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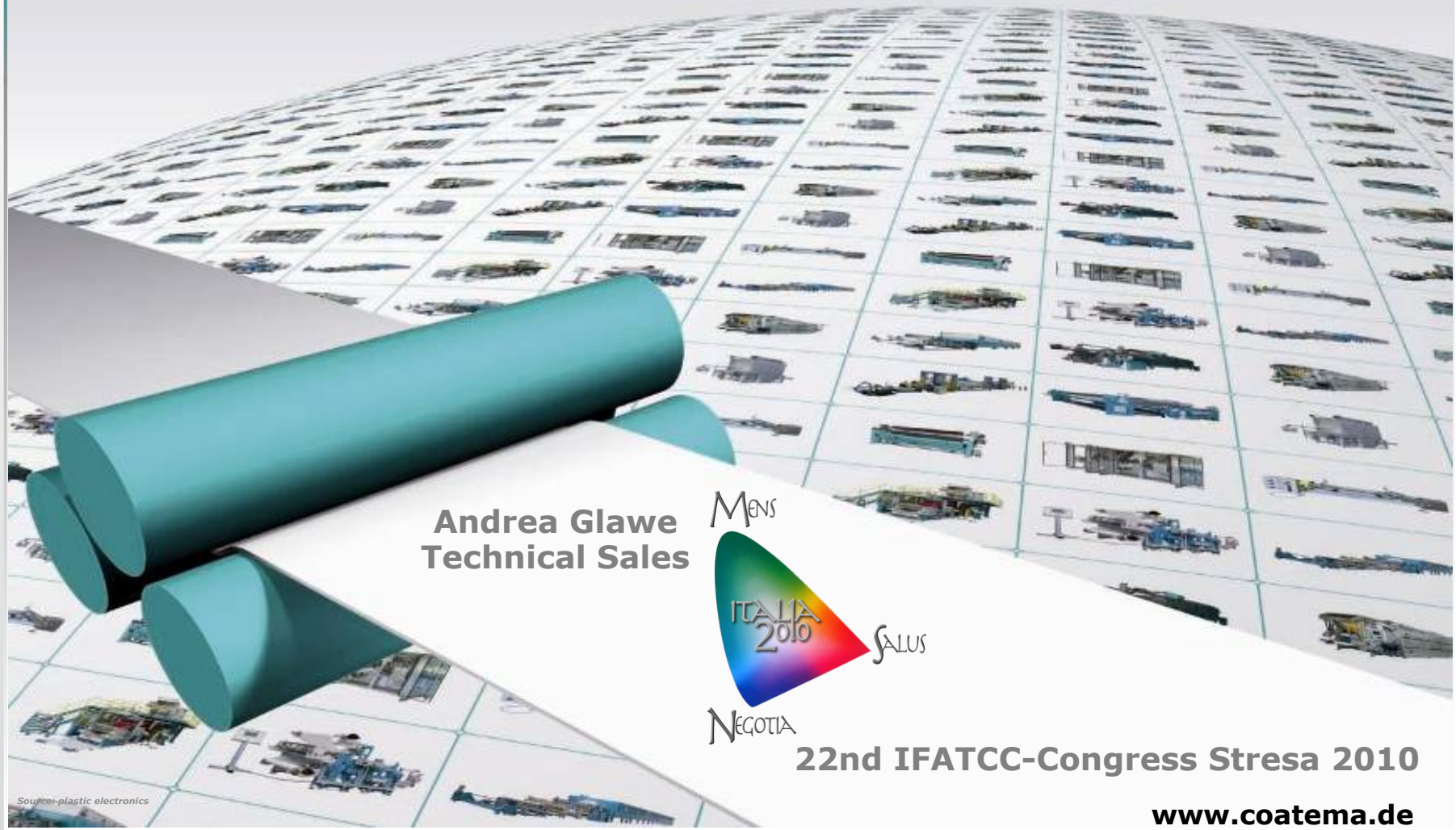
Coating Machinery GmbH

Coating technologies and coating plant concepts for thin film liquid coating layers



Andrea Glawe
Technical Sales

MENS
ITALIA 2010
SALUS
NEGOTIA

22nd IFATCC-Congress Stresa 2010

www.coatema.de

Outline

- Overview
- Functional Nano Layers
- Coating Technologies
- Lab to Fab - Coating Plant Layouts

Overview

Coatema Concept

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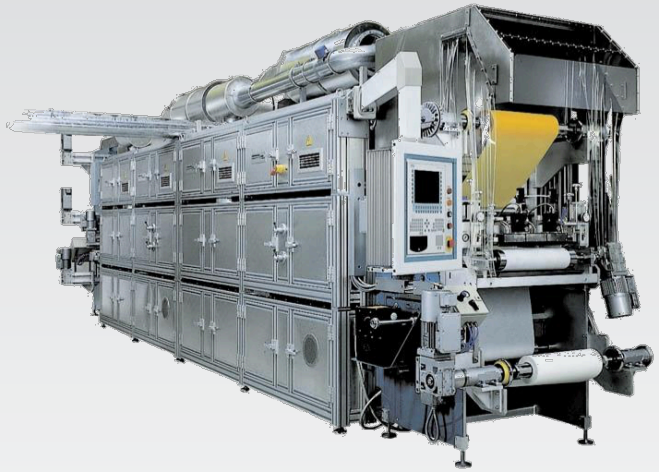
The best solution for every coating need



Laboratory … → …pilot scale … → …production equipment.

The Coatema Coating Know-How

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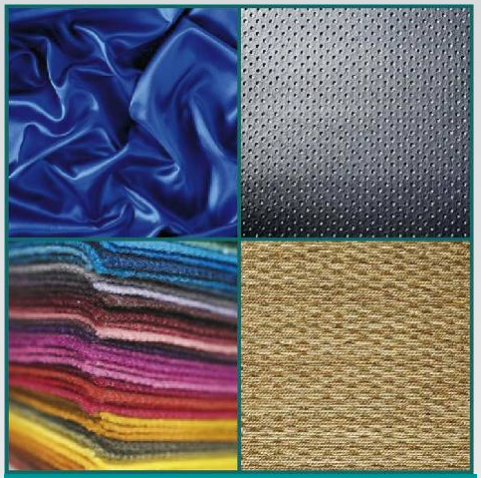
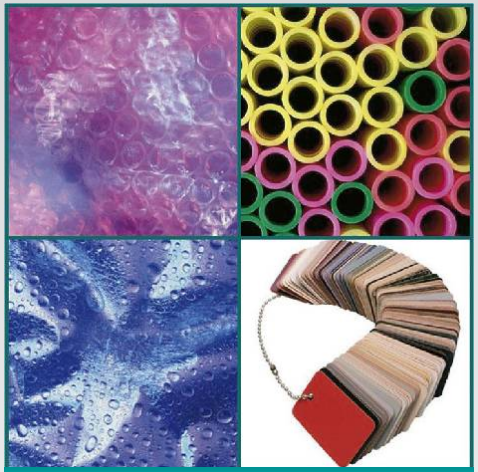
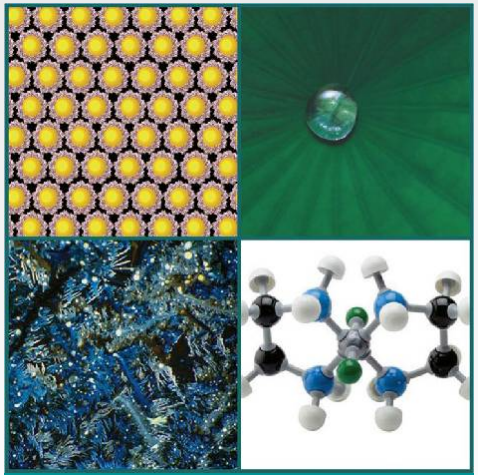


Textile



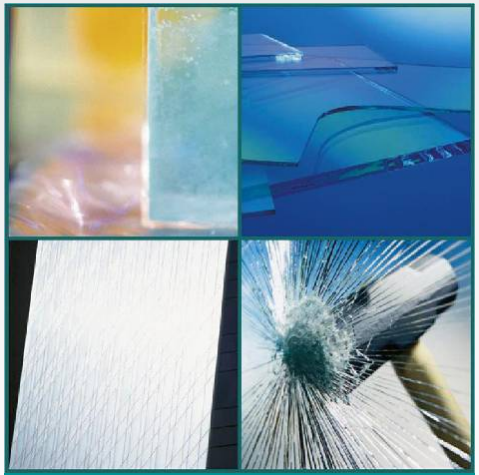
Film

Renewable



Nanotech

Paper



Glass

Influences on the coating result

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Coating Chemistry

- Rheology
- Viscosity
- Viscoleastizity
- Type of solvents
- Amount of solids
- Van der Waals force
- Sheer ratio
- Adhesion/Cohesion

Coating Processes

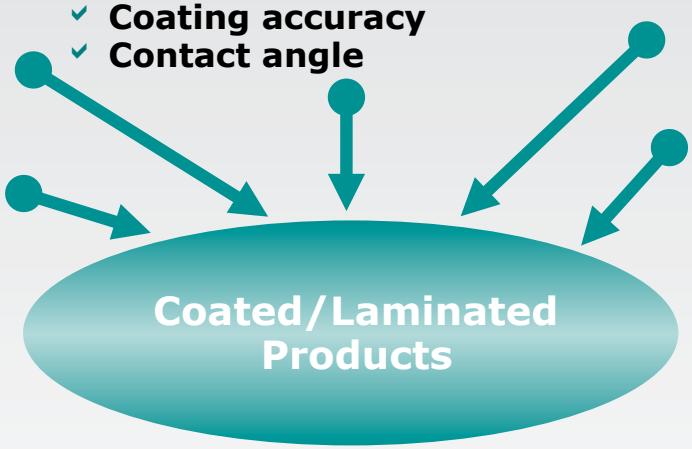
- Coating systems
- Single or Multilayer coatings
- Direct coatings
- Transfer (indirect) coatings
- Substrate speed
- Layer Thickness
- Coating accuracy
- Contact angle

Curing/Drying Processes

- Convection drying
- Contact drying
- Infrared drying
- Sintering
- NIR
- High Frequency
- UV crosslinking systems

Substrate

- Surface tension
- Dimension stability
- Surface structure



Process control

- Process layout
- Tension control system
- Material guiding system
- Inline parameter control
- Quality control
  - Coating Weight control
  - Surface defect detection

Pretreatment

- Corona
- Plasma
- Cleaning

Environment condition control

- Humidity
- Temperature
- Inert Conditions

Finishing

- Calendering
- Embossing
- Slitting

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Functional Nano Layers

Functional Nano-Layers

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➔ Products made of functional thin film coating layers:

- Flexible Displays
- Lighting & Signage
- Organic Based Sensors
- Organic Labels & Tags
- Smart Packaging




Functional Nano-Layers

- Fuel Cells and Batteries
- OLED´s
- Optical Coatings
- RFID Applications
- Smart Labels
- Electro Luminescent Panels






Functional Nano-Layers

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➔ New technical solution for conductive layers

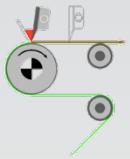
Application of reactive layers:

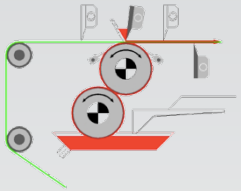
- application of ITO layers
- application of transparent conductive layers for conductive materials
- electro luminescent layers
- application of SiO_2 barrier layers for solar products
- chemicals for low roughness of surfaces
- coating for electro-conductive and optical transparency

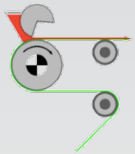
Coating Technologies

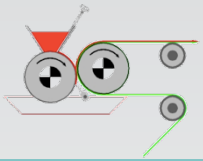
Coating methods

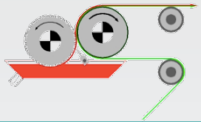
Modular Coating Systems

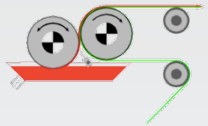

Knife System


Double Side System

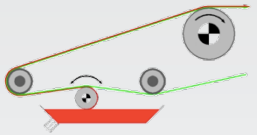

Commabar System

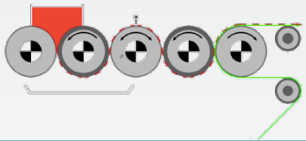

Case Knife System

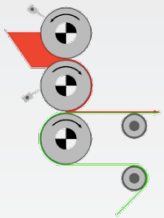

Engraved Roller System

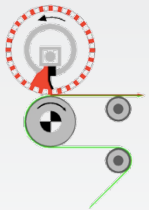

2 Roller System

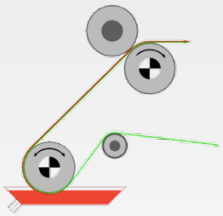

3 Roller Combi System

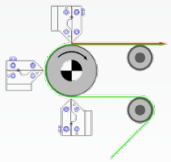

Micro Roller System

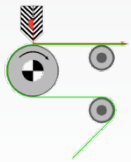

5 Roller System

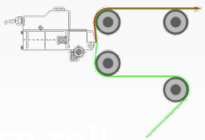

Reverse Roll System

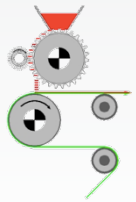

Rotary Screen System


Dipping System


Slot Die System

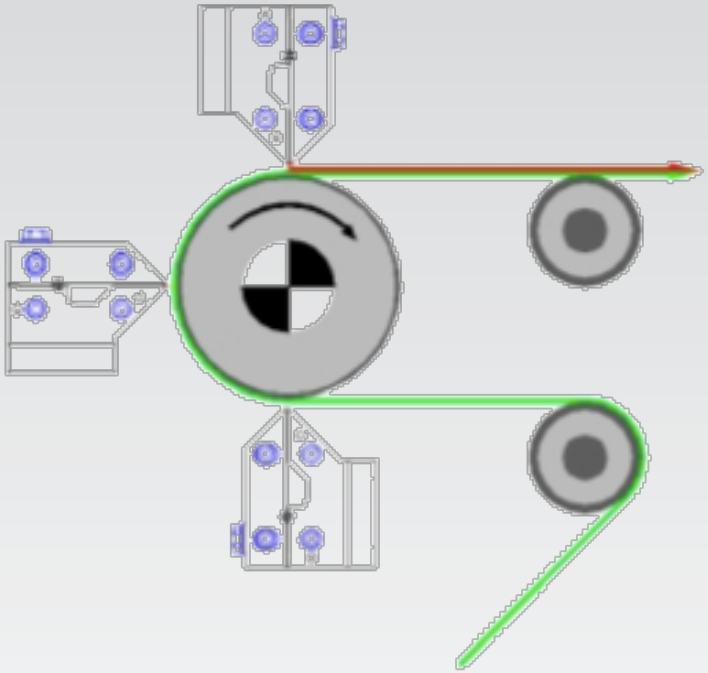

Curtain Coating System


Hotmelt Slot Die System


Powder Scattering System

Coating methods

- **Slot die technology – single side**
- **Variation of the Coating Weight**
  - < 1 to 200 g/m²
- **Range of Viscosity (mPas)**
  - < 1 – 30 000
- **Typical Applications**
  - Foil coating
  - Battery
  - Solar technology



Coating methods

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Slot die technology – single side

Coating methods

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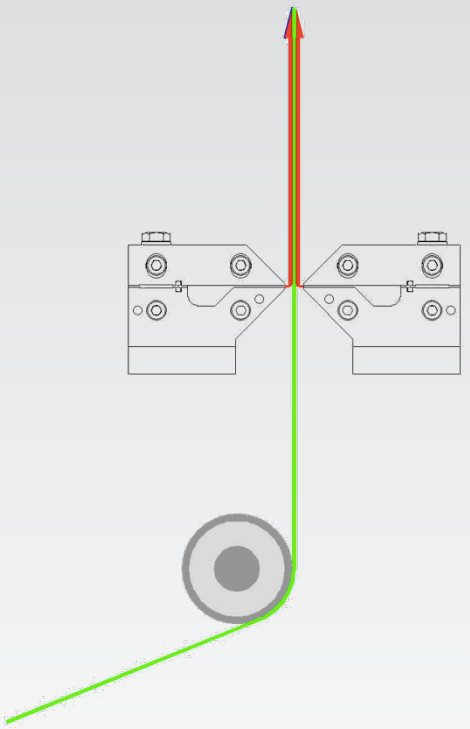
➔ Slot die technology – double side

- ✔ < 1 to 200 g/m²

➔ Range of Viscosity (mPas)

- ✔ < 1 – 30 000

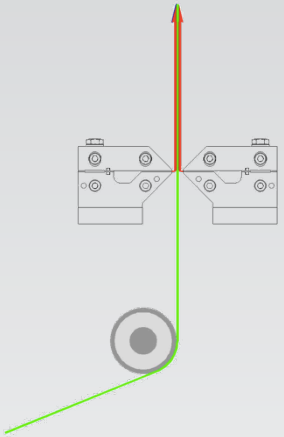


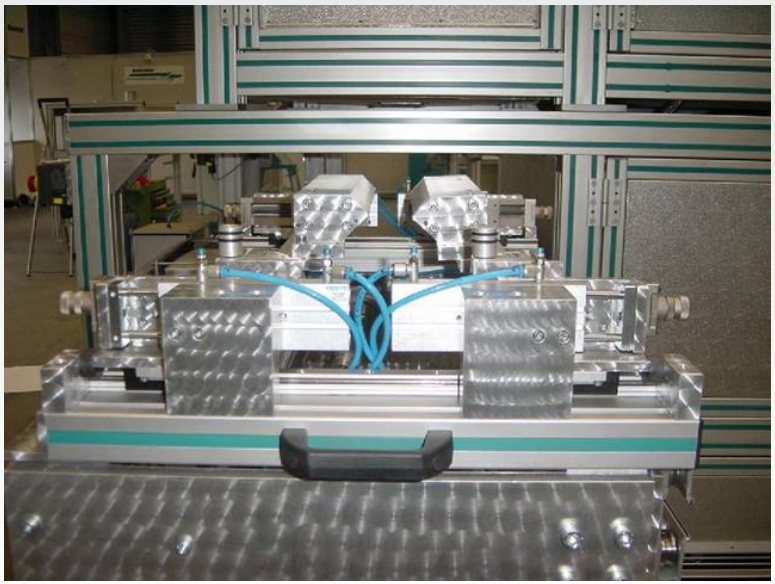
➔ Typical Applications

- ✔ Li-Ion Batteries
- ✔ Intermittent Coatings

Coating methods

Slot die technology – double side





Coating methods

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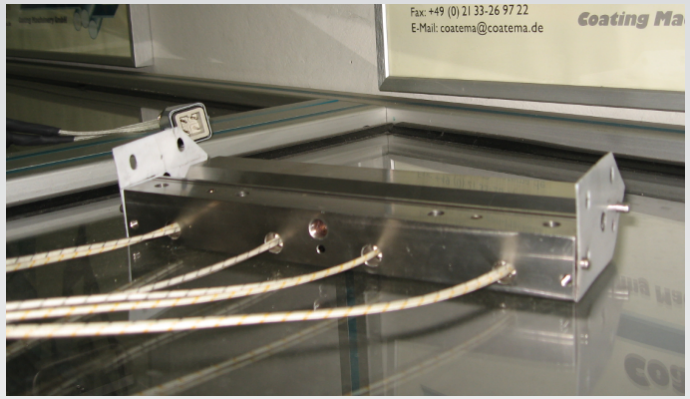
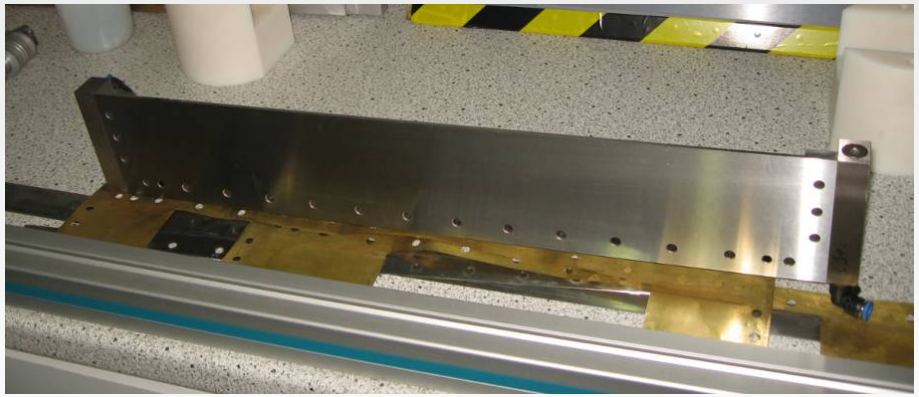
Slot die technology – heated technology



Electrical heated system with Heating elements



Electrical heated system with Hot water technology

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Coating methods

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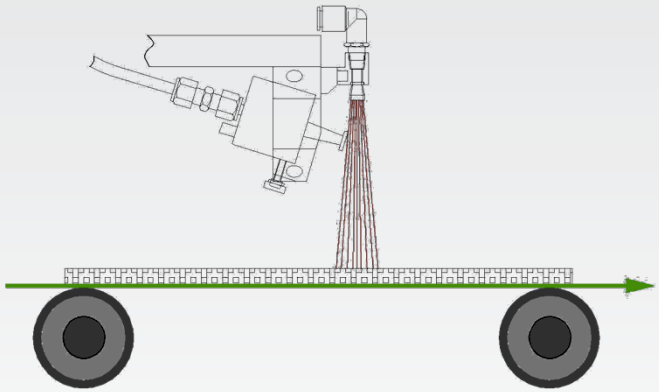
Spraying technologies

Variation of the Coating Weight

- 5 to 3000 g/m² (depending on pumping volume and substrate speed)

Range of Viscosity (mPas)

- < 1 – 1 000



Typical Applications

- Thin layers
- Non contact coating technology
- Application technology for low viscos coating materials

Coating methods

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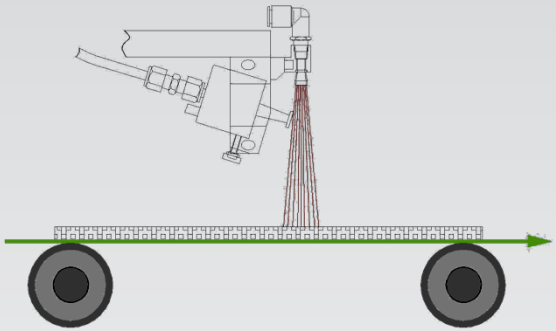
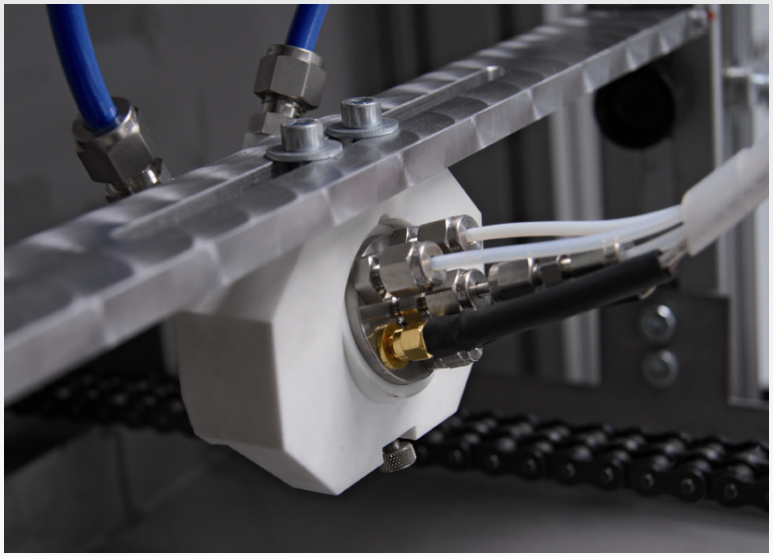
Ultrasonic spray technology





Coating methods

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Rotor and spray technology

Spray Star

Spray system company Lechler

Coating methods

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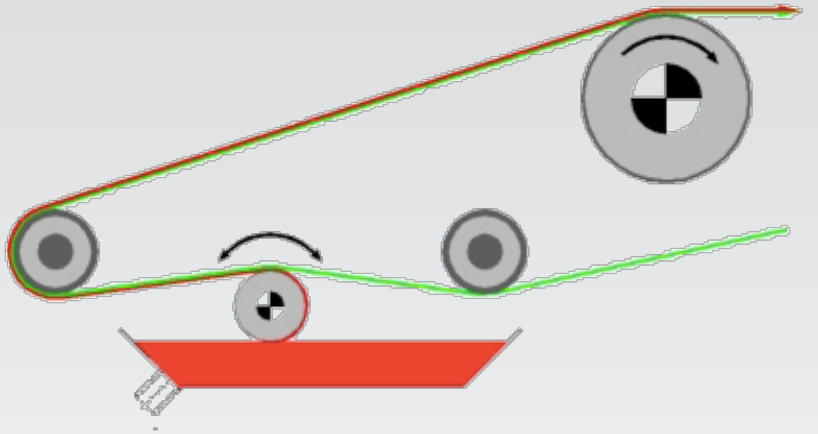
Micro Roller System

Variation of the Coating Weight

- 2 to 100 g/m²



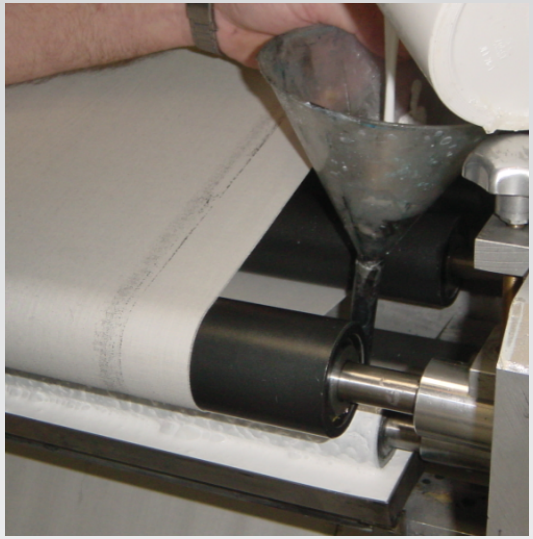
Range of Viscosity (mPas)

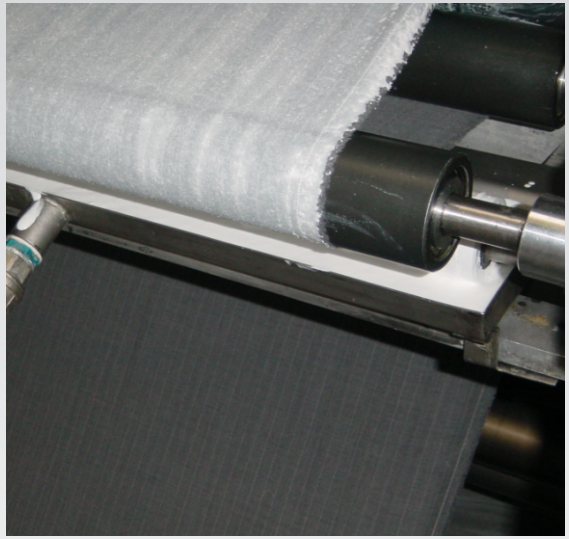
- < 1 – 15 000

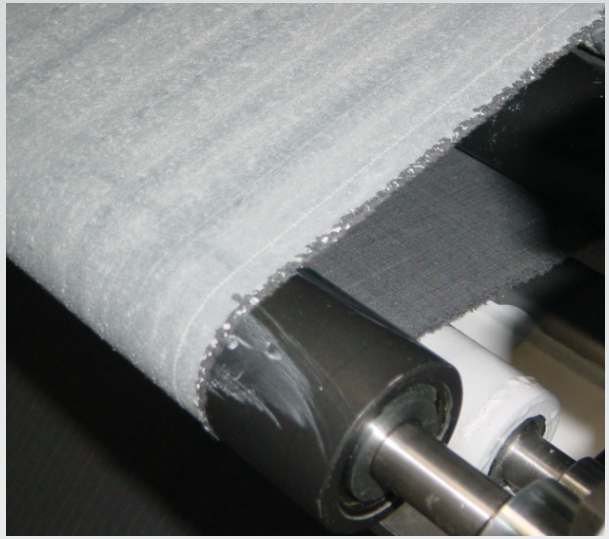
Typical Applications

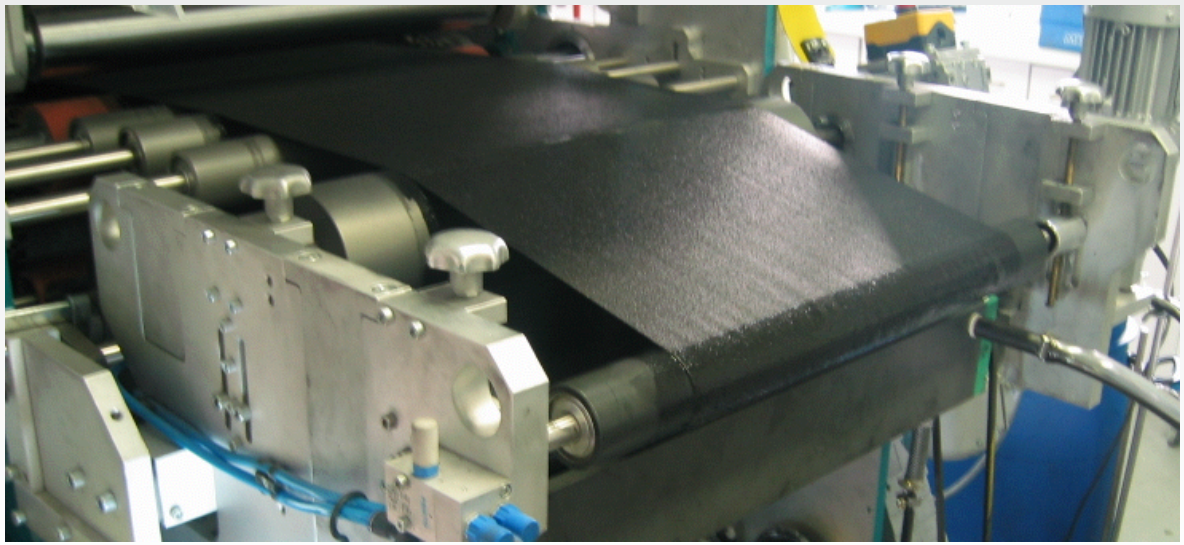
- Finishing of non-wovens
- Thin layers for the functionalisation of films, coated substrate and much more
- Fuel cells

Coating methods









Coating methods

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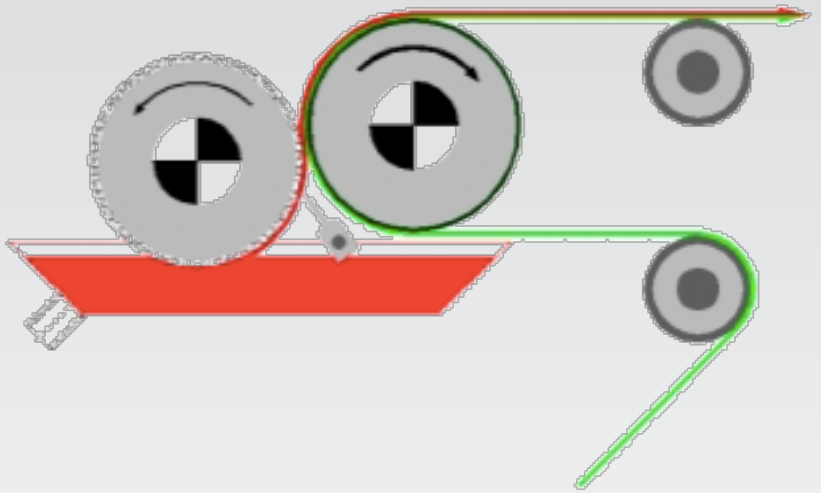
2 Roller or Engraved Roller System



Variation of the Coating Weight

- 2 to 200 g/m²

Range of Viscosity (mPas)

- < 1 – 15 000

Typical Applications

- Printing technology
- Lacquering of coated surfaces
- Nano-layers
- Thin layers on unstructered substrates (e.g. foils)

Coating methods

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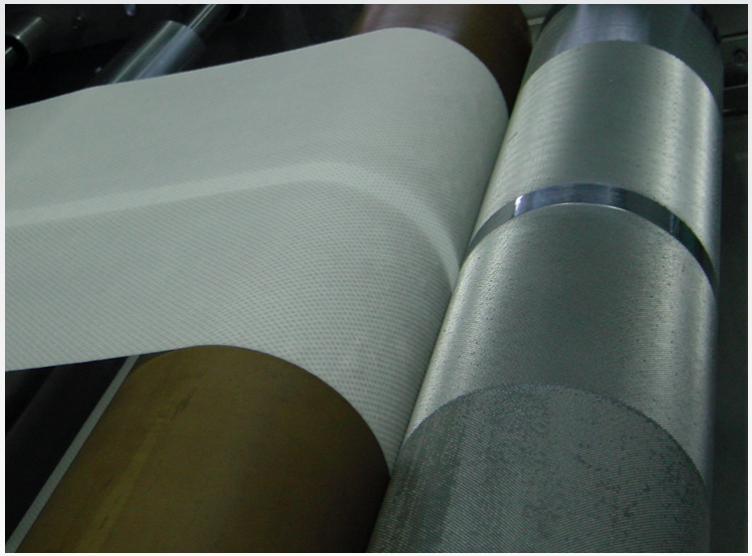
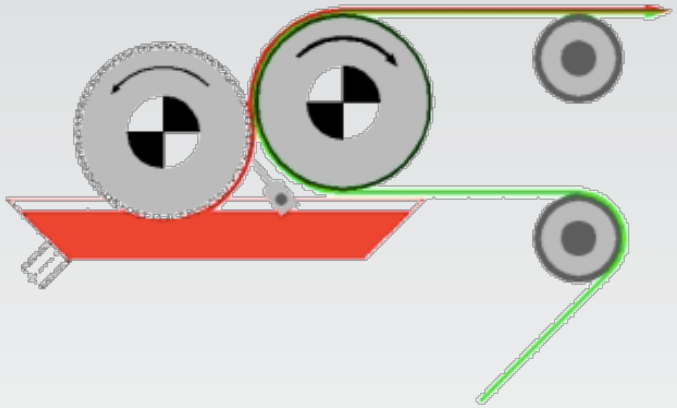
Engraved Roller System for coating application

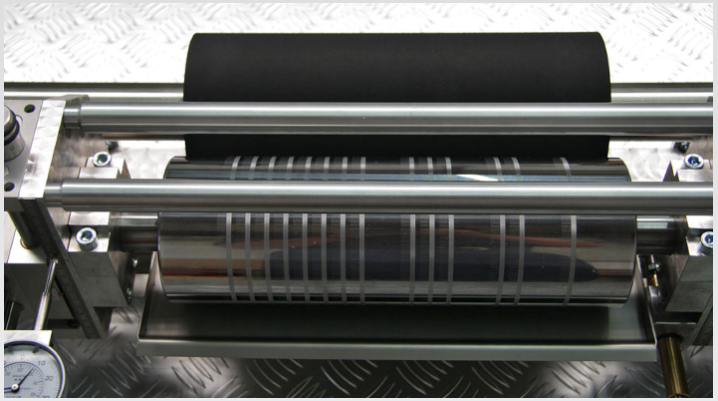
- Surface treatment
- Coating of closed layers as well as printing of open structures
- Definition of coating weight by use of different designs

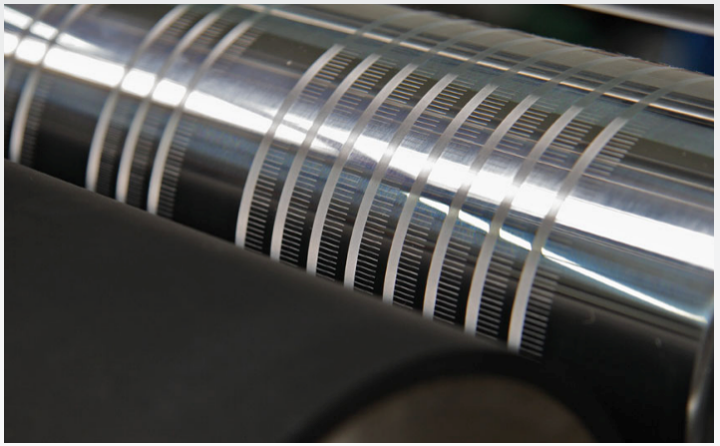


Coating methods

Engraved Roller System for printing application







Coating methods

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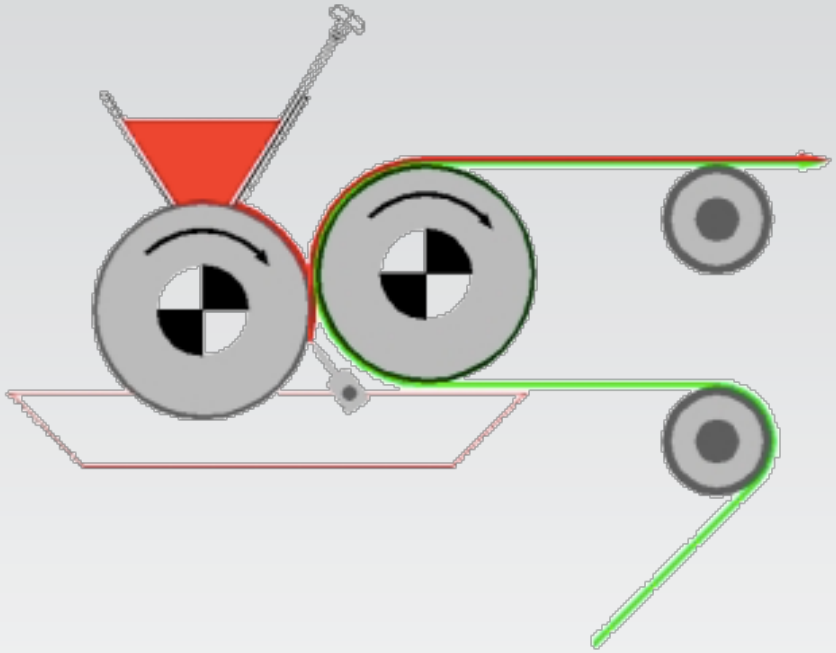
Case Knife System



Variation of the Coating Weight

- 2 to 200 g/m²

Range of Viscosity (mPas)

- 1000 – 30 000

Typical Applications

- Roller application for highly viscous coating raw materials
- Solvent-based, highly volatile coating raw materials
- Lacquering
- Application of adhesives

Coating methods

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Case Knife System

Lab to Fab

Coating plant concepts

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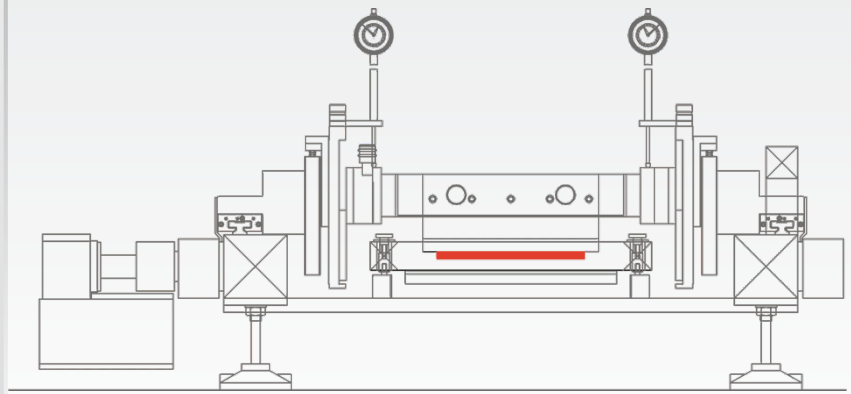
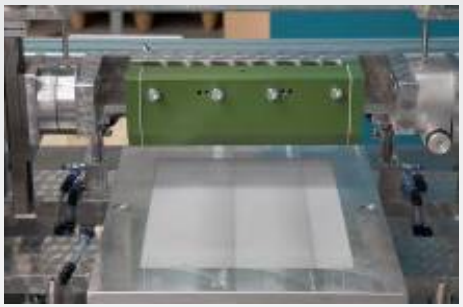
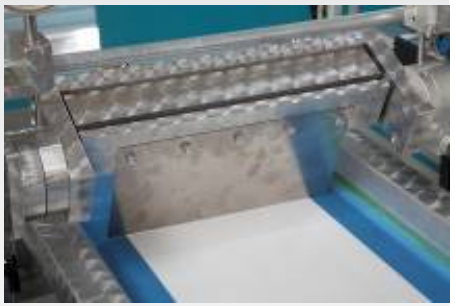
Easycoater

Working Width:	DIN A 4 (210 x 297 mm)
Knife Width	300 mm
Speed:	5 – 50 (U/min)
Electrical Connections:	230 V / 50 Hz, 24 V / 50 Hz
Total Weight:	approx. 120 kg
Dimensions (LxWxH):	1.300 x 1.035 x 550 mm

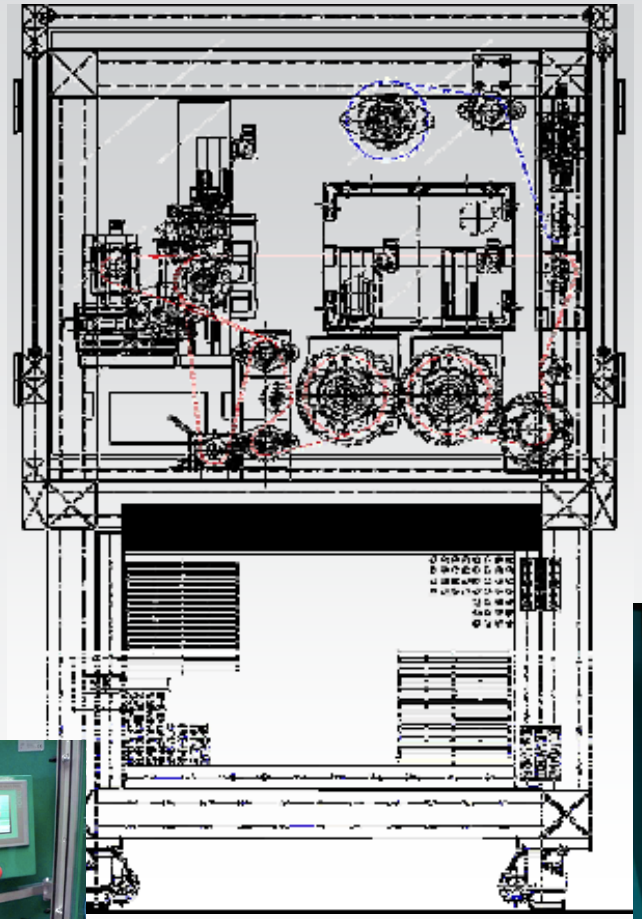




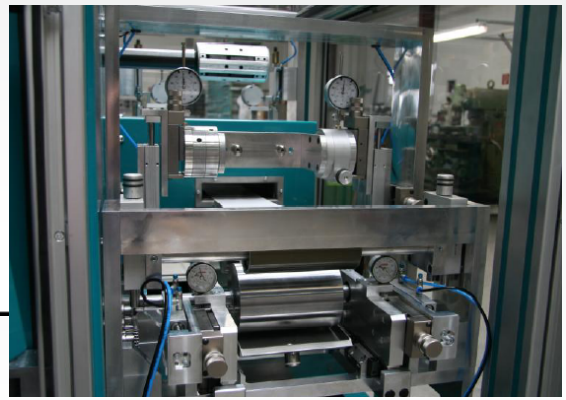


Coating plant concepts

Smartcoater

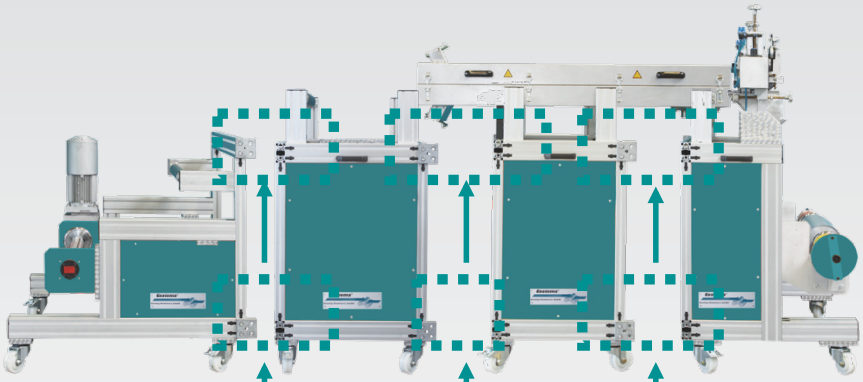


Working Width:	100 mm
Knife Width	150 mm
Speed:	0,1 – 1 m/min
Electrical Connections:	480 V / 50 Hz, 24 V / 50 Hz
Design:	EEx-design / Glove box option
Dimensions (LxWxH):	1.500 x 1.500 x 1.500 mm



Coating plant concepts

Click&Coat –
a new patented flexible laboratory coating line concept



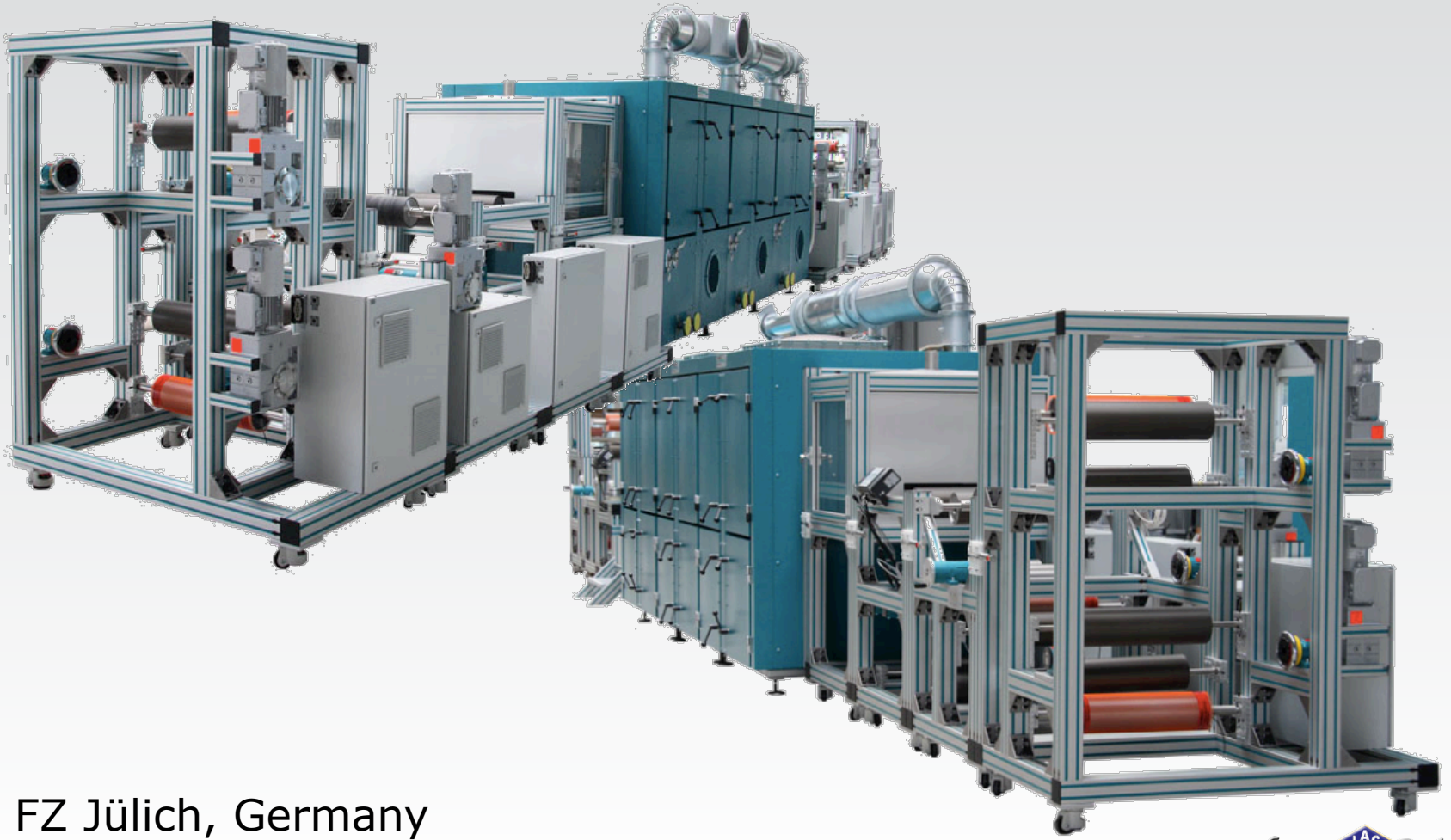
click + click + click...

... and coat

Coating plant concepts

Coatema®
Coating Machinery GmbH

Coating line for fuel cells – 500 mm Working Width



FZ Jülich, Germany

Coating plant concepts

Coating line for OLED – 500 mm Working Width

Vtt Espoo, Finland

Clean Room Coating Applications

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Holst Centre
Open Innovation by IMEC-NL and TNO

Coating plant concepts

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Double head coating line – 1.000 mm Working Width

Conclusion

Conclusion

The constant growing market of functional products and its versatility determinates the requirements. Therefore the producer has to meet the following specifications:

- Flexible machine equipment
- Modular layout
- Selection of different coating systems
- Selection of the right drying technology

Coatema is the right partner to support you in your R&D activities with its technology centre in Dormagen.

You are always welcome to give us visit!

Coatema Concept

Dormagen, R&D Center Germany

You are always welcome to give us visit to discuss new coating challenges!

Thanks for your attention!

Coatema®
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