Center for future-oriented COATING TECHNOLOGY

Through the Technology Center at its Hamburg location, KROENERT offers a unique service. On totally three different coating lines with a variety of possible technical processes, line layouts tailored to customer needs as well as the appropriate process technology are developed. Equally, new processes are tested or existing processes are optimized.

The equipment at the Technology Center makes it the biggest test center in the world.
Through the Technology Center at its Hamburg location, KROENERT offers an unique service. On totally three different coating lines with a variety of possible technical processes line layouts tailored to customer needs as well as the appropriate process technology are developed. Equally, new processes are tested or existing processes are optimized.

The equipment at the Technology Center makes it the biggest test center in the world.
Technology Center Tasks and Objectives

**Development of individual machine layouts**

At the Technology Center the customer has the opportunity to test coating and drying processes for different end products, and with various materials.

Line layout, process technology and settings parameters are developed and optimized for the customer’s end product, before they invest in a new line. This optimization can be carried out in close cooperation with the raw material or substrate suppliers during the test runs at the Technology Center.

Studies on increasing efficiency, improving cost-effectiveness and reducing the use of materials can also be performed.

**Raw Material Development**

Producers of coating materials and application media can also benefit from the Technology Center. The ever-improving performance of machines leads to a constant demand for new material compositions, which can generally be tested in our laboratory facilities. However, a 1:1 conversion to larger production lines is rarely possible – for this our Technology Center is available to the customer.

**From know-how to know-why**

Because of continuous cooperation with institutes for science, research institutes and universities, the Technology Center is always at the cutting edge of technology. In terms of this particular scope of work, for instance, experience from everyday practice is entered into theoretical computer models. Often these investigations are carried out as Masters and student projects in cooperation with national and international universities.

The Technology Center is also available for training and workshops.

**The Technology Center Team**

Experienced employees support our customers in the production of their products.
Technology Centre Equipment & Facilities

At the Technology Center a wide variety of tests are conducted on materials and raw materials, at a variety of processing parameters.

Besides the RECO 800 A, LabCo and PAK 610 lines, a variety of ancillary machines are available at the Technology Center, ensuring that different media can be processed easily while obtaining accurate results. This allows the processing, on site, of raw materials and the accurate assessment of the quality of the coating compounds and coated products with the latest measuring technology. The equipment includes:

Dosing and Materials Handling
- Eccentric screw pumps
- Gear pumps
- Micro gear pumps

Measuring Technology
- Rotational viscometer
- Surface tension meter
- Coating weight measurement (radiation)
- Flexible weight measurement (ultrasonic)
- Microscope for visual coating assessment
- Drying oven
- Scales

Mixing Units
- Agitators
- Mixers

If necessary and for special requirements, other systems may be added, by arrangement, for tests.
RECO 800 A

The High-Performance Production Line for Water and Solvent-Based Media as well as 100 % Systems

The multi-functional RECO 800 A is at the heart of the Technology Center. It is used primarily for the production of semi-finished items for flexible packaging, technical products as well as products for use in the renewable energy and environmental protection fields.

Flexible materials such as paper, cardboard, polymer films and metal foils in roll format are coated and laminated. Water and solvent-based dispersions and suspensions, as well as 100 % systems, can be used for coating. Both wet and dry laminating are available. The RECO 800 A disposes of over 60 coating processes.

Technical Data

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working width</td>
<td>1.300 mm</td>
</tr>
<tr>
<td>Material widths, min, max.</td>
<td>500 - 1.300 mm</td>
</tr>
<tr>
<td>Roll external diameter, max.</td>
<td></td>
</tr>
<tr>
<td>Unwinder 1</td>
<td>1.300 mm</td>
</tr>
<tr>
<td>Unwinder 2</td>
<td>800 mm</td>
</tr>
<tr>
<td>Unwinder 3</td>
<td>800 mm</td>
</tr>
<tr>
<td>Unwinder/winder 4</td>
<td>1.000 mm</td>
</tr>
<tr>
<td>Winder</td>
<td>1.300 mm</td>
</tr>
<tr>
<td>Internal diameter of winding cores</td>
<td></td>
</tr>
<tr>
<td>Unwinder 1</td>
<td>76 mm (3”) + 152 mm (6”)</td>
</tr>
<tr>
<td>Unwinder 2</td>
<td>76 mm (3”) + 152 mm (6”)</td>
</tr>
<tr>
<td>Unwinder 3</td>
<td>76 mm (3”) + 152 mm (6”)</td>
</tr>
<tr>
<td>Unwinder/winder 4</td>
<td>76 mm (3”) + 152 mm (6”)</td>
</tr>
<tr>
<td>Rewinder</td>
<td>152 mm (6”)</td>
</tr>
<tr>
<td>External diameter, min.</td>
<td>175 mm</td>
</tr>
<tr>
<td>Web tensions</td>
<td></td>
</tr>
<tr>
<td>Unwinder 1, 2, 3, 4</td>
<td>50 - 300 N</td>
</tr>
<tr>
<td>Rewinder</td>
<td>150 - 700 N</td>
</tr>
<tr>
<td>Machine speeds</td>
<td>4 - 1.610 m/min</td>
</tr>
<tr>
<td>Coating weights, dry coating</td>
<td>0,2 - 100 g/m²</td>
</tr>
</tbody>
</table>
Processing temperatures in the coating head of up to 90 °C

**Coating systems**
Gravure rollers, Smooth and multiple rollers, Roll doctor blades, Comma bars
Slot die
- Clean room conditions at enclosed coating table/slot die coating station (2-stage filtering: F7 + U 15)
Curtain coating
- Slot die, 1 slot, up to 1.200 mm
- Slide die, 3 slots, up to 800 mm

**Dryer**
Length 6 sections at 3 m in length
Temperature, max. 200 °C
Recirculation volume/section max. 27.000 m³/h
Air outlet speed at nozzle max. 50 m/sec.
Total amount of exhaust air max. 25.000 m³/h
Dryer performance (thermal oil) max. 1.200 kW
IR 6 x 6,2 kW/bar

**UV station**
N2 inerted
UV lamps 5
Performance of each UV lamp 25 - 200 W/cm adjustable

**Laminating stations**
2 or 3 rollers, dry or wet

**Remoistening stations**
Steamtec 1.0 600 kg/h
Steam moisturizer

**Materials**
Paper 17 - 180 g/m²
Cardboard 180 - 500 g/m²
Polymer film 3 - 500 µ
Metal foil 6 - 150 µ
Length of substrates, min. 2.000 m

**Coating media**
solvent less, min. 30 - 50 kg
solvent based, min. 120 l
Silicone, min. 10 kg
Dispersions, min. 100 - 200 l

Additional equipment such as Corona pretreatment, web cleaner, antistatic devices etc. are components of the line
LabCo

The Pilot Coating Line for Small Batches

The LabCo can be used with water and solvent-based media, as well as 100 % systems, for the production of functional layers, in clean room conditions, for use in organic photovoltaics, printed electronics, Li-ion batteries or in fuel cells. For this the line is encapsulated and supplied with filtered air (HEPA13). The line can also coat materials for the production of membranes, adhesive tapes or labels and release products. Wet and dry lamination are available.

The results are scalable on a 1:1 basis to KROENERT production lines.

Technical Data

- **Web width**: 500 mm
- **Material widths**: 100 - 500 mm
- **Roll external diameters**: up to 400 mm
- **Machine speeds**: 0,1 - 40 m/min
- **Internal diameters/cores**: 3”, alternative 6”
- **Coating weights, dry**: 0,5 - 200 g/m²
- **Coating systems**: Gravure rollers, Smooth & multi rollers, Doctor blade, Slot die coating, Kiss Coat
- **Viscosity ranges**: 50 - 20.000 mPas (20 °C, 100 [1/sec])
- **Ø Coating rollers**: 200 mm, mounted on both sides
- **Dryer**: 2 x 2 m sections, electronic heating
- **Temperature, max.**: 120 °C
- **Web guiding**: Floating or roller supported
- **Air circulation**: max. 28 m/sec, frequency regulated, up to 2.700 m³/h per section
- **IR and UV curing**: by arrangement
- **Ø Guide rollers**: 80 mm, cantilever mounted

**Substrates**

- **Paper**: 20 - 200 g/m²
- **Aluminum, copper**: 8 - 30 µm
- **PE, PP, PET, PA etc.**: 15 - 100 µm
- **Fabrics and non-wovens**: 10 - 100 g/m²
**Technical Data**

- **Working width**: 1,300 mm
- **Material widths**: 250 - 1,300 mm
- **Roll external diameter**: up to 1,000 mm
- **Machine speeds**: 10 - 300 m/min
- **Coating weights**: 2 - 200 g/m²
- **Coating systems**: Roller coating, Dip coating
- **Viscosity ranges**: 500 - 200,000 mPas
- **Temperature, max.**: 180 °C
- **Laminating**: 2 rollers

**Substrates**
- **Paper**: 20 - 140 g/m²
- **Cardboard**: up to 500 g/m²
- **PP, PET**: 20 - 200 µm
- **Aluminum**: 7 - 100 µm

The PAK MELT, with heatable rollers and material feeding, is available for the PAK 610. Edge and center cutting for narrow web production are possible.

**Contact**

**Head, Technology Center**
Marco Wogrom
Telephone: +49 40 85 393 627
Email: marco.wogram@kroenert.de

**Responsible for the RECO 800 A**
Matthias Capeletti
Telephone: +49 40 85 393 782
Email: matthias.capeletti@kroenert.de

**Responsible for the LabCo and PAK 610**
Ralf Thiel
Telephone: +49 40 85 393 730
Email: ralf.thiel@kroenert.de
Contact

Head, Technology Center
Marco Wogrom
Telephone + 49 40 85 393 627
Email marco.wogram@kroenert.de

Responsible for the RECO 800 A
Matthias Capeletti
Telephone + 49 40 85 393 782
Email matthias.capeletti@kroenert.de

Responsible for the LabCo and PAK 610
Ralf Thiel
Telephone + 49 40 85 393 730
Email ralf.thiel@kroenert.de
Modern control and visualisation

Mechanical expertise

Quality control rewind

Modern software control

Trial preparations

Variable parameters