

sustainable nonwovens





Spunlaced Cotton
Nonwoven Lines



Needle-Punching Lines
for Natural Fibers



High-Speed Spunlacing Lines
for Viscose and Lyocell Fibers



Lines for Carded/Pulp (CP) and
Wet-Laid/Spunlaced (WLS) Nonwovens

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Sustainability matters

More than 50% of the annual non-wovens production is converted into single-use products. Used diapers, wipes and other hygiene or medical products add several million tons to the waste mountain each year. Moreover, most products contain petroleum-based fibers such as PP,

PET or bicomponent fibers. Thrown-away carelessly, nonwovens containing synthetic fibers disintegrate into micro fibers, i.e. micro plastics. These do not biodegrade but stay in the environment – and eventually in the food chain – for decades.

Fiber material for sustainable nonwovens

Trützschler Nonwovens' spunlacing (hydroentangling) and needle-punching lines process a wide range of natural and sustainable man-made fibers.

Cotton fibers for premium products

Virgin cotton fibers – bleached and unbleached – and comber noils result in strong, yet soft nonwovens.

Due to fluctuating fiber supply, prices are on the higher end of the scale. Disposable products from cotton fibers belong to the premium segment.



Solutions for manufacturing sustainable nonwovens

Our production line concepts do not sacrifice neither productivity and efficiency nor product quality for sustainability. In every segment many lines all over the world already reliably deliver high-quality products:

- Carding/spunlacing lines for a variety of cotton and natural fibers
- High-speed carding/spunlacing lines for viscose or lyocell fibers
- Crosslapping/spunlacing or needle-punching lines
- Wet-laying/spunlacing (WLS) lines and carded/pulp (CP) lines for wood pulp and viscose/lyocell fibers. We closely cooperate with Voith, the leading partner of the paper industry.

Regenerated cellulose fibers

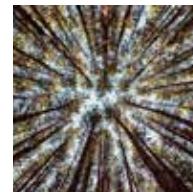
Viscose and lyocell fibers are man-made, cellulose-based fibers and thus biodegrade in contact with soil bacteria. Their origin often is plantation beechwood.

Paper-grade pulp

NBSK pulp made from plantation wood and other pulp types are made from plantation wood such as pine, spruce and others. It is the same raw material the paper industry uses and thus available in constant quality all over the world.

Natural fibers

Hemp, flax, jute – all plant fibers from renewable sources are the rising stars in nonwovens manufacturing. Whether for single use or biodegradable durable products.



Biodegradation made visible. A nonwoven from pulp and lyocell disappears.



Biodegradable single-use and durable nonwovens

The majority of Trützschler Nonwovens' core competencies bundle along the spunlaced (hydroentangled) nonwovens value chain. Since several years we develop solutions for producing sustainable nonwovens, especially for wet and dry wipes, skin, wound care and hygiene products.

Our focus is on machinery and complete line concepts for nonwovens that are suited for mass production and are

- fully functional in their respective field of application
- free of chemicals (e.g. binders)
- biodegradable
- from renewable resources



Baby personal care cosmetic and medical wipes

Disposable baby wipes are by far the largest segment in wipes followed by personal care wipes. Sustainable solutions could make a real difference. Dry and wet wipes have to meet highest requirements concerning wet strength, dirt pick-up and softness.

For cotton, natural, viscose/lyocell fibers and pulp we developed specific high-speed processes. Internal lab trials and a whole range of customer products show that top-quality sustainable wipes can be made from all these raw materials.

Skin and wound care products

Multi-layered cotton nonwovens serve both cosmetic and medical purposes. Thick, heavy-weight, spunlaced pads clean and moisten the skin.

Cotton-based, lint-free wound dressings quickly absorb wound secretion and minimize contamination risks. Thin products are the basis for skin-friendly, breathable adhesive tapes.



Femcare and hygiene products

Nonwovens for diapers, panty liners or sanitary pads are thin, light and flexible. The growing demand for environmental-friendly disposable products

encourage producers to develop carded/spunlaced cotton top sheets. They are skin-friendly, biodegradable and made from renewable resources.



Flushable wipes (Moist Toilet Tissue)

A wipe is classified as "flushable" when it passes a series of standardized tests. Nonwovens made with the wetlaying/spunlacing (WLS) technology by Trützschler Nonwovens and Voith

pass the flushability tests with flying colours. Nowadays the majority of Moist Toilet Tissues (MTT) found in drug stores and supermarkets is made from WLS materials.



Natural fibers

Hemp, flax, jute – etc are the rising stars in nonwovens manufacturing. Due to their oleophilic characteristic many natural fibers make for excellent industrial wipes.

Durable applications are temporary road construction, bank and coastal protection or gardening. Needle-punched materials from natural fibers are selected because they biodegrade over time – no micro plastics will enter the environment.



COTTON
NONWOVEN
LINES



Why nonwovens from cotton fibers

Consumers love cotton fibers and their soft, luxurious touch. Not only the skin-friendly characteristic of cotton fibers is an advantage. Due to their irregular shape, they also pick up dirt very well. Moreover, the fibers absorb liquids quickly due to the swelling behavior.

All these properties make cotton an excellent choice for hygiene single-use products such as wet and dry wipes, femcare products, cosmetic and medical pads and wound dressings.

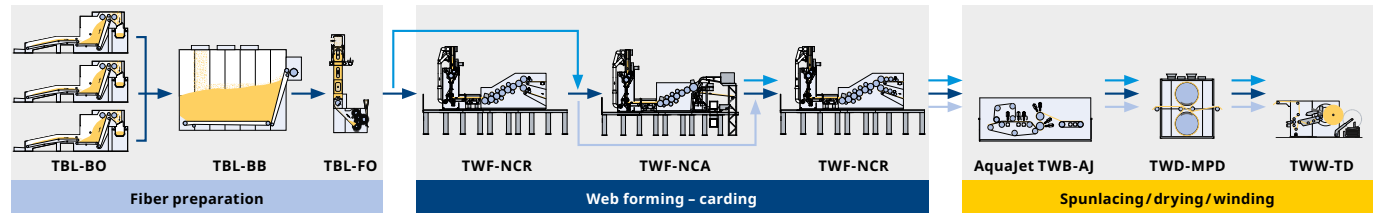
Cotton fiber quality, end product and process requirements differ significantly. For this reason, Trützschler Nonwovens offers several machines and line configurations for efficiently processing

- virgin cotton,
- bleached and unbleached qualities,
- blends from virgin material and comber noils and even
- 100% noils

Cotton lines I

Flexible production lines for cotton nonwovens

End products: cotton wipes and cosmetic pads



➔ Inline configurations with two NCR random cards for wipes:

Web weight: 35 – 120 gsm
Line speed: 60 – 180 m/min

➔ Inline configurations with one airlay and one random card for wipes:

Web weight: 35 – 120 gsm
Line speed: 60 – 120 m/min

➔ Inline configurations with two random and one airlay card for wipes:

Web weight: 130 – 400 gsm
Line speed: 15 – 60 m/min



Cotton lines II

Crosslapper lines for isotropic cotton nonwovens

Nearly isotropic webs with a high random layer are formed by a combination of NCR card and crosslapper.

Web weight: 35 – 50 gsm

Line speed: 20 – 40 m/min

End products: cotton wipes and outer layers for cosmetic pads

Small capacity lines with Trützschler flat top cards

Flat top cards are known for their ability to reduce the nep content in cotton fiber tufts. Gentle carding and web forming results in spotless, homogeneous webs.

Cosmetic pads:

Web weight: 130 – 300 gsm

Line speed: up to 35 m/min

Femcare products:

Web weight: 34 – 40 gsm

Line speed: up to 70 m/min

Larger capacity lines with flat top and roller cards

The combination of flat top and roller cards increases throughput and guarantees a high web quality.

Cosmetic pads:

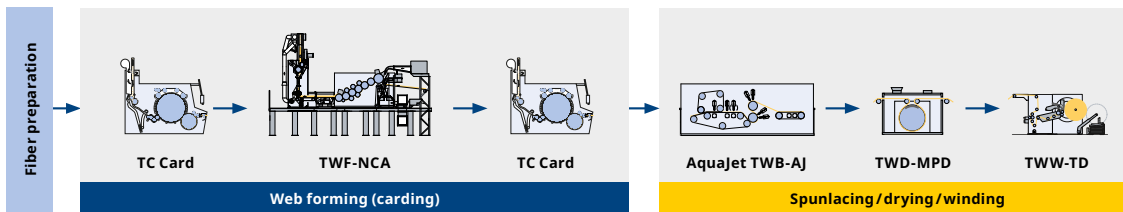
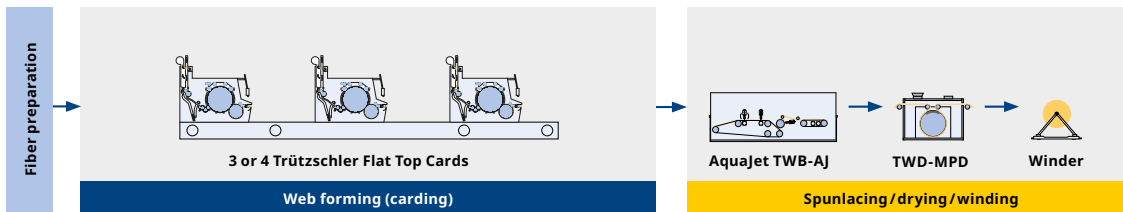
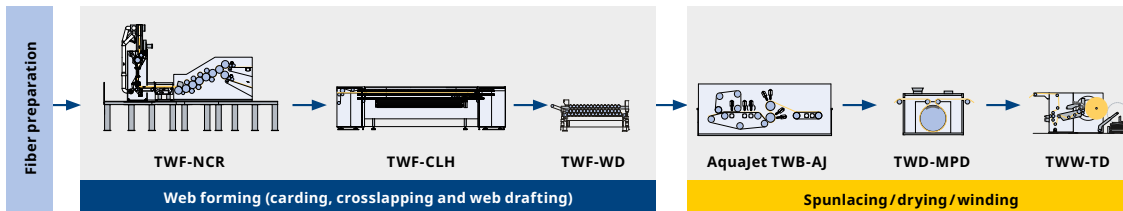
Web weight: 130 – 300 gsm

Line speed: up to 50 m/min

Wipes and femcare products:

Web weight: 35 – 90 gsm

Line speed: up to 70 m/min



NONWOVEN WITH
WOOD PULP
(WLS AND CP)



Why nonwovens with paper-grade wood pulp

Paper-grade NBSK (Northern Bleached Softwood Kraft) pulp or other pulp types are new, cost-effective materials for highly-functional spunlaced sustainable nonwovens.

To generate a wet-laid web, a blend of short fibers is dispersed in water and laid down on a belt. A homogeneous, highly randomly oriented web forms which is spunlaced (hydroentangled) by high-pressure water jets. The final product is a plain, structured or perforated nonwoven.

Teaming up with Voith, leading partner to the paper industry

When an end product requires wet-laying, Trützschler Nonwovens closely cooperates with Voith. The company is a specialist for wet-laying machinery including the entire water treatment system.

A cooperation between

TRÜTZSCHLER
NONWOVENS

VOITH

Carded/Pulp (CP) nonwovens

Combining the wet-laying with a separate carding process results in two-layer, composite carded/pulp webs. The wet-laid ply from 100% pulp is cost-effective, voluminous and quickly absorbs liquids. The carded layer from lyocell or viscose fibers gives sufficient strength and softness for excellent baby and body wipes.

Wet-Laid/Spunlaced (WLS) nonwovens

The WLS process already is the technology of choice for producing moist toilet tissue (MTT). Higher-strength nonwovens can also be produced by changing line parameters.

Web weights range from 20 to 150 gsm. End products are all kind of wipes: including flushable wipes (moist toilet tissue – MTT). Line speeds are up to 300 m/min at the winder.



Production line concepts for CP and WLS nonwovens

CP (Carded/Pulp) lines

Raw material: paper-grade wood pulp, re-generated cellulose fibers (viscose, lyocell) – for sustainable nonwovens

Flexible lines for CP lines and WLS nonwovens

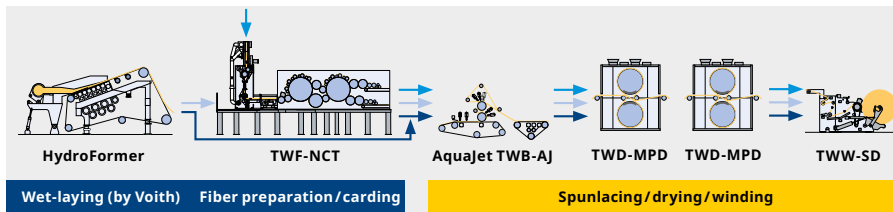
Web weight: some 50 gsm; pulp layer more than 25 gsm
Line speed: up to 300 m/min
End products: baby and body wipes; flushable wipes (MTT) without card

WLS: A line for flushable wipes or baby/body wipes

Raw material: paper-grade wood pulp, re-generated cellulose fibers (viscose, lyocell) – for sustainable nonwovens

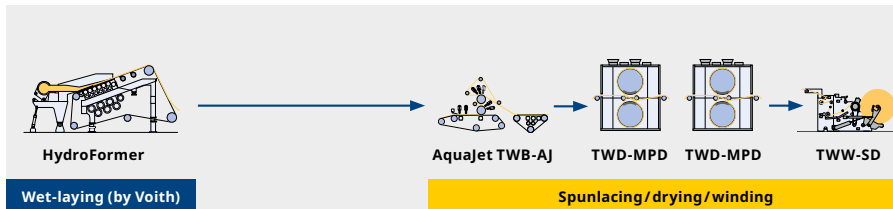
Lines for wet-laid/spunlaced (WLS) nonwovens

Web weight: some 50 gsm
Line speed: up to 300 m/min
End products: flushable wipes (MTT); baby and body wipes



In-built flexibility:

- wet-laid / spunlaced nonwovens
- carded / spunlaced nonwovens
- carded / pulp nonwovens





Voith's machinery for wet-laying

The most prominent examples for wet-laid materials are paper and cardboard. The manufacturing technology is known since centuries:

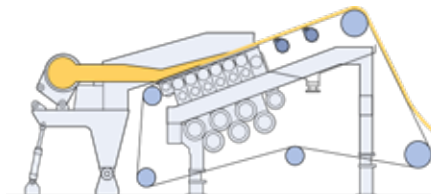
- Short fibers are uniformly dispersed in water and then pipelined over a wire.
- The water drops off and the fibers form a homogeneous, random structure.

Essential in WLS and CP lines: the water circuit

The HydroFormer comes as part of an integrated water treatment system. The white water from the former is filtered, treated and returned to the manufacturing process. Fibers are recovered to minimize fiber loss.



Voith's HydroFormer in a WLS line



Material flow within the HydroFormer



Carded/pulp installation

Voith's HydroFormer

Voith's paper making machinery is in service worldwide.

More than 50 years ago, Voith adapted its proprietary inclined wire solution to enter the nonwovens machinery market. The HydroFormer soon became a favourite core component in manufacturing such different nonwoven products as tea bags, overlay paper, glass mats and battery separators.

Advantages:

- high fiber flexibility – pulp, natural and man-made as well as glass or metal fibers... Every fiber that disperses in water can be used.
- fiber length in the range from 1 – 40 mm

- the web's tensile strength can be adjusted. HydroFormer combines high capacity with superb web formation
- easy, 1-step production of 1-ply, 2-ply or 3-ply products

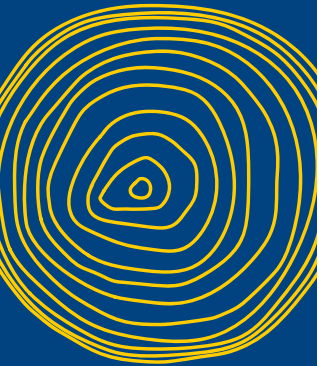
Tailor-made CP lines

The HydroFormer is the proven core of several Carded/Pulp installations.

Machinery and equipment supplied by

VOITH

NONWOVENS FROM
**VISCOSE AND
LYOCELL**



Why spunlaced nonwovens from re-generated cellulose fibers

Both viscose and lyocell fibers are man-made fibers derived from cellulose. Plantation hardwood is chemically processed into dissolved wood pulp and then spun into staple fibers or filament yarns.

Re-generated cellulose fibers come from renewable resources, most often from beechwood, spruce or gum wood. They are 100% biodegradable which qualifies both viscose and lyocell fibers for the production of sustainable nonwovens.

Since the fibers are man-made, they are as easy to process as, for instance, polyester fibers. Spunlaced nonwovens from 100% viscose or lyocell fibers are strong, yet soft and absorb liquids quickly – a good choice for baby, personal care or medical wipes.

Crosslapping line with NC cards

Raw material: 100% re-generated cellulose fibers (viscose, lyocell)

Web weight: 35 – 100 gsm

Output: up to 8,000 tons/year (depending on fiber type, web weight and working width)

End products: dry and moist baby and body wipes; medical textiles, cosmetic beauty masks

Viscose and lyocell fiber production lines

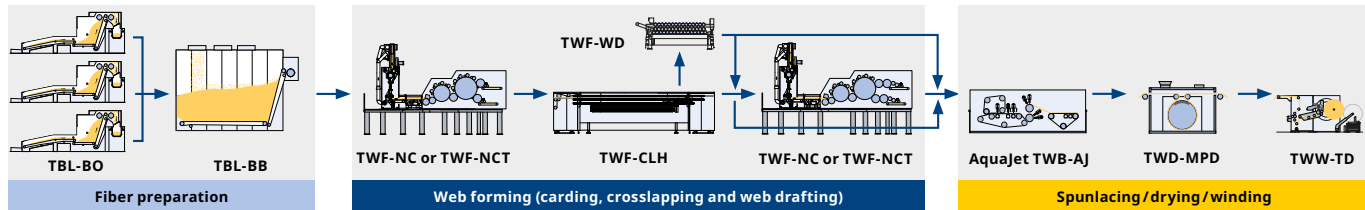
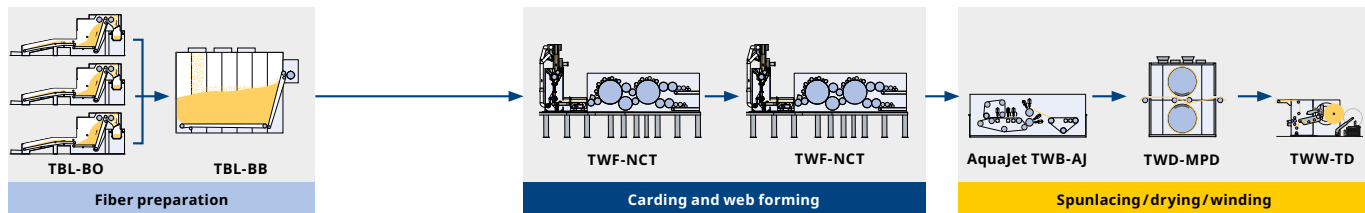
High-speed lines for hydroentangled nonwovens from viscose or lyocell

Raw material: 100% re-generated cellulose fibers (viscose, lyocell)

Web weight: 30 – 100 gsm

Output: more than 20,000 tons/year (depending on fiber type, web weight and working width)

End products: dry and wet baby and body wipes; medical textiles





Needle-punched nonwovens from natural fibers

Many technical nonwovens rely on needle-punching processes since industrial, heavy-duty applications need thick and dense felts. In most cases the end use asks for synthetic or even performance fibers, for instance polypropylene and polyester fibers in the automotive sector, PTFE, PPS and aramide fibers for hot gas filtration media.

Nevertheless, natural fibers also play a role when designing needle-punched materials for specific purposes. Biodegradable nonwovens from hemp, jute, coir or kenaf are intentionally chosen for geotextiles with a short lifespan. A typical task is inhibiting soil erosion until vegetation covers the area.

Hemp or kenaf fibers are also a good choice for oil-absorbent industrial wipes while cotton-based soft and absorbent needle-punched nonwovens make for excellent hygiene products.

Partnering up with Texnology for T-SUPREMA lines

Trützschler Nonwovens and Texnology s.r.l. joined their respective strengths to offer high-performance but easy to use needle-punching lines. Our target: make operations as easy as never before.

T-SUPREMA lines are
a cooperation of

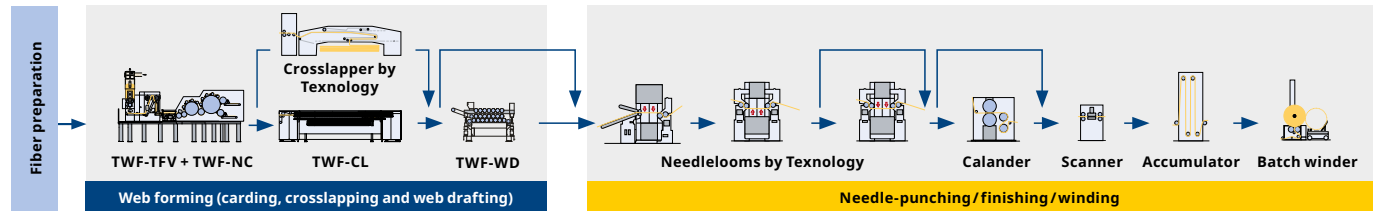
TRÜTZSCHLER
NONWOVENS



Needle-punching lines for natural fibers

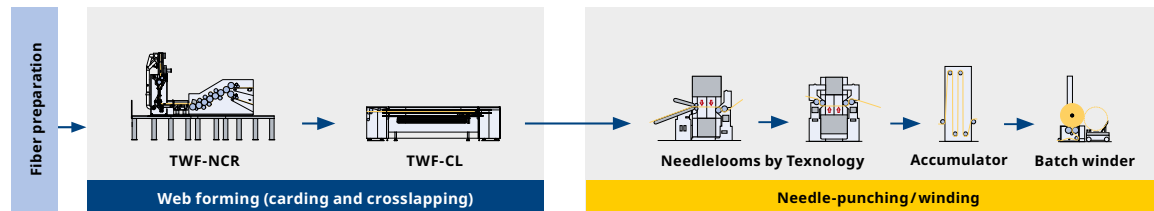
Medium capacity T-SUPREMA geotextile line up to 600-700 kg/h:

Web weight: up to 800 gsm
 Fibers: hemp, kenaf etc.; 4.4-12 dtex with fiber length up to 100-120 mm
 Product width: up to 7,000 mm product width



Special applications

Often needle-punched nonwovens serve specific requirements in niche applications.
 We love to find special solutions for your product ideas.





Virgin cotton, 50 gsm



Bleached comber noils



Unbleached cotton, 50 gsm



3-layer cotton pad

The true way to quality nonwovens

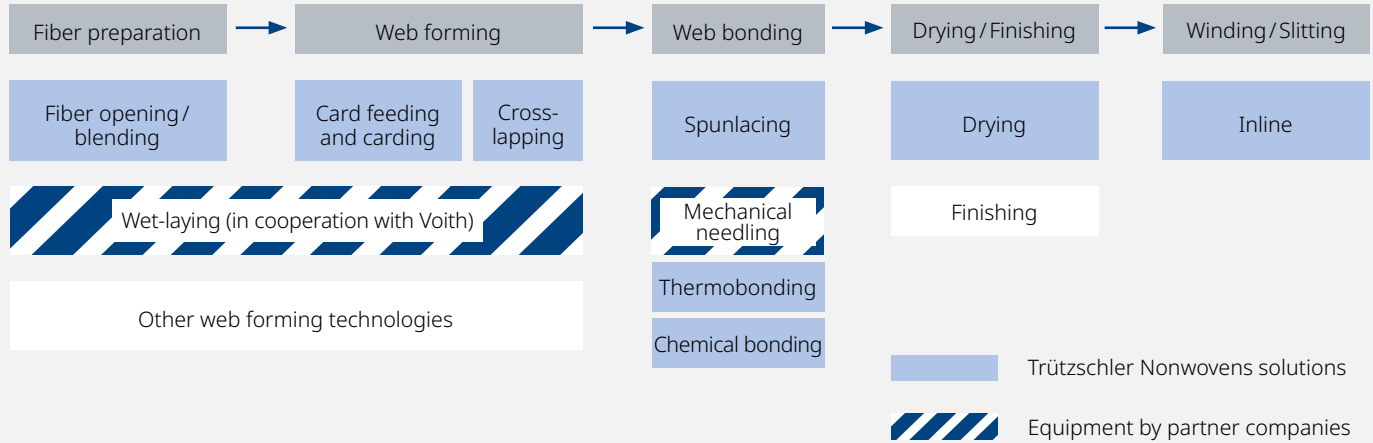
Our passion is machinery, processes and everything associated with the economic production of high-quality nonwovens. We love the challenge of opening up new fields of application with new materials and innovative technologies.

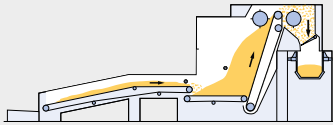
Equipment by Trützschler Nonwovens comes from a single source. All process steps – from fiber opening to final

slitting and winding – are perfectly coordinated. Are you mainly interested in individual components from our product range? Welcome – our machines also set standards as solitaires.

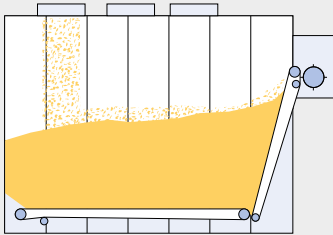
We do not know what the future holds, but the best way to predict the future is to shape it yourself. If you are constantly searching for new ways, join us on the true way to successful products.

Range of Trützschler Nonwovens machinery:

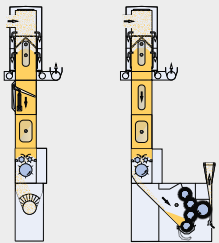




Bale opener TBL-BO with weighing pan or weighing belt



Blending bin TBL-BB



Feed box TBL-FB for viscose/lyocell lines and fine opener TBL-FO for cotton lines

Fiber preparation – the T-BLEND system

The modular T-BLEND system allows for high line throughputs. Modular machinery – bale and fine openers, weighing and blending systems as well

as accessories for reliable fiber transport – opens up the door to individual installations that exactly meet requirements.

Advantages:

- Throughput of up to 1,000 kg/h per bale opener
- All components are easy to start up
- Various executions depending on process and/or fiber requirements
- “Clean Concept” with various types of sealings, targeted air currents and smart aspirations to keep fibers away from critical machine parts
- Easy access for fast cleaning and efficient waste fiber removal
- Modular built to speed-up the startup process and to ensure both extensibility and upgradability



Bale opener TBL-BO is adjustable to a broad range of fibers



Weighing pan TBL-WP for high accuracy and high performance



Blending bin TBL-BB: a fiber blender and material buffer

Consistent high blending quality

In high performance lines the blending chamber is used as a fiber storage to ensure a continuous flow of fibers to the web forming machinery. If fibers of different types, lengths and colours are to be blended, the chamber allows for a maximum homogeneity. It is easy to operate, safe and reliable.



Feed box TBL-FB for fine opening in viscose lines

The TBL-FB feed box/fine opener in a viscose line

This box is more than a material buffer between blending bin and card feeder. Equipped with feed rolls and a pinned opening roller, it generates a uniform flow of small tufts to the card feeder. Fine opening by the feed box is clamp-free to prevent stress on the fibers. The speed of the feed rolls is continuously adjusted via a pressure monitoring system that monitors the filling level in the downstream card feeder (CONTIFEED).

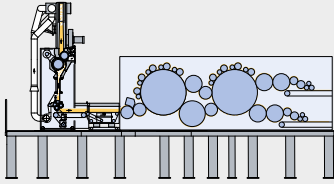


The fine opener TBL-FO for natural fiber processing in natural or recycled fiber lines

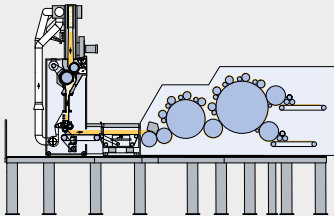
Fine opening TBL-FO

The high demands of cotton, natural and recycled fibers require a fine opener to be included in the production line. TBL-FO works clamp-free with several opening rolls. It gently opens coarse fiber tufts into finest tufts or even single fibers to facilitate carding.





High-speed card TWF-NCT: fully equipped with random and condensing rollers



Multi-purpose TWF-NC card with basic doffing section

High-speed carding in viscose/lyocell lines



The NCT card has been designed for high-speed spunlacing applications. Its layout with two equally sized, large cylinders and double transfer ensures

excellent carding and blending results. Higher throughput goes hand in hand with top web quality and enhanced process stability.

Advantages:

- Increased carding power due to a total of nine worker-stripper pairs
- Better blending due to double intermediate transfer
- Higher throughput due to the enlarged 1,500 mm pre-cylinder
- Reduced fiber fly and air turbulences due to optimized roller diameters and undercasings
- Available with doffing configurations for parallel, random or condensed webs

Carding with TWF-NC



Whether standard, coarse or extremely long fibers – the combination of the multi-purpose NC card and various card feeder ensures homogeneous fiber feeding, carding and blending. The process is permanently monitored and adjusted by the weighing belt between feeder and card.

TWF-NC is available in six different basic types that can be combined with three different doffing systems for forming parallel, random or condensed webs.



NCT high-speed card: no compromise on web quality

Highspeed Card TWF-NCT

Fiber fineness	1.0–3.0 dtex
Fiber length	< 60 mm
Web weight	14–55 gsm
Line speed	≤ 300 m/min
Working width	≤ 4,000 mm



Proven in many lines: TWF-NC

TWF-NCT: Also proven in CP lines

The high-speed card is particularly suited for carded/pulp processes. Due to enhanced carding power, even a single card is able to keep up with the high processing speeds achieved in CP production lines.

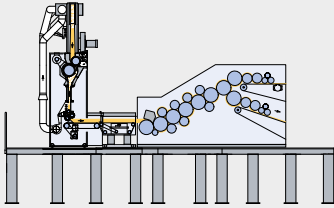


TWF-NC: our card for crosslapping lines

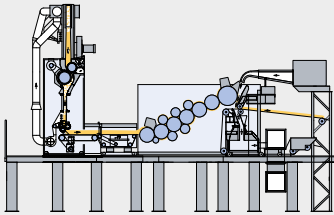
When isotropic nonwovens from viscose, lyocell or recycled fibers are required, the NC card is first choice. It perfectly teams up with the CLH crosslapper in card/crosslapper or card/crosslapper/card configurations.

Roller Card TWF-NC

Fiber fineness	0.7–100 dtex
Fiber length	14–150 mm
Output	< 450 kg/hm
Working width	≤ 4,200 mm



TWF-NCR random card: a power horse in both inline and crosslapper configurations



TWF-NCA airlay card features the same carding section as the NCR card

Carding in natural fiber lines



Conventional nonwoven roller cards deliver high speeds but the intensive carding by worker/stripper pairs significantly increases fiber nep content when processing natural fibers. TWF-NCR and TWF-NCA roller cards'

special designs allows for efficient carding and web forming. The Clean Card Concept ensures a high machine availability. Various technical measures reduce the risk of fiber migration and allow for easy handling.



Trützschler Nonwovens' NCR random and NCA airlay cards feature a series of similar-sized rollers instead of small worker and stripper roller pairs. This configuration provides a large carding area, puts less stress on the fibers and ensures a high web quality.



Two NCR random cards in a high-performance cotton line

Random Card TWF-NCR

Fiber fineness	0.7–17 dtex
Fiber length	14–60 mm
Web weight	25–140 gsm
Output	< 260 kg/hm
Working width	≤ 3,800 mm



NCA airley card for webs with a balanced MD/CD ratio

Web forming with NCR random card

TWF-NCR is suited for subsequent spunlacing or needle-punching processes. It is suited for both inline and crosslapper lines.

Dynamic web formation

The special arrangement of main cylinder, an air guiding plate and doffer re-arranges the fibers during transfer to the doffer. A highly random, voluminous web emerges. Spunlacing turns these webs into bulky and soft nonwovens with very good MD/CD ratios.

Airley Card TWF-NCA

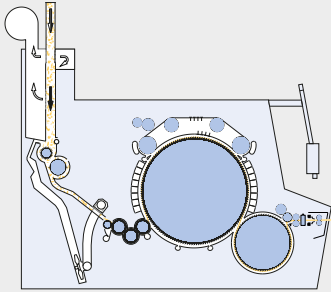
Fiber	0.7–17 dtex
Fiber length	12–60 mm
Web weight	20–400 gsm
Output	< 350 kg/hm
Working width	≤ 3,800 mm

NCA airley card for short fiber processing

Cotton waste fibers from blow rooms, flat top cards or combers are a valuable raw material. The NCA airley card reliably individualises fibers between 14 mm and 60 mm length.

Aerodynamic web formation

In the NCA airley card the singled fibers are blown off the turbo roller and are laid-off randomly on the web formation belt. The result is a slight three-dimensional web with a balanced MD/CD ratio.



A TC flat-top card by Trützschler Spinning. A winning team in combination with a small AquaJet.

Carding with flat top cards



Classic flat top cards such as Trützschler's TC series are known to reduce the number of fiber neps during carding. Due to lower processing power, their use of cotton fibers in nonwoven production lines is restricted to special applications.

A proven small-capacity configuration is three or four cards for manufacturing multi-layer cosmetic pads.

For higher throughputs the airlay card TWF-NCA can be combined with TC flat top cards. While the outer web layers are formed by TC cards, the NCA forms the inner layer from less-expensive short fibers.



Web forming section in a cotton pad line



A small-sized AquaJet entangles the homogeneous web delivered by several TC cards.

Making the difference: card clothings by Trützschler Card Clothing

Optimum card performance

Roller cards in nonwoven lines as well as flat-top cards depend on the quality of the clothing to ensure top-class products. Wires differ with regard to the tooth contour and the profile cross section, the structure or the surface treatment.

We supply tailored clothings for each roll. These are based on the roll type, the raw material, the production speed and other processing parameters.



Quality assured: All production steps are subjected to permanent online monitoring

Global availability and service

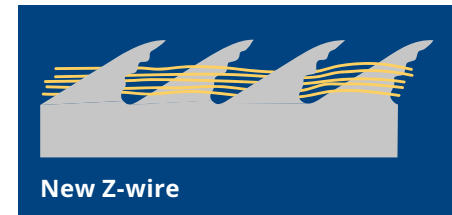
For decades TCC has been providing worldwide locally organised, customer-oriented service – and this service is continuously expanding. It ranges from one-off visits for troubleshooting to maintenance contracts and tailor-made clothing management.



State-of-the-art diagnostics minimize standstill times

Latest development: the Z-wire for high-speed nonwoven lines

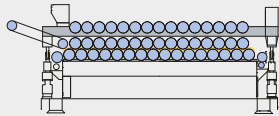
At higher speeds, the the rotational forces of the rolls increase and single fibers can eventually fly away. The special contour of the new Z-wire holds the fibers in place. It is therefore the perfect clothing for the worker/ stripper rollers of high-speed roller cards.



High operational reliability in high-speed processing of viscose or lyocell fibers



TWF-CLH crosslapper for all fiber materials



The web drafter TWF-WD in an 8 trio configuration

Forming isotropic webs



To produce webs that are particularly wide, thick or virtually isotropic, the crosslapper precisely folds the web and lays it down in several layers at high speed.

Numerous configurations allow custom-made solutions for manufacturing hydroentangles or needle-punched nonwoven.



Crosslapper CLH and web drafter WD

Advantages of the CLH crosslapper:

- Safe web transport without floating draft zones
- Reduced load during acceleration and braking due to weight reduction
- Increased energy efficiency due to latest drive technology



The crosslapper's CROSSMASTER system eliminates higher web weights in the edge area

Even web thickness over the entire working width

Special attention is given to a uniform web weight distribution over the layered web's entire working width. For profiling, TWF-CLH features the CROSSMASTER, a control system that works with specific drafts. Unwanted side effects of processing, for instance increased web density at the edges, are monitored and corrected.



Giving a crosslapped web the final touch: TWF-WD web drafter

4/6/8 web drafter: measurable increase in speed

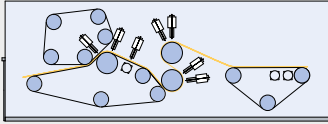
A crosslapper usually pairs up with a web drafter to finally give the web the desired characteristics. The drafter TWF-WD reorients the web's fibers and adjusts both web weight and thickness. With up to eight drafting zones, it also increases the line speed – especially when processing lightweight webs.

Crosslappers

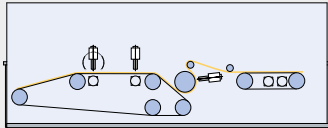
Output	over 140 m/min
Laying width	< 8,000 mm
Number of layers	4–76 layers

Web Drafter

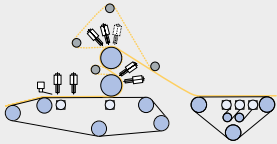
Drafting zones	4–8
Working width	< 9,000 mm
1 transfer roll between each trio	



AquaJet for high-speed spunlacing lines.



AquaJet is also a proven solution for low capacity cotton pad lines with Trützschler flat-top cards.



Special-configuration AquaJet for wet-laying/spunlacing (WLS and CP) processes

AquaJet for hydroentangling (spunlacing)

Hydroentangling with the AquaJet has two advantages:

- It's fast – up to 500 m/min line speed can be realized for carded and even 1,000 m/min for spunlaid webs. It is an ideal technology for mass production.
- It's versatile – a proved bonding technology for many web types and fiber materials such as thin or thick carded cotton webs, carded/crosslapped webs or wet-laid webs.

AquaJet for various types of nonwovens

The AquaJet hydroentangles single-layer, light-weight materials as efficiently as heavy-weight, multi-layer materials for cotton pads or filter media. No special equipment is needed for manufacturing plain, structured or perforated nonwovens.





AquaJet in a carding/spunlacing line



A finely tuned system: AquaJet spunlace drum and jet heads



AquaJet in a wet-laying/spunlacing WLS line

Trendsetting design

- Patented jet head design for a laminar, turbulence-free water flow
- Optimized water outlet for focused water jets
- For up to 400 bars water pressure (needed for filter and coating materials for instance)
- Bent-proof, thin-walled spunlace drum shell with some 50% open surface for efficient water suction

Easy handling

To maximise uptime, AquaJet's components are easy to access, clean and maintain:

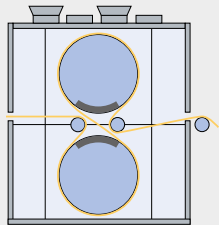
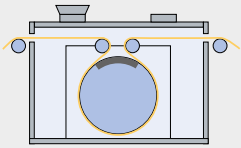
- Easy-to-change shells (drum sleeves) for web structuring and/or perforation
- Design for quick change of jet strips or spunlace drum's suction bars
- The jet head itself contains no filters. Police filters are placed outside for easy accessibility. In an optional duplex configuration, filters can be changed without stopping the line.

Hydroentangling in WLS and CP lines

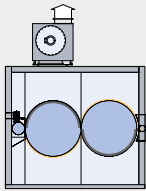
AquaJet's special layout in WLS and CP lines ensures gentle material transport, effective fiber entangling and homogeneous nonwovens. For either perfectly flushable wipes or strong baby and body wipes.

Water circuit

AquaJet is integrated in either Trützschler Nonwovens' or Voith's comprehensive water treatment system. It comprises equipment for high-pressure water jet generation, dewatering, air/water separation and filtration. Various measures minimize water consumption and fiber loss.



The new Modular Performance Dryer (MPD): High-space-optimized and a high drying capacity



All modular drum dryers (MDD) are tailor-made to the line's specific requirements.

Dryers for hydroentangled nonwovens

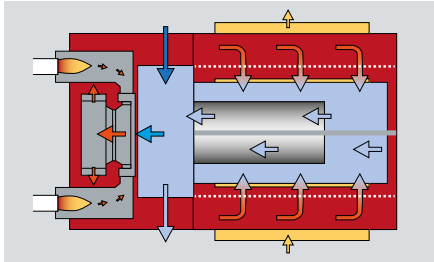
Drum dryers combine a high evaporation capacity with a small footprint. All are tailor-made to the line's specific requirements. It is your product and your process which determine the evaporation capacity needed and the appropriate size of the dryer.

NEW: MPD, the Modular High-Performance Dryer

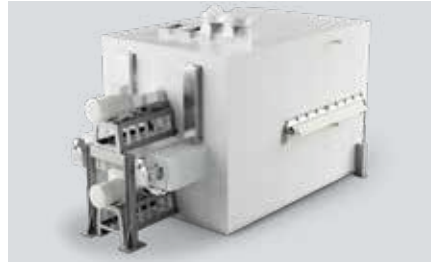
A drying drum with a diameter of 2,000 mm and the possibility to stack 2 modules, deliver highest drying capacity in a small footprint into a hydroentangling line.

To reduce thermal energy consumption, Trützschler's new MPD dryers also feature intermediate chambers. The basic idea: extract the colder, moist exhaust air before heating it up.





The intermediate chamber: air flow separation for reduced heat loss



A variety of heating systems to exactly meet product, cost and environmental requirements



Highest evaporation capacity: a 5-drum dryer in a heavy duty cotton nonwoven line

Built-in energy efficiency

An intermediate chamber is the core of all our vertical, multi-drum and Omega dryers. It's advantages:

- No heating of exhaust air
- Significant reduction of thermal energy consumption
- Reduced air turbulences caused by air extraction
- High drying uniformity over the entire working width
- Opportunity to integrate heat recovery from the beginning or retrofit a HRS system at a later time

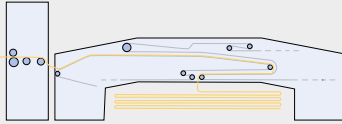
Individual heating systems

MPD not only features classic heating systems such as natural gas, electricity, steam- or thermal oil-based heat exchangers. The dryer can also be operated environmentally-friendly with hydrogen or biogas.

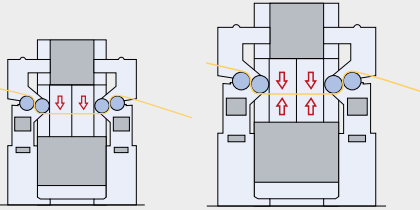
A two-module MPD dryer opens up more possibilities. The natural gas-based first module extracts most of the water contained in the nonwoven. It can be accompanied by an electrically heated second module to realize a cooler temperature zone for final drying.

Modular design

All drum dryers allow for an easy start-up since they arrive in transportable units with pre-built and pre-tested modules. The number of single parts to be handled at construction site is reduced to facilitate and systematize assembly. Well-defined module interfaces also allow for easy dryer (re-) dimensioning.



Texnology's crosslappers eliminate bottle necks and thus increase line productivity.



The needlelooms' special design minimizes stress on components thus reducing or even preventing vibrations, noise, leakage, wear and tear.



Needle-punching equipment for T-SUPREMA lines

To ensure a top-quality end product, all machinery is perfectly adapted to the application and to each other. T-SUPREMA components stand out due to their high availability, efficiency and ease-of-use.

T-SUPREMA's fiber preparation and web forming

The Trützschler bale and fine openers, weighing and blending systems ensure reliable fiber transport even in high throughput lines. Information on the T-BLEND system, Trützschler Nonwovens' cards, crosslapper and web drafter are described on pages 26-33.

Texnology's line of crosslappers guarantee web homogeneity, productivity increases and low energy consumption. Every crosslapper is separated from the card by Stirovelo, a web profiling unit. Stirovelo gener-

ates a variable density web at constant speed. This profiling system eliminates any "smile" effect on web thickness.

The subsequent web drafter is characterized by five individually driven and precisely adjustable draft trios. They give the crosslapped web exactly the characteristic needed for the subsequent needling process.

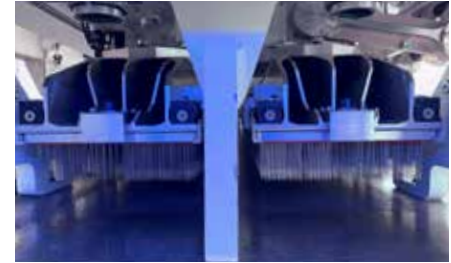
Crosslapper, web drafter and batt turner are provided on a case-to-case basis by either Texnology s.r.l. or by Trützschler Nonwovens.



Forming the perfect web by automatic web weight regulation



Enabling T-SUPREMA's high product widths of up to 8,500 mm



Low vibration designs minimize stress on components

Closed loop profiling system

Texnology's automatic web weight profiling system relies on data generated by the X-ray-based traversing scanner before the winder. This continuous information is used to automatically regulate the Stirovelo system for feeding both crosslapper and card feeder.

Stirovelo generates a variable density web at constant speed so the finished nonwovens show a uniform thickness over working width.

A wide range of needlelooms

Working width	up to 8,500 mm
Maximum speed	up to 1,800 rpm
Stroke amplitude	30/40/60/70 mm
Needle pattern	up to 7,000 dls/m

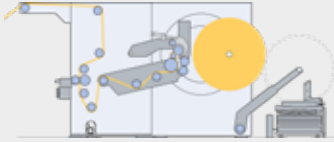
T-SUPREMA needlelooms

Six single and double board needleloom types come in working widths up to 8.5 meters. Needlelooms with a revolutionary elliptical needle movement are available as well.

In addition to the comprehensive product portfolio, different needle densities, stroke amplitudes and stroke frequencies etc. ensure perfect adaptability to customers' requirements.



Scan the code for detailed product information



Suited for almost any material: turret disc winder TWW-TD with inline slitting capability



A robust solution: TWW-SD, a master roll winder with many options

Winding solutions

Trützschler Nonwovens also supplies various winders for a broad range of nonwoven production lines.



Precisely adjusted tension allows for winding sensitive materials such as cotton pads

Fully automatic turret disc winder with inline slitting capability

TWW-TD winders combine circumferential and axial drives to wind rolls with optimal hardness. The winders are equipped with an inline slitting system. No further slitting/rewinding step is needed to produce ready for sale (narrow) rolls. The inline solution requires lower investment, less labour costs and less space compared to an offline solution.





TWW-SD in a high-speed spunlacing line

Master roll winder TWW-SD

For offline configurations the SD master roll winder is the best choice. The surface-driven, robust winder is equipped with an integrated cross cutting and engagement system.

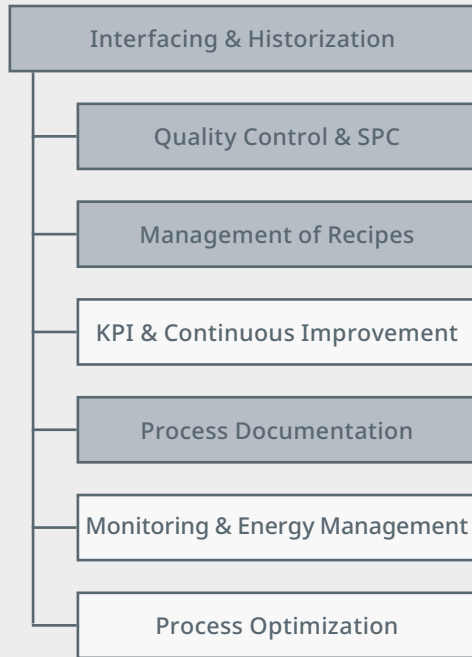
A bunch of options, for instance 6" winding shafts, S-wrap pull roller, a second spreader roll or longitudinal knives, lets the SD winder also meet more sophisticated requirements.

Automatic winder with inline slitting


Material width	< 3,400 mm
Roll diameter	< 1,500 mm
Production speed	< 450 m/min

Surface-driven winders

Material width	up to 3,600 mm
Roll diameter	< 1,800 mm
Production speed	< 200 m/min



T-ONE modules for systematic and digitalized work routines

 basic package

T-ONE - increasing production performance

T-ONE delivers direct benefits to line operators, quality engineers, product developers and the management.

A digital working environment for the entire production

The various software modules not only digitalize work routines but also collect and file all relevant production data (specifications, roll measurements, recipes and changes, line performance KPIs, sensor data etc.). Moreover, T-ONE implements powerful AI-based algorithms for line simulation and optimization.

An open client-server system

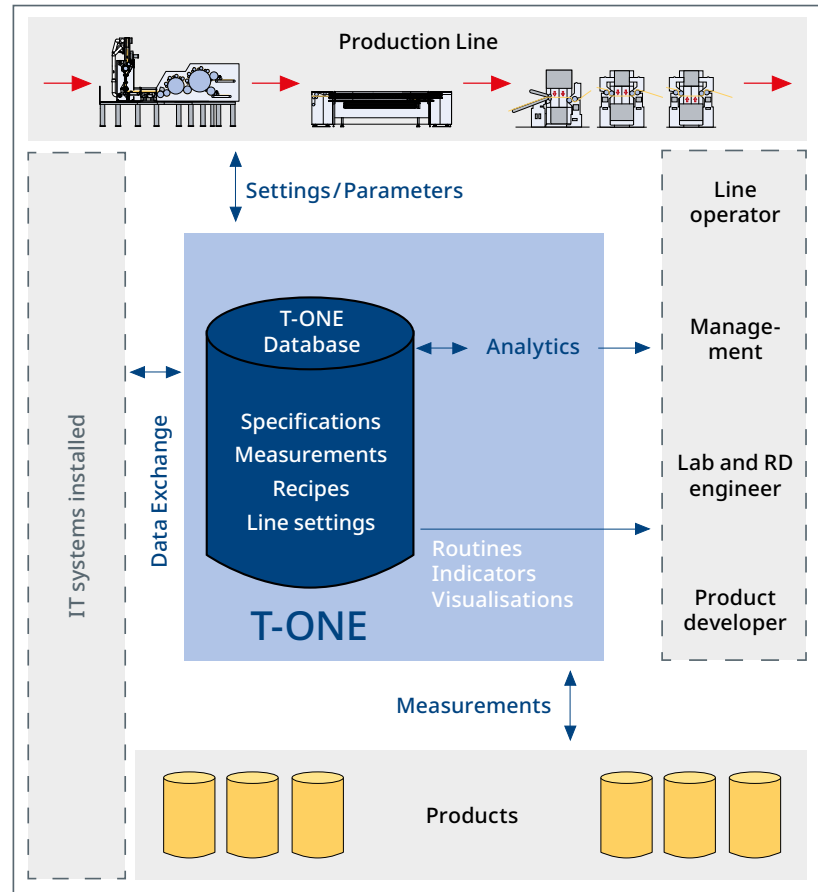
T-ONE's architecture and its refined user management give you 100% control over all data. The heart is a database installed on one of your (virtual) servers. The clients are Windows-based computers. As an open system, T-ONE not only neatly fits into your existing IT environment but is also able to communicate with every open machine in the production line.

Setting up a T-ONE project

The software will be customized to your production line and your specific requirements, to the IT solutions already installed in your production and even to your ERP system if desired.

Benefits of working with T-ONE

- Save money – by systematically reducing energy consumption
- Save resources – support routine tasks (e.g. quality control) and save up to 40% time by the digitalized recipe management
- Focus on important things – continuously monitor line efficiency, take action and keep track of improvement work
- Stay informed – visualize product quality and detect rising issues in advance
- Accelerate complex work – analyze line settings, simulate line behavior and get advise on better machine settings
- Get access to all production-related data – the complete history of product specifications, quality data, recipes and line settings





Welcome to NCTC! (Nonwovens Customer and Technology Center)

In Egelsbach, Germany, your ideas become reality. Fast and reliable. Just 15 kilometers away from Frankfurt/Main Airport more than 20 multi-functional line configurations await you.

Fully equipped playground

NCTC – the largest nonwovens trial center of its kind – is equipped with laboratory and testing capabilities. Moreover, it features a showroom with hundreds of nonwoven materials.

On the playground

More than 5,000 square meters are dedicated to two independent nonwoven lines for:

- Crosslapped/needle-punched
- Carded/spunlaced
- Wet-laid/spunlaced (WLS)
- Spunlaced carded/pulp
- Through-air bonded nonwovens

Both lines feature the whole range of Trützschler Nonwovens' equipment.

Opportunities galore!

Running to full capacity?

Bring your own raw material, process and product ideas to NCTC. Together, we'll make the most out of it.

In doubt about performance promised?

Visit NCTC and put our machines through their paces.

Pressed for optimized processes?

Discuss with experienced experts and develop the optimum manufacturing process.

No time to train new people?

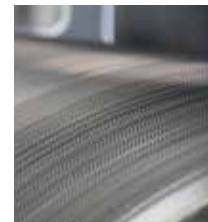
Send them to NCTC for thorough qualification and focused hands-on training.

In search for future-fit products?

Take advantage of our profound knowledge and partnerships.

In need for test material?

If you are considering entering new markets, Trützschler Nonwovens can provide you with roll goods for testing.



We are always by your side

Your equipment has a high utilization and sometimes operates under tough operating conditions; therefore, we recommend regular inspection, maintenance, and repair to keep its performance high.

Trützschler service offers specialized solutions to help maintain your operations. The provision of original parts, repair and maintenance maximizes uptime and performance. Engineers in the worldwide Trützschler service network have the specialized skills and expertise to save you time and resources.

Moreover, let us give you peace of mind. With Trützschler service contracts maintenance and maintenance costs become predictable. We will take care of your service schedule to keep your equipment running at peak efficiency.

Contact us directly at spareparts-tnw@truetzschler.de

or contact your local Trützschler service organisation

After Sales Service

Choose our individual and specialized services:

- Inspections and assessments
- Plant efficiency consulting
- Service agreements
- Smart remote services
- Upgrades and modernizations
- Original spare and wear parts
- Trainings on-the-job and in-house



It's your choice

Inspections, audits and repair services

To reduce future unplanned downtime, we recommend regular mechanical and operational inspections. Our engineers work in accordance to original supplier manuals and help debottleneck line. Our global service network is happy to support your plant manager.

Service contracts

Setting up a regular scheduled service, including remote support, not only guarantees an efficient and reliable production. Service contracts also make maintenance costs transparent and predictable.

Modifications

Our nonwoven lines are designed to run to last for decades. But technology advances open up new opportunities. To keep your system up-to-date, we offer various upgrades.

Trainings

Our NCTC Technical Center in Egelsbach allows for training your staff even before your new line has been started up. We offer comprehensive on-the-job training before the line is handed over - and at any time thereafter.

Original parts

We believe in original parts to keep line performance high. Let's talk about your individual needs. Our high-quality parts packages ensure the machines retain their value over time.



TRÜTZSCHLER
S P I N N I N G

Fiber preparation installations: Tearing line · Bale openers · Mixers
Cleaners / Openers · Foreign part separators · Dust separators · Tuft blenders
Waste cleaners | Cards | Draw frames | Combing machines |
Digital Solutions

TRÜTZSCHLER
N O N W O V E N S

Bale openers/mixers | Card feeders | Cards/crosslappers
Wet-laying lines | Hydroentangling, needle-punching, thermo- and
chemical bonding lines | Finishing, drying, winding machinery |
Digital Solutions

TRÜTZSCHLER
M A N - M A D E F I B E R S

Carpet yarn systems (BCF) · Industrial yarn systems |
Digital Solutions

TRÜTZSCHLER
C A R D C L O T H I N G

Metallic wires: Cards · Cards long staple · Cards Nonwovens
Rotor spinning | Flat tops | Fillets | Carding segments
Service machines | Digital Solutions | Service 24/7

www.truetzschler.com