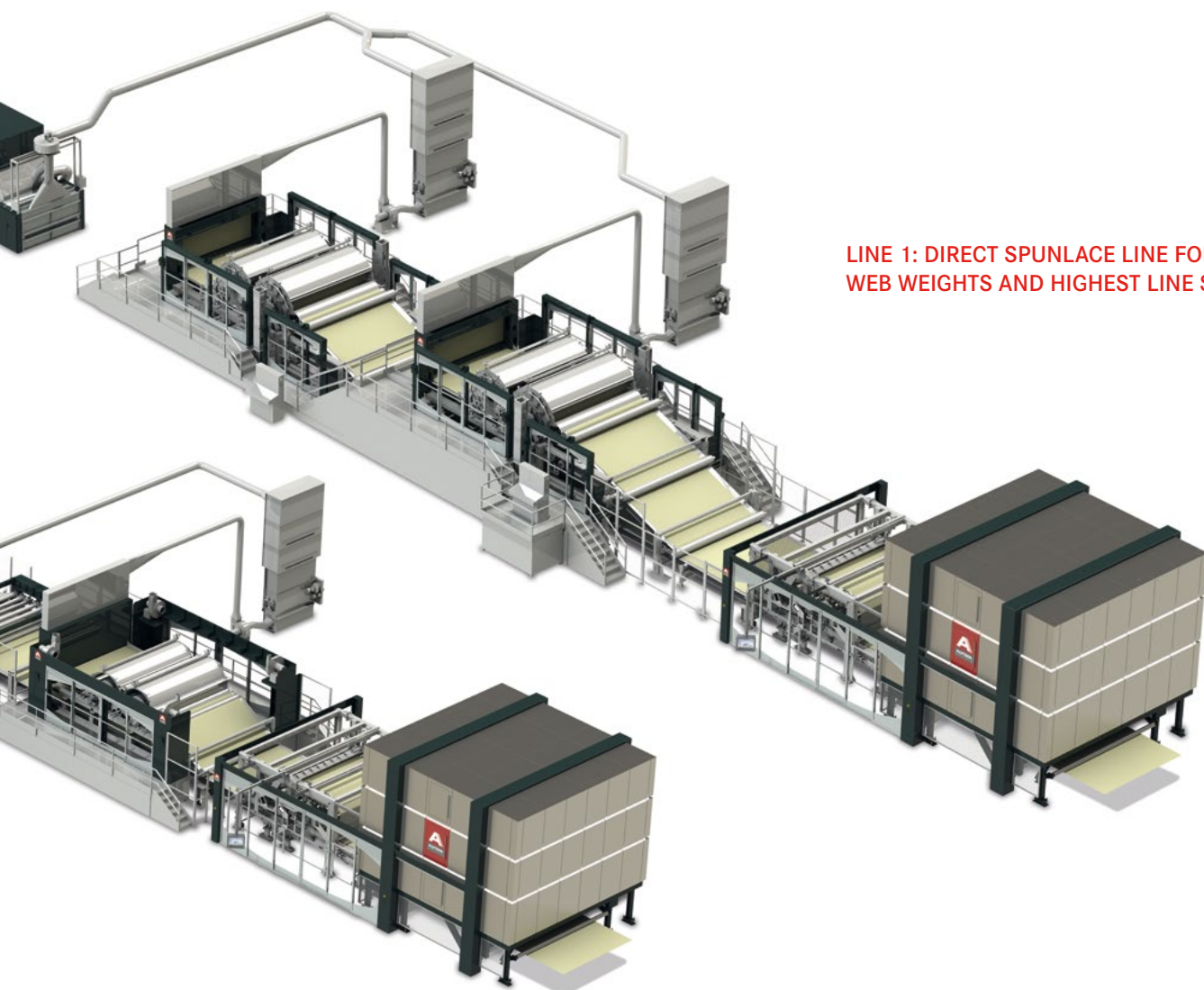




Line 1: Direct Spunlace line for low web weights and highest line speed



Line 2: Crosslapped Spunlace line for medium web weights



LINE 1: DIRECT SPUNLACE LINE FOR LOW WEB WEIGHTS AND HIGHEST LINE SPEED

Injection Card

A highly innovative aerodynamic principle, ensuring gentle fiber treatment

In the Injection Card, the traditional mechanical carding principle, using workers and strippers, has been replaced by an aerodynamic concept. While its first tambour is equipped with stripper and worker rollers, the second tambour is exclusively designed for carding and therefore provided with workers only. In this highly innovative design, the fibers are injected against the following worker roller by the stream of air produced by the rotation of the main cylinder, and taken off the worker rollers by an aerodynamic effect generated by specifically shaped devices. This avoids considerable mechanical stress on the fibers, if compared to the traditional carding systems with stripper rollers: the carding action takes place at the tangent point of two convex surfaces and it is very smooth. Moreover, the fiber path is completely on the inside of the card, thus reducing the negative effects caused by centrifugal forces. Combined with the patented EVO-2 and EVO-3 take-off systems, the Injection Card achieves very high production speeds with an excellent uniformity, even when working with fine fibers. The Injection Card has been specifically designed to provide a high throughput and the highest performances. The Injection Card, working together with the CL4006 SL Crosslapper, boosts the speed and production in existing and new spunlace lines.

ADVANTAGES

- High speed applications, especially for spunlace
- Very high production rate
- Reduced fiber recycling, so less neps
- Easy machine cleaning
- Easy access to all the parts of the machine
- Reduced time for maintenance and rewiring

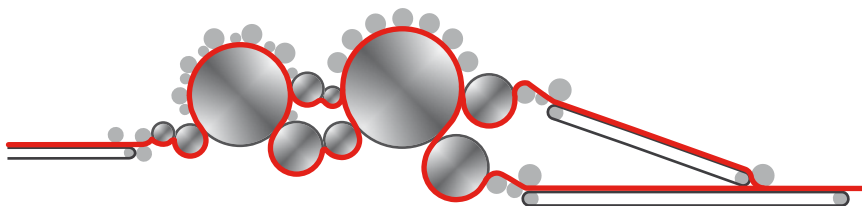
APPLICATIONS

- Direct web products
- Crosslapped products
- Fine fibers products

SPECIAL FEATURES

- Tambour Ø 1.500 (Injection) or 1.270 mm (Injection CL)
- High speed tambour
- Independent motors for all the tambours. This feature allows an independent setup of the speed of each tambour, to achieve the finest tuning of the card
- High number of carding points, ensuring a gentle action on the fibers
- New side doors and covers, with improved opening angle. These innovations guarantee an easier access to the card inner components
- Transfer rolls with larger diameters. The double intermediate transfer rolls are larger, thus providing an improved fiber transfer from the doffers to the tambour
- New drives and V belts only (no more chains). The new drives and chains replacement for workers and strippers with V belts greatly improve the card efficiency, by reducing maintenance downtimes

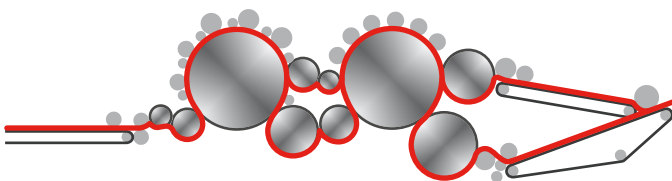
The Injection Card second tambour has a diameter of 1.500 mm, as well as 7 workers. This, since this card has been designed to work on direct, high-speed lines, thus providing a particularly elevated throughput.



Injection Card



The tambour of the Injection CL card has a smaller diameter (1.270 mm), with 6 workers. AUTEFA Solutions high speed Webforming sub-system, consisting of Injection card CL and Crosslapper CL4006 SL supports customers to keep or extend their leadership in the highly competitive Spunlace market.



Injection CL Card

Card Layermaster

Excellent quality web for the fabric top

The Layermaster Card is a very reliable machine, deriving from proven and highly appreciated technologies, producing a very good quality web to be laid on the top of the fabric. This card is based on a tambour of small diameter, together with a single doffer.

This carding machine is normally used as a second card in lines with crosslapper, providing a very good quality web to be laid on the top of the fabric. This card is equipped with just one doffer, not being designed to reach a high throughput: due to the Layermaster specific focus on high-quality, large tambours are not needed. Instead, this design ensures the fulfilment of all the correct passages inside the card, in order to provide a top-quality web.

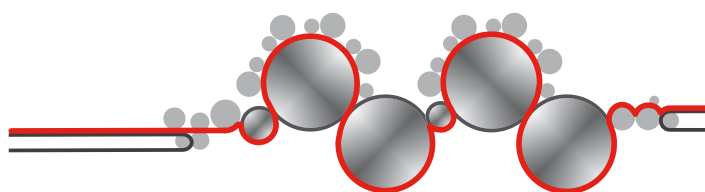
This card includes a bottom plate at the infeed group; moreover, it may work with different kinds of delivery groups. Being specifically designed to grant the highest quality, it works at a reduced production rate, if compared with the faster Injection Card. It is usually positioned as second card of the line, after a crosslapper, working at a lower speed – for instance, producing the top layer of the web.

ADVANTAGES

- Best quality of the web
- Increased production
- Maximum flexibility: the Layermaster Card can work with most kind of fibers
- Easy cleaning of the machine
- Easy access to all the parts of the machine
- Reduced time for maintenance and re-wiring
- Modular layout

APPLICATIONS

- Medium to high production volumes
- Mainly used today as second cards for top-quality web



Card

Layermaster









Crosslapper Topliner CL 4004/4006 SL

High infeed speeds and precise weight distribution

Weight accuracy in the bonded lapped web is the most important quality feature for a nonwoven installation. The crosslappers of the Topliner series are characterized by high infeed speeds and precise weight distribution. Crosslappers take up the carded web coming from the carding machine with constant speed and gently bring it to the delivery belt. The crosslappers Topliner increase both web homogeneity and throughput speed and thus eliminate any bottlenecks.

With the Topliner CL4006 SL AUTEFA Solutions offers a crosslapper with special features for the Spunlace application. Highest layering speeds and precise weight distribution are possible thanks to the integrated drafting unit, compensation belt, antistatic equipment and new designed transport aprons. These features are very important especially for light-weight applications in spunlace lines and ensures web laydown speed up to 200 m/min.

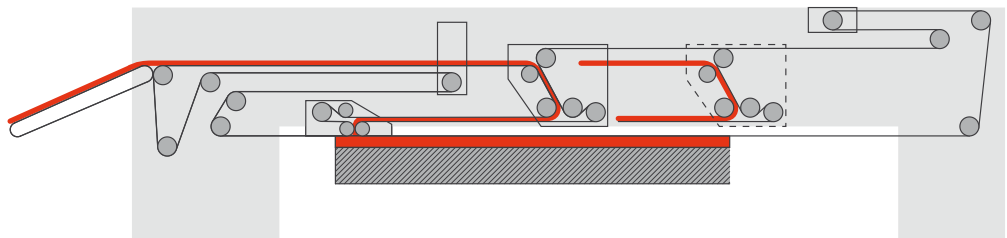
OPTIMIZED CV-VALUES THANKS TO INTEGRATED WEB STORAGE WEBPLUS

The patented integrated web storage WEBPLUS increases product regularity and enables an improved CV-value. Contrary to carriage layers, working in opposite direction, the Topliner is equipped with an integrated web storage, which stores the arriving web during reverse movement of the carriages and delivers it during their constant movement. The capacity of the storage depends on speed and is continuously adjustable at the operating panel.

The use of web storage WEBPLUS avoids material accumulations at the turning points of the crosslapper. Thus a uniform web thickness over the entire working width is achieved.

ADVANTAGES

- Lapping speeds up to 200 m/min
- Precise weight distribution
- Optimized CV- Values
- Perfect synchronization of all movements
- No false drafts thanks to speed compensation belt SC 123



Crosslapper Topliner – Integrated web storage WEBPLUS

Crosslapper Topliner SL version

Special features for high-production

DRAFTING UNIT-INFEED

The drafting unit at the infeed compresses the web and forms a counterweight profile on the delivery apron. This compensates the smile effect due to material shrinkage. Topliner crosslappers ensure weight uniformity after the bonding process. The drafting unit is part of the machines and needs no separate space.

SPEED COMPENSATION BELT SC 123

The speed compensation belt SC 123 ensures a continuous and smooth transport to the following machine without any false drafts. It compensates the discontinuous speed of the crosslapper's discharge apron and acts as an intermediate storage. This feature is of special importance when light webs (e.g. for spunlace applications) are produced.

ANTISTATIC ADJUSTMENT

The special ionization bars ensure an automatic adjustment of the polarity and level the static electrical load.

CONTROLLED MACHINE GROUNDING

The grounding brushes provide appropriate derivation of static electricity load in the machine.

Web Drafter

Web optimization and line speed increasing

The Web Drafter WD is installed after the speed compensation belt SC 123 of the Crosslapper. With up to 8 drafting trios, the Web Drafter drafts the crosslapped web in material direction (MD). This drafting work optimizes the web, resulting in better tensile strength and elongation. When processing light-weight products, the Web Drafter increases the productivity of the line.

ADVANTAGES

- Production increase of a nonwoven line
- Higher production for lower gsm fabrics
- Draft and re-orientation
- Adjustment of MD/CD ratio
- Infinitely variable adjustment of drafts
- Clamping distances variable adjustable





Hydroentanglement Machine V-Jet FUTURA

2-Model strategy – covering the main applications of Spunlace

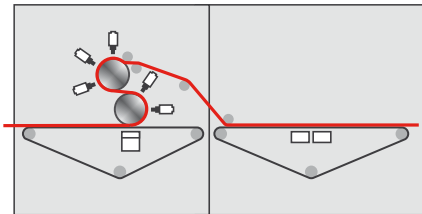
AUTEFA Solutions offers two versions of the Hydroentanglement Machine V-Jet FUTURA. The V-Jet-FUTURA II is the base model with 2 suction drums and up to 5 injectors. The Hydro-entanglement Machine V-Jet FUTURA III is the version for full flexibility with 3 suction drums and up to 8 entanglement injectors. Customers aiming for perforation and/or structuring are opting for this execution.

All peripheral equipment, such as high-pressure pumps, suction system, drum shells etc. is provided by first class European OEM's.

ADVANTAGES

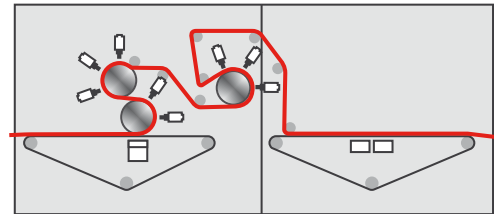
- Broad market coverage with water pressure of up to 300 bar and 300 m/min delivery speed
- Uniform humidification of unbonded web with integrated pre-wetting injector
- Highest entanglement efficiency with up to 8 injectors
- Up to 3 suction drums for entanglement, perforation and/or structuring
- Fast and easy exchange of belts and drum-shells thanks to the cantilevered design
- Efficient dewatering on exit belt
- User friendly external police filter system
- Safety hatches for exchange of V-Jet-strips during normal machine operation

V-JET-FUTURA II



- Working widths (m): up to 3.6m
- Number of drums: 2
- Number of entanglement injectors: up to 5
- Pre-wetting: Under first drum (1 injector)
- Dewatering: Double suction under outlet belt
- Raw material range: All standard applications / fibers for SL

V-JET-FUTURA III



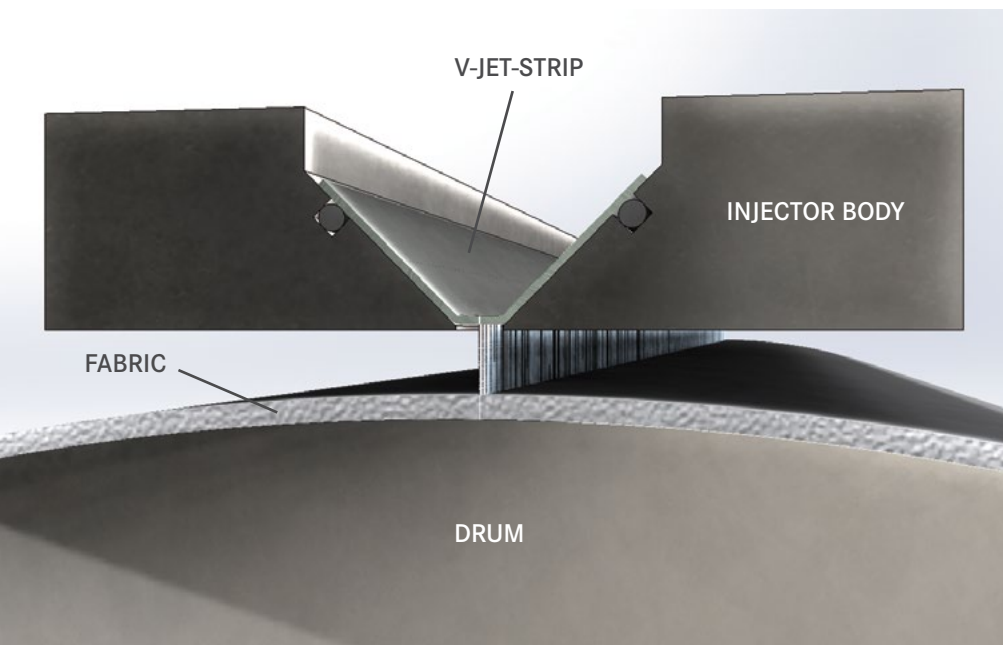
- Working widths (m): up to 3.6m
- Number of drums: 3
- Number of entanglement injectors: up to 8
- Pre-wetting: Under first drum (1 injector)
- Dewatering: Double suction under outlet belt
- Raw material range: All standard applications / fibers for SL
- Perforation / Structuring: Yes (on drum 3)

Unique V-Jet Injector design

Unique and patented technology

AUTEFA Solutions developed and patented the V-Jet Injector. Compared to standard injector systems the V-Jet Injector decreases the distance between nozzle and injector bottom from 15 mm-25 mm now to 0.5 mm. Thus energy losses by friction with air, air turbulences and jet expansion can be reduced to a minimum.

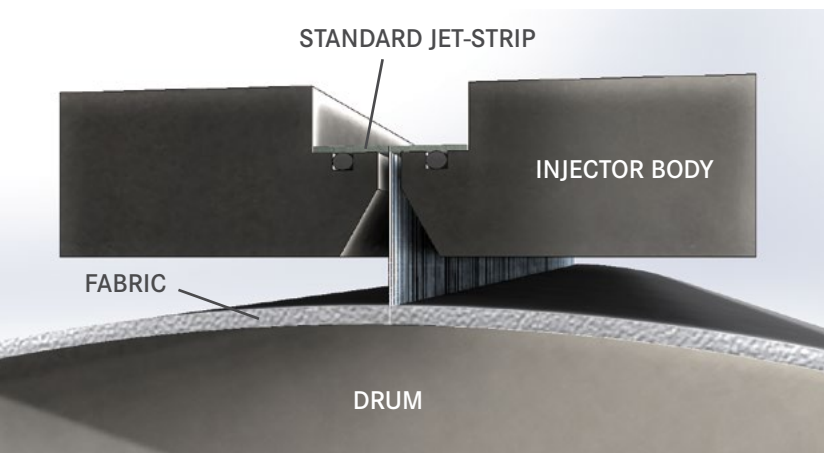
The V- Jet Injector leads to significantly higher tensile strength at same entangling water pressure than the standard injector. This means that the same tensile strength can be reached with lower water pressure. The possible reduction of water pressure can reach up to 20%. This depends inf the level of needed water pressure (as higher the pressure as higher the saving potential) and process (plain, perforated, structured). Also the water consumption is reduced when using the same nozzle diameter and pitch. This leads to an additional saving potential using the V-Jet technology.



ADVANTAGES

- Up to 30 % lower energy consumption
- Minimum distance from nozzle to fabric
- Sturdy V-Jet-Strip design for longer lifetime
- Retrofit of existing Spunlace machines with V- Jet Injector

AUTEFA Solutions V-Jet Injector



Standard-Injector

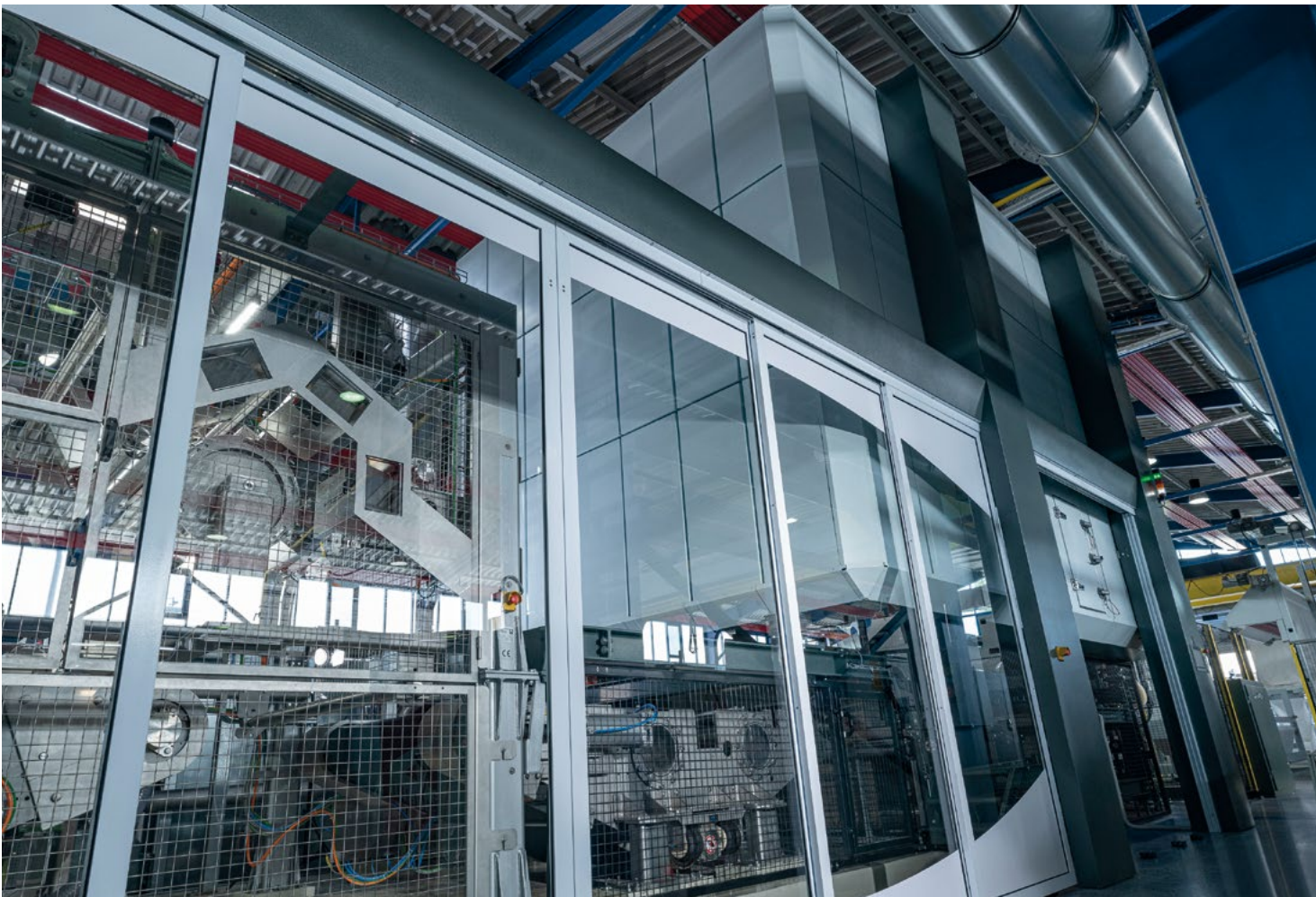
Square Drum Dryer SQ-V

Energy saving thanks to efficient hot air circulation

The nozzle system in the Square Drum Dryer SQ-V distributes the airflow in terms of speed and temperature uniform throughout the whole working width, providing best spunlace web and surface quality results. The suction nozzle design ensures a 100% surface vacuum behind the conveyor belt, while the blowing nozzle design ensures impingement air jet for high heat transfer and high evaporation performance. For a capacity of 2.5 tons water evaporation per hour, the Square Drum Dryer SQ-V is using 4 chambers where the temperature, airflow and humidity profile is individually adjustable and controlled. A constant measurement of the exhaust humidity controls the maximum circulation air humidity. The reproducible drying performance guarantees a production with constant quality and residual product moisture.

ADVANTAGES

- Considerable lower thermal energy consumption with EnRec Systems
- Excellent quality with unique nozzle design
- Higher drying length
- 1 to 4 active drying levels
- Up to 450 m/min delivery speed



Square Drum Dryer SQ-V

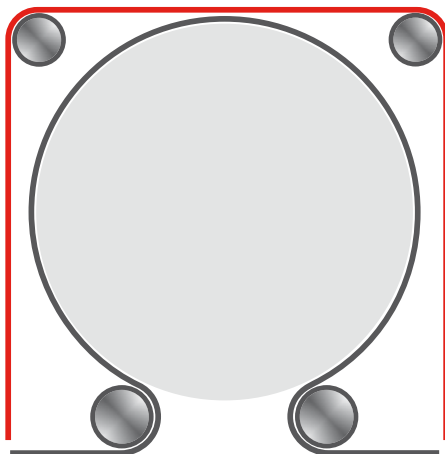
Increased drying length with small footprint

AUTEFA Solutions Square Drum Dryer SQ-V combines the advantage of a horizontal belt dryer, the better drying efficiency with the space advantage of a drum dryer.

Today using a drum dryer is common for drying spunlace nonwovens. A drum dryer has only one drying zone, in consequence the same drying conditions are used for the wet and nearly dry product. Thus drying cannot be done at the thermo-dynamic optimum. A belt dryer can be divided into different heating zones and operate each heating zone with optimal drying conditions. The disadvantage of the belt dryer is the larger footprint, which typically prevents the use of a belt dryer in spunlace applications.

To integrate the best of both worlds in one system AUTEFA Solutions spunlace lines are equipped with the Square Drum Dryer SQ-V which stands for increased drying length on a small footprint.

EXCELLENT DRYING CAPACITY ON SMALL FOOTPRINT



— Autefa Solutions Square Drum Dryer SQ-V
with two active levels
— common drum dryer

**25% MORE DRYING LENGTH
WITH AUTEFA SOLUTIONS
SQUARE DRUM DRYER SQ-V**

- Working width: up to 6.0 m
- Machine length: 7.0 m
- Variants: 1 to 4 active levels (+1 transfer level)
- Speed: up to 450 m/min
- Excellent drying capacity on small footprint as base to upgrade existing lines







AUTEFA Solutions Germany GmbH
Paul-Lenz-Str. 1 · 86316 Friedberg · Germany
T: +49 821 2608 0 · F: +49 821 2608 299
www.autefa.com · germany@autefa.com