

Company Presentation

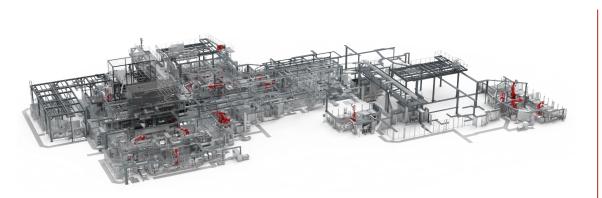
Aumann Lauchheim GmbH



Aumann at glance



Fully automated production lines...

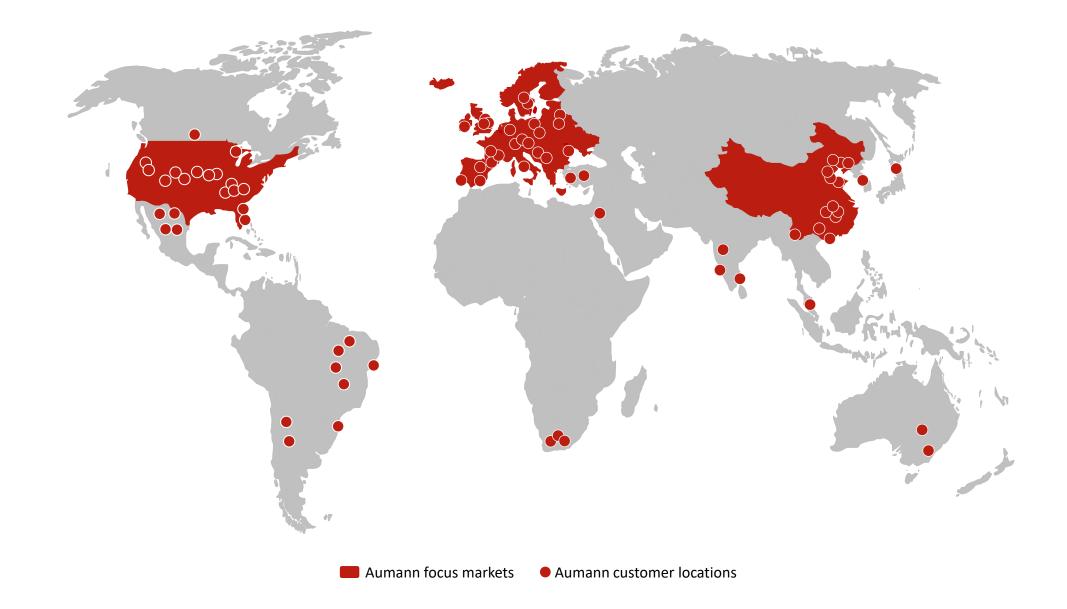


...with focus on the entire range of electromobility



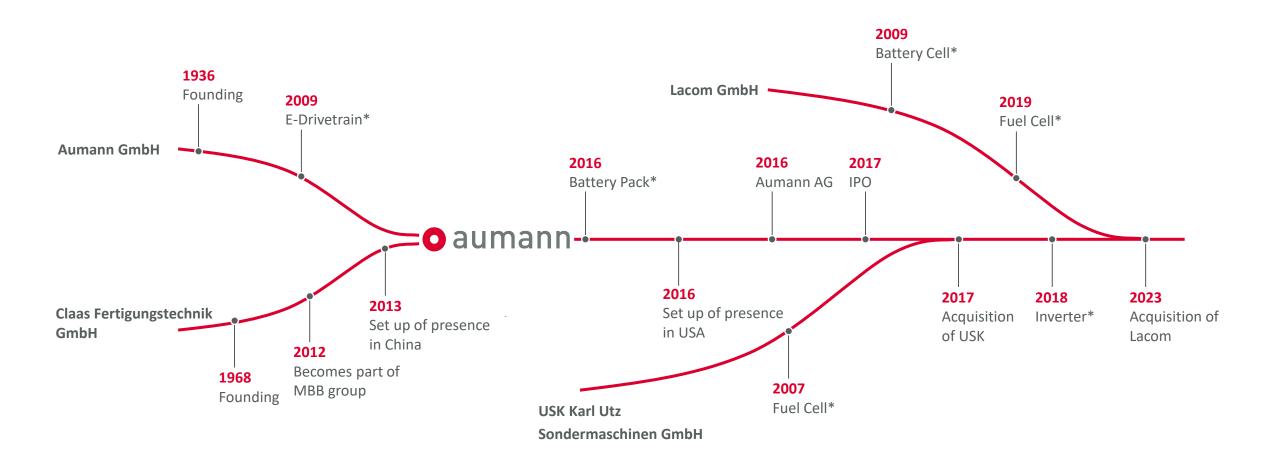


Aumann main markets



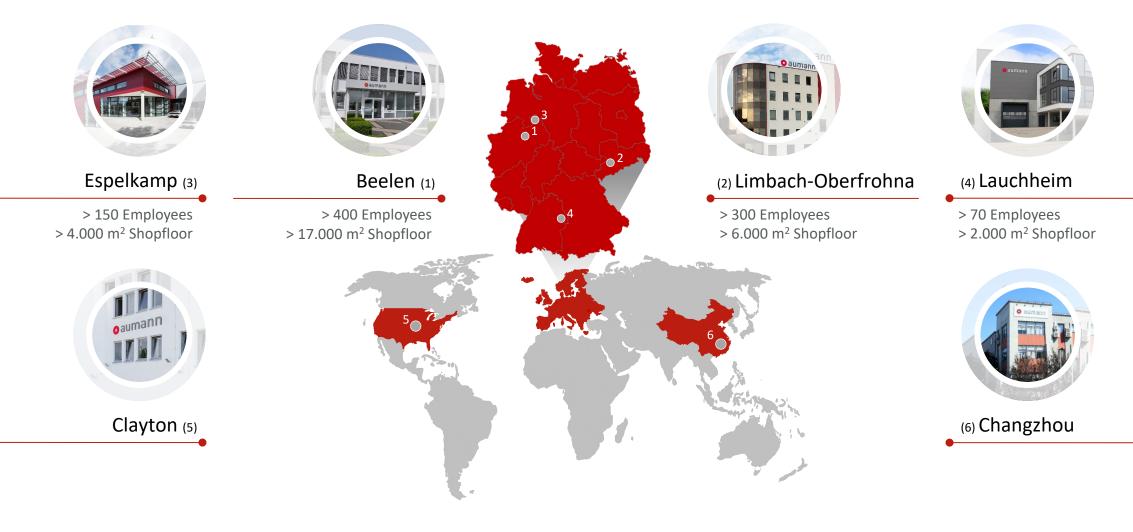


Aumann history



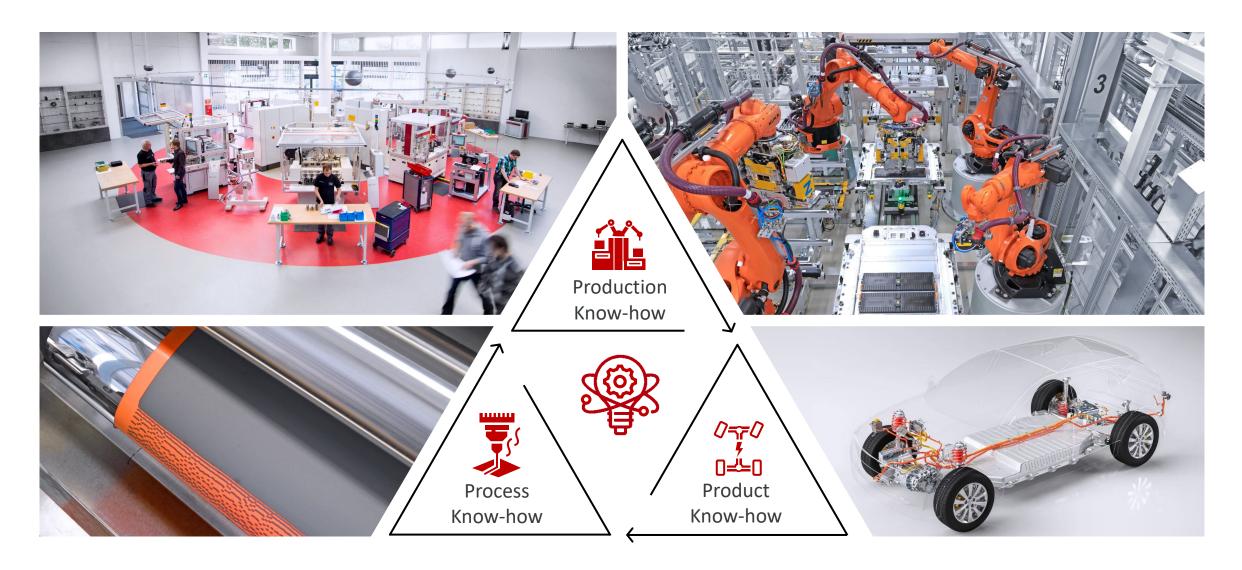


Global footprint to serve our customers





Aumann's innovation competence is the foundation for success





Unique combination of process competencies



Assembly

Press-Fit / Joining Dispensing / Fastening Stacking Bin-Picking Contacting Gripping Automation / Handling



Winding

Needle Flyer Linear

Hairpin / I-Pin

Continuous Hairpin

S-Winding

Pole chain



Converting

Coating Laminating Drying Slitting Calandering Inspection Winding



Welding

MIG / MAG Laser-Hybrid / -Coldwire Laser Remote Soldering Machining Piercing Tools & Dies



Metrology

Optical Measurement Tactile Measurement End of Line Testing Weld Seam Inspection Functional Test Electrical Test Leakage Test



Deep product expertise in our focus markets



E-Mobility

Battery Module & Pack Battery Cell E-Traction Inverter & Controls E-Auxiliary Drive Fuel Cell



Automotive

Powertrain Transmission Electronics & Sensors Dynamics Components Interiors Structures



Consumer Goods

Photovoltaic Renewables Energies Textile & Flooring Power Tools Home Appliances Micromobility



Industry

Industrial Motors Electrolyzer Functional Fabrics Industrial Appliance Aerospace Medical



Technical centers



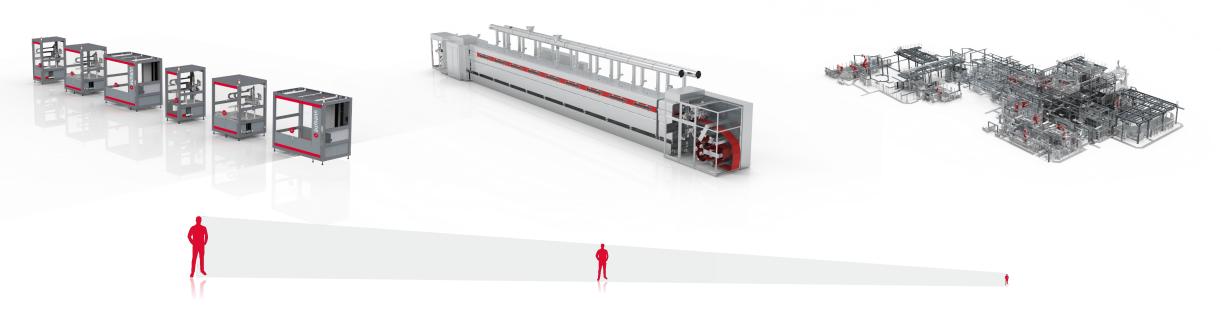


Unique range of solutions tailored to the requirements of electromobility

Modular solutions

Process solutions

Turnkey solutions



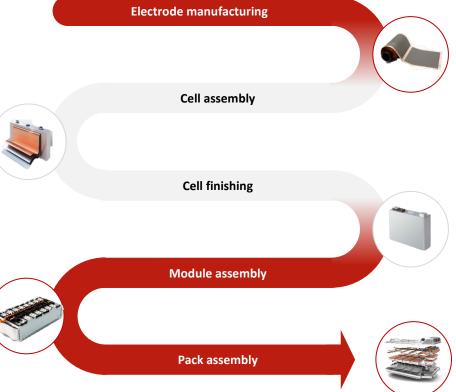
Standardised process stations and modular cell systems for flexible production lines Complex production lines with specialized Aumann process knowhow, e.g. converting, winding Large-volume series production systems, tailored to the requirements of our customers



Aumann is a leading supplier of production solutions for advanced battery systems

Battery System

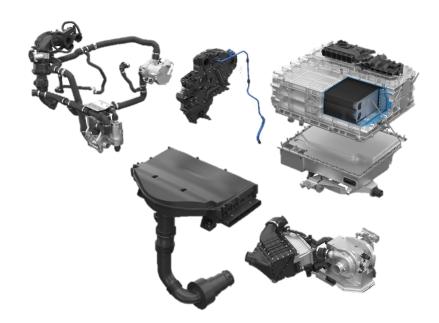


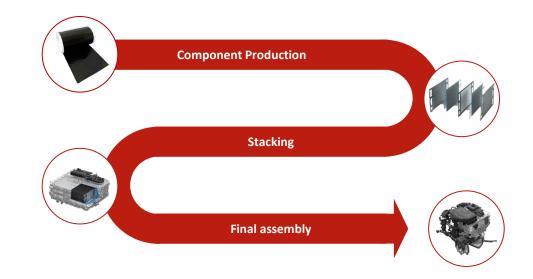




We are a turnkey supplier for fuel cell production solutions

Fuel Cell





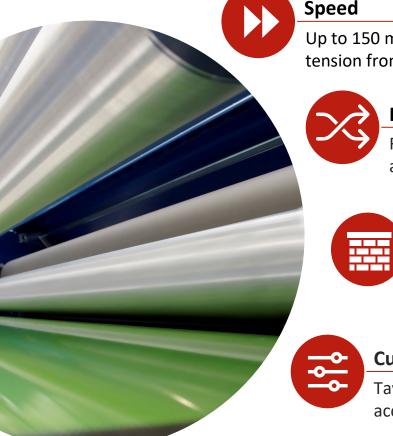


Converting classic – product portfolio





Converting classic – product highlights



Speed

Up to 150 m/min production speed with coating width up to 5.200 mm and web tension from low (e.g. bi-elastic shoe knit material) to high (e.g. broad loom carpet)

Flexibility

Revolver Dosing Head: One application system – 3 different application methods

Durability

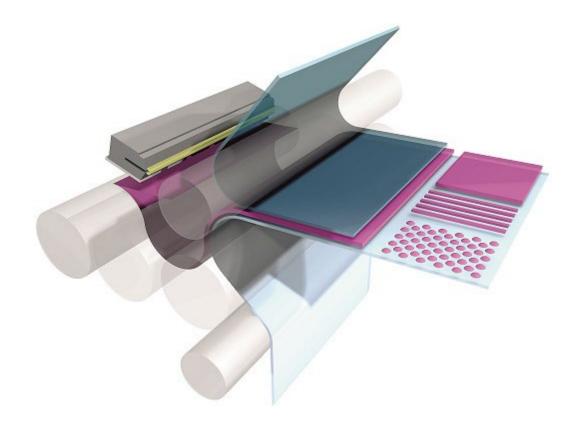
Developed and designed for demanding production environments (> 20 years of experience, > 200 installations)

Customized

Taylor-made systems out of standard components according to individual customer requirements



Application systems

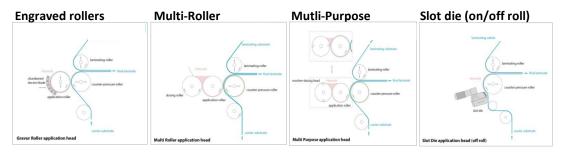


As one of the world's leading suppliers of laminating and coating systems, our innovative machine concepts have paved the way to success. The Aumann Lauchheim slot die system, the engraved roller process, as well as the multi-roller technology are examples of the implementation of future-oriented ideas using state-of-the-art technologies. Our Multi-Purpose System is the top of innovation and shows what Aumann is capable of. We consistently focus on the requirements of the market and our customer needs. They are an essential part of the ongoing development of our products.

Machines and components for laminating and coating of flexible, mostly thin materials (foil, textile, foams, carpet, paper) with adhesives, pastes, hot melts, etc. in different application quantities $(2g/m^2 - 1500g/m^2)$.

In-house developed coating processes for different applications:

Order systems with:





A-Compact



For processing thermoplastic and reactive hotmelts for multifunctional laminates and full-cover coatings. The COMPACT is the machine that offers full functionality in the smallest space as the winders and control system are integrated into the machine frame.

Broad application for all types of flexible laminates such as technical textiles, automotive interior components, multifunctional textiles, medical textiles, home textiles, materials for construction and industrial use (such as roofing membranes, abrasives, adhesive tapes) and fiber-based composites (such as filter media).



- Application speed
- Coating Width
- Application Weight
- Types of application
- Heating medium
- Application Temperature 50°C 210°C
- Adhesive viscosities 2.000 - 80.000 mPas

1 – 40 m/min

bis 3.200 mm

Thermal-Oil

 $5 - 40 \text{ g/m}^2$ (with engraved roller)

Dot coating (with engraved roller) Full-cover coating (with plain roller)

 $10 - 150 \text{ g/m}^2$ (with plain roller)



- Roll-to-Roll
- Non-Stop
- Web Cleaning
- Edge Cutting
- Data Connection to customer systems



A-Evolution



The A-EVOLUTION combines proven Aumann technology with high production speed to provide a versatile solution for a wide range of flexible laminates. From technical textiles, automotive and transportation to multifunctional outerwear, medical applications, home textiles and industrial supplies - this system meets the highest demands.

With modular expansion options, the A-EVOLUTION becomes the heart of a customized roll-to-roll or non-stop production system for maximum efficiency.



Specifications

- Application speed
- Coating Width
- Application Weight
- Types of application
- Heating medium
- Application Temperature 50°C 250°C
- Adhesive viscosities 2.000 - 120.000 mPas

1 – 100 m/min

1.800 - 3.500 mm

 $5 - 40 \text{ g/m}^2$ (with engraved roller)

Dot coating (with engraved roller) Full-cover coating (with plain roller)

Thermal-oil (max 250°C) or hot water (max 90°C)

 $10 - 150 \text{ g/m}^2$ (with plain roller)



Options

- Roll-to-Roll
- Non-Stop
- Manual or automatic splice
- Web Cleaning
- Edge Cutting
- Data Connection to customer systems



A-Duplex





Specifications

- Application speed
- Coating Width
- Application Weight
- Types of application Multi Purpose
- Heating medium
- Application Temperature 50°C 210°C
- Adhesive viscosities 5.000 –60.000 mPas

5 – 150 m/min

 $5 - 40 \text{ g/m}^2$

Thermal-oil

1.800 - 3.200 mm

The A-DUPLEX offers all the advantages of the proven Aumann Lauchheim technology. With two integrated applicators in combination with high production speed - makes it possible to achieve a high production volume of "triplex laminates" in a single pass.

Broad application for all types of flexible laminates such as technical textiles, automotive interior and exterior components, medical textiles, construction and industrial textiles (such as roofing membranes), and fibre-based composites (such as filter media).

Options

- Manual or automatic splice
- Web Cleaning
- Edge Cutting
- Data Connection to customer systems



A-Pilot "Textile"



Specifications

- Application speed
- Coating Width
- Application Weight
- Types of application
- Heating medium
- Application Temperature 50°C 210°C
- Adhesive viscosities 2.000 - 60.000 mPas

1 – 20 m/min

Thermal-oil

 $5 - 40 \text{ g/m}^2$ (with engraved roller)

Dot coating (with engraved roller) Full-cover coating (with plain roller)

 $10 - 150 \text{ g/m}^2$ (with plain roller)

500 mm

The PILOT is the ideal solution for production-related testing of lamination and coating processes. It offers all the advantages of Aumann Lauchheim technology in the smallest of spaces and enables the testing and validation of new developments for all AUMANN systems. Working widths of up to 500 mm guarantee meaningful test results with the simplest operation and simplified material handling for an economical validation phase. Two versions are available, one for textile applications and the other for carpets.



Options

• Data connection to customer systems



A-Combi



The COMBI is the ideal solution for coating prefabricated blanks and is characterized by a space-saving and ergonomic design. The coating system is able to apply the adhesive both over the entire surface and as a screen dot using proven roller application technology. The COMBI stands for a high level of process and product reliability with maximum costeffectiveness.

Areas of application: textiles, automotive, composites and floor coverings.



Specifications

- Application speed
- Coating Width
- Application Weight
- Types of application
- Heating medium
- Application Temperature 50°C 210°C
- Adhesive viscosities 2.000 - 60.000 mPas



Options

- Shuttle
- Conveyor Belt
- Roller Conveyors
- Data Connection to customer systems

650 – 1.800 mm $5 - 40 \text{ g/m}^2$ (with engraved roller) $10 - 150 \text{ g/m}^2$ (with plain roller) Dot coating (with engraved roller) Full-cover coating (with plain roller) Thermal-oil

1 – 20 m/min



A-Giant



With its high maximum application weight, the GIANT offers the ideal conditions for coating carpet backings with a layer that can be flame-retardant or antistatic.

The machine is suitable for heavy coatings or a second backing lamination. With a working width of up to 5,200mm, effective production is ensured. With the associated peripherals, the GIANT can be designed as a non-stop production system or integrated into an existing wet coating system as a hybrid solution.



- Application speed Coating Width
- Application Weight
- Types of application
- Heating medium
- Application Temperature 50°C –250°C
- Adhesive viscosities 10.000 120.000 mPas



- Non-Stop
- Integration into the latex line (replacement of the latex applicator)

1 – 20 m/min

Thermal-oil

2.200 / 4.200 / 5.200 mm

 $150 - 3.000 \text{ g/m}^2$ (with plain roller)

Full-cover coating (with plain roller)

- Hybrid (latex and hot melt)
- Continuous monitoring of application weight
- Data connection to customer systems



A-Pilot "Carpet"



The PILOT is the ideal solution for production-related testing of lamination and coating processes. It offers all the advantages of Aumann Lauchheim technology in the smallest of spaces and enables the testing and validation of new developments for all AUMANN systems. Working widths of up to 500 mm guarantee meaningful test results with the simplest operation and simplified material handling for an economical validation phase.



- Application speed
- Coating Width
- Application Weight
- Application Types
- Heating medium
- Application Temperature 50°C 210°C
- Adhesive viscosities 2.000 - 80.000 mPas

1 – 20 m/min

Thermal-oil

 $50 - 40 \text{ g/m}^2$ (with engraved groller)

 $10 - 600 \text{ g/m}^2$ (with plain roller)

Dot coating (with engraving roller) Full-cover coating (with plain roller)

600 mm

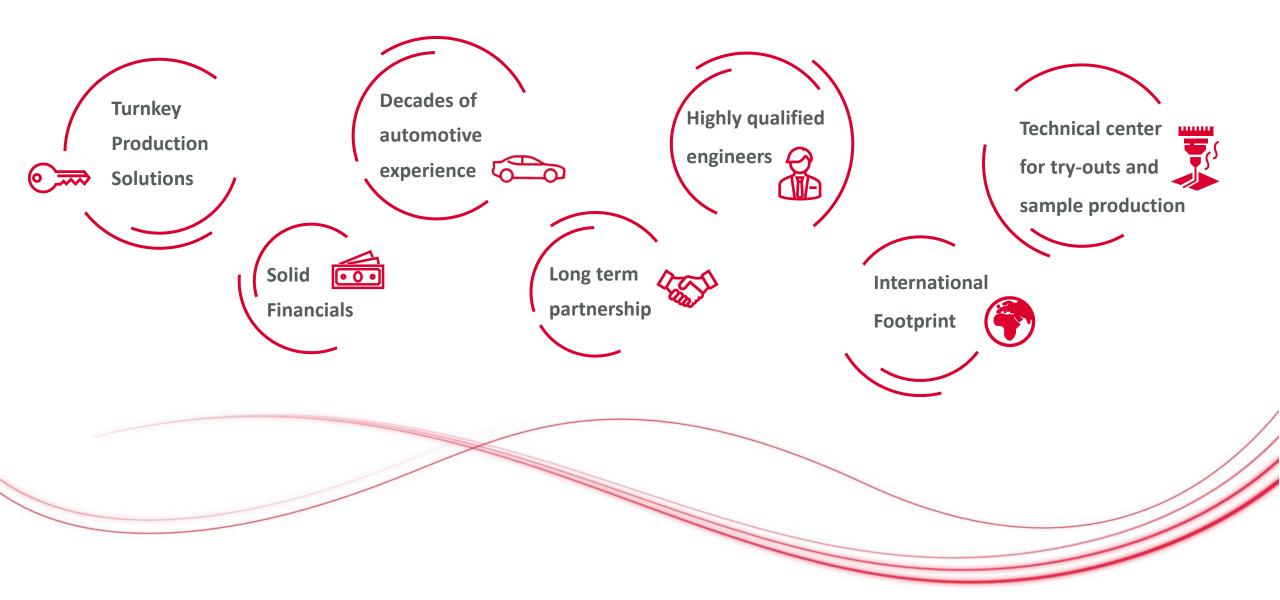


Options

• Data connection to customer systems

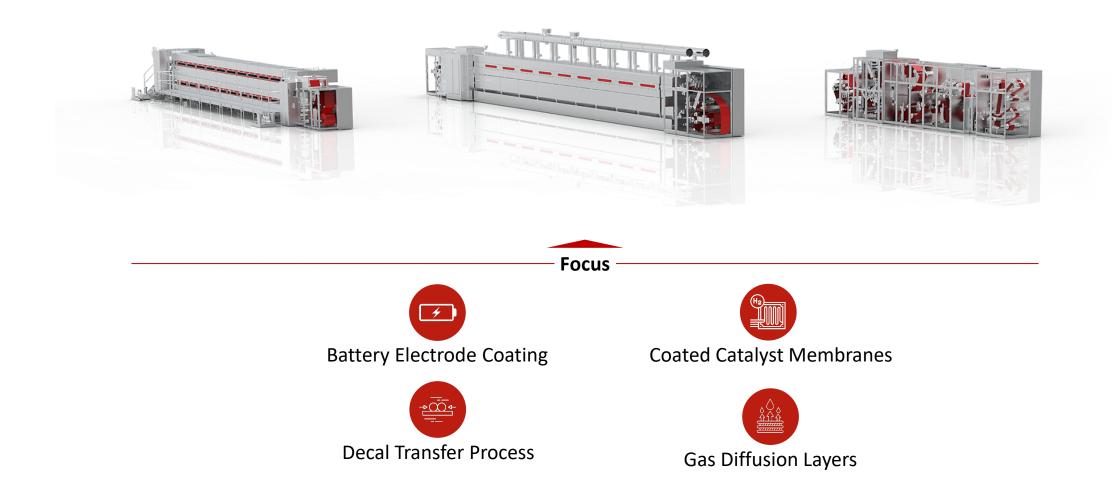


Aumann – Your partner for customized production solutions





Converting blue line – product portfolio





Converting blue line – product highlights



Up to 30 m/min production speed with coating width up to 1.200 mm and low web tension for fragile materials

Flexibility

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Various options are possible to include (e.g. measurement devices, solvent recovery, etc.)

Durability

Solid design for high requirements of the production environment

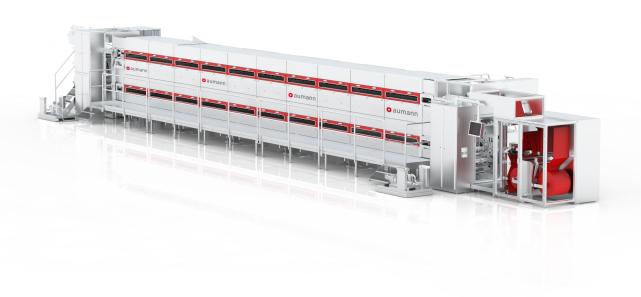
Customized

Tailor-made and customized line design for lab-, pilot- and production scale – for multiple cell sizes and designs

25



Coating anode & cathode



0,5 – 30 m/min

50 - 1.200 mm

max. 800 mm

up to AAAA

+/- 0,2 mm

5 – 300 N



Specifications

- Coating speed
- Coating width
- Coating weight wet:
- Nozzel precision:
- Width tension area
- Precision A to B side

- · Coiling and uncoiling with guided system and edge steering
- Coiling and uncoiling with manual splice
- · Coiling and uncoiling with a fully automatic splice
- Track cleaning and preparation:
 - Corona treatment
 - Touch and touchless cleaning
 - Track cleaning with anti-static unit
- Commissioned work:
 - Slot die, rotation pressure, squeegee application etc.
- Dosing technology
- Drying line single and double:
 - Convection dryer hanging and roller lead (easily modified)
- Additions such as supporting IR-drying.
- Quality check:
 - Regulation of coverage A to B side
 - Thickness measurement wet and dry
 - Surface inspection using reflected and transmitted light
 - Edge inspection (e.g., Heavy-Edges, Leading-Edges etc.)
 - Splice detection
- Special Features:
 - Implementation of the system according to ATEX guidelines
 - Customer oriented engineering
 - Partnership with customers during development with our technical experts
 - Error tracking
 - Error marking
 - DMC Code Marking
 - Data connection to customers system
 - NMP condensation system and heat recovery unit



Coating hydrogen fuel cell



0,5 – 30 m/min

40 – 1.200 mm

4 – 100 μm

up to AAAA

5 – 300 N

+/- 0,2 mm



Specifications

- Coating speed
- Application thickness wet
- Spray precision
- Coating width
- Loading track area
- Precision A to B side

- Winding and unwinding system
 - turretwinder / Single-Winder
 - with web guiding tension control
 - with edge control (centered or edge controlled)
 - with manual or automated splice
- Web cleaning and pretreatment:
 - Corona treatment
 - Touchless or contact cleaning
 - Web cleaning with anti-static units
- Application unit:
 - Slot spray application, rotary printing, knife coating, etc.
- Dosing methods
 - Drying tracks single and double stage:
 - Convection dryer hanging and guided by rolls (simple to modify)
 - alternative / supporting IR drying, contact drying, etc.
- Our solutions to ensure quality during coating for all relevant process steps include:
 - Regulator from cover A to B side
 - Layer thickness measurement wet (ATEX) and dry
 - Loading measurement
 - Surface inspection using reflected light and transmitted light process
 - Edge inspection (e.g., Heavy-Edges, Leading-Edges etc.)
 - Splice detection



DECAL | Transfer & slitting





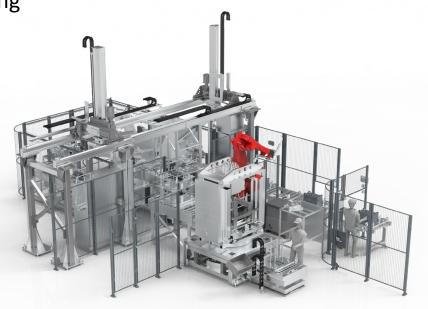
Specifications

- Coating speed
- Reachable precision covering
- Goods track width
- Goods track tension area
- 0,5 15 m/min +/- 0,2 mm max. 750 mm
- max. 750 n
- ea 150 N

- Winding and unwinding system
 - turretwinder / Single-Winder
 - with web guiding tension control
 - with edge control (centered or edge controlled)
 - with manual or automated splice
- Web cleaning with anti-static units
 - Corona treatment
 - Touchless or contact cleaning
 - · Web cleaning with anti-static units
- Preheating of the decal film by means of IR emitters and/or heated rollers
 - Calander as hot press versions with rollers, subsequent exchange can be implemented at any time: steel-steel or steel-rubber
 - Crush or shear cut incl. optional extraction of cutting dust
- Quality check and control systems:
 - Surface inspection using reflected and transmitted light
 - Geometric measuring (e.g., width measuring)
- Special Features:
 - Cleanroom or dryroom environment
 - Customer oriented engineering
 - Partnership between our customers and
 - our technical team to develop the right system
 - Error tracking
 - e.g. DMC Code marking
 - Error marking
 - Laser marking



Stacking





Specifications

- Position tolerance BPP to BPP: < 0.5 mm
- Cycle time per stack dependent on number of cells, expansion stage of the system
- Self-sufficient running time without material supply
- Production from various varieties with one system possible
- 100% quality and traceability

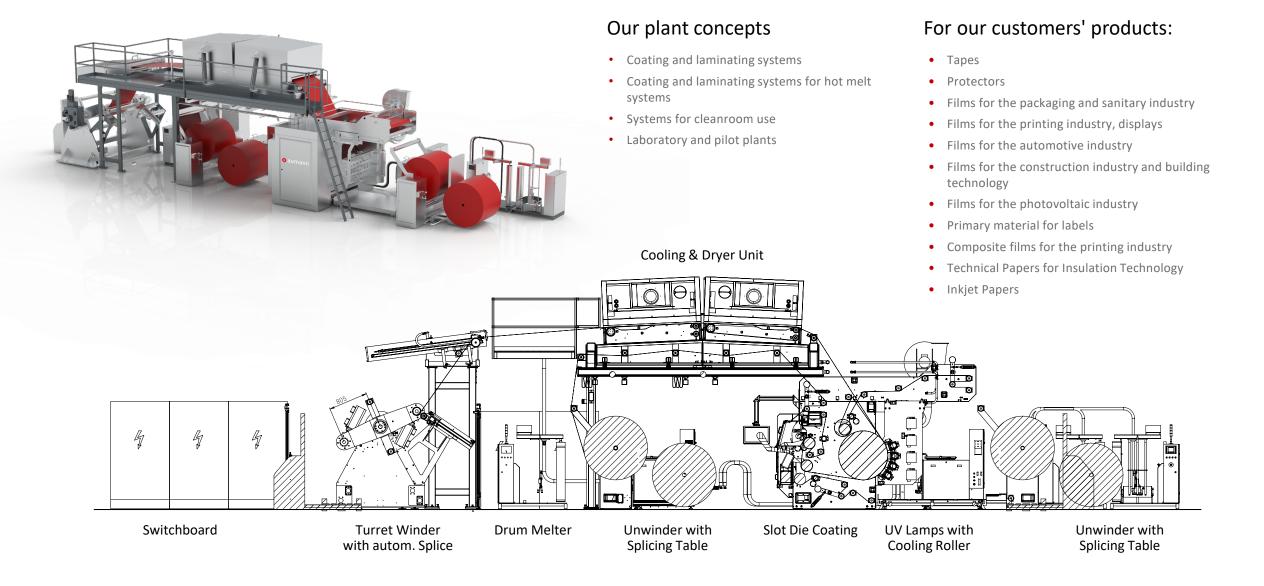
Our machine concepts are complete solutions made by Aumann, to fit the individual demands of our customers.

They include:

- Automatic feeding of individual components, alternatively a direct connection to a Aumann system
- Roundtable concept and palletizer for a neutral cycle time loading
- Fast cycle Pick and Place unit as well as SCARA-Robot
- Vacuum gripper
- DMC Scanner
- Positioning with integrated camera systems
- Transport belts
- Magazine for individual components
- Joining and pressing
- Leak testing
- Strapping (interim packaging) for transport security
- IO and NIO outward transfer e.g., container
- Rework station
- Geometric measuring of the stack
- DMC lasering, printing or gluing
- Climate control and air treatment



TAPE | UV hotmelt system





TAPE | Hotmelt system



Our plant concepts

- Coating and laminating systems
- Coating and laminating systems for hot melt systems

Roller

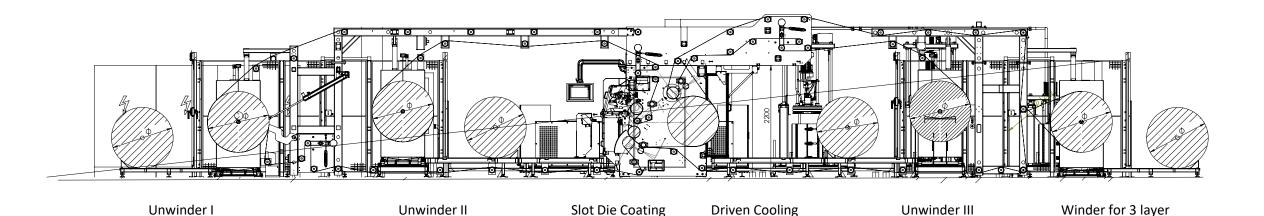
- Systems for cleanroom use
- Laboratory and pilot plants

For our customers' products:

- Tapes
- Protectors
- Films for the packaging and sanitary industry
- Films for the printing industry, displays
- Films for the automotive industry
- Films for the construction industry and building technology
- Films for the photovoltaic industry
- Primary material for labels
- Composite films for the printing industry
- Technical Papers for Insulation Technology

substrate

Inkjet Papers



System



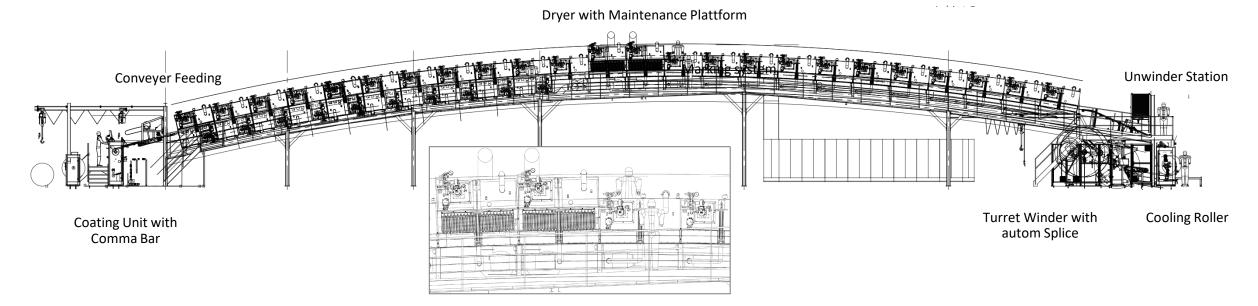
TAPE | Dispersion coating



Our plant concepts

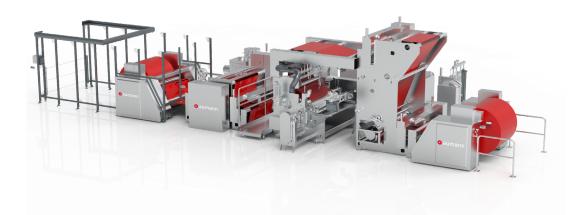
- Coating and laminating systems
- Coating and laminating systems for hot melt systems
- Systems for cleanroom use
- Laboratory and pilot plants

- Tapes
- Protectors
- Films for the packaging and sanitary industry
- Films for the printing industry, displays
- Films for the automotive industry
- Films for the construction industry and building technology
- Films for the photovoltaic industry
- Primary material for labels
- Composite films for the printing industry
- Technical Papers for Insulation Technology





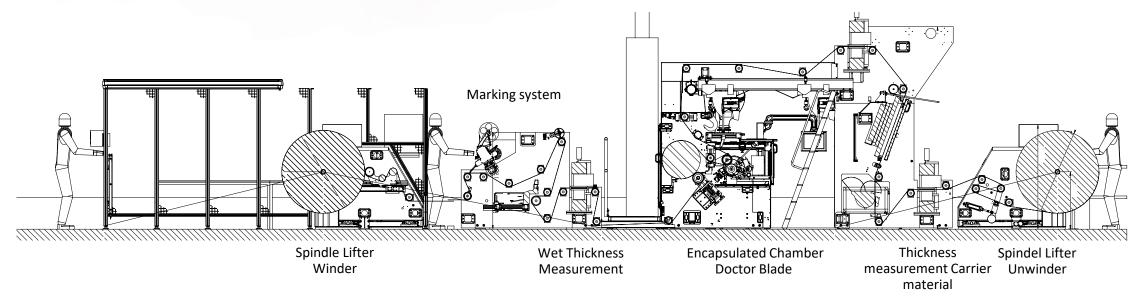
MEDICAL | Coating Line



Our plant concepts

- Coating and laminating systems for transdermal systems
- Coating systems for oral films
- Coating and laminating lines for self-adhesive products
- Cleanroom systems for dressing materials
- Machines designed to cGMP, Gamp 5 and 21 CFR 11 standards
- General cleanroom coating systems
- Modular machine concepts for easy cleaning

- Mucoadhesive Buccal Film "MBF"
- Wound Care Products
- Self-adhesive products for medical applications
- Bandages and bandages
- Skin treatment
- Diaphragms for Diagnostics
- Transdermal Delivery Systems "TDS" and Patches
- Transdermal Therapeutic Systems "TTS"
- Orally dissolvable films "ODF"
- Oral thin-film films "OTF" (oral)
- Edible foils





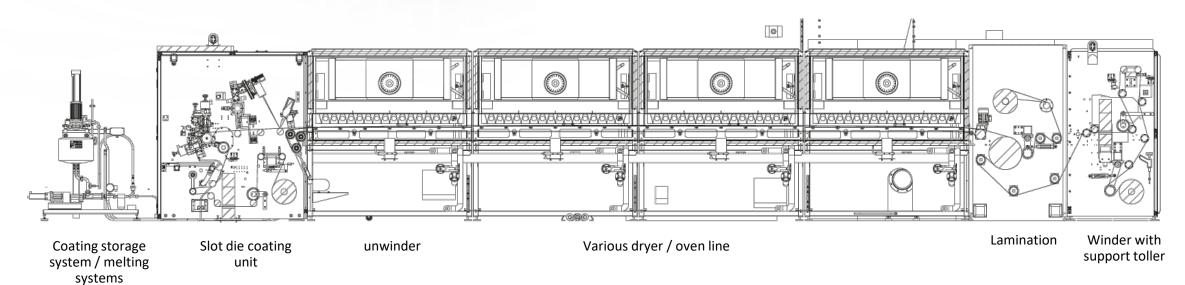
MEDICAL | Coating line



Our plant concepts

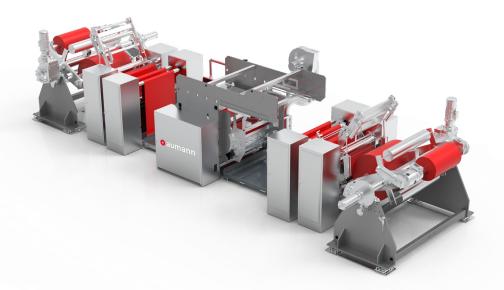
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- Modular machine concepts for easy cleaning
- Machines designed to GMP, Gamp 5 and 21 CFR 11 standards

- For our customers' products:
- Mucoadhesive Buccal Film "MBF"
- Wound Care Products
- Self-adhesive products for medical applications
- Bandages and bandages
- Skin treatment
- Diaphragms for Diagnostics
- Transdermal Delivery Systems "TDS" and Patches
- Transdermal Therapeutic Systems "TTS"
- Orally dissolvable films "ODF"
- Oral thin-film films "OTF" (oral)
- Edible foils



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DECOR | Laquering line



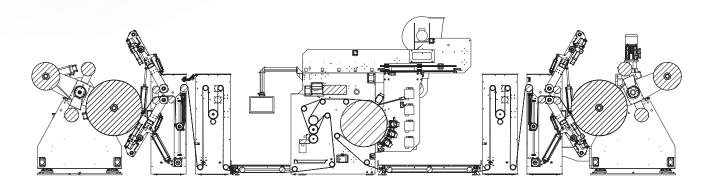
Our plant concepts

With our systems, you can laminate decorative films with thicknesses between 50 and 600 μ m and automotive films between 0.5 and 5 mm. The temperatures during the lamination process are up to 200°C.

Exemplary coating technologies:

- Inline systems for non-stop design changes during ongoing production
- Machines for direct and/or indirect laquer application
- UV varnish in "High Gloss" and "Super Matt"
- Primer Coating
- Sleeve Technology
- Trolley systems for fast product changeovers

- 2D and 3D furniture films
- Films for door panels
- Films for window profiles
- Stretch ceilings
- Films for building facades
- Aerospace and Transportation
- Instrument, door and side panels
- Seat covers and backrests, headrests
- Sun visors, armrests and gear lever boots
- Cross-linked foams



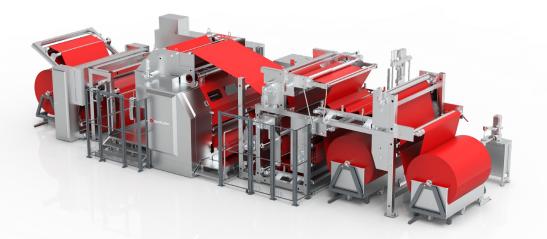
UV-Unit with Laquering station Excimer



Unwinder



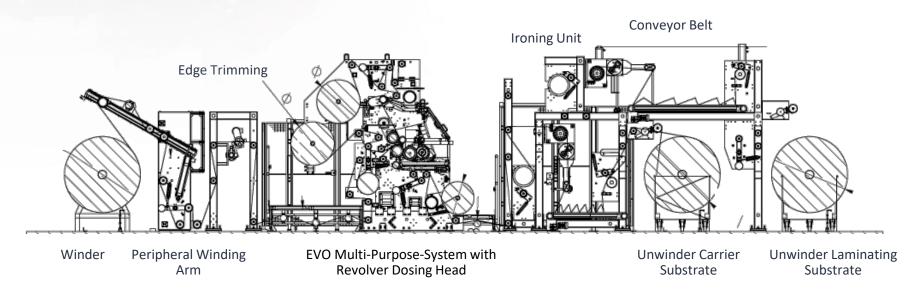
TEXTILE | Laminating and coating line



Our plant concepts

- Coating and laminating systems
- Coating and laminating systems for hot melt systems
- Systems for Non-Stop use
- Laboratory and pilot plants

- Multifunctional duplex and triplex laminates for sports and leisure clothing (e.g. outdoor)
- Protective workwear
- Heat protection articles (e.g. clothing, nongarment)
- Laminated and coated materials for the automotive industry (interior fittings)
- Foam or fleece laminated upholstery fabrics
- Laminates and coatings for the shoe industry (e.g. insoles, shoe caps)
- Textile coatings for non-slip finishing or other functional layers



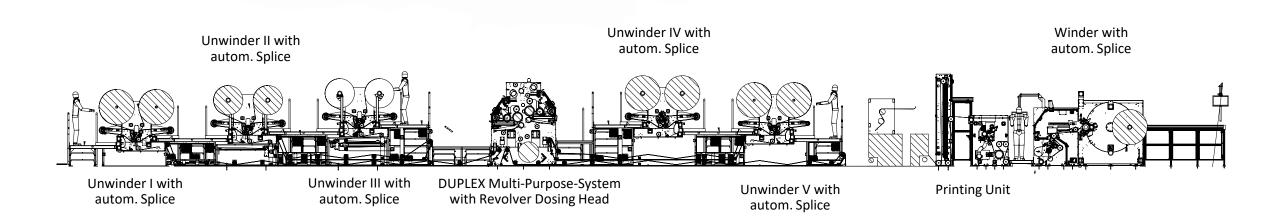


TEXTILE | Laminating and coating line

Our plant concepts

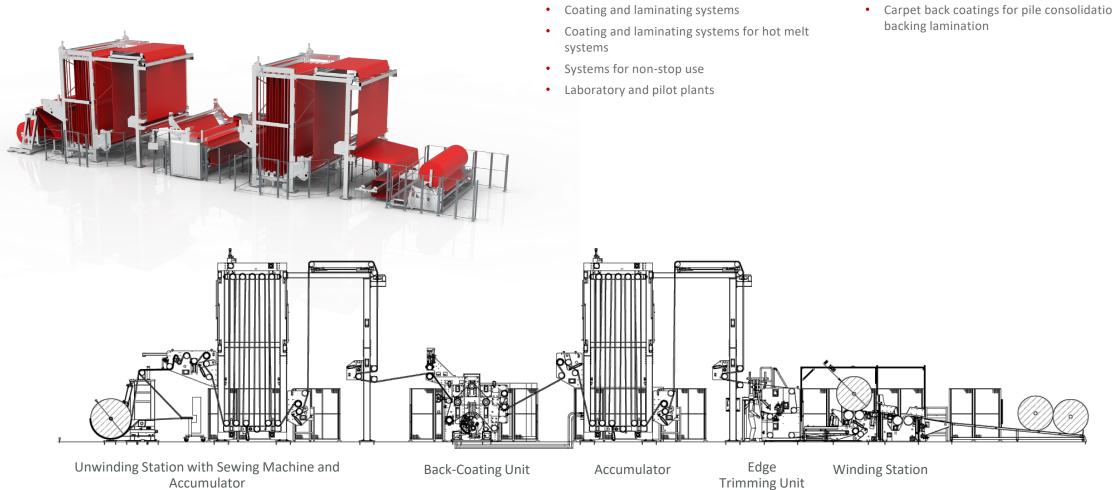
- Coating and laminating systems
- Coating and laminating systems for hot melt systems
- Systems for Non-Stop use
- Laboratory and pilot plants

- Coated and laminated nonwoven, (e.g. as painter's covering fleece, anti-slip fleece, geo-textile, etc.)
- Disposable or reusable items in the medical sector (e.g. hospital clothing, surgical drape etc.)
- Coated and laminated composites for industrial applications (e.g. filter media, abrasives, roofing underlay, etc.)





FLOORING | Laminating and coating line



Our plant concepts

For our customers' products:

• Carpet back coatings for pile consolidation or secondary



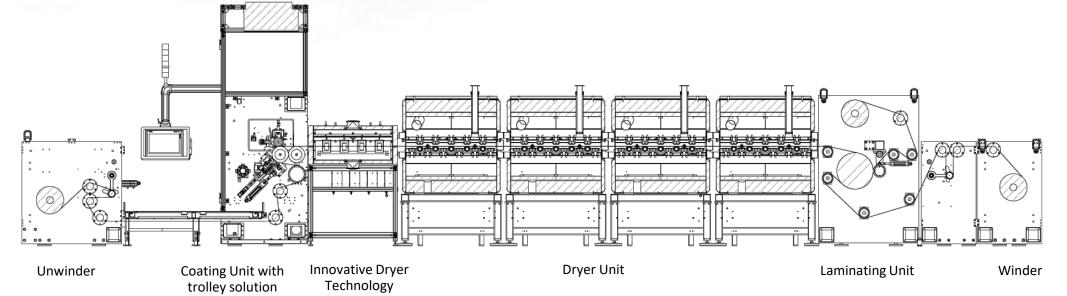
TECHNICAL CENTER | Blueline



Our plant concepts

Highly flexible laboratory system for coating in medical, renewable energy and all other applications. It offers a high degree of flexibility, which makes it possible to use various coating processes such as slot-die coating, Commabar and gravure roller systems. The integration of microwave and IR modules in the dryer is particularly interesting as it can increase the efficiency of the dryer. A laminating unit is also available after the dryer for medical applications or to apply protective films for sensible materials.

- Catalyst or Electrode Coating
- Primer coating prior to dry coating applications
- Converting applications e.g. tape or adhesives
- Medical applications e.g. OTS, TDF etc.
- Various laminates



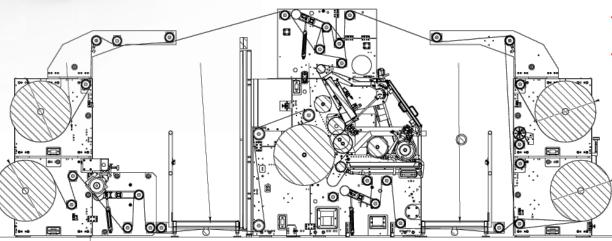


TECHNICAL CENTER | Coating



Our plant concepts

• Laboratory and pilot plants



Multi-Winder with Edge-Cutting Unit Multipurpose Laminatingand Coating Unit

Multi-Unwinder

- Multifunctional duplex and triplex laminates for sports and leisure clothing (e.g. outdoor)
- Protective workwear
- Heat protection articles (e.g. clothing, nongarment)
- Laminated and coated materials for the automotive industry (interior fittings)
- Foam or fleece laminated upholstery fabrics
- Laminates and coatings for the shoe industry
- Textile coatings for non-slip finishing or other functional layers
- Coated and laminated nonwoven
- Disposable or reusable items in the medical sector
- Coated and laminated composites for industrial applications
- Carpet backing coatings for pile consolidation or secondary backing lamination



Our customers

E-Mobility	Industry	Consumer
<image/>	<image/>	MILLIPSWILLOWILLOWILLOWILLOWILLOAEGSOMERSBOSCHDOMECSIEMENSENCONSMARCHERBaldaMELLON



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