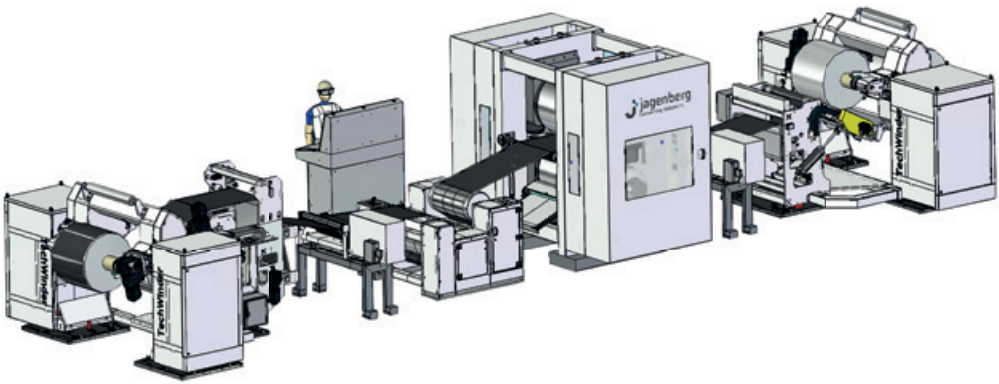
jagenberg
Converting Solutions

Integrate.Converting.Competences.

Calendering

Precise compaction in µm steps

Calendering



SMART CALENDERING OF ELECTRODES FOR LI-ION BATTERIES

Precise compression.
Intelligent control.
Maximum productivity.

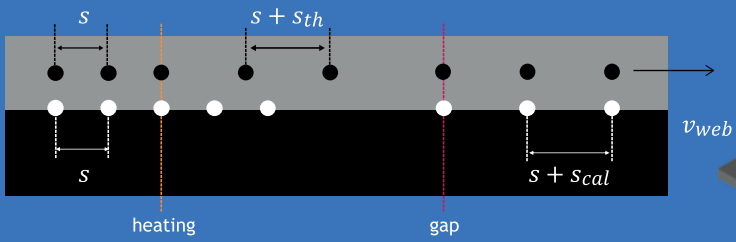
We provide customized calendering machines and specifically designed additional modules to meet your individual high-quality production requirements.

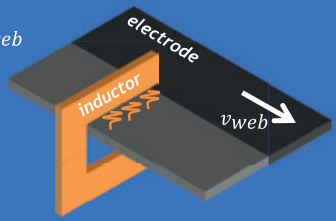
CHALLENGE OF HANDLING ELECTRODE DEFECTS

Solutions based on process understanding

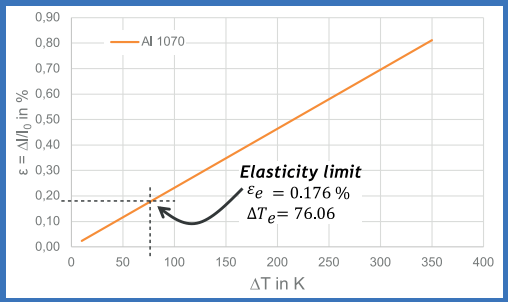
Example: Reduction of foil embossing by induction heating

- The coated part is lengthened during calendering, the uncoated part remains unchanged.
- Solution: Creation of an additional lengthening to compensate for the difference in length.





- Induction generates a heat that leads to an irreversible lengthening.



Target: length equality

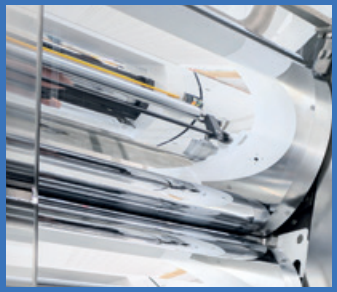
$\varepsilon_{coated\ area} = \varepsilon_{uncoated\ area}$

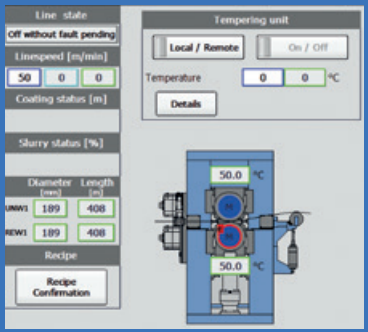
$\Delta l_{coated\ area} = \Delta l_{uncoated\ area}$

Thermal strain due to heating

CALENDER ROLL SURFACE TEMPERATURE

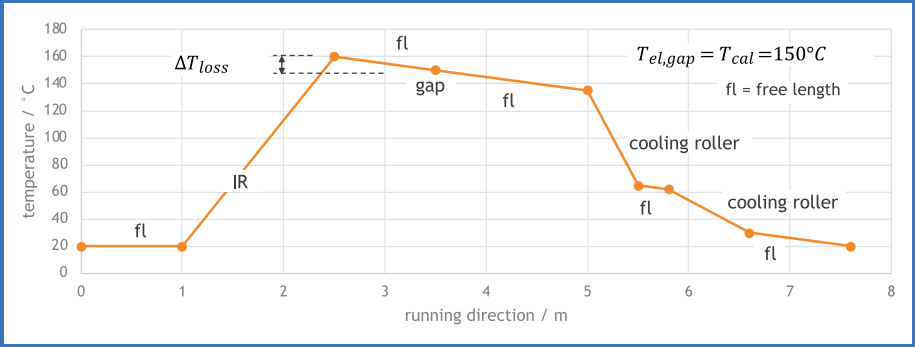
- Direct measurement on a highly polished roll surface





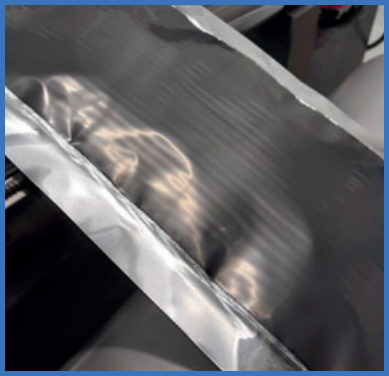
ELECTRODE TEMPERATURE CONTROL

- Controlled preheating to achieve the desired temperature in the gap
- Controlled cooling
- Avoidance of temperature-induced wrinkling

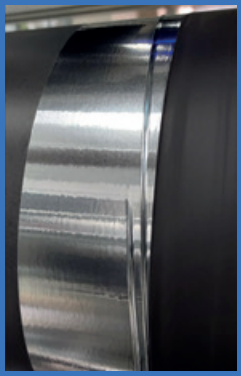


CHALLENGE OF HANDLING ELECTRODE DEFECTS

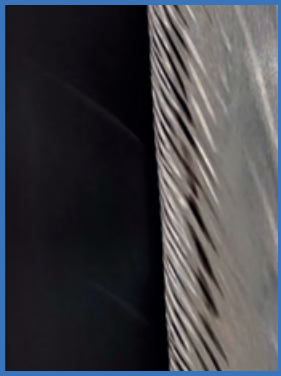
Together with our partners we develop innovative customized solutions to reduce defects from calendering.



Waviness and buckling



Longitudinal wrinkling



Foil embossing

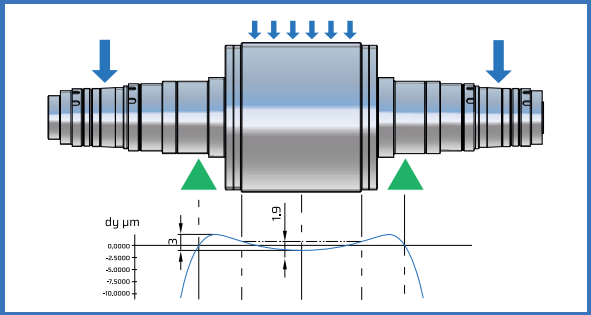
Additional and customer-specific modules

- spreader rollers
- pre-heating units
- measuring and monitoring equipment

can be integrated according to your specific requirements.

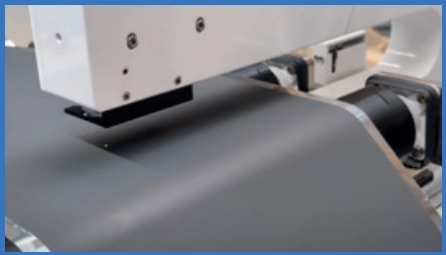
HYDRAULIC POSITIONING OF THE CALENDER ROLLS

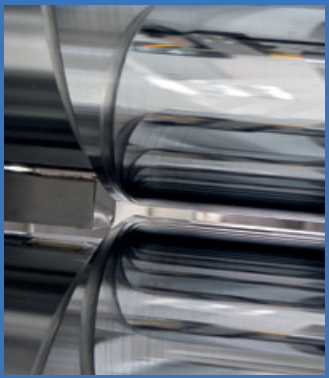
- Accuracy of 1 µm
- Two calendering modes
  - High-precision gap control
  - High-precision force control
- Closed loop control with external measurement unit

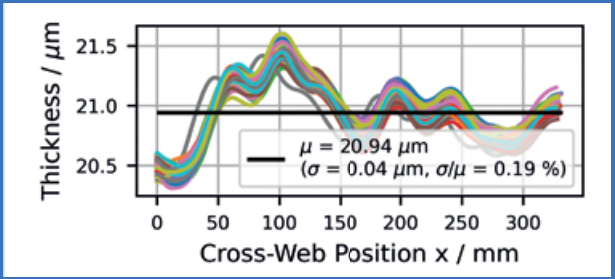


DEFLECTION COMPENSATION

- Automatic deflection compensation
  → parallel application of force to the product

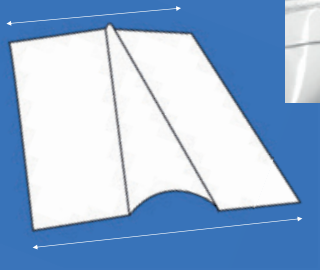






ROLL PROTECTION

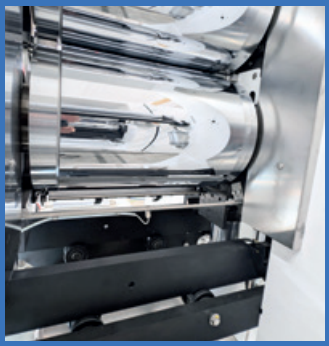
- Detection of web tear and web width reduction due to wrinkling
- Automatic machine stop

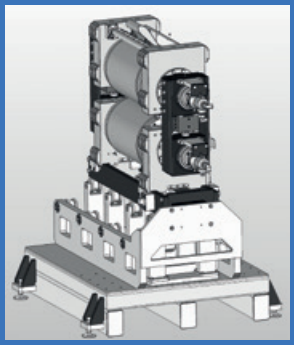


Width reduction from buckling and wrinkling

MAINTENANCE ROLL CHANGE

- Roll change crosswise to the machine direction, no crane required
- Optimized roll change process within a minimum of time and effort
  → minimized downtimes and lower costs





Customized calendering line

- Your calender line can be set up according to your individual requirements
- Preheating of the electrodes
- Wrinkle reduction through induction heating and spreader rollers
- Suitable for operation in dry and clean rooms

24/7 R2R production

- Additional modules such as automated layer thickness measurement for intelligent closed loop control
- Integration of individual quality monitoring systems
- Turret winders and automated splice detection enable automated coil change
- Automatic center position control

Laboratory option

- Automatic or manual sheet feeding
- Adapted web speeds

Short maintenance time

- Intelligent and simple roll change with minimum space and time requirements

Technical Data

Material
Wet and dry coated anodes and cathodes

Web width
300–1,200 mm *

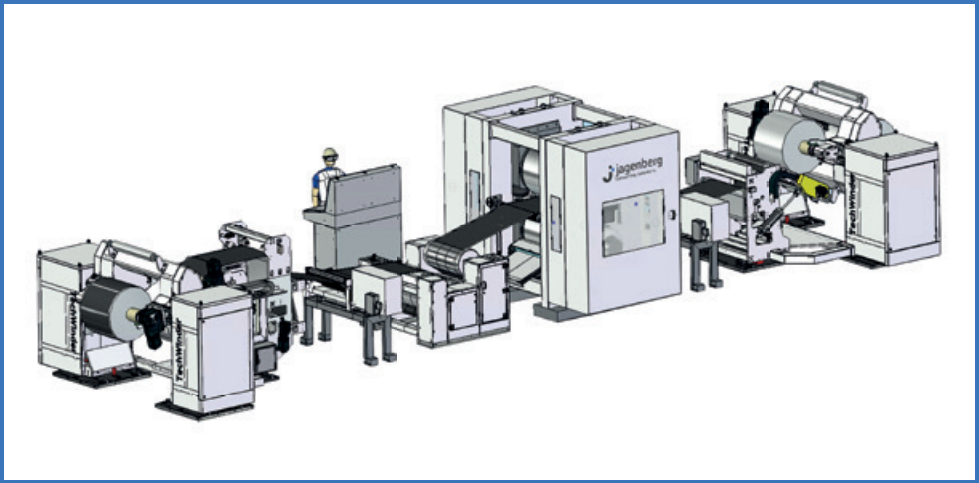
Line loads
4,400 N/mm at 450 mm coating width -
2,800 N/mm at 700 mm coating width *

Roll surface temperature
Ambient - 170°C*

Roll properties
concentricity < 3 µm /
cylindrical shape < 2 µm /
Ra < 0.02 µm,
chrome & tungsten carbide

Control type
High-precision force and gap control

* other specifications at request



Calendering
Key Features

- Non-stop production – precise, fast, and continuous
- Wrinkle prevention – enabling a high product quality
- Web temperature control – preheating and cooling of the electrode
- Customized inline measuring systems – embedded quality monitoring
- Short maintenance time – intelligent and simple roll change with minimum space requirements

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If you are interested or have any questions about calendering, please contact

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Group

Create.Future.Together.