

NONWOVENS LINES

OUR TECHNOLOGY
FOR YOUR SUCCESS





STRAHM

AUTEFA Solutions –

Experience, Know-How and Competence in Nonwoven Technology

AUTEFA Solutions is a leading solution provider for turnkey nonwovens lines and machines for carded-crosslapped needlepunching lines, spunlace lines and thermobonding lines. Besides the complete equipment, AUTEFA Solutions also offers comprehensive engineering services, including start-up and production support, as well as quality and capacity guarantees.

AUTEFA Solutions represents companies with a long tradition and many years of success in the market. By combining the experience of 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 utilising the skills and practical experience of its employees. Customers benefit from the dynamic flexibility and AUTEFA Solutions’ key technology locations in Germany, Austria, Italy and Switzerland.

// AUTEFA Solutions – Turn-Key Nonwovens Lines

OUR TECHNOLOGY FOR YOUR SUCCESS

AUTEFA Solutions is a leading solution provider for turnkey nonwoven lines and machines for carding, crosslapping, spunlace and thermobonding. In addition to complete equipment, we offer comprehensive engineering services including start-up and production support as well as quality and capacity guarantees.

Nonwoven production lines can be complex and diverse, producing an extraordinary variety of materials. The list includes artificial leather, filter media, boot liners and headliners, geotextiles, floor coverings, insulation and sound absorbing fabrics, and of course hygiene products. Raw materials include man-made fibers such as PP, PES, PA, PAN, PTF and viscose, as well as glass and carbon fibers, and natural fibers such as flax, hemp, jute, wool and cotton. The range of product parameters is enormous: from very light fabrics of only 10 g/m² to heavy fabrics of up to 9000 g/m².

The main trends in the nonwoven industry – high productivity combined with low maintenance costs and high flexibility for different nonwoven products – increase the demand for high quality machines from AUTEFA Solutions. The main feature of AUTEFA Solutions production lines is their outstanding flexibility, which enables nonwovens manufacturers to produce a wide variety of products and truly unique fabrics. AUTEFA Solutions is a full line supplier in all leading nonwovens technologies.

ADVANTAGES

- Increased productivity
- High flexibility
- Constant web quality, excellent uniformity
- Considerable raw material savings
- Easy cleaning and maintenance
- Strong partners for special line solutions

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FIBER PREPARATION

fiber opening and blending

WEB FORMING

carding

airlay

airlaid

wetlaid

crosslapping/
webdrafting

WEB BONDING

needling

chemical bonding

thermobonding

hydroentanglement
(spunlace)

WEB FINISHING

drying

impregnating/
coating

embossing/
perforating

scattering

WEB HANDLING

winding

cutting

stacking

festooning



// Applications and Products

Discover the versatility and quality of our machine products

NEEDLE PUNCHED PRODUCTS

- Geotextiles
- Roofing felts
- Automotive headliners
- Automotive velour
- Artificial leather/coating substrates
- Automotive substrates
- Carpets (structured & flat)
- Hometex
- Technical felts (filtration)
- Wipes

THERMOBONDED PRODUCTS

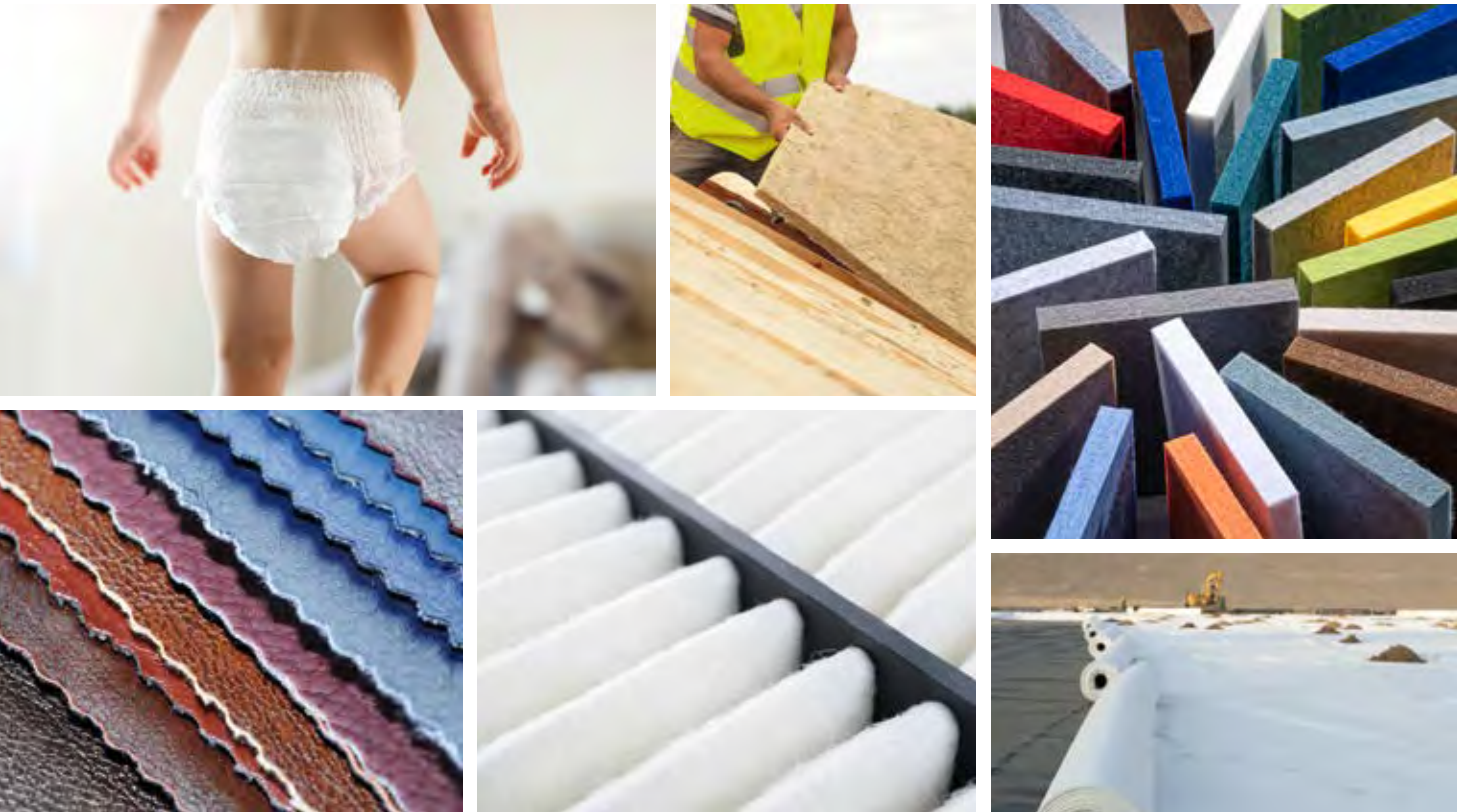
- Coverstock
- Interlinings
- Waddings
- Home furnishing
- Automotive substrates
- Insulation felts

SPUNLACED PRODUCTS

- Wipes (hygienic, medical, cleaning)
- Coating substrates
- Wide range of products like CP and WLS

FIBER APPLICATIONS

- All kinds of fibers (PP, PES, PA, PAN, PTF, CV, glass, natural fibers, shoddy etc.)
- For fibers up to 120 mm fiber length for capacities up to 2000 kg/h



// Focusing on Sustainability

Our commitment for a greener future

Sustainability is a core value at AUTEFA Solutions. We prioritize the efficient use of resources, use environment-friendly materials, and implement stringent emission control measures to actively contribute to reducing our environmental footprint. Our commitment extends to supporting the development of durable and recyclable products, with social responsibility at the forefront throughout our supply chain.

Our machines and production lines offer comprehensive solutions for sustainable manufacturing. This includes a focus on energy efficiency, careful material selection, effective lifecycle management, emission reduction strategies, and a strong emphasis on social responsibility. In addition, we continually innovate and invest in research to further enhance our sustainability initiatives.

At AUTEFA Solutions, we are committed to promoting sustainable manufacturing practices that not only minimize environmental impact, but also help build a more sustainable future for generations to come.

SUSTAINABILITY

- Energy efficiency
- Material selection
- Lifecycle management
- Emission reduction
- Social responsibility
- Innovation & research
- A little bit of AUTEFA magic

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// Nonwovens Competence Center

Where ideas transform into advanced products

AUTEFA Solutions Nonwovens Competence Center, located in Linz, Austria, stands as a beacon of innovation and product development for our valued customers. Our state-of-the-art facility offers exceptional opportunities for trials, supporting our clients in their quest to develop cutting-edge, advanced products. With four nonwovens production lines for needling, thermobonding, and hydroentanglement we provide a comprehensive platform for product development and testing.

The installed equipment within our Competence Center serves as a window into the quality, workmanship, capability, and performance of AUTEFA Solutions machinery. It's a place where ideas take shape, and the boundaries of what's possible are pushed further than ever before.

Our commitment to product development extends far beyond our equipment. Our team of specialists, driven by a passion for innovation, tirelessly works to optimize technical and technological aspects of your product based on both your specific requirements and the demands of the market.



PARTNERS IN INNOVATION – OUR SERVICE

- **Evaluation of fibers:** We meticulously assess the key components of your nonwovens to ensure they meet your standards.
- **Recommendations for machine and line configurations:** Our expertise helps you determine the most efficient setup for your production needs.
- **Performance and quality optimization:** We work closely with you to fine-tune the performance and quality of your products.
- **Production of samples for customers:** We create samples that vividly represent the capabilities of our machinery and your product.
- **Process developments for special applications:** When your product has unique requirements, we develop customized processes to meet those needs.
- **Comprehensive trial reports:** We provide in-depth reports on the trials, offering insights and data crucial for your product development process.
- **Individual training programs:** We ensure your team is equipped with the knowledge and skills needed to maximize the potential of our machinery.



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// Opening & Blending

Superior fiber treatment right from the start

AUTEFA Solutions offers complete lines, starting from bale opening up to finished products. All process steps base on approved and economic technologies which are integrated in turnkey solutions. A huge range of opening and blending equipment is available, starting from bale openers, storage of fibers, up to fine opening and card feeding, according to the different fiber properties, final product specifications and customers' requirements. AUTEFA Solutions reliable equipment focusses on an easy maintenance and high flexibility for fully automatic processes.

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// Carding

Highest speeds, proven quality and reliability

The card is the key machine in the drylaid process for manufacturing a quality web. Based on the proven F.O.R. carding technology, AUTEFA Solutions offers different carding models, each machine is designed for specific applications. A modular machine design allows various specifications based on functions. All cards distinguish themselves by flexibility, high production speeds and process efficiency.

ADVANTAGES

- Improved web evenness
- Improved web quality
- Optimized productivity
- Minimized maintenance
- High reliability

Web Master FUTURA

The Web Master FUTURA card is developed and designed for high production speeds with a special focus to improve the cost factor of maintenance. The different modules of the card, i.e. feeding group, main cylinder, transfer group and doffers, are placed each on a separate carriage. The carriages are connected to each other and form a “train” which allows easy and full access for cleaning and maintenance.

Injection Card

In the Injection Card, the traditional mechanical carding principle, using workers and strippers, has been replaced by an aerodynamic concept. 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. The Injection Card has been specifically designed to provide a high throughput and the highest performances.

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// Web profile controlling

WebMax control technology

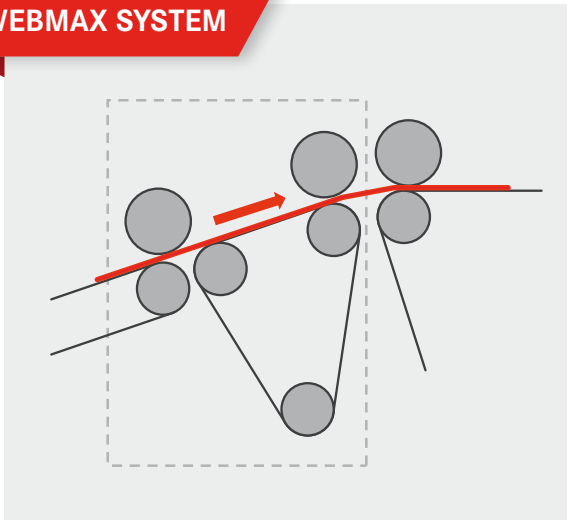
AUTEFA Solutions WebMax produces a counter weight profile to avoid the smile effect. This is the key to product quality. WebMax ensures that the carded web weight is already being altered at the crosslapper infeed. Via the layering carriage control, the carded web is deposited on the layering belt in a way that the lapped web weight is controllably lighter in the edge areas compared to the center areas. This concave weight profile therefore compensates the weight changes due to material shrinkage and leads to the highest possible weight evenness in the final product.

With the improvement of the lapped web profile WebMax also leads to a proportional reduction of raw material consumption. A special advantage of this system is that it relates exclusively to the crosslapper Topliner. The WebMax does not require any separate space, and can be retrofitted with a lapper of the Topliner-series. WebMax can be delivered for card web working widths of 2.0-4.0m.

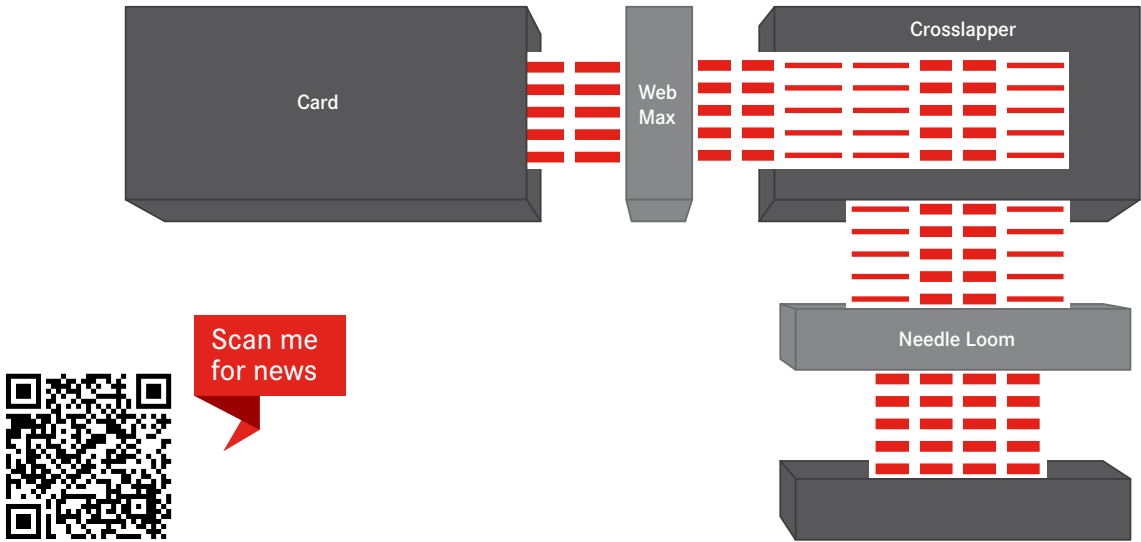
ADVANTAGES

- Highest possible weight evenness in the final product
- Considerable reduction of raw material consumption
- Compensation of the smile effect caused by material shrinkage
- Two independently controllable drafting zones create a counterweight profile on the delivery belt
- Can be switched off at any time by lifting the pressure rollers

WEBMAX SYSTEM



NONWOVEN LINE WITH INTEGRATED WEBMAX SYSTEM



// Web quality controlling

Closed Loop System

Nonwoven quality control plays a crucial role in the production process. The crosslapper ensures that the carded web is precisely laid in several layers to the required width and basis weight. Driven by independently controlled servo motors, the Topliner can individually adjust the machine speed to achieve optimum results.

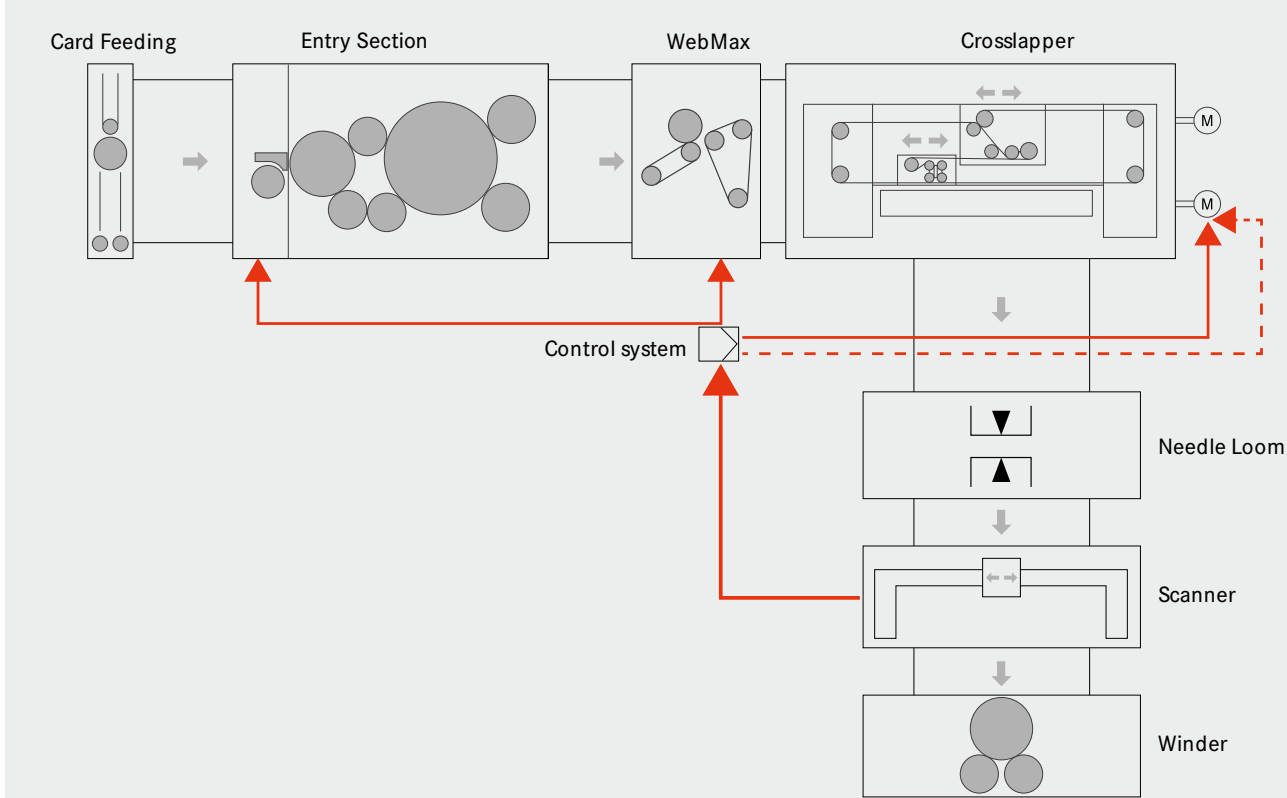
The closed-loop system monitors the entire nonwoven production line. The profile of the outgoing web is measured at the outlet of the line. This measuring system allows the weight distribution to be accurately determined, while the control system regulates the profile at the infeed and during the laying process. Parameters such as overall line warpage and shrinkage are taken into account and integrated into the process.

Continuous monitoring and precise control of the entire production process ensures consistent and accurate quality assurance.

ADVANTAGES

- Closed-loop system monitors and improves web quality in real time
- Outgoing web profile monitoring results in consistent product characteristics
- Integration of quality parameters into the production process
- Consistent quality control and defect reduction

CLOSED LOOP SYSTEM



// Crosslapping

Maximum weight accuracy

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. The uniform web laydown in conjunction with the WebMax and Closed Loop System helps to save fibre costs.

ADVANTAGES

- Highest lapping speeds up to 200 m/min at constant web quality thanks to a short web path
- Full productivity potential and precise laying behavior on all working widths due to the use of composite components
- Further reduction of energy consumption (kWh per kg) by utilization of latest drive technology with energy recovery
- User-friendly concept with excellent accessibility and easy maintenance
- Flexible installation variations due to modular machine design and belt guidance
- Fast and easy service support through remote maintenance by means of remote access



// Web Drafting

High infeed speeds and precise weight distribution

A web drafter is a crucial component in nonwovens production lines, enhancing the quality and uniformity of the nonwoven web. Positioned typically between the crosslapper and the first needleloom, the web drafter plays a vital role in optimizing the characteristics of the nonwoven material.

The Web Drafter WD is installed between the crosslapper and the first needle loom. With up to 8 drafting trios, the Web Drafter drafts the crosslapped web in the material direction (MD), enabling high infeed speeds and precise weight distribution. This results in web optimization in terms of tensile strength and elongation. When processing lightweight products, the Web Drafter increases web uniformity.

Equipped with multiple drafting trios, often up to 8, the Web Drafter WD works by drafting the crosslapped web in the machine direction (MD). This process enables higher infeed speeds while ensuring precise weight distribution across the web. As a result, the nonwoven web experiences improved tensile strength, elongation, and overall uniformity. The Web Drafter WD is particularly beneficial when processing lightweight nonwoven products, as it helps to increase web uniformity, ensuring consistent quality throughout the material. By optimizing the web characteristics, the Web Drafter WD contributes to the production of high-quality nonwovens.

ADVANTAGES

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



// Needle Punching

High-Performance level

Needle punching machines, crucial for the production of nonwovens, mechanically bond fibers by needling. AUTEFA Solutions offers a range of single, multi-board and structuring needle punching machines with the expertise of over 3000 machines in operation worldwide. The product range includes single and double board needle looms, tandem needle looms as well as velour, structuring and patterning needle looms, all based on the Needleloom Stylus NL and Needleloom Stylus VARILIPTIC drive concepts.

The unique elliptical drive of the Needle Loom Stylus Variliptic reduces drafts and improves coefficient of variation (CV) values across all quality levels. This drive allows continuous adjustment of the horizontal stroke during needling, increasing needle life and minimizing the risk of breakage while optimizing the fabric surface and protecting the fibers.

AUTEFA's Stylus needle punching machines offer additional features such as optimized bed and stripper plates, advanced needle patterns with conical bed plate holes and improved feeding systems for pre-needle looms. When processing recycled, natural or short fibers, a dust extraction system is available and recommended to ensure efficient operation and maintain product quality.



ADVANTAGES

- Our modular design system features fully sealed eccentric drives for optimum performance and longevity
- Our machines run vibration-free, ensuring smooth operation even at high speeds
- With working widths up to 16 meters, we offer the flexibility to meet a variety of production needs
- Take advantage of our In-house developed needle distributions and achieve mark-free penetration for precise, high-quality results
- Our system offers the highest stroke rates in continuous operation with cost-saving service intervals.

// Advanced Drive Technology

VARILIPTIC DRIVE CONCEPT

NL DRIVE CONCEPT

CHARACTERISTIC FEATURES FOR THE VARILIPTIC DRIVE AND NL DRIVE CONCEPT

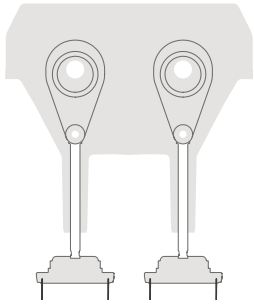
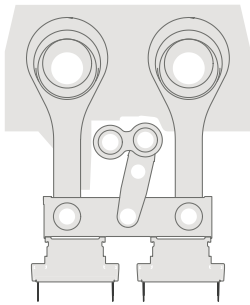
- | | |
|--|--|
| <ul style="list-style-type: none">• Vibration-free running• Highest stroke frequencies in continuous operation• Working width up to 16 meters• High stiffness in needling zone and machine frame<ul style="list-style-type: none">• Without resonance over full speed range• Product consistent over the working width | <ul style="list-style-type: none">• Computer-generated needle distribution (i-Point)<ul style="list-style-type: none">• Mark-free penetration• Special patterns possible• Optional Bed and Stripper plate Quick Exchange System available<ul style="list-style-type: none">• Easy cleaning• Fast exchange of needle pattern |
|--|--|

MAIN CHARACTERISTIC FEATURES

- | | |
|---|---|
| <ul style="list-style-type: none">• One compact module for both vertical and horizontal movement• Automatic grease lubrication• Simple integration in machine frame• Horizontal stroke continuously adjustable during operation range, 0 – 12 mm | <ul style="list-style-type: none">• Modular design system with fully sealed eccentric drives• Oil lubrication• Highly robust design• Improved mass balancing• Extremely low vibration level |
|---|---|

MAIN CHARACTERISTIC FEATURES

- | | |
|---|---|
| <ul style="list-style-type: none">• Energy-efficient<ul style="list-style-type: none">• Only one drive for horizontal and vertical stroke• High versatility• Easy maintenance• Reduced draft in needling zone• Higher uniformity• Less shrinkage• Improved felt surface• Higher production speed | <ul style="list-style-type: none">• Closed Drive System<ul style="list-style-type: none">• Dust protection• Less noise• High rigidity<ul style="list-style-type: none">• Well proven for heavy load operation• Cost-saving service intervals of several thousand hours |
|---|---|



TECHNICAL DATA

- | | |
|---|---|
| <ul style="list-style-type: none">• up to 2400 rpm• 30 – 70 mm vertical stroke | <ul style="list-style-type: none">• up to 3050 rpm• 25 – 76 mm vertical stroke |
|---|---|

// Aerodynamic Web Forming

Total randomization, superior quality and flexibility

Airway line solutions are characterized by highest product quality, economic production and reliability. The classic aerodynamic web forming line FUTURA V21/R - K12 offers excellent quality and flexibility in two steps. The High-Loft device for K12 increases the web volume. The Airway FUTURA V12/R is compact and economical, ensuring cost-effective production.

The aerodynamic web forming machines are also the versatile solution for all different recycling possibilities. AUTEFA Solutions' Airway machines use the aerodynamic principle, which results in three-dimensional fiber orientation and total randomization, enabling isotropic web properties. During the process, the material is opened down to the individual fiber, allowing high flexibility in fiber selection and providing a solution even for very short fibers.

The FUTURA design allows easy opening and quick access for cleaning and maintenance. Completed with the Stylus needle punching machine and the HiPerTherm thermobonding oven, AUTEFA Solutions offers aerodynamic web forming lines from a single source.



// Thermobonding

Uniform airflow and precise temperature distribution

AUTEFA Solutions' thermobonding oven HiPerTherm distinguishes itself by an approved accuracy airflow system with high production speeds. Used as single or double belt oven the AUTEFA HiPerTherm thermobonding oven with its double nozzle system is still the machine of choice when it comes to thermally bond materials from airway lines and card-crosslapping lines using almost any kind of fiber as well as lines for manufacturing hygiene products such as ADL or topsheets. The double nozzle system ensures a uniform product treatment.

The key strengths of the AUTEFA Solutions belt dryers are highest uniform airflow, the precisely adjustable temperature distribution and the ability to maintain loft. The manufacturing of top sheets and ADL demands utmost accuracy.

ADVANTAGES

- Flexible and high capacity
- Perfect temperature profiling
- Uniform airflow
- Energy efficient with EnRec systems

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// Hydroentanglement (Spunlace)

Advanced and unique energy saving spunlace technology

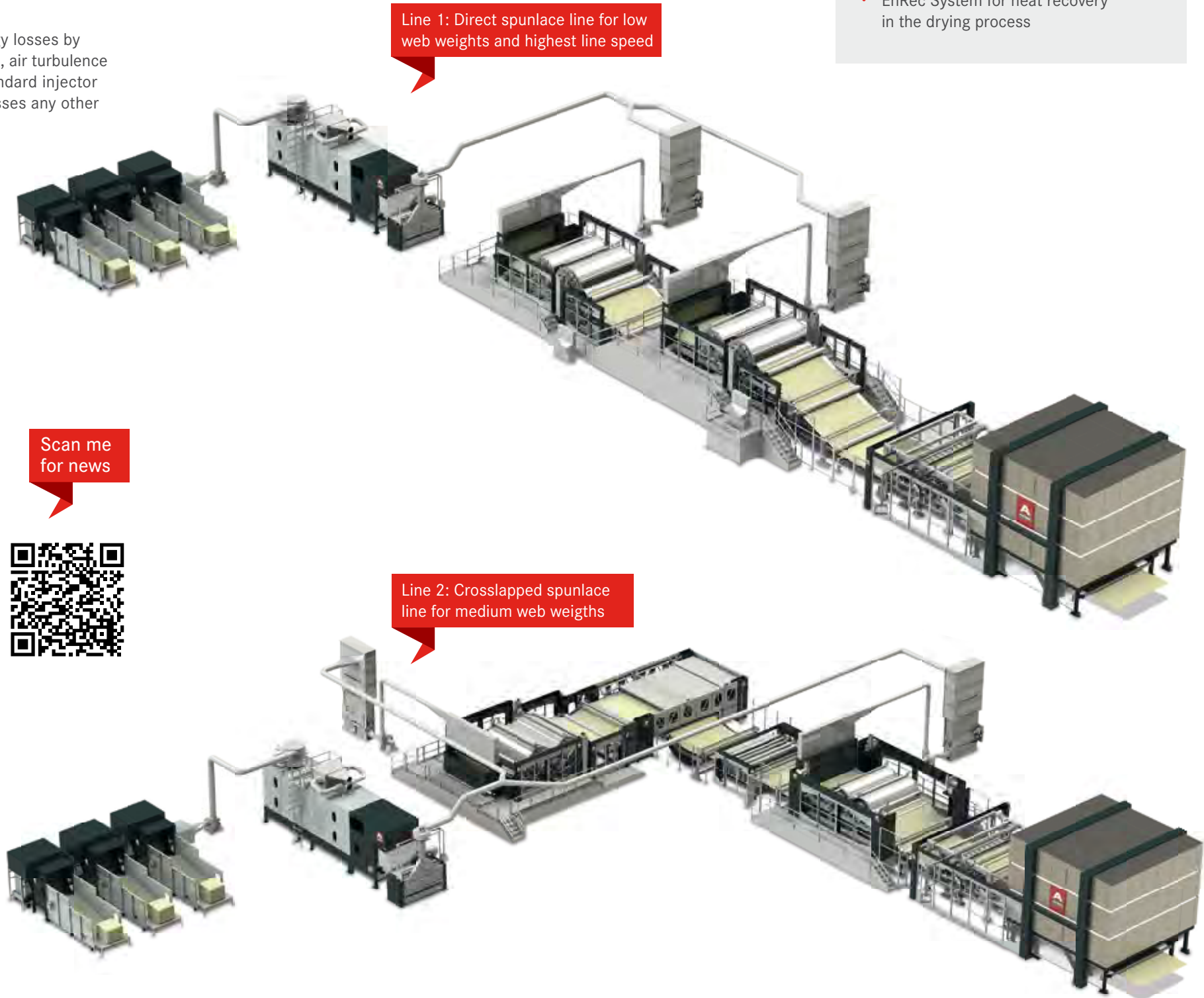
AUTEFA Solutions offers comprehensive production lines for spunlaced nonwovens products, available in direct or crosslapped configurations. The web forming process, which includes the innovative Injection Card and Crosslapper Topliner, is crucial to ensure a consistent high quality nonwoven fabric. With the V-Jet FUTURA hydroentanglement machine and the SQ-V square drum dryer, AUTEFA Solutions has advanced technology with a special focus on energy efficiency.

An innovation of AUTEFA Solutions is the patented V-Jet Injector. This technology reduces energy losses by minimizing the distance between the nozzle and the bottom of the injector. By reducing air friction, air turbulence and jet expansion, the V-Jet Injector significantly reduces energy consumption compared to standard injector systems. This technology represents a significant advancement in energy efficiency that surpasses any other state-of-the-art production line.



ADVANTAGES

- Lower energy consumption with energy saving V-Jet technology
- Highest productivity with Injection Card technology
- Improved web quality with Topliner CL4006CL
- EnRec System for heat recovery in the drying process



// Wetlaid-Spunlace Lines

Sustainable carded-pulp (CP) and wetlaid-spunlace (WLS) nonwovens

The cooperation between AUTEFA Solutions and PAMA Paper Machinery combines expertise in nonwoven web formation, consolidation and drying with the widely used Wetlaid technology from the paper industry. Wetlaid-Spunlace has become the preferred technology for the production of sustainable and cost-effective nonwovens from cellulosic raw materials such as pulp, viscose or lyocell fibers. In today’s environment of rising raw material and energy costs, producing sustainable goods while saving energy is essential. Through our Wetlaid-Spunlace technology, we are meeting this challenge head on, delivering solutions that minimize environmental impact while remaining economically viable.

Green Innovation: Biodegradable and Plastic-Free Wipes

In the production of nonwovens on Wetlaid-Spunlace lines, biodegradable fibers and pulp are preferred to reduce the environmental footprint. Another sustainable measure is to replace traditional viscose fibers with pulp in various blends. Biodegradable and plastic-free wipes offer an environmentally friendly alternative to conventional products as they decompose easily and have less negative impact on the environment. Their use reduces the burden on landfills and oceans caused by non-biodegradable plastics. AUTEFA Solutions’ Wetlaid-Spunlace technology also makes it possible to increase the thickness and improve the feel of the product.

ADVANTAGES

- Energy optimized through V-Jet technology
- Energy optimized with SQ-V drying technology
- Wetlaid machine configurations adapted to the needs of the nonwoven industry
- Production lines tailored to the specific needs of the customer

SPECIAL FEATURES

- Wide range of carded-pulp (CP) and wetlaid-spunlace (WLS) products
- Typical products include biodegradable and plastic-free wipes, all types of wipes and flushable wipes
- Suitable for a wide variety of fiber and pulp types, staple lengths
- Wide range of area weights, density and product thickness
- Production up to 20.000 t/year (depending on raw material and final product)
- Lowest raw material costs



// Hydroentanglement Drying Technology

Energy saving thanks to efficient hot air circulation

The nozzle system in the Square Drum Dryer SQ-V distributes the airflow uniformly in speed and temperature across the entire working width, ensuring the best spunlace web and surface quality results. The suction nozzle design ensures a 100% surface vacuum behind the web, while the blow nozzle design provides an impingement air jet for high heat transfer and evaporation capacity.

Continuous measurement of exhaust humidity controls the maximum recirculating air humidity, ensuring reproducible drying performance and consistent product quality with residual moisture. Compared to conventional drum dryers, the Square Drum Dryer SQ-V consumes approximately 30% less thermal energy for the drying process.

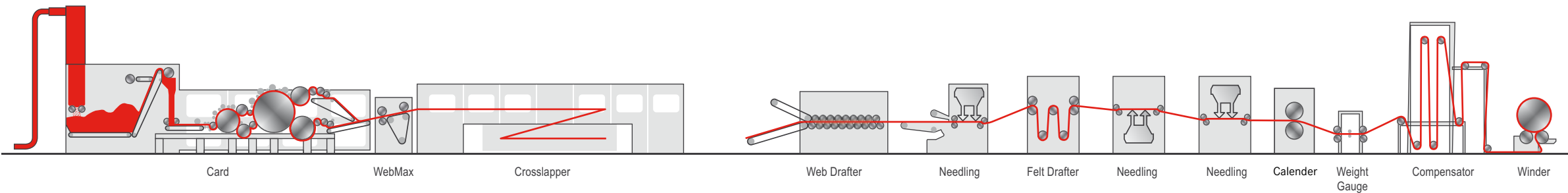
ADVANTAGES

- Significantly lower thermal energy consumption with EnRec System
- Excellent quality with unique nozzle design
- Long drying length for minimal space requirements
- 1 to 6 active drying levels
- Up to 450 m/min delivery speed and even higher with special measures

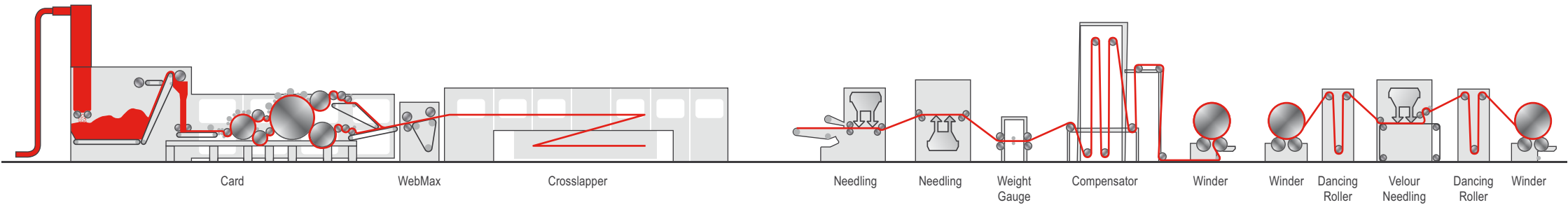


// Line Configurations

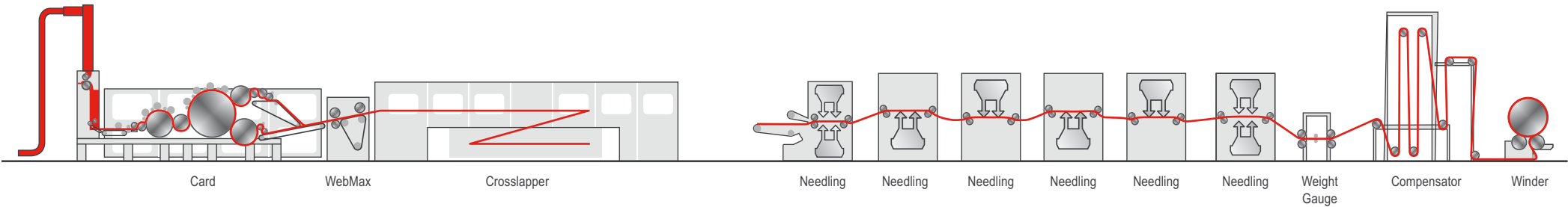
01 GEOTEXTILE LINE



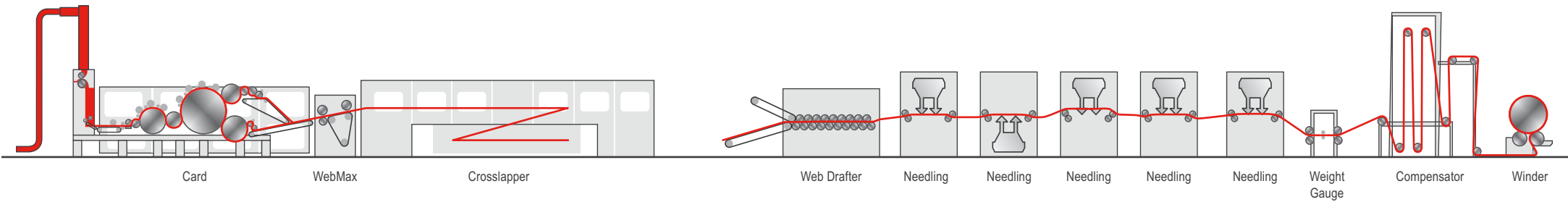
02 AUTOMOTIVE VELOUR



03 ARTIFICIAL LEATHER

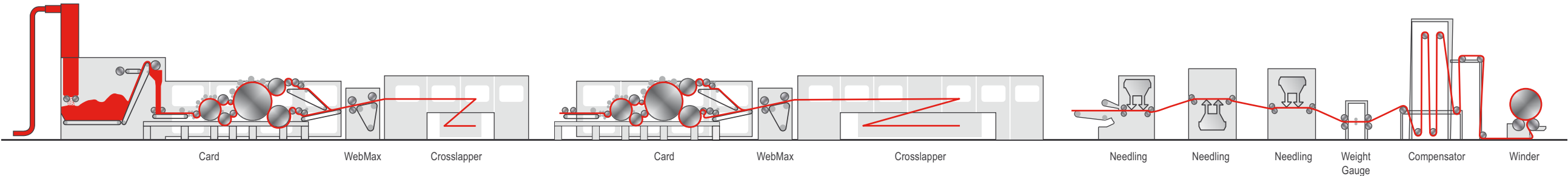


04 AUTOMOTIVE HEADLINER

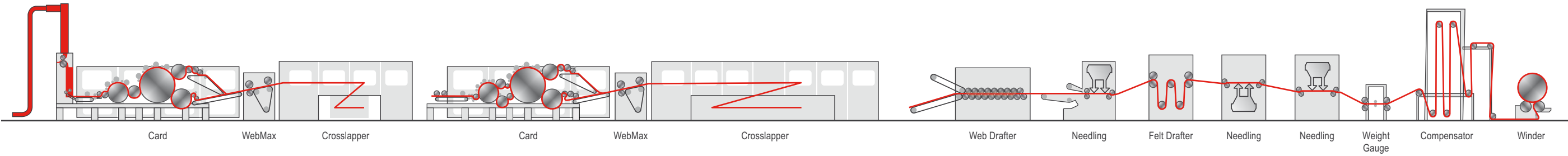


// Line Configurations

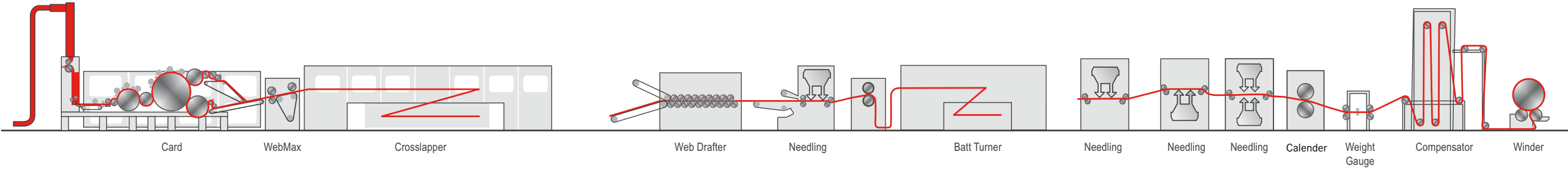
05 CARPET



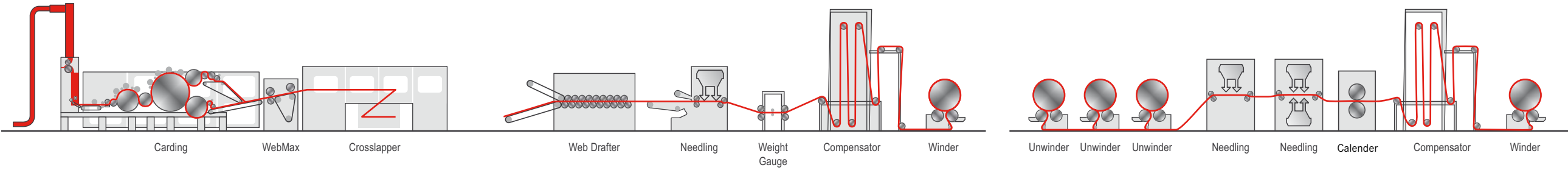
06 TECHNICAL FELTS



07 FILTER- INLINE PRODUCTION

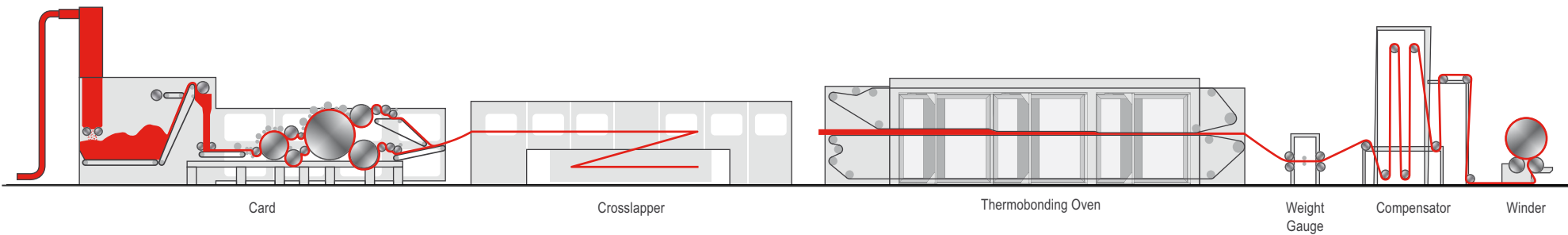


08 FILTER- OFFLINE PRODUCTION

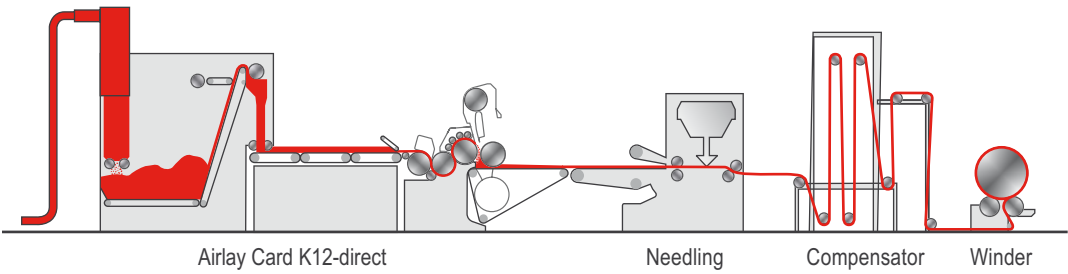


// Line Configurations

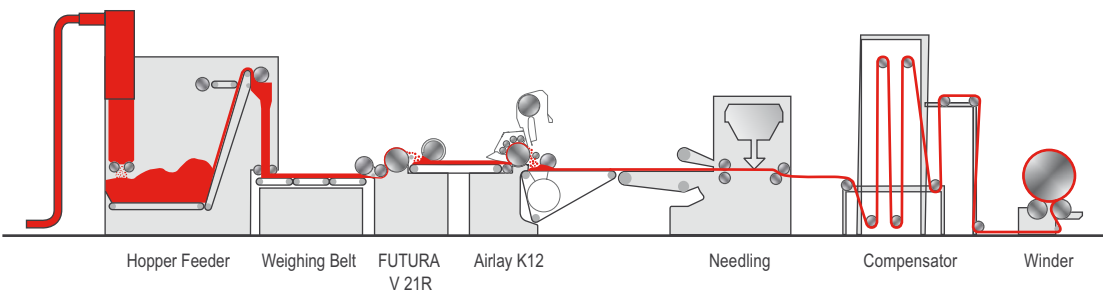
09 WADDINGS / HOME FURNISHING



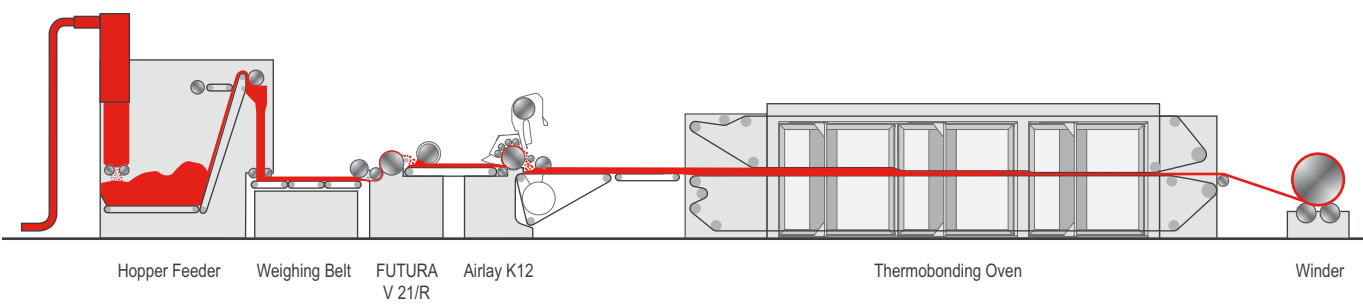
10 GLASS FIBER MATS



11 AUTOMOTIVE “SUBSTRATES” AND NOISE INSULATION FELTS

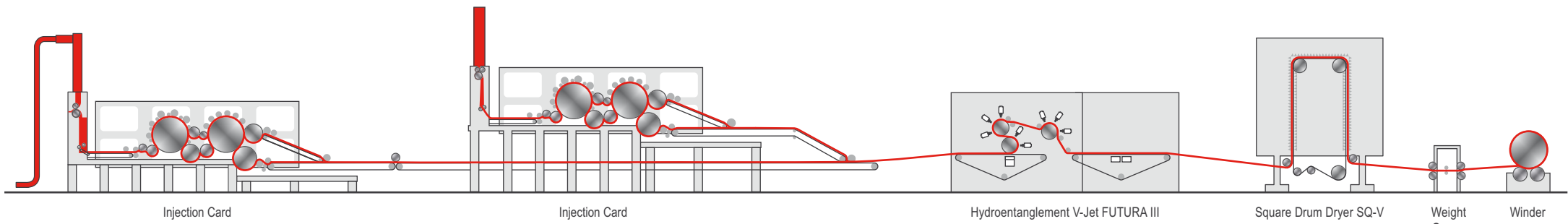


12 WADDINGS / HOME FURNISHING AND THERMAL INSULATION

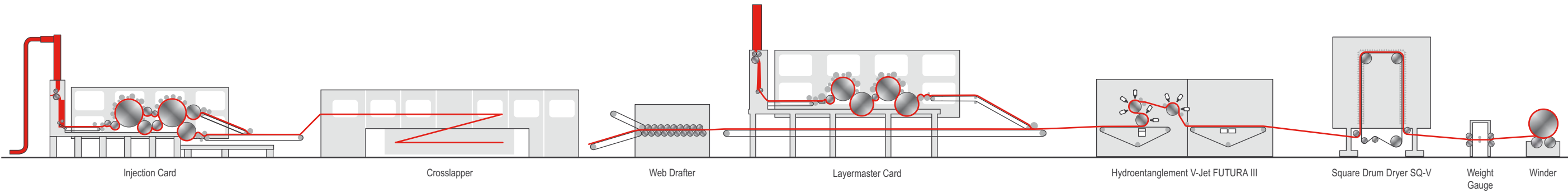


// Line Configurations

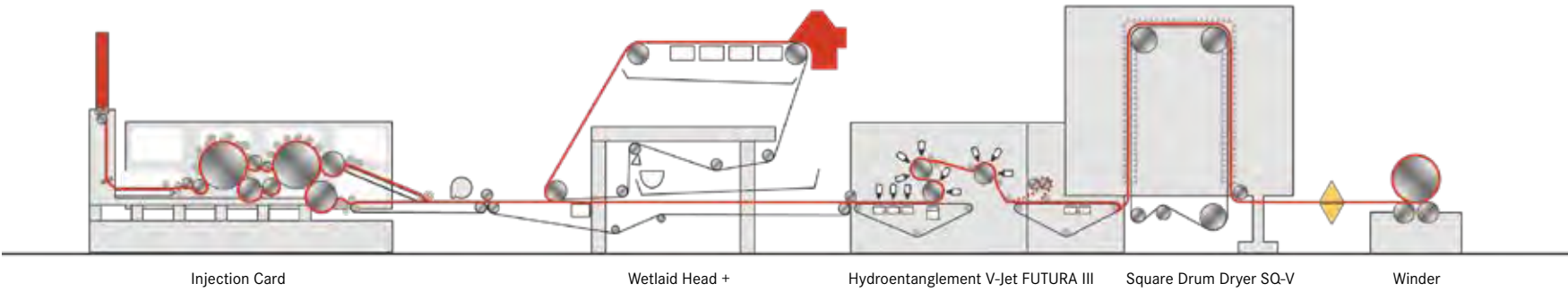
13 SPUNLACED WIPES



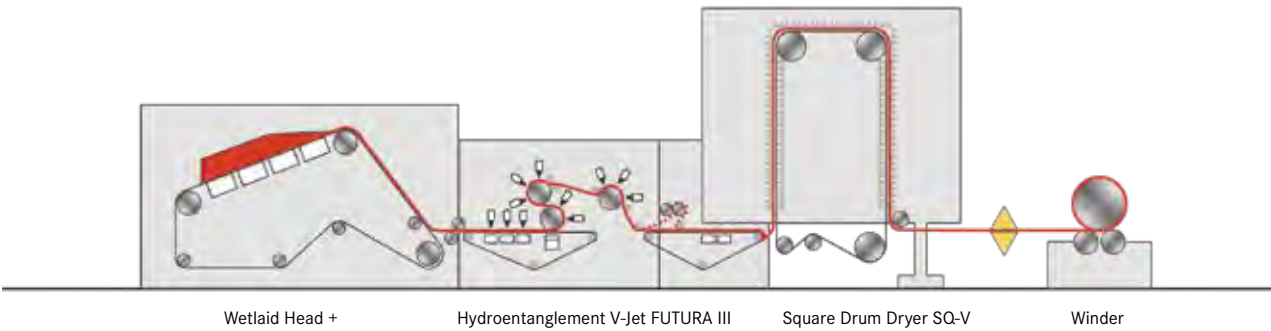
14 SPUNLACED COATING SUBSTRATES



15 WETLAID-SPUNLACE LINE FOR PLASTIC FREE WIPES INCLUDING CARDED FIBERS AND PULP (CP)

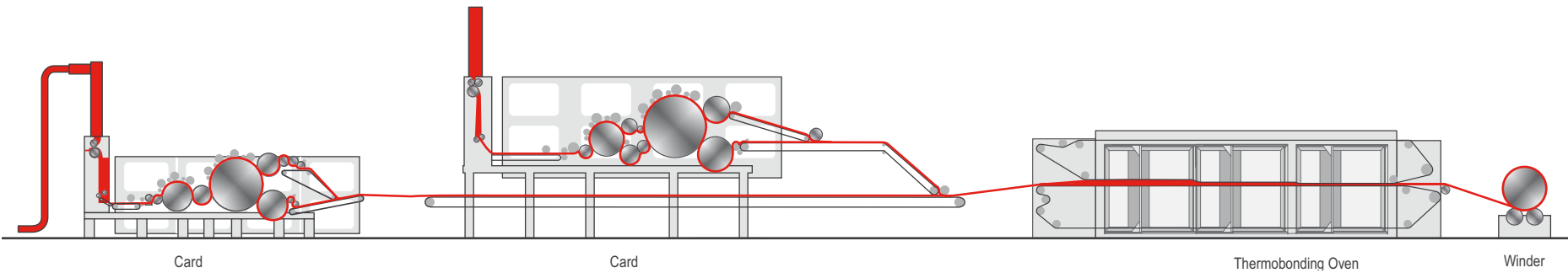


16 WETLAID-SPUNLACE LINE FOR BIODEGRADABLE WIPES

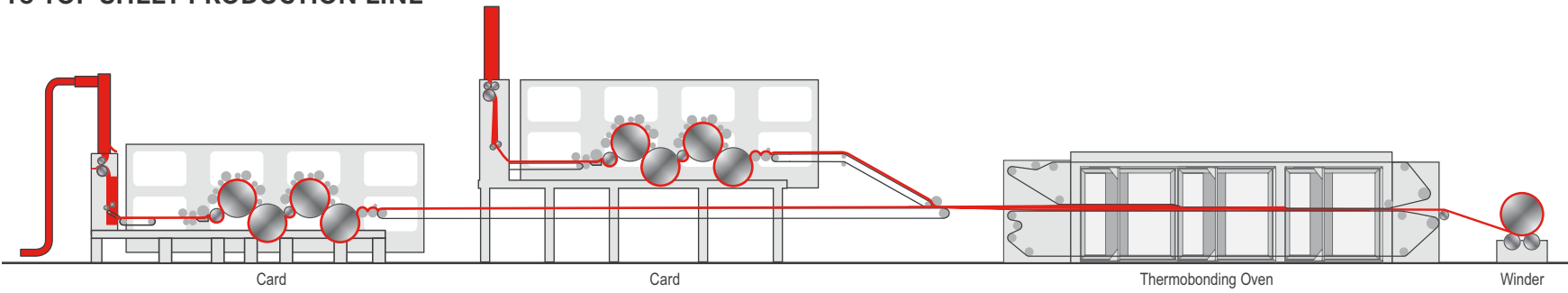


// Line Configurations

17 ADL PRODUCTION LINE



18 TOP SHEET PRODUCTION LINE



// Lifecycle Service

For nonwovens lines maintenance and enhancement

At AUTEFA Solutions, we understand the critical role that nonwoven lines and machines play in your operations. Our equipment is renowned for its sophisticated technologies, quality, and cost-effectiveness. To ensure your machines continue to perform at their best, it's imperative to prioritize regular servicing, maintenance, and prompt repairs. Our Lifecycle Service offers a comprehensive suite of solutions to keep your production lines running smoothly.

AUTEFA Solutions' service contracts are tailored to offer fast and effective support exactly when you need it. Our comprehensive range of service modules allows for individual customization, ensuring that your maintenance needs are met precisely.



SPARE PARTS FOR LIFETIME QUALITY – PRESERVE QUALITY AND EFFICIENCY WITH OEM SPARE PARTS

The quality of your manufactured products and the longevity of your machines are inextricably linked to the spare parts you use. AUTEFA Solutions offers OEM spare parts that are meticulously designed to match your specific machine and system.



SERVICE CONTRACTS – CUSTOMIZED SUPPORT FOR UNINTERRUPTED OPERATIONS

Our service contracts provide customized support tailored to ensure uninterrupted operations for your business. Benefit from proactive maintenance, rapid response times, and cost-effective solutions designed to minimize downtime and maximize productivity.



UPGRADES AND RETROFIT SOLUTIONS – ENHANCE AND ADAPT YOUR MACHINES FOR EVOLVING NEEDS

We offer valuable and cost-effective upgrade and retrofit solutions that enhance your existing systems, making them adaptable to ever-changing market conditions. Our modifications significantly improve occupational safety, reduce workload, enhance process reliability, and minimize complaints.





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