



# Coatema company presentation

06/05/2024

MEMBER OF ATH

***Coatema***

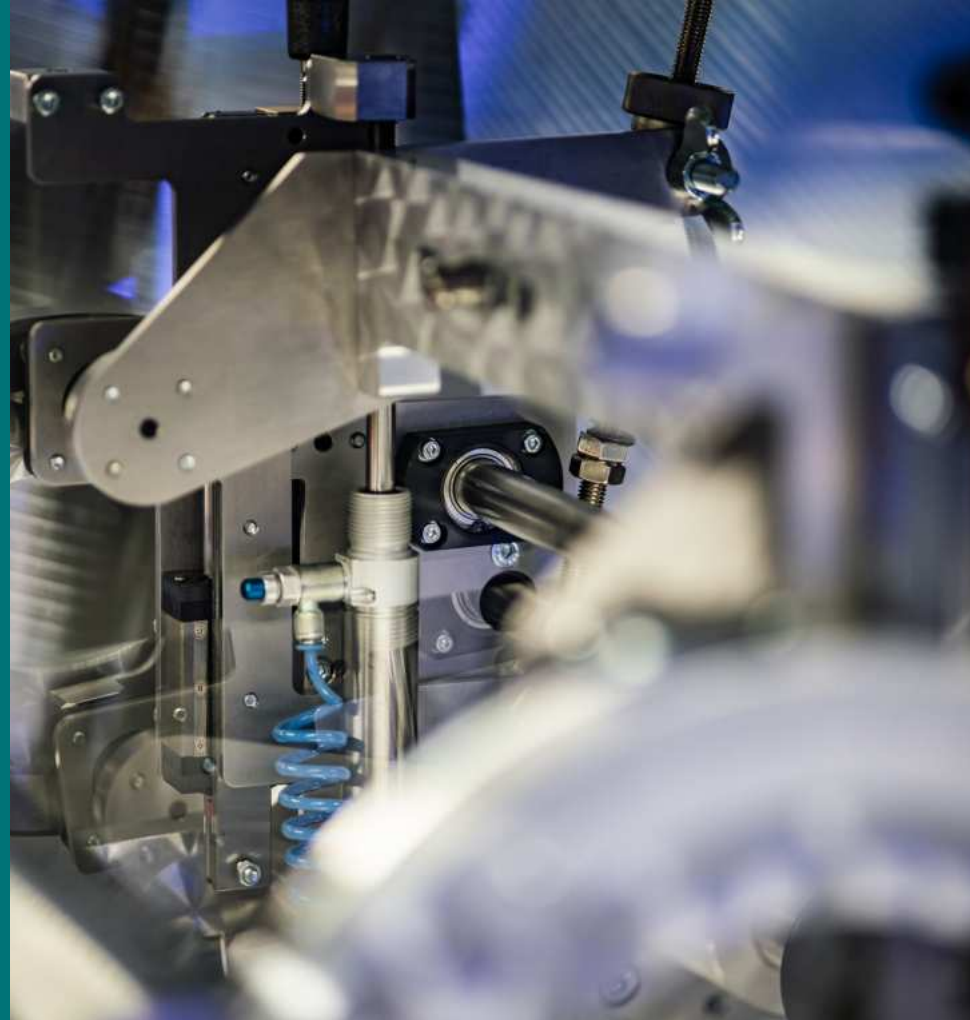
# Agenda

1. Introduction
2. Our markets
3. Equipment
4. R&D centre
5. Contact



# 1.

## Introduction



# Overview



## Group of companies

**ATH** ALTONAER  
TECHNOLOGIE  
HOLDING



**KROENERT**

- ✓ Founded 1903
- ✓ Approx. 200 employees
- ✓ Located in Hamburg

**DRYTEC**

- ✓ Founded 1995
- ✓ Approx. 50 employees
- ✓ Located in Norderstedt



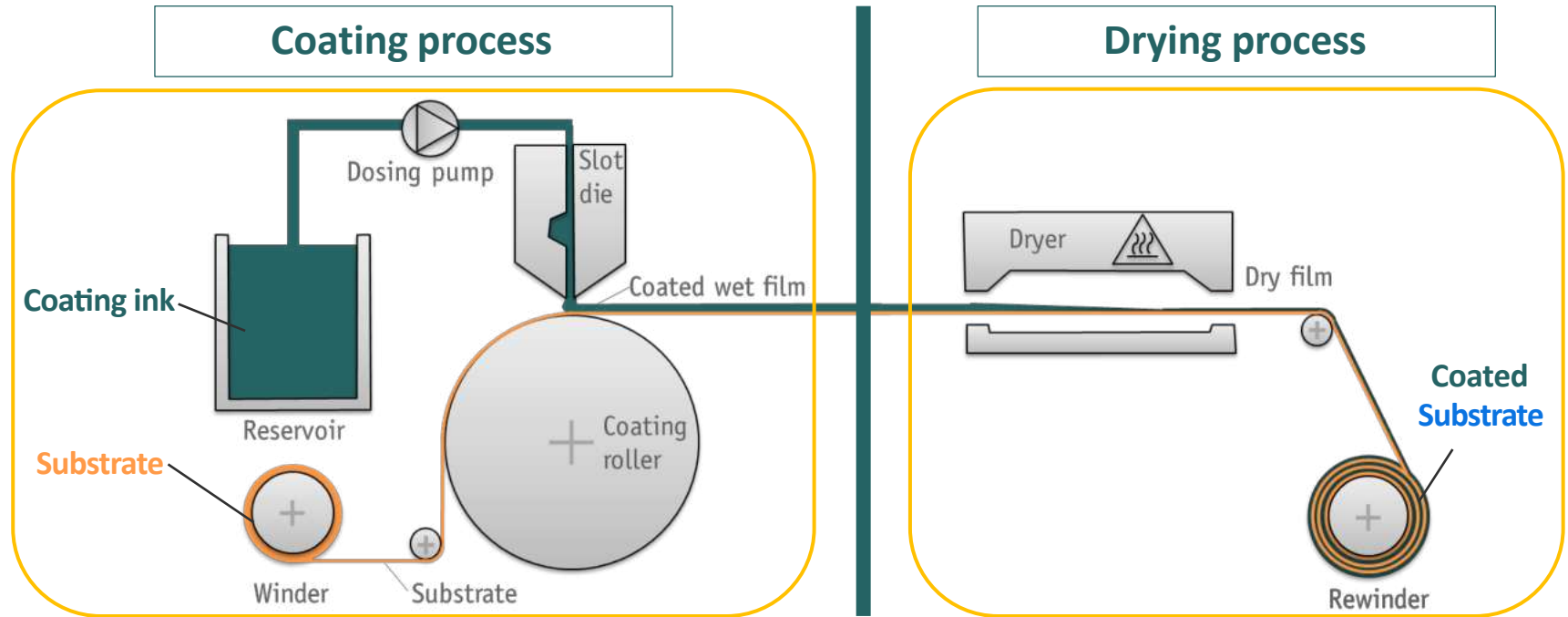
**Coatema**<sup>®</sup>  
Coating Machinery GmbH

- ✓ Founded 1974
- ✓ Approx. 50 employees
- ✓ Located in Dormagen

## Represented worldwide



# Upscaling – R2R lab scale production into fab



## Coatema equipment platform strategy for lab2fab



Lab

- ✓ State-of-the-art research and development equipment
- ✓ Sheet-to-sheet to roll-to-roll systems on small scale & footprint



Pilot Production

- ✓ Proven processes for printing, coating and laminating equipment
- ✓ Highest-quality pilot lines enable stable pilot production and reduce cost of operation
- ✓ Scaling laboratory equipment to enable pilot production



Production

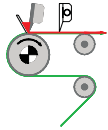
- ✓ Full-scale production lines
- ✓ Optimize the manufacturing process, including streamlining assembly, reducing material waste, and optimizing the carbon footprint



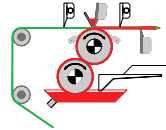
## Coating parameters

Coating chemistry	Coating processes	Process control	Drying
<ul style="list-style-type: none"> <li>✓ Rheology</li> <li>✓ Viscosity</li> <li>✓ Viscoelasticity</li> <li>✓ Type of solvents</li> <li>✓ Solid content</li> <li>✓ Van der Waals force</li> <li>✓ Sheer ratio</li> <li>✓ Adhesion/Cohesion</li> </ul>	<ul style="list-style-type: none"> <li>✓ Coating systems</li> <li>✓ Single or multilayer coatings</li> <li>✓ Direct coatings</li> <li>✓ Transfer (indirect) coatings</li> <li>✓ Substrate speed</li> <li>✓ Layer thickness</li> <li>✓ Coating accuracy</li> </ul>	<ul style="list-style-type: none"> <li>✓ Process layout</li> <li>✓ Tension control system</li> <li>✓ Material guiding system</li> <li>✓ Inline parameter control</li> <li>✓ Quality control</li> </ul>	<ul style="list-style-type: none"> <li>✓ Convection drying</li> <li>✓ Contact drying</li> <li>✓ Infrared drying</li> <li>✓ Sintering</li> <li>✓ NIR</li> <li>✓ High frequency</li> <li>✓ UV crosslinking systems</li> </ul>
Substrate	Pretreatment	Environment	Finishing
<ul style="list-style-type: none"> <li>✓ Surface tension</li> <li>✓ Dimension stability</li> <li>✓ Surface structure</li> <li>✓ Contact angle</li> </ul>	<ul style="list-style-type: none"> <li>✓ Corona</li> <li>✓ Plasma</li> <li>✓ Cleaning</li> </ul>	<ul style="list-style-type: none"> <li>✓ Humidity</li> <li>✓ Temperature</li> <li>✓ Inert conditions</li> </ul>	<ul style="list-style-type: none"> <li>✓ Calendaring</li> <li>✓ Embossing</li> <li>✓ Slitting</li> </ul>

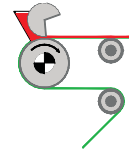
## Coating systems



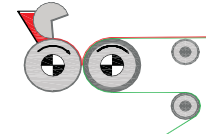
Knife system



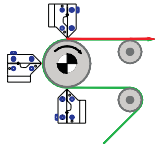
Double side coating system



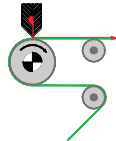
Commabar system



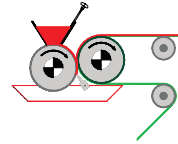
Reverse commabar system



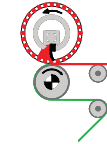
Slot die system



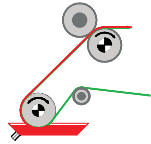
Curtain coating system



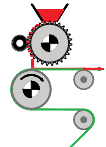
Case knife system



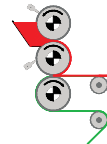
Rotary screen system



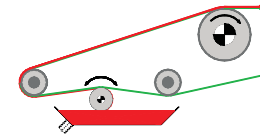
Dipping system (Foulard)



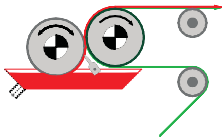
Powder scattering system



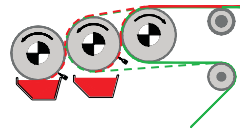
Reverse roll coating system



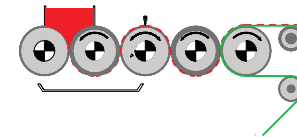
Micro roller coating system



2-roller coating system

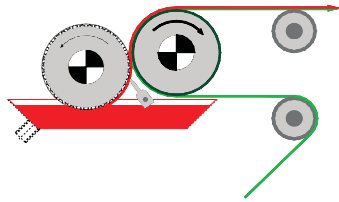


3-roller combi coating system

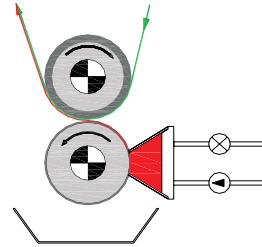


5-roller coating system

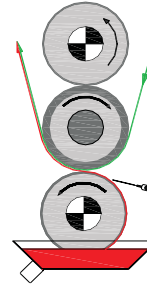
# Printing systems



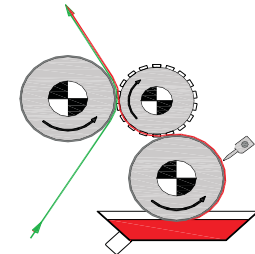
Engraved roller system



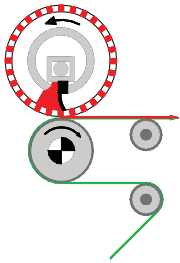
Gravure roller system



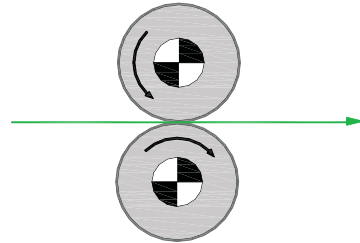
Gravure indirect system



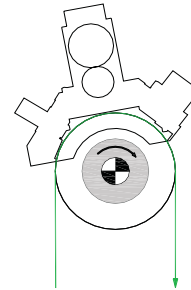
Flexography system



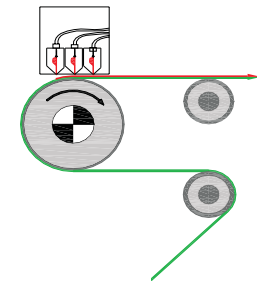
Rotary screen system



Hot embossing system



Nanoimprint system



Inkjet system

# 2.

## Our markets



## Coatema focus areas

Green Hydrogen

Fuel Cells

Batteries

Solar



Sustainability

Digital fabrication

Printed  
electronics

The next thing

# R&D centre – our customers

**TECHNISCHE UNIVERSITÄT DRESDEN**  
**KIT** Karlsruhe Institute of Technology  
**Agency for Science, Technology and Research** SINGAPORE  
**THE UNIVERSITY OF ARIZONA**  
**UNSW SYDNEY**  
**Queen Mary University of London**  
**ARISTOTLE UNIVERSITY OF THESSALONIKI**  
**TTRI** Taiwan Textile Research Institute  
**ITA** Institut für Textiltechnik und Lehrstuhl für Textilmaschinenbau  
**RWTH AACHEN UNIVERSITY**  
**NREL** Transforming ENERGY  
**RUHR UNIVERSITÄT BOCHUM**  
**RUB**  
**TECHNICAL UNIVERSITY OF LIBEREC** www.tul.cz  
**hochschule hof** University of Applied Sciences  
**Deutsches Textilforschungszentrum Nord-West** German Textile Research Centre North-West  
**cea** Centre for Energy Efficient and Sustainable Textiles  
**Fachhochschule Kiel** Hochschule für Angewandte Wissenschaften  
**CENTI** Centre for Nanotechnology and Smart Materials  
**FILK** Forschungsinstitut Leder und Kunststoffbahnen  
**Hochschule Niederrhein** University of Applied Sciences  
**Georgia Institute of Technology**  
**UNIVERSITY OF CAMBRIDGE**  
**Neue Materialien Fürth**  
**JOANNEUM RESEARCH**  
**HERIOT WATT UNIVERSITY**  
**ZSW**  
**DITF** DEUTSCHE INSTITUTE FÜR TEXTIL+FASERFORSCHUNG  
**JÜLICH** FORSCHUNGSZENTRUM  
**NATIONAL UNIVERSITY of MONGOLIA**  
**VTT**  
**TNO** innovation for life  
**eurecat** Centre Tecnològic de Catalunya  
**Fraunhofer IMM**  
**Fraunhofer LBF**  
**KITECH** Korea Institute of Industrial Technology  
**Holst Centre** (Open membership since 2002)  
**Hochschule Reutlingen** Reutlingen University  
**Fraunhofer IAP**  
**Fraunhofer IAF**  
**Fraunhofer ILT**  
**Fraunhofer IFAM**  
**Fraunhofer ISC**  
**Fraunhofer IFP**  
**Fraunhofer IVV**  
**Fraunhofer ISE**  
**Fraunhofer ICT**  
**Fraunhofer PYCO**  
**Fraunhofer IPT**  
**Fraunhofer IWM**

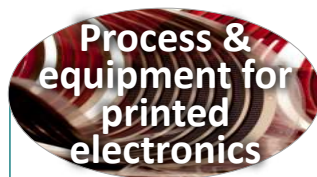
## R&D projects overview 2022 – 2024



In-line and real-time digital nano-characterization for flexible organic electronics

### NOUVEAU PROJECT

The NOUVEAU project will develop solid oxide cells (SOCs) with innovative La- and PMG-free electrode materials



R2R production line for OPV solar with integrated backend



Development of near-field electro hydrodynamic nanowire printing



Implementation of laser drying processes for lithium-ion battery production



R2R process optimization for solid state batteries



Plasmonically enhanced photocatalysis for wastewater treatment

### RetroWin

R2R Process and machinery development for retrofit window films for lower production costs

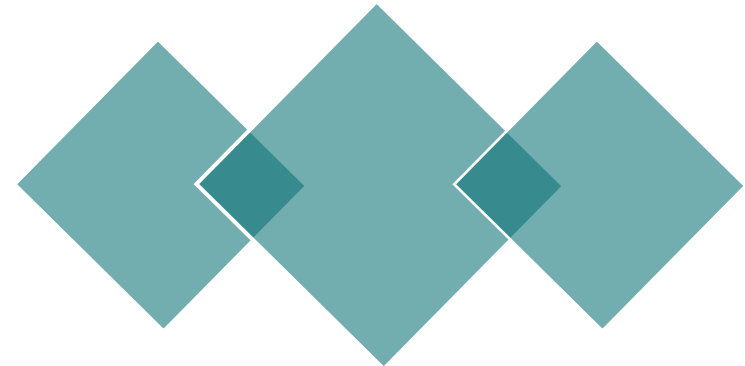


The WaterProof project aims at developing an electrochemical process that converts CO<sub>2</sub> emission



Creating an open-innovation testbed for sustainable packaging

## Flex2Energy project

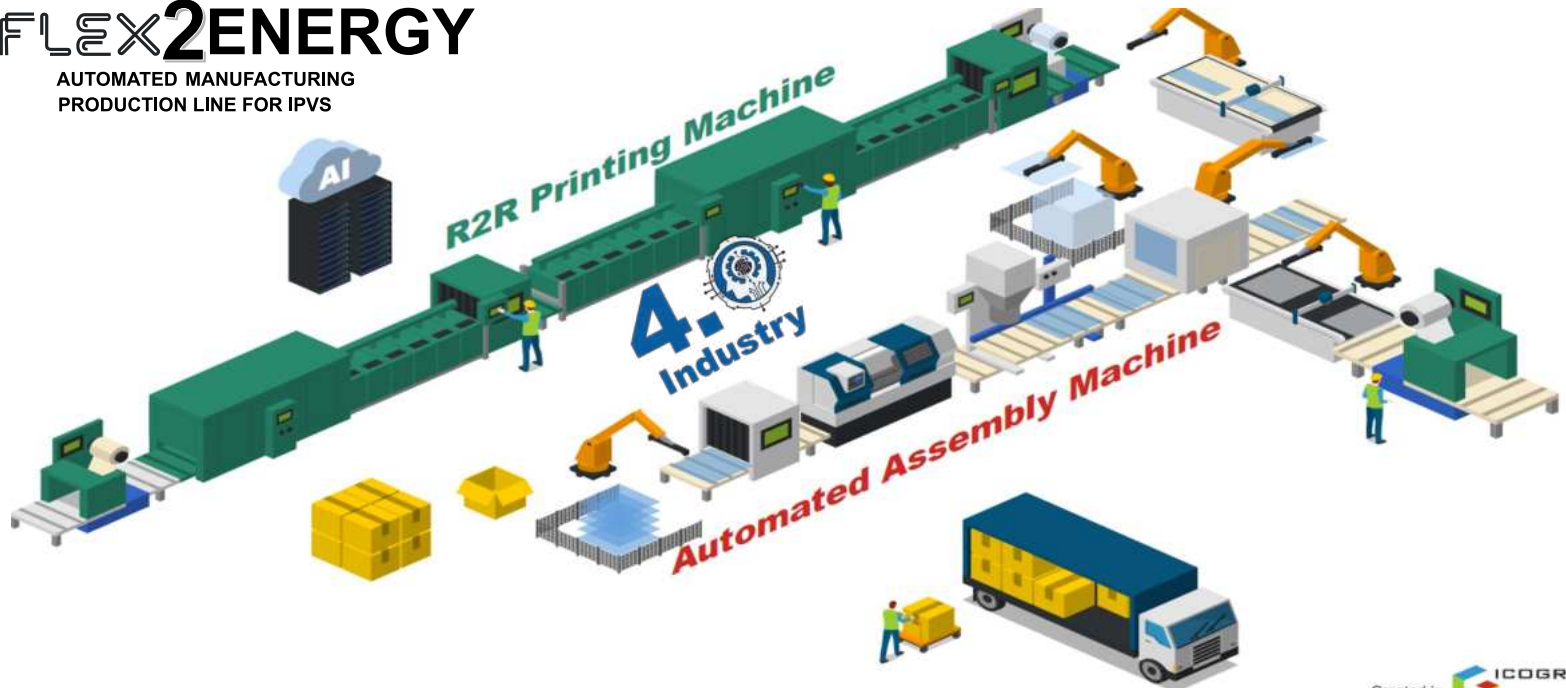




# Flex2Energy project – Consortium partners



# Flex2Energy project



# 3.

## Equipment



## S2S

Lab



Test Solution



Easycoater

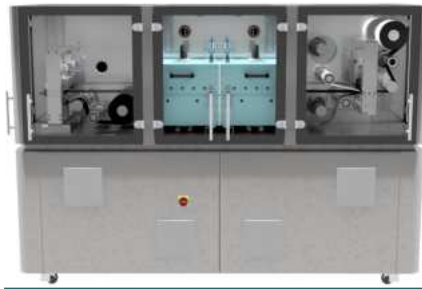


Easycoater Evolution

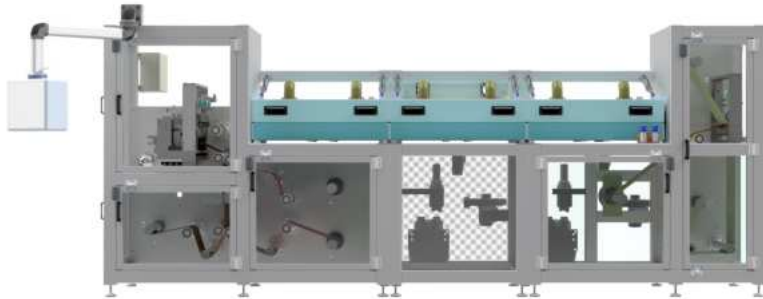
Today's equipment for lab scale R2R

## R2R lab systems

Lab



Test Solution R2R



Basecoater R2R

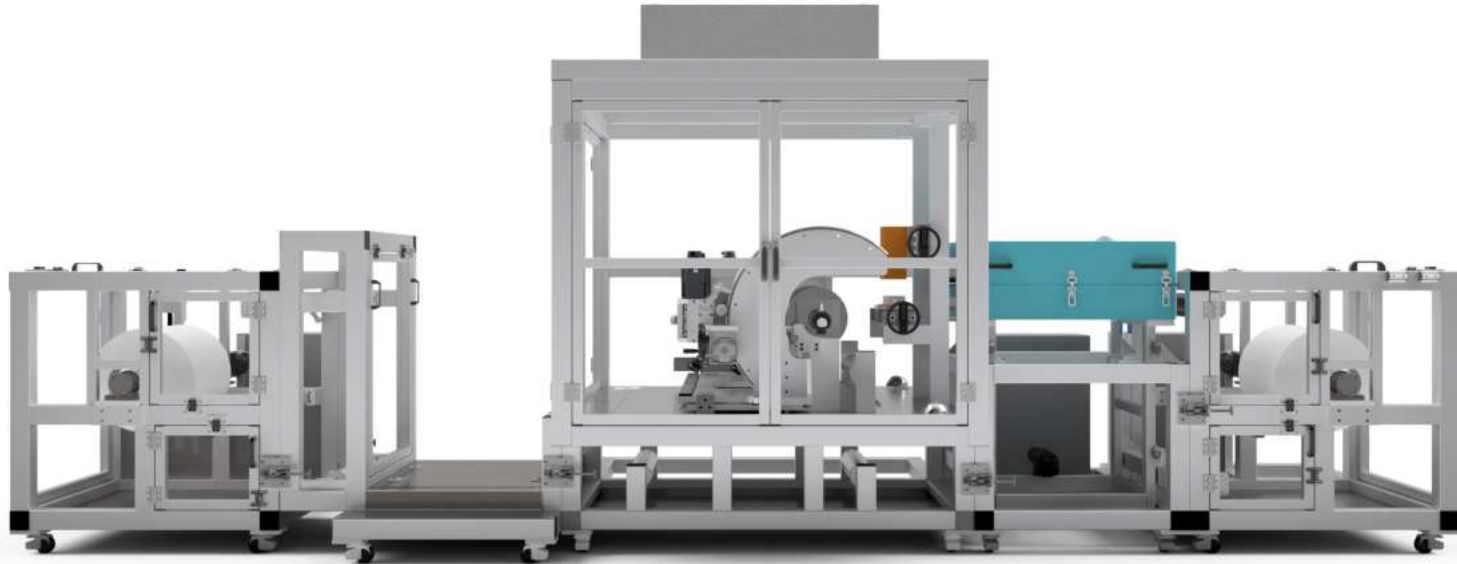


Smartcoater R2R

Today's equipment for pilot scale R2R

## The Click&Coat™

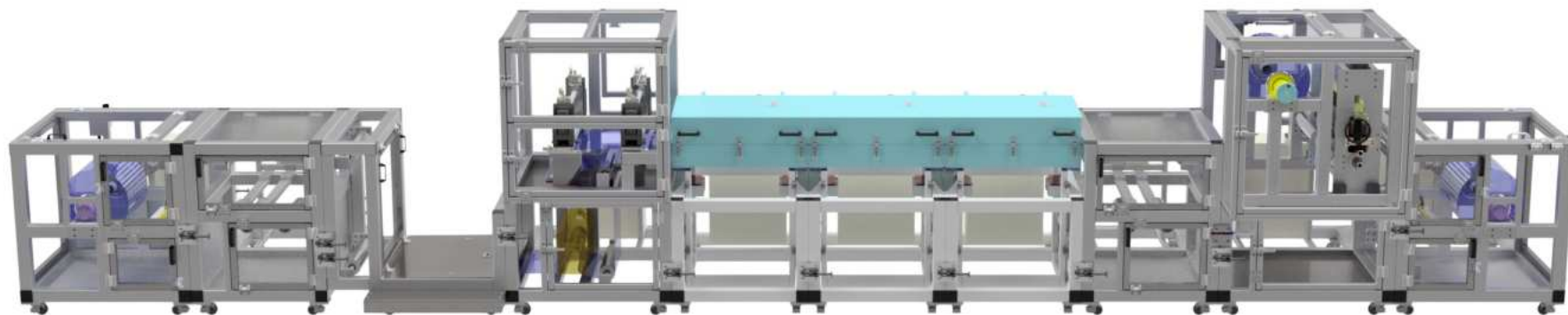
Pilot



Today's equipment for pilot scale R2R

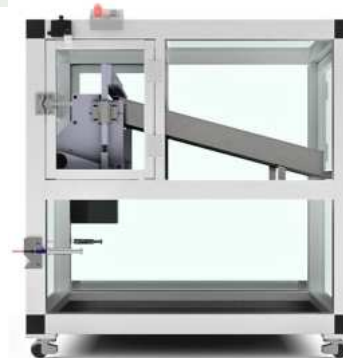
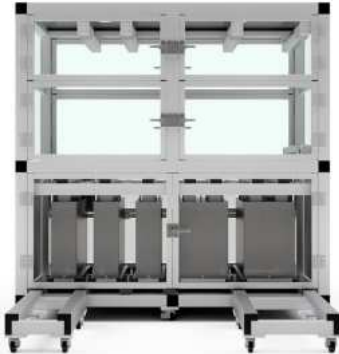
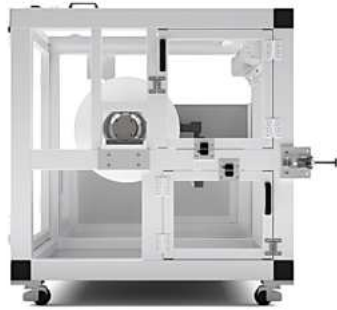
## The Click&Coat™

Pilot



Today's equipment for pilot scale R2R

## The Click&Coat™ single modules





Today's equipment for production

# The Click&Coat™ in production scale in the R&D centre

Production



Today's equipment for production

## The Click&Coat™ in production scale



Today's equipment for production

## The Click&Coat™ in production scale

Production



## Production lines

Production



Production lines



Production lines

## Bespoke equipments

Custom  
made



Printed oleds



Optical film



Composite fibres






# 4.

## R&D centre



# R&D centre USP



	<b>Process development</b> <ul style="list-style-type: none"><li>✓ Feasibility study</li><li>✓ Ink – process study</li><li>✓ Process analysis</li><li>✓ Slot die coating simulations</li><li>✓ Proof of concept</li><li>✓ Small scale prototype</li></ul>
	<b>Test production</b> <ul style="list-style-type: none"><li>✓ Prototyping</li><li>✓ Near to market testing</li><li>✓ TRL evaluation</li><li>✓ Training of staff</li></ul>
	<b>Education</b> <ul style="list-style-type: none"><li>✓ Coating conference</li><li>✓ Partner trainings</li><li>✓ Education of students</li><li>✓ Workforce training</li></ul>
	<b>Development of custom-made design for equipment</b> <ul style="list-style-type: none"><li>✓ Prototyping</li><li>✓ Proof of concept</li></ul>
	<b>Public funded research projects know-how</b> <ul style="list-style-type: none"><li>✓ German funded</li><li>✓ Horizon 2020</li><li>✓ Global 2+2 projects</li><li>✓ B2B projects</li></ul>

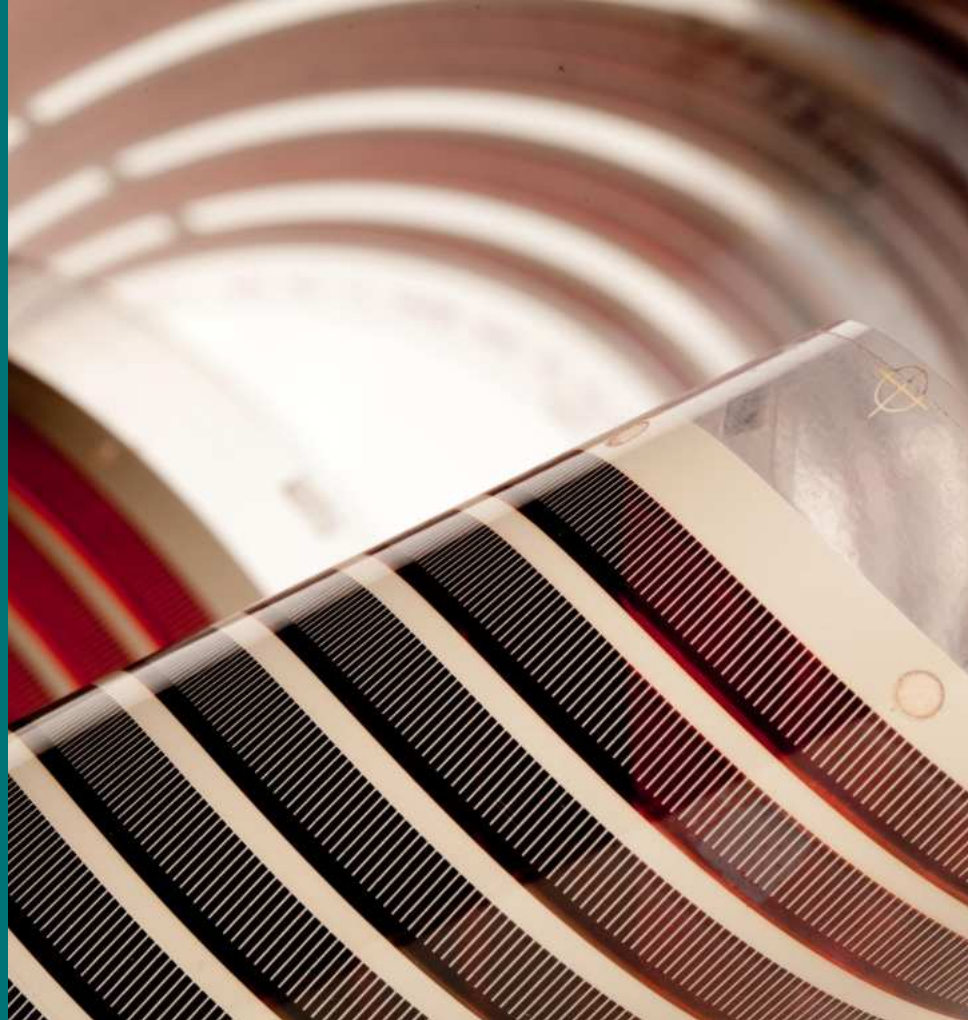
# Coatema coating symposium for 23 years





# 5.

## Contact



## Do not hesitate to contact us!



Anything missing?

Let us know and we will make it happen!

Our R&D centre is worldwide the most versatile centre for coating, printing and laminating.

Sales department:  
[sales@coatema.de](mailto:sales@coatema.de)



Earlybirds get  
**10% OFF**  
until  
June 28<sup>th</sup>, 2024

# 23<sup>rd</sup> international Coating Symposium

## November 26<sup>th</sup> + 27<sup>th</sup>, 2024 in Dormagen, Germany

The international Coating Symposium has been a fixed event in the coating and printing industry since the year 2000.

Speakers from industry, institutes and R&D will present the latest developments around Coating, Printing and Laminating and we will show trials in our R&D centre on site in Dormagen.

We extended the \*\*\* 10% discount \*\*\* on the registration fee **until June 28<sup>th</sup>!** The not-to-be-missed event for practitioners and opinion leaders in the coating technology field.

**Register now! We look forward to seeing you!**

**Register now!**



## Download brochures & presentations



# *Coatema*

## Thank you

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T +49 21 33 97 84 - 0 ▪ [info@coatema.de](mailto:info@coatema.de)

[www.coatema.com](http://www.coatema.com)

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