

"Hydroentanglement is commonly called 'spunlacing'. This process grew significantly over the past years, accounting for about 16 percent of the total nonwovens production.

Explanations of this impressive growth are the products' advantages such as softness, cloth-like feel, modest strength and good absorbency."

**EDANA (European Disposables And Nonwovens Association)** 

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## AUGMENTED REALITY CONTENT

To show videos, illustrations and picture galleries in a more direct and lively way, we have added augmented reality to several contents! Download our **ANDRITZ AR APP** from our website or from the AppStore/PlayStore!

SCAN THE MARKED PAGES AND EXPERIENCE THE ENHANCED CONTENT.







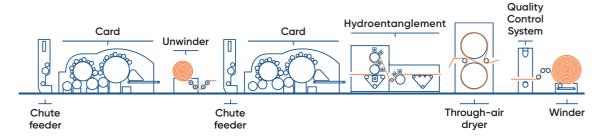
## neXline eXcelle spunlace line

**Trust a global partner:** Today, ANDRITZ is an active player in most of the world's spunlace production. In order to meet the market demands, ANDRITZ offers you a wide range of complete spunlace lines combining performance, efficiency and profitability.

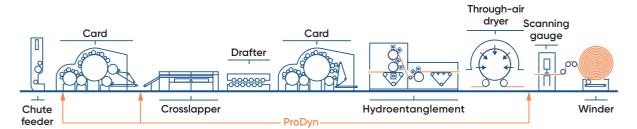
The neXline spunlace eXcelle is the premium line layout, combining very high capacity of up to 25,000 t/a with low energy consumption and able to produce all types of spunlace roll goods.

Line types	Fabrics	Line speed	Working width	Capacity	End uses
Direct	18-120 gsm	up to 400 m/min	up to 4.8 m	25,000 t/a	Wipes, medical, hygiene
Crosslapping	25-400 gsm	up to 130 m/min	up to 4.8 m	9,000 t/a	Face masks, automotive, artificial leather, filtration,

The direct line configurations are mainly designed for lightweight spunlace fabrics using sub-denier fibers, and for cellulosic fibers.



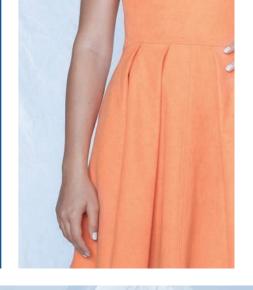
For durable end-uses, crosslapping line configurations are preferred using a wide range of technical fibers such as: PTFE, PA6, PA66, PE, glass fibers, PPS, Kevlar, and so on.





#### **UNIQUE CHARACTERISTICS**

Spunlace fabrics are made from all types of raw materials – natural or synthetic. Softness, drape, comfort, conformability, high strength, and the fact that they contain no chemicals are the major characteristics that make spunlace nonwovens unique.









#### **VARIOUS APPLICATIONS**

Spunlace can be used for a large number of markets, such as:

- Baby, cosmetics, household wipes
- Technical and hard surfaces wipes
- Face masks
- Diaper ears, top sheet and back sheet
- Cotton pads
- Medical and surgical
- Coating substrates
- Automotive
- Filtration
- Wallpaper ...

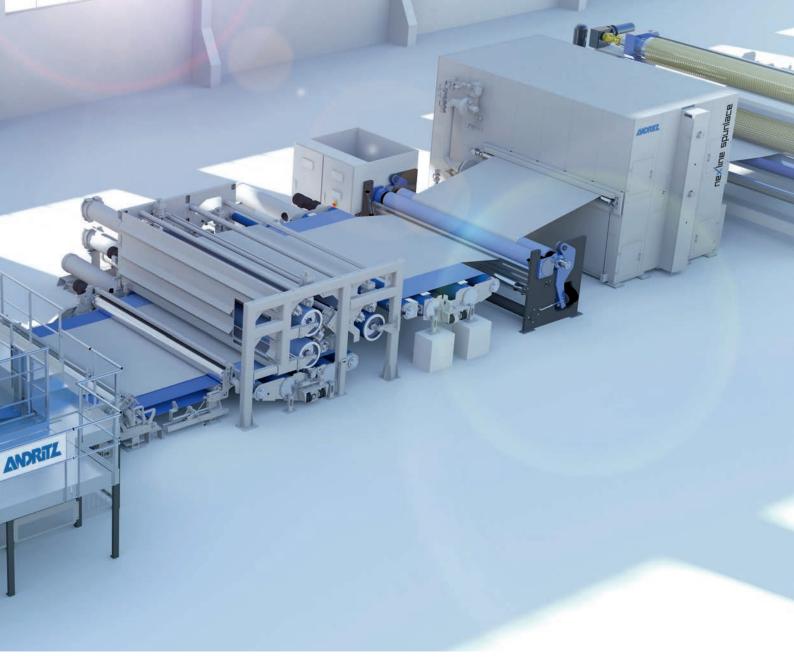








All components in harmony: As the market becomes more and more competitive, producers need to be focused on their core business, which is efficient production, marketing, and sale of nonwoven roll goods. ANDRITZ offers fully engineered solutions to help producers choose the right equipment to save time and money.



#### **SINGLE-SOURCE SOLUTION**

The heart of the ANDRITZ expertise lies in arranging and configuring the main process components in a production line so that they work in harmony to deliver the exact end product desired. ANDRITZ system supply services ensure that nonwovens manufacturers have a cost-efficient, flexible, and reliable spunlace line covering the full spectrum, from fiber opening / blending to finished rolls. Spunlace fabrics combine web characteristics (machine direction/cross-direction ratio, bonding index, and thickness), line performance (productivity, energy consumption, water treatment), and web uniformity.

#### **FULL PROJECT MANAGEMENT**

Important added-value from ANDRITZ is full project management, from planning control to reduce the delivery time to start-up of the line and securing a prompt return on investment. Savings on raw materials and utilities will be reflected in your operating margin. ANDRITZ expertise in this field has a direct impact on your fibers and on power and water consumption in each stage of your process.



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## Develop your products with our experts

**Continuous research and development targeting your needs:** In an ever more demanding market, get the most out of your investment with the support of our test equipment and highly skilled engineers. You can benefit from more than three decades of experience and expertise.

The state-of-the-art installations at our technical center in Montbonnot and our process and product engineers work with you to develop and ensure reliable technologies and process optimization. Evaluating new processes and defining parameters for product guarantees are yet another main focus.

#### RESEARCH AND DEVELOPMENT

Being dedicated to high quality and innovative production technologies propels us to seek ideal solutions. Let our combined forces achieve maximum results.

Highly skilled staff provide unique know-how drawn from our installed base and continuous R&D.

#### **EXPERIENCE NEW PRODUCTS**

We offer you the opportunity to test your new developments on our state-of-the-art spunlace line. It is the perfect opportunity to experience new products that will enable you to access different markets.

#### **SPUNLACE LINE**

Our spunlace pilot line includes state-of-the-art equipment to produce a wide range of spunlace fabrics. During the trials, the pilot line is able to operate at up to 500 m/min. Tests can be conducted in-line with the TT card or off-line with an unwinder.



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### VERSATILE WATER FILTRATION UNIT

The ANDRITZ technical center is equipped with a complete water filtration system so that trials can be conducted with all types of fibers. You can test natural or synthetic fibers, short or long fibers, paper fibers, and so on.

- Process expert support
- Equipment containing the latest technology
- Integrated laboratory to test nonwoven fabrics
- Simulation tool





ANDRITZ Technical Center in Montbonnot, France

## **Dedicated service**

#### We know how important uptime is for your production efficiency:

That's why we do everything to keep interruptions to a minimum. With remote maintenance and a highly responsive service team, we can react to your concerns in the shortest time possible.

#### **SPARE PARTS**

To ensure the longevity and the performance of your equipment, we recommend using only original spare parts from ANDRITZ.

A sales team for spare parts is at your disposal at ANDRITZ to help you make your choice.

#### **UPGRADES AND RETROFITS**

ANDRITZ specialists are available to inspect your production lines and propose improvements to extend the product life of your equipment and enhance productivity.

### SKILLED TECHNICIANS AT YOUR DISPOSAL

With the goal of providing the most efficient and reactive service as possible, ANDRITZ assigns a dedicated team of skilled technicians, as well as automation and textile engineers.

#### **ONLINE SUPPORT**

ANDRITZ wants to support you at all times. You always have a competent partner to explain any problems related to textile, mechanical, or electrical/electronic issues.



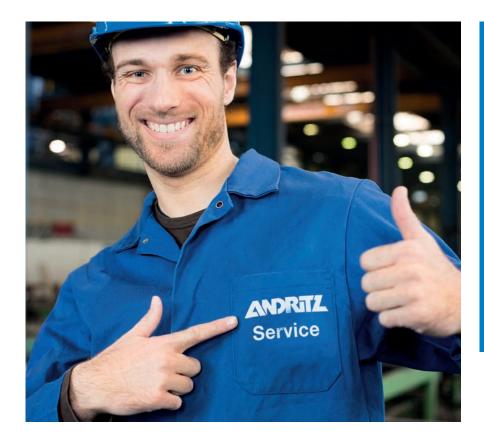
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- Service centers around the globe
- Technical and electrical diagnosis by experts
- Complete stock of original parts
- Assistance with installation, operation, maintenance, and training
- Improve your production operations
- Enhance the performance of your equipment

## Foresee digitally with Metris

Industrial Internet of Things (IoT) Industry 4.0, digitalization – current buzzwords that industries use when seeking to improve their performance and equip themselves for the future of industry.



#### ANDRITZ DIGITAL SOLUTIONS

As a technology leader with extensive and long-term experience in supplying industrial measurement, control, and optimization solutions for various industries, ANDRITZ is combining process and equipment expertise with the latest enhancements in the digital era. The result of this powerful combination is Metris: a portfolio of ANDRITZ Digital Solutions.

#### METRIS OPP

One of the flagship capabilities of the Metris assortment is its ability to optimize industrial processes with Metris OPP. It has been developed over the past decade within the pulp and paper sector and has recently been introduced to the nonwovens industry. It combines powerful analytical and data mining software with the knowledge of the world's top process experts to deliver a smart service initiative for customers.



## A CONSTANTLY GROWING PORTFOLIO

The depth and effectiveness of the Metris portfolio continues to improve thanks to ongoing R&D, collaboration with key customers and institutions, and venture activities. Portfolio options all rely on the three strategic focus areas of the Metris brand: Industrial IoT



technologies, Smart Service concepts, and Venture activities. The main technological advancements integrated into individual Metris products are derived from big data analytics, smart sensor technologies, and augmented reality solutions. The Metris UX platform providing full support throughout the entire lifecycle of a



plant is the most recent of our IoT developments. With Metris solutions, customers foresee digitally due to the continuously improved portfolio and its performance – and to ANDRITZ providing tailored and fully integrated digital solutions from a single source.



### Cards

**Fitting in with market needs:** ANDRITZ offers comprehensive solutions for every kind of drylaid web forming process. Several ranges of cards are available, depending on the line configuration, for a direct or crosslapping layout. The axcess and excelle cards cover all possible market requirements in terms of capacity or web properties.

#### eXcelle CARDS

eXcelle cards are designed for high production levels. They are available in working widths of up to 5.1m and for different delivery configurations. This card provides the best solutions to meet producers' requirements in terms of throughput and web characteristics.

The eXcelle cards can be fitted with one, two, or three VarioWeb doffers. These cards are also equipped with reliable take-off devices so the delivery speeds can be adapted to any crosslapper infeed capabilities while maintaining the card web structure.

#### **eXcelle TT CARDS**

A revolutionary design within the ANDRITZ eXcelle range is the TT card with a dedicated carding roll configuration. It provides very good web uniformity and improves MD/CD ratio homogeneity at high speed. This card is designed to meet the expectations of wipes producers and can produce nonwovens at top speeds of up to 400 m/min. The state-of-the-art design, with quick and easy accessibility for maintenance and service, is very user-friendly.

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- A full range of solutions
- Perfect web uniformity
- Available for high-speed lines up to 400 m/min
- Available for ultralight web
- Processability with the widest range of fibers
- User-friendly
- Quick and easy accessibility



eXcelle TT card for high-speed spunlace lines

#### **eXcelle RANGE FOR FLEXIBILITY IN WEB FORMING**

The eXcelle cards cover all your requirements in terms of capacity or web properties and are available with carding power alternatives.

Single or double card set-up and different web structure solutions: parallel, condensed, or randomized. In combination with the number of doffers, the card enables you to obtain a wide range of web weights.

#### **Alternatives for** card feeding sections

#### "R" feed plate 1 - AVT breast roller 2 - RTB roller 3 - Feed roller 4 - Feed plate

#### "S" feed plate

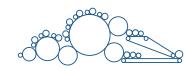
- 1 AVT breast roller
- 2 COM transfer roller
- 3 Licker-in roller
- 4 Feed roller



#### **Alternatives for** carding power



#### R 35 PPLL



#### S 35 PPCCAA



#### S 5 PP 5 VarioWeb 3



#### S 5 PP 6 TT



#### Alternatives for card web structure



Condenser (type L)



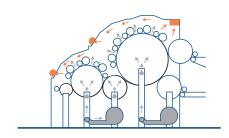
#### Condenser (type C/A)



VarioWeb delivery



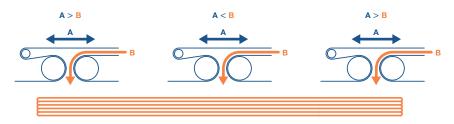
#### Air management system



## **Profile crosslappers**

**Experience and innovation:** ANDRITZ crosslapping technology is based on 60 years of experience and continuous innovations. The crosslappers can be provided for cards with up to 3.75 m working width and for delivery aprons up to 15 m wide. All transfer carriages and aprons have individual motors in order to control the batt weight distribution.

Thanks to its short textile path, profiling capabilities, and infeed speed, the Profile crosslappers range perfectly matches the new production lines requiring higher productivity and web weight profiling improvements.



Profiling batt shaping - speed principle

#### **NONWOVEN EVENNESS**

ANDRITZ has designed two different solutions to contribute a remarkable reduction in production costs thanks to the improved fabric weight evenness. The ProWid and ProDyn are designed to work with a scanning gauge for fully automatic, closed-loop control.

#### **YOUR BENEFITS**

- State-of-the-art system for weight evenness
- Fabric weight evenness (low CV%)
- Fiber savings
- · High production speed
- Low cleaning requirement
- ProDyn works without stretching and without drafting the card web(s), thus providing greater fabric dimensional stability

#### **ProWid**

The ProWid system is a tool that regulates the card web weight before it enters the crosslapper in order to lay a web with lighter edges. The CV percentage is generally improved by a factor of two, in particular when the CV percentage is in excess of 3% without the ProWid system.

ProWid can be delivered with an individual ANDRITZ crosslapper to enhance performance in existing carding lines or with new spunlace axcess lines.

#### ProDyn

The ProDyn system combines actions from the card doffers and dynamic speed variation at the crosslapper. It allows you to generate a web with lighter edges (no "smiling effect").

To minimize cloudiness and variations in fabric behavior, the web is formed with card web layers with the same consistency and low fiber tension.

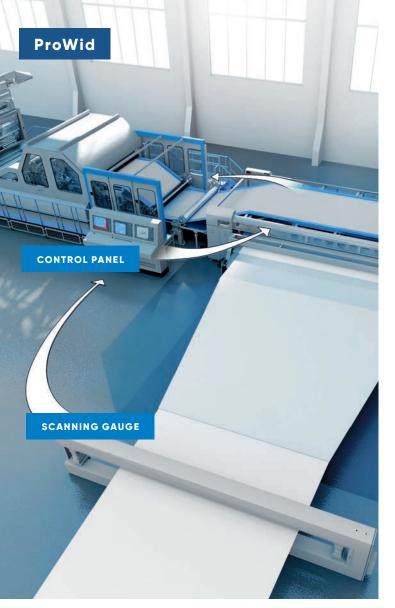


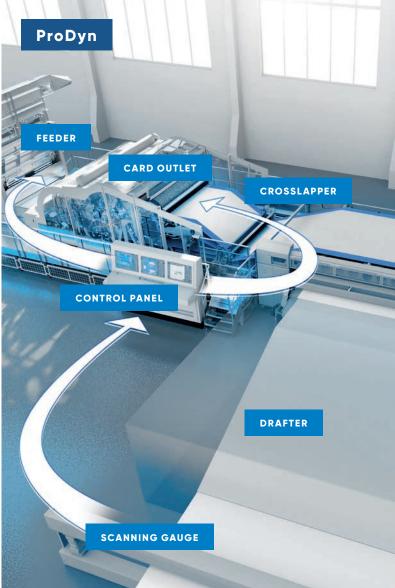
Web profile with standard web forming

Web profile with ProDyn system

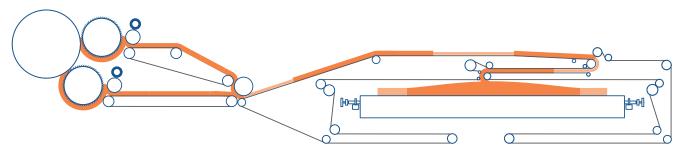


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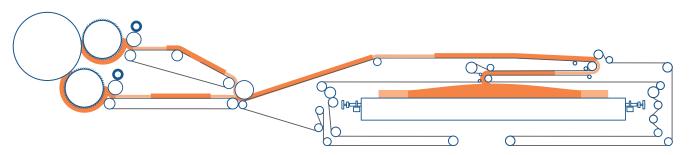




ProWid system ProDyn system



Impact of the ProWid system on fiber distribution

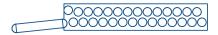


Impact of the ProDyn system on fiber distribution

## **Drafters**

**Perfect control of the fiber mat:** ANDRITZ drafters ensure you perfect control of the product throughout the process to increase the line speed and to better balance the MD/CD tensile strength ratio.

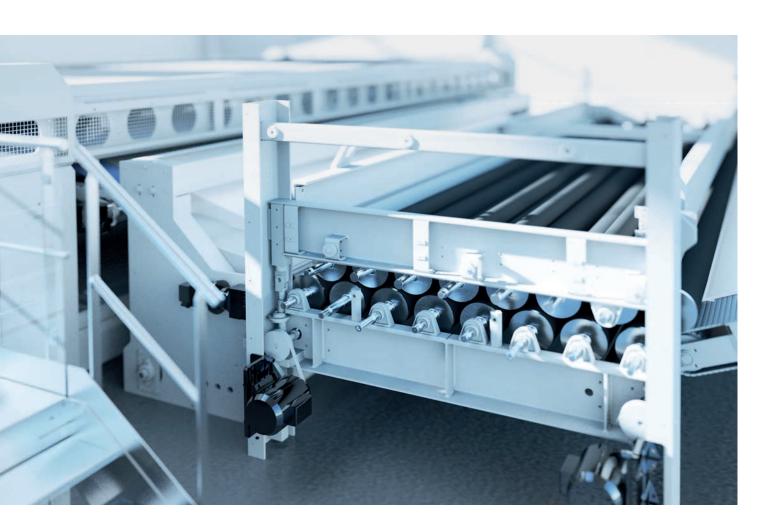
ANDRITZ provides you with batt drafters located after the crosslapper and containing between 9 and 27 rolls.

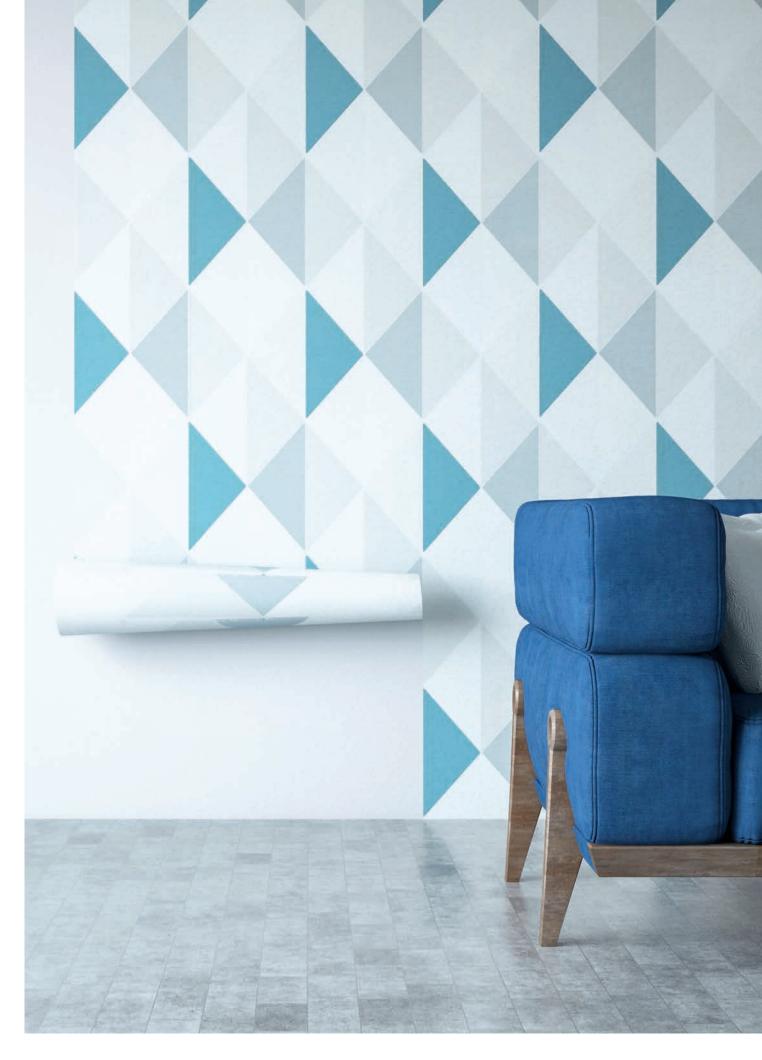


ET-27 batt drafter with pressing roller

- Optimum MD/CD tensile strength ratio
- Higher production capacity for light webs
- Enhanced tensile strength
- Improved dimensional stability in the web
- Minimum web shrinkage
- Low cleaning requirement







## Jetlace portfolio

**State-of-the-art hydroentanglement units:** As a result of its unique experience in the spunlace industry, ANDRITZ offers the widest range of Jetlace hydroentanglement units to cover the needs of all nonwovens producers around the world.

#### **JetlaceEssentiel**

ANDRITZ JetlaceEssentiel is perfectly designed to produce lightweight and ultra-lightweight fabrics from 20 to 120 gsm at very high speeds of up to 400 m/min. JetlaceEssentiel is ideal for the production of most synthetic/natural lightweight fabrics for hygiene, medical, face masks, and wipes applications. Scaled to meet various line capacity requirements, machines are available in 3.75, 4.00, 4.25, 4.5, and 4.75 m widths.

#### **JetlaceEvolution**

To produce durable nonwovens, such as coating substrates and automotive or filtration fabrics, spunlace lines are equipped with crosslappers and ANDRITZ JetlaceEvolution to create nonwovens with a balanced MD/CD ratio. JetlaceEvolution is available in widths up to 4.5 m and is able to produce spunlace fabrics from 30 to 400 gsm.

#### **JetlaceCottonPad**

ANDRITZ JetlaceCotton Pad is the hydroentanglement system for production of cotton pads and cotton wipes. It retains bulk and delivers perfect surface evenness. And it is compact in size, with widths up to 3.6 m and a product range from 30 to 270 gsm. In order to customize cotton pad and cotton wipe fabrics with creative patterns, spunlace producers can add the optional patterning or aperture system known as Perfojet Unit.

#### Jetlace3000

The ANDRITZ Jetlace3000 can be fully customized and meet virtually all production requirements in terms of capacity, line speed, fabric weight, and machine width. Jetlace3000 is perfectly designed to manufacture nonwoven fabrics for filtration, industrial wipes, agricultural, and surgical applications. It can operate at up to 1,000 m/min and is available in widths of up to 7.0 m.

#### YOUR BENEFITS

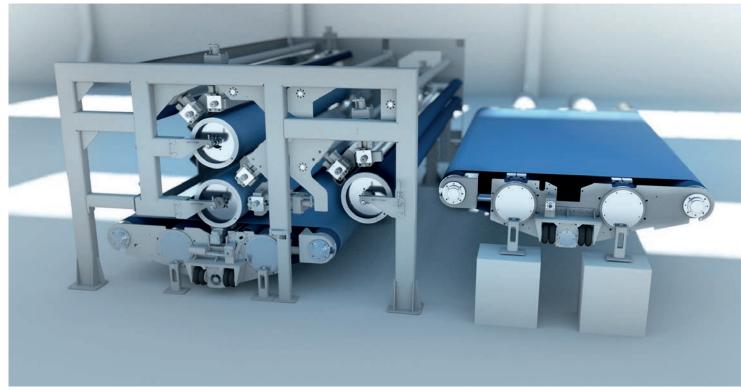
- · Customized design
- Compact configuration
- Energy efficiency-oriented
- High capacity over the whole gsm range
- Experience at up to 1,000 m/min
- Embedded Metris functions

#### **JetlaceAvantage**

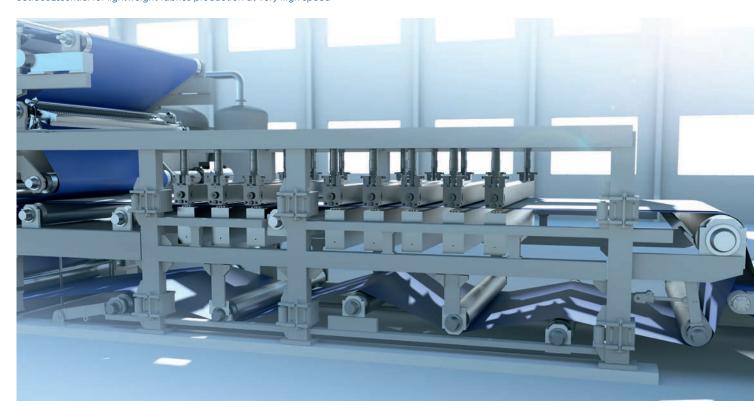
ANDRITZ JetlaceAvantage is recognized as the new standard for growing markets and is perfectly optimized to produce spunlace fabrics from 30 to 120 gsm for wipes and medical uses. JetlaceAvantage is available in 2.5 and 3.6 m widths. Designed with two or three cylinders, this standard machine can produce state-of-the-art spunlace fabrics at up to 200 m/min.

Hydroentanglement units	Fabric grammage	Line speed (at winder)	End uses
JetlaceEssentiel	20 - 120 gsm	up to 400 m/min	Wipes, medical, hygiene,
JetlaceEvolution	30 - 400 gsm	up to 200 m/min	Automotive, artifical leather, filtration, wallpaper,
JetlaceCottonPad	20 – 270 gsm	up to 200 m/min	Cotton pads, cotton wipes, hygiene, face masks,
Jetlace3000	30 - 800 gsm	up to 1,000 m/min	Industrial, surgical, agriculture, insulation, filtration, clothing,
JetlaceAvantage	30 – 120 gsm	up to 200 m/min	Wipes, medical, hygiene, face masks, wallpaper,





JetlaceEssentiel for lightweight fabrics production at very high speed



Jetlace3000 configuration for Wetlace lines

## Spunjet bonding

A bonding solution for endless filaments: The patented nonwovens process called Spunjet is the in-line hydroentanglement of continuous filaments, creating a new generation of spunlaid nonwovens. Spunjet offers you the best properties ever achieved in 80 % of existing and in new nonwovens applications.

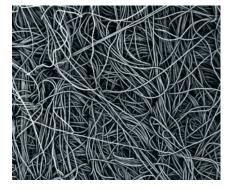
This new process has been developed to better address applications such as geotextiles, roofing, packaging, synthetic leather, and many others.

Spunjet configurations can open up exciting new business opportunities for you in terms of innovative products. It can also add value to your existing products.

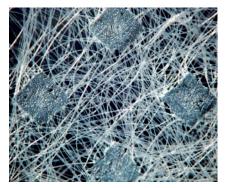
By combining two first-class bonding technologies, you can benefit from the typical strength of spunlaid as well as the softness of spunlace. The Spunjet process offers you additional softness, bulk, drape, and tensile strength while maintaining the isotropic MD/CD ratios in your fabric properties.

Spunjet lines can operate at speeds of up to 1,000 m/min.
The high-quality water needles generated by the Spunjet injectors ensure high-grade bonding of your continuous filament webs.

- Added product value
- Softness and bulk
- More flexibility
- New business opportunities
- Suitable for 80 % of nonwoven applications



Microscopic view of SpunjetBond web (×20



Microscopic view of spunbond web (×20)



ANDRITZ spunjet equipment

## neXjet injectors

**Heart of the spunlace process:** Injectors are considered a critical point in the spunlace process. Based on our know-how in fluid mechanics and robust manufacturing, we install state-of-the-art neXjet injectors in hydroentanglement units. ANDRITZ technology always provides optimum quality at very low energy consumption.

Top-quality needling water is ensured by the advanced design whereby the water is distributed through a patented, continuous slot inside the neXjet injector. Process engineers use the latest computer-based fluid mechanics modeling tools to optimize the neXjet injector efficiency. In addition, the process water undergoes final filtration by the EXH cartridge inside the neXjet injector body just before the water enters the needle strip. Finally, the ANDRITZ injector can be equipped with an auto-cleaning system and designed to avoid the pulp buildup occurring in Wetlace™ and Airlace™.

#### **EASY MAINTENANCE**

ANDRITZ has developed a mechanical seal that not only prevents leaks, but is extremely easy to clean or replace. The conventional sealing method required a maintenance worker and specific tools. The ANDRITZ sealing system does not require any tools! A maintenance worker can easily remove and replace the seal. No special skills or extra training are required for regular maintenance jobs.



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- Perfectly homogeneous distribution of water
- Lower operating costs
- Final filtration of process water just before the strip (filter inside the injector)
- Quick access to the strip and the filtration cartridge in less than 1 min
- Drip-tray, additional vacuum system, to avoid water marks
- Designed for pulp raw materials



Top-quality needling water

## **Patterning solutions**

Customize your spunlace fabrics: The market trend demands product diversification. ANDRITZ has developed a series of patterning and aperture sleeves or thermo-embossing calenders to create unique designs, surface haptics and functions on spunlace, Airlace, and Wetlace fabrics.

#### **NEXIMAGING SLEEVE**

The latest patterning sleeves use neXimaging technology, which allows full customization of spunlace fabrics with reproduction of virtually any logo or pattern in high-quality detail. Logo and pattern definition are enhanced, while optimum production speeds are maintained. Logos can be designed to customer requirements, and neXimaging also allows perfect creation of apertures on the web.

#### **PERFOJET UNIT**

ANDRITZ has developed an innovative process to apply special and unique artwork to flushable wipes - the Perfojet Unit. This enables wipes producers to distinguish their product by showing the correct disposal method in combination with consumer-friendly branding.

- Innovative solutions for patterning and aperture
- · Unlimited number of possible patterns
- Any 3D shape and texture



Perfojet Unit for cellulosic fibers







Examples of possible patterning and apertures

## Efficient water processing

**High-quality sub-systems:** Another critical point in the spunlace process is treatment of the water. Due to the large amount of water required, it is essential to recycle and recirculate it.

A high-quality filtration system is necessary. ANDRITZ has developed the sub-systems to treat and filter suspended solids and spin-finish water. One priority is to optimize the filtration process for synthetic and/or natural fibers.

#### The main features are:

- Suitable for any type of fibers
- Filtration capacity: more than 400 m<sup>3</sup>/h
- Recycling ratio: up to 99.5%
- Turbidity: < 2 NTU
- Full monitoring system
- Turnkey in-house solutions

The filtration process is optimized by removing all the particles, from the largest down to the finest, when the process water passes through the main filtration systems:

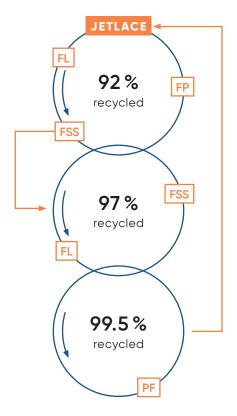
- Flotation cell (FL)
- Sand filters (FSS)
- Bag filters (FP)
- Press filter (PF)
- UV lamps (UV)
- etc.



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- Highest fabric quality
- Full process guarantee
- Reduced water consumption
- Minimal wastewater discharge
- Low chemicals consumption
- Increased line efficiency
- Reduced maintenance downtime



Optimization of the water filtration system



High-efficiency water treatment

## Innovative drying solutions

**High-efficiency combination:** ANDRITZ supplies its own through-air dryer technology to meet the highest performance levels for non-wovens lines. The dryers excel by achieving high nonwovens product quality while saving energy.

#### neXecodry SYSTEM

The neXecodry drying technology, a combination of dewatering and drying technology, was designed by ANDRITZ to make significant reductions in the energy consumption of existing spunlace, Wetlace and Airlace production lines.

Nonwovens producers achieve better quality fabrics with higher bulk and no pattern degradation.

#### neXdry

neXdry is a through-air dryer designed and manufactured by ANDRITZ and available for spunlace, Wetlace, Airlace, spunbond, and Spunjet processes at very high production speeds. It features high evaporation capacity and low power consumption.

#### neXdry Avantage

neXdry Avantage drying technology is designed by ANDRITZ in Europe and made in the ANDRITZ facilities in China. This efficient dryer is the perfect solution to meet the demands of spunlace producers using aXcess lines for a capacity range up to 12,000 t/a.

- Up to 35% energy savings
- Premium-quality nonwovens
- Easy to use
- Roll-in/roll-out design
- Extremely durable
- Compact design
- · Low operating cost
- Perfectly designed for your line upgrade







neXdry designed for drying of high-capacity cellulosic fibers drying

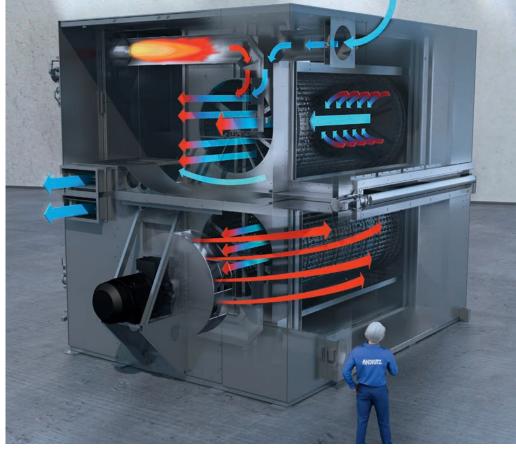


#### **U-Drum**

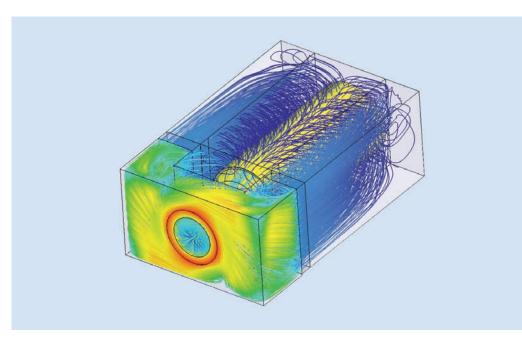
The U-Drum design has an extraordinarily large open area (96%) that permits high air flow at a low pressure drop for extremely efficient drying. The U-Drum (patent pending) is made of 100% stainless steel. Its structural rigidity and integrity are such that it can be offered on lines with working widths up to six meters and at speeds of up to 1,200 m/min. The U-Drum design is ANDRITZ Nonwoven's cornerstone development in a new generation of dryers with high evaporation capacity and low power consumption for electrical ventilation.

#### **QUALITY MAINTAINED**

Nonwoven producers are facing challenges over and above energy and quality issues. The neXecodry dewatering and drying technology solution contributes to a plant's ability to reduce its carbon footprint by reducing energy consumption and supports the producers in meeting its sustainability goals. The ANDRITZ neXecodry technology does not come into contact with the web, it does not alter the product properties, it does not degrade the web pattern, even with sensitive fibers, and it will not overheat or overdry. This maintains perfect conditions for premiumquality nonwovens in terms of bulk and softness.



Full efficiency in drying thanks to the double drum



Optimized air path



#### **GET THE MOST OUT** OF YOUR INVESTMENT

At ANDRITZ Nonwoven, we know that your business depends on satisfied customers and efficient processes. That's why we support you in every aspect of your nonwoven production. Take advantage of technology that lets you produce consistent quality for decades to come. Profit from the highly efficient use of energy and raw materials that our production provides. You can rely on our responsive service teams, who will protect your investment and optimize your processes. Experience how innovative approaches and digital services give you more control than ever before. With ANDRITZ, the leading supplier for the nonwovens market, you get the most out of your investment.

#### FRANCE

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