



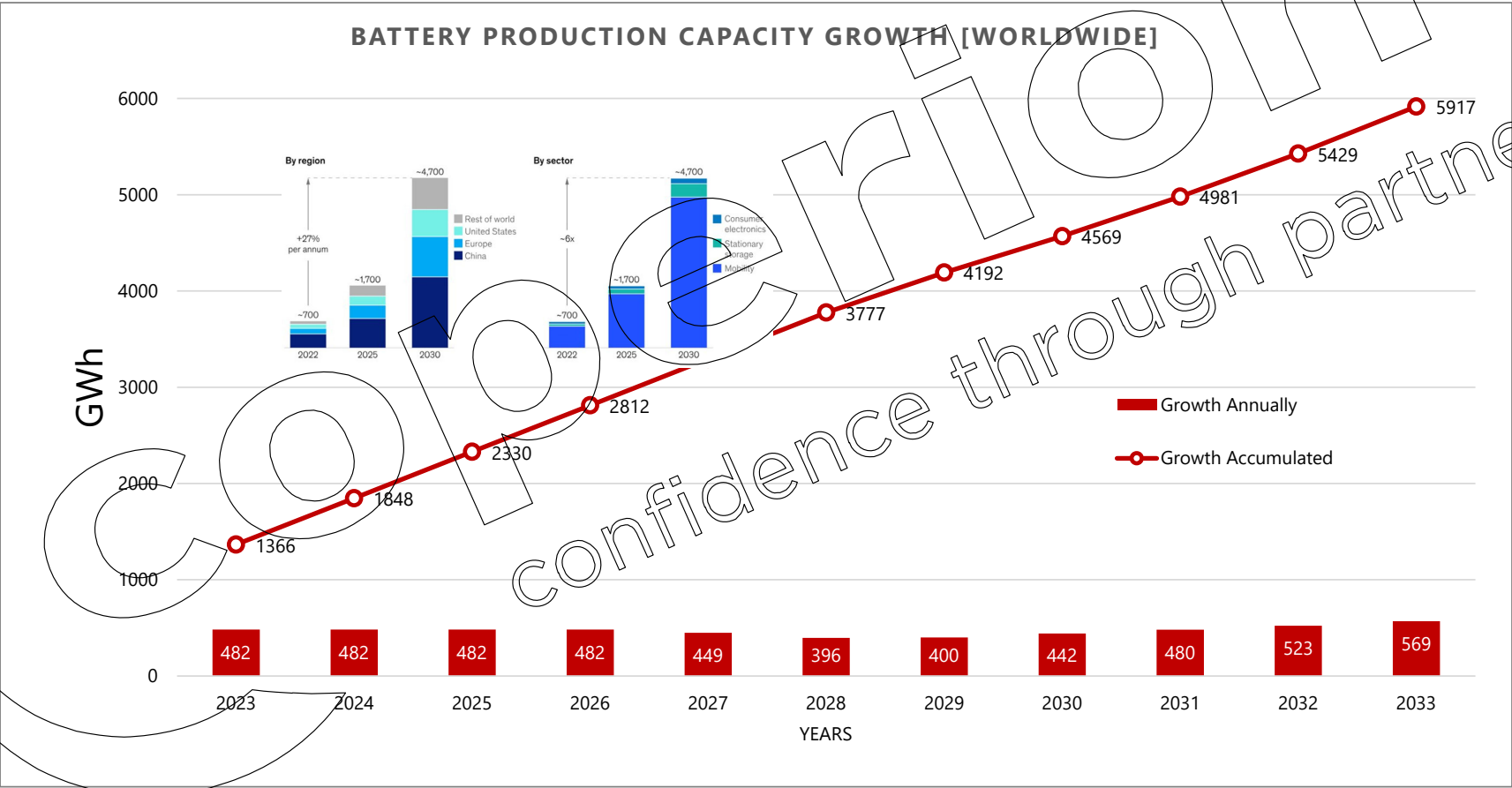
coperion

Continuous Mixing of Battery Electrode Masses by Extrusion

From the perspective of a system supplier

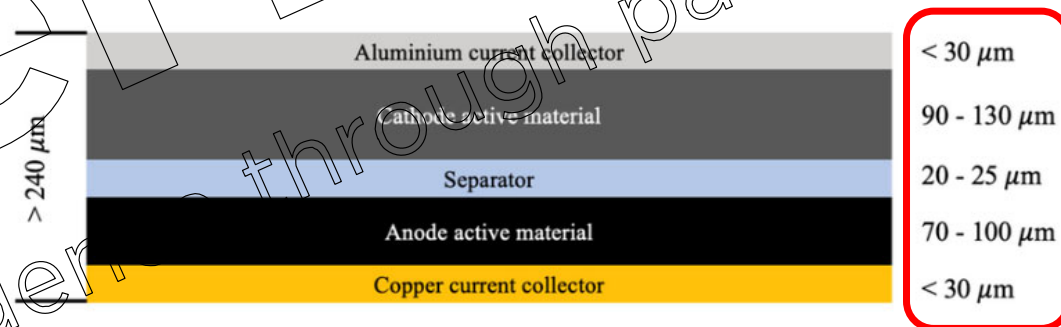
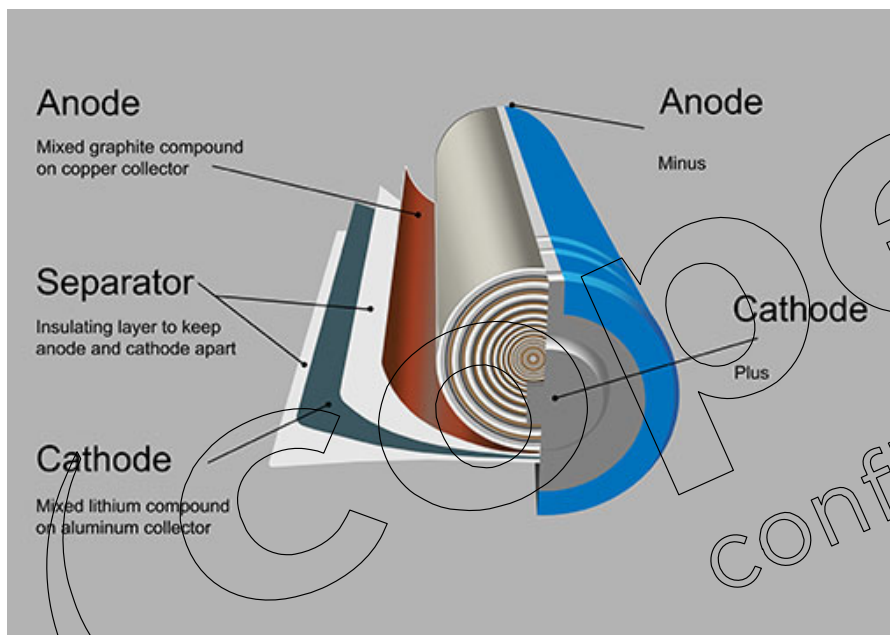
Hans-Peter Neuberger
General Manager of South Korea

Global Lithium-Ion Battery Market Overview



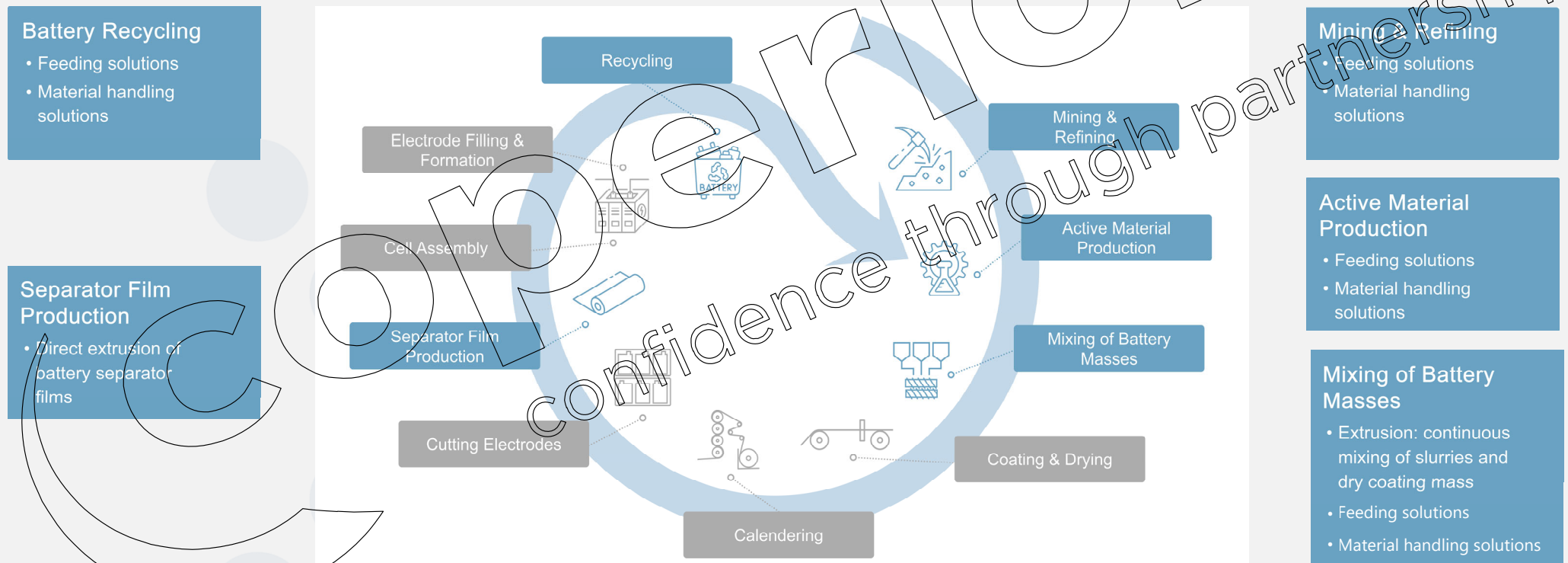
Lithium-Ion Battery

Principle design



Process Chain

Process chain battery production



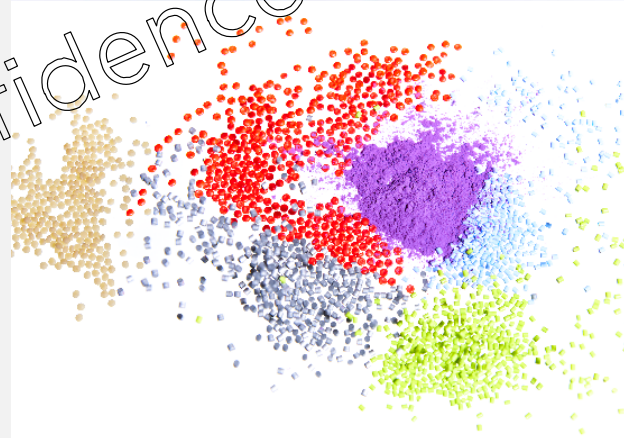
Polymer Division



For high-quality end products: From single components to complete systems

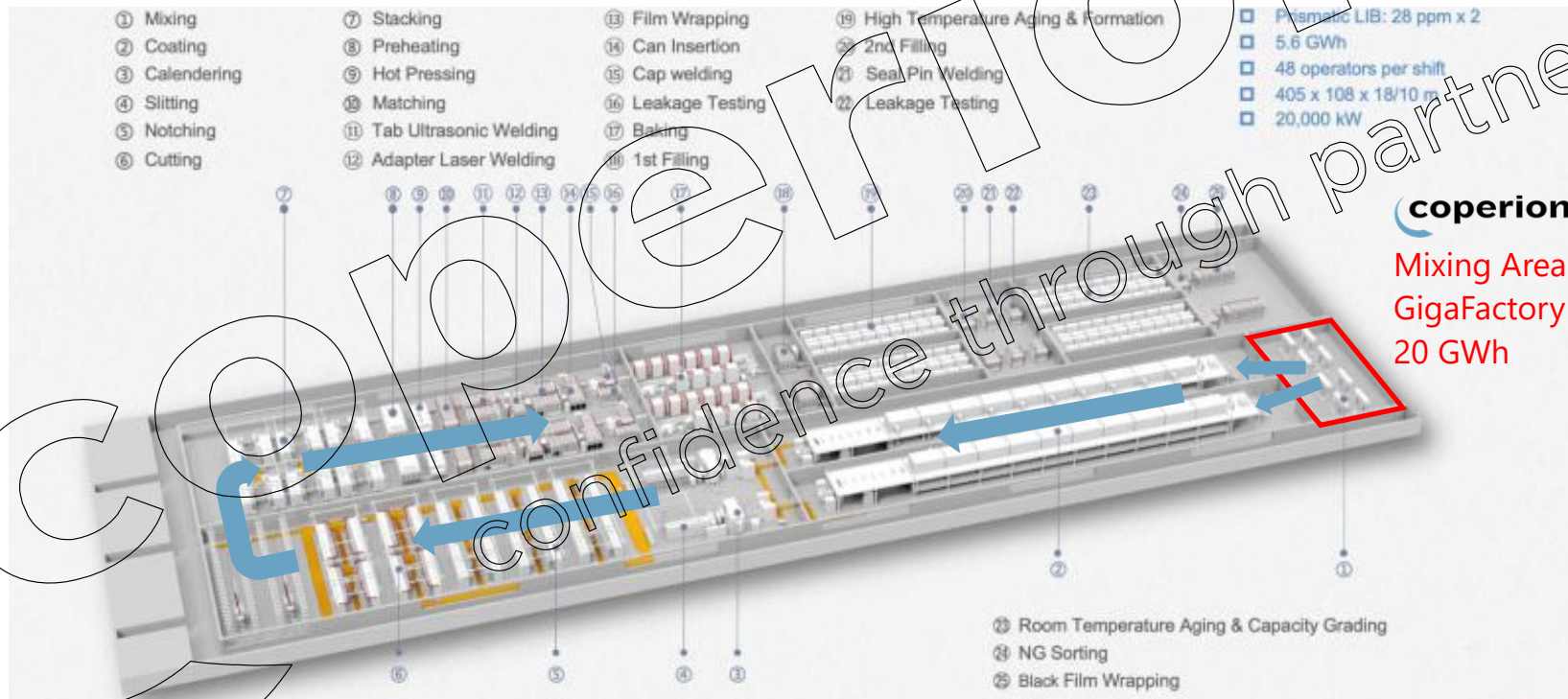
Target Markets

- Polyolefin Industry
- Engineering Plastics
- Masterbatch
- PVC/HFFR
- Plastics Recycling
- Bio Plastics
- Direct Extrusion
- Battery Masses
- Battery Separator Films
- Chemical Applications
- Minerals
- Nonwovens



Electrode Production / Mixing of Battery Masses

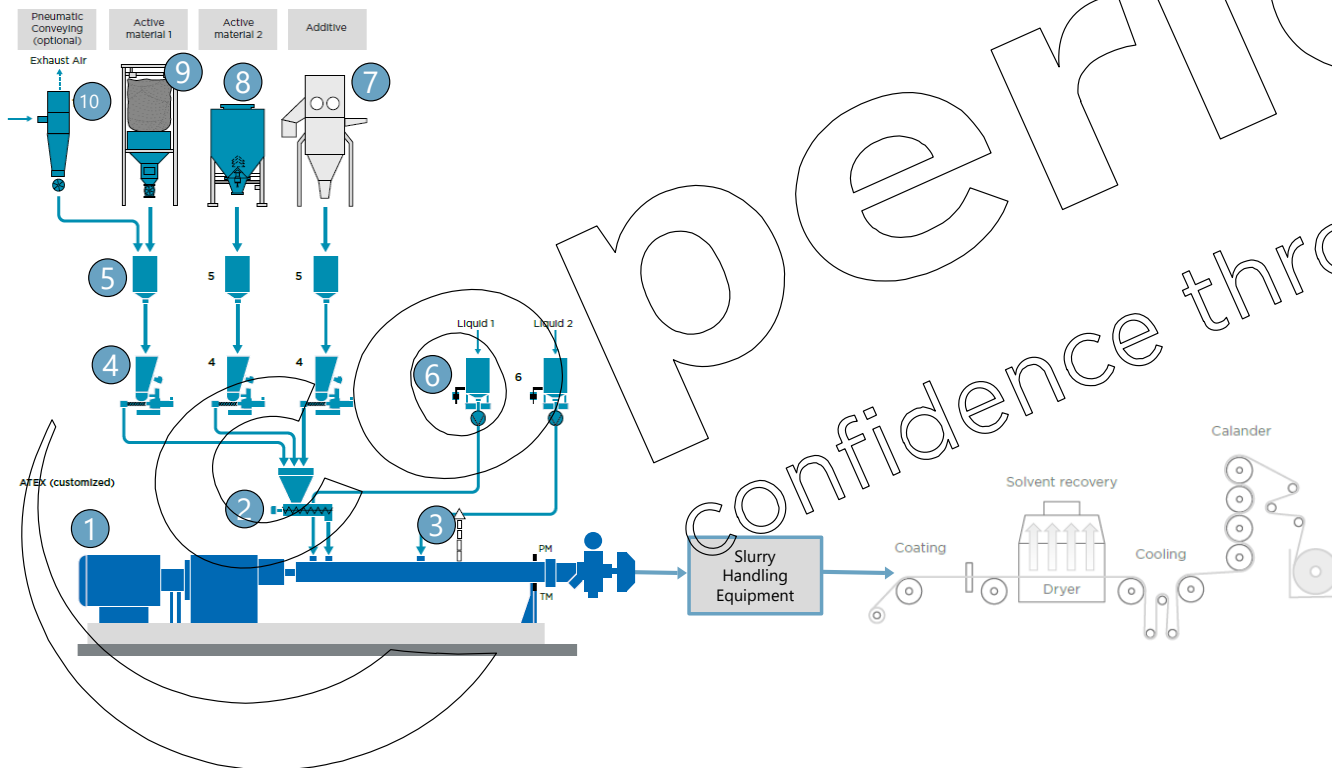
Giga Plant



Coperion – Continuous Mixing Electrode Coating Process



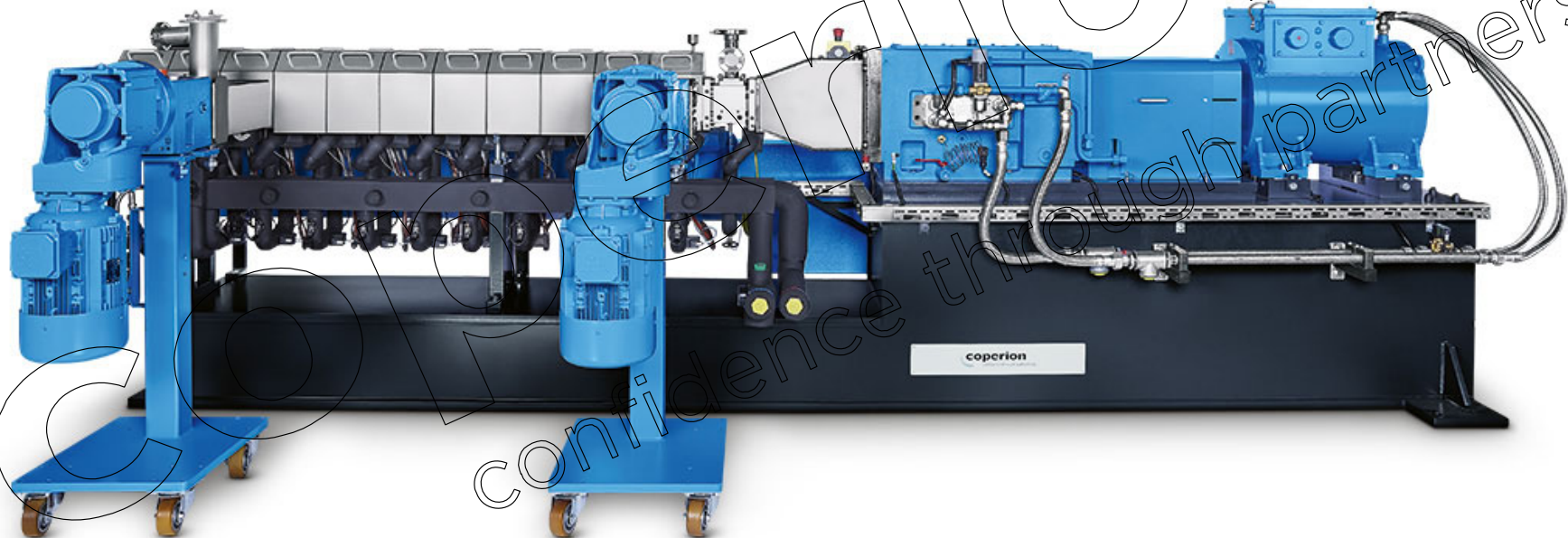
Schematic Flow Diagram and Concept for Giga Factory



- 1 Coperion ZSK Mc¹⁸ Extruder
- 2 Coperion ZS-B Side Feeder
- 3 Degassing
- 4 Coperion K-Tron Solid Feeders
- 5 Storage Tank
- 6 Liquid Feeder
- 7 Glovebox for Sack Unloading
- 8 Hopper Discharge Station
- 9 BigBag Unloading Station
- 10 Separator

Extruder

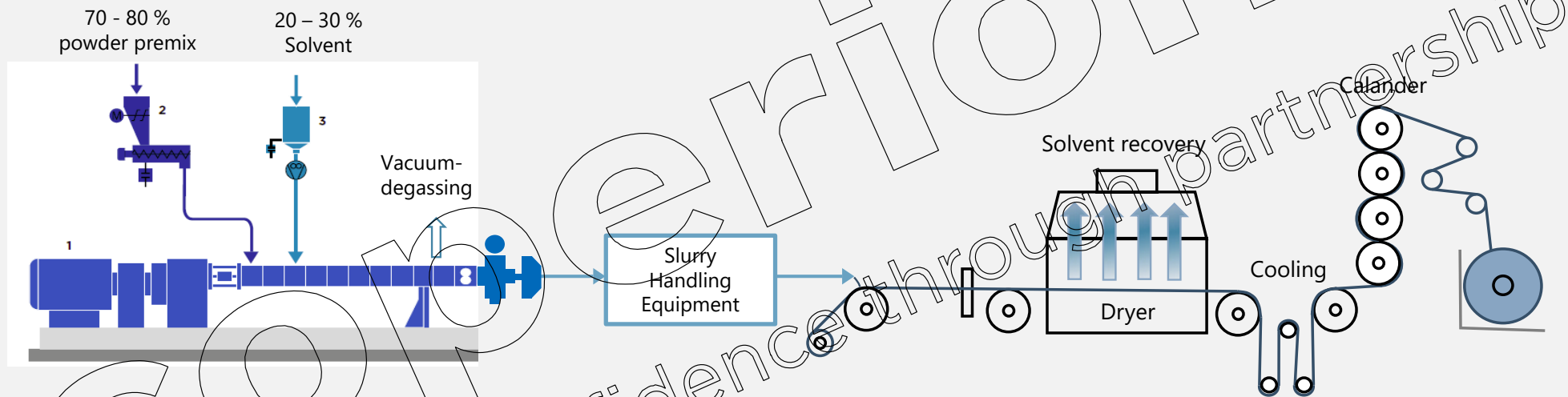
Continuous Mixer



Roadshow South Korea Oct 2024

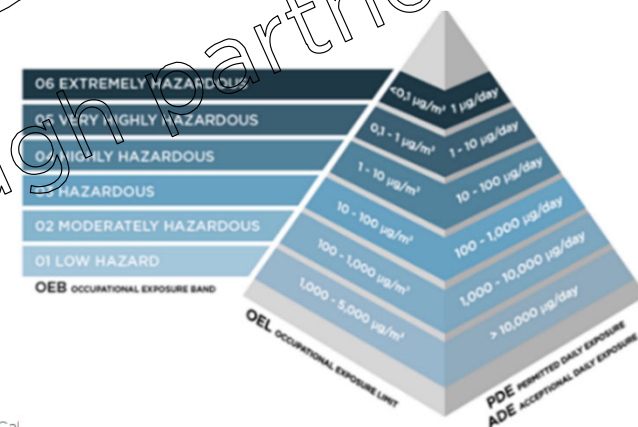
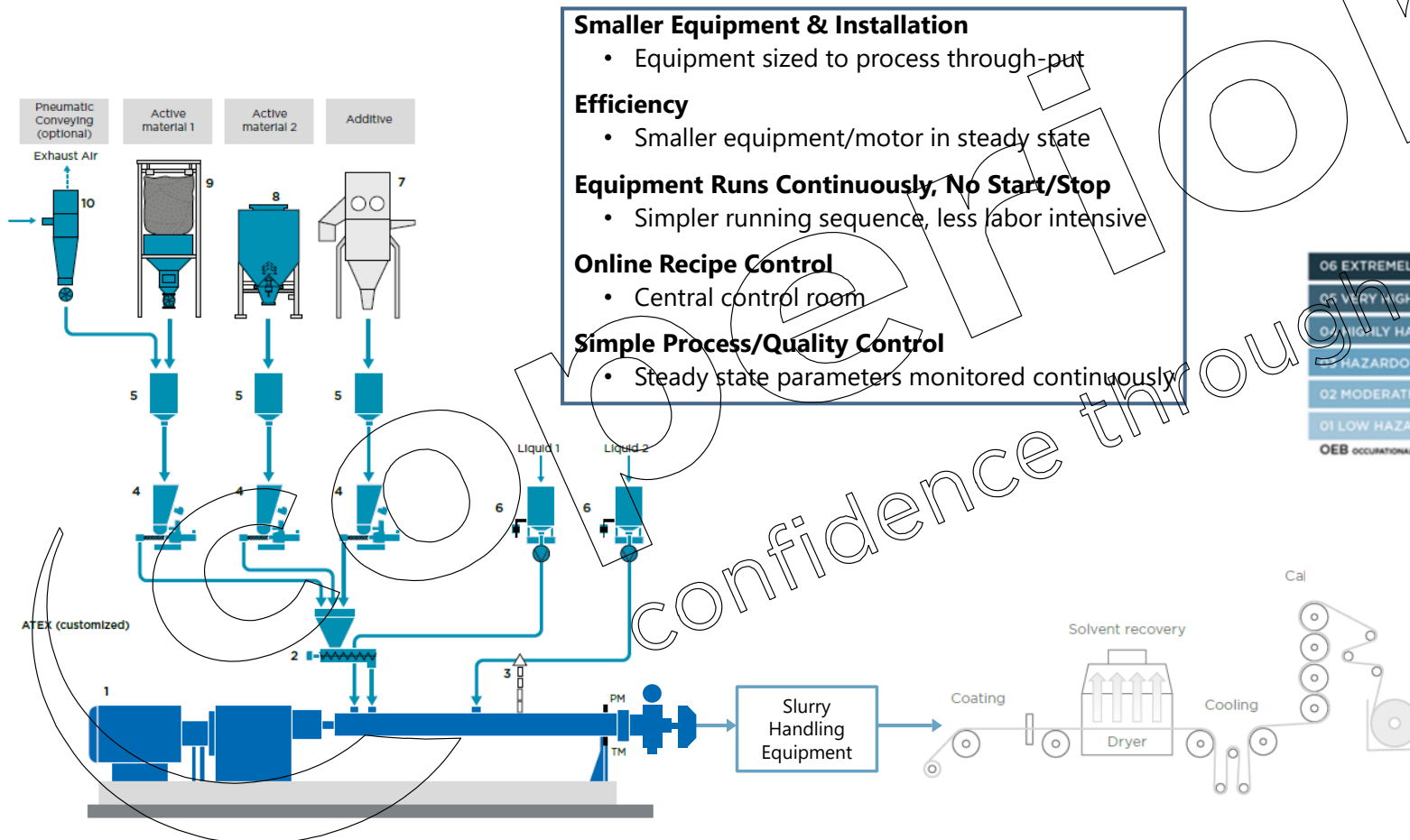
Continuous Mixing of Battery Electrode with ZSK

Advantages



- High formulation accuracy by reliable continuous dosing / feeding
- High homogeneity by intensive dispersive/distributive mixing
- Material efficiency through self-cleaning screw elements
- Low residence time (about 1 minute or less)
- Mixing process is 100% scale-able (requested range 5 - 3.000 kg/h)
- Stable and monitored end-product quality

Continuous Manufacturing of Battery Compounds



Requirements for Battery Electrode Production



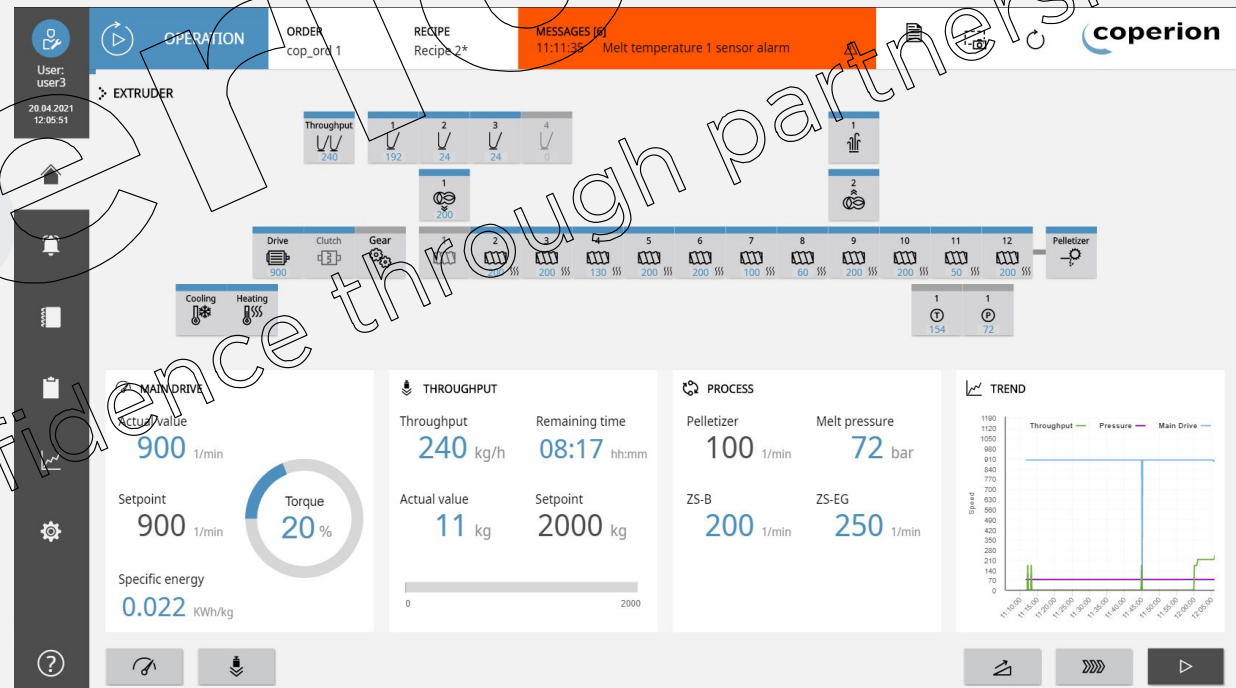
Quality control

Process data

- Screw speed
- Torque measurement
- Product temperature
- Outlet pressure
- Barrel temperatures
- Dosing / feeding data

Inline/offline measuring capabilities

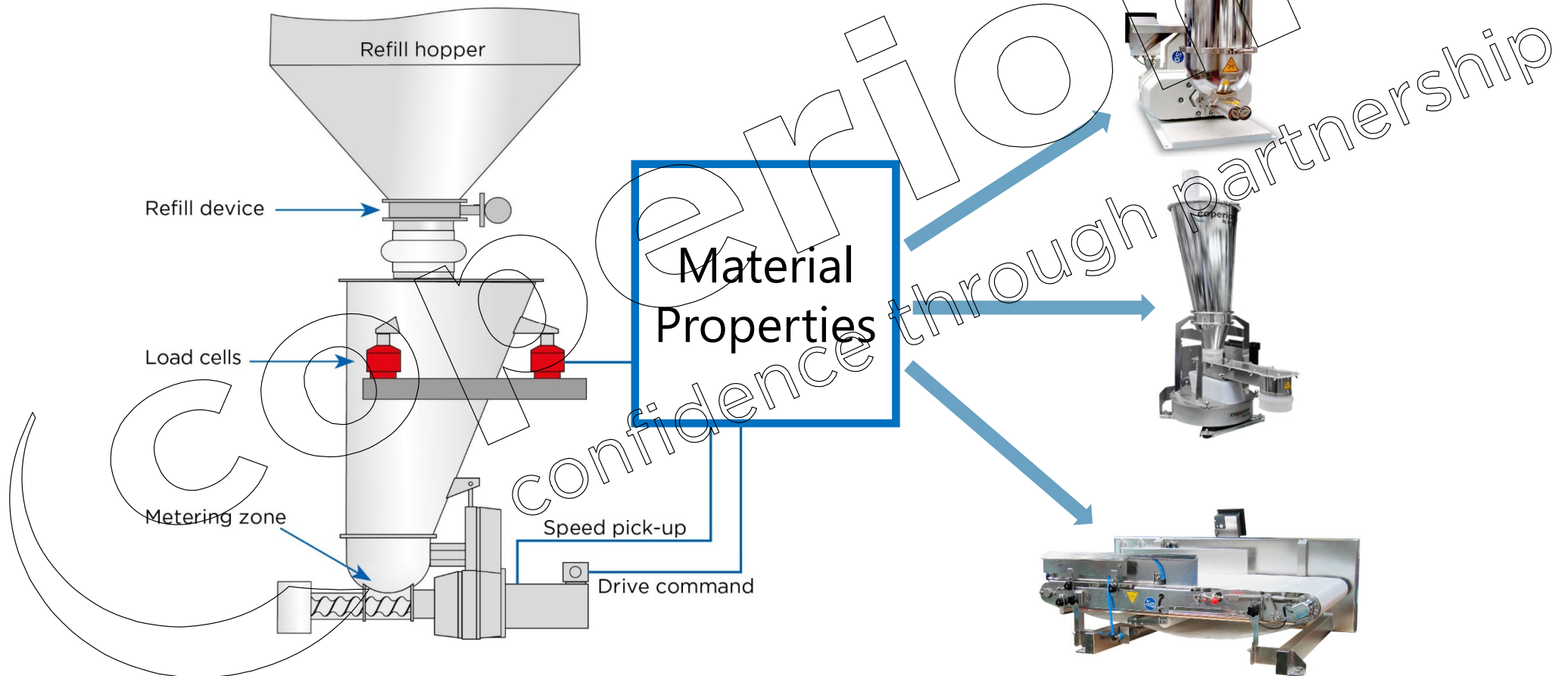
- Viscosity
- Density
- Particle size distribution



High Accuracy Feeder – Mechanical Handling

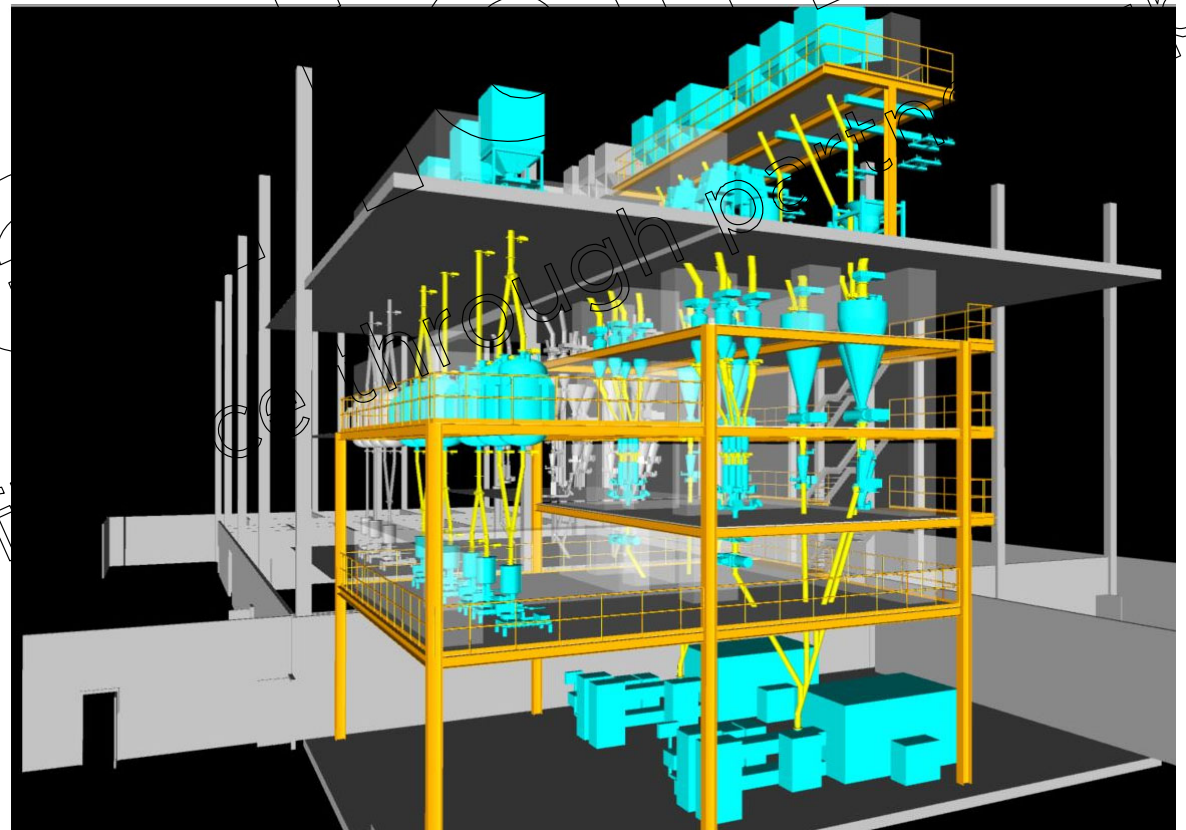
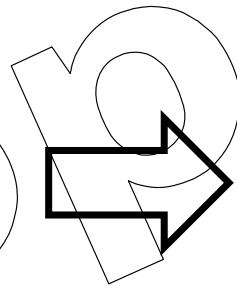
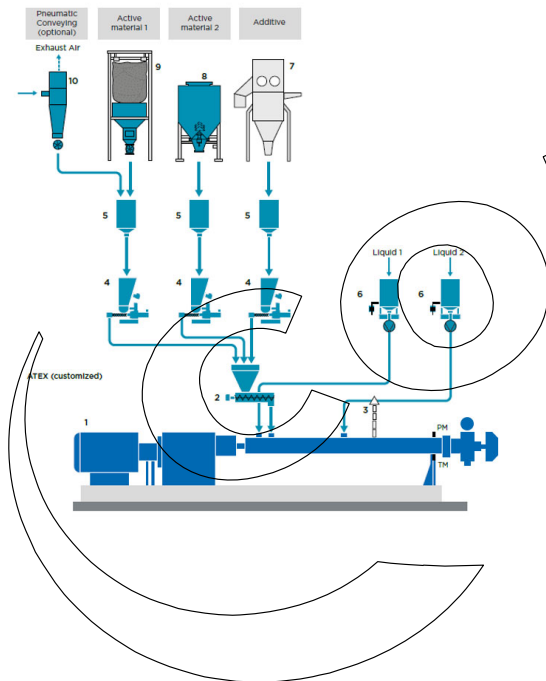


What is it ?

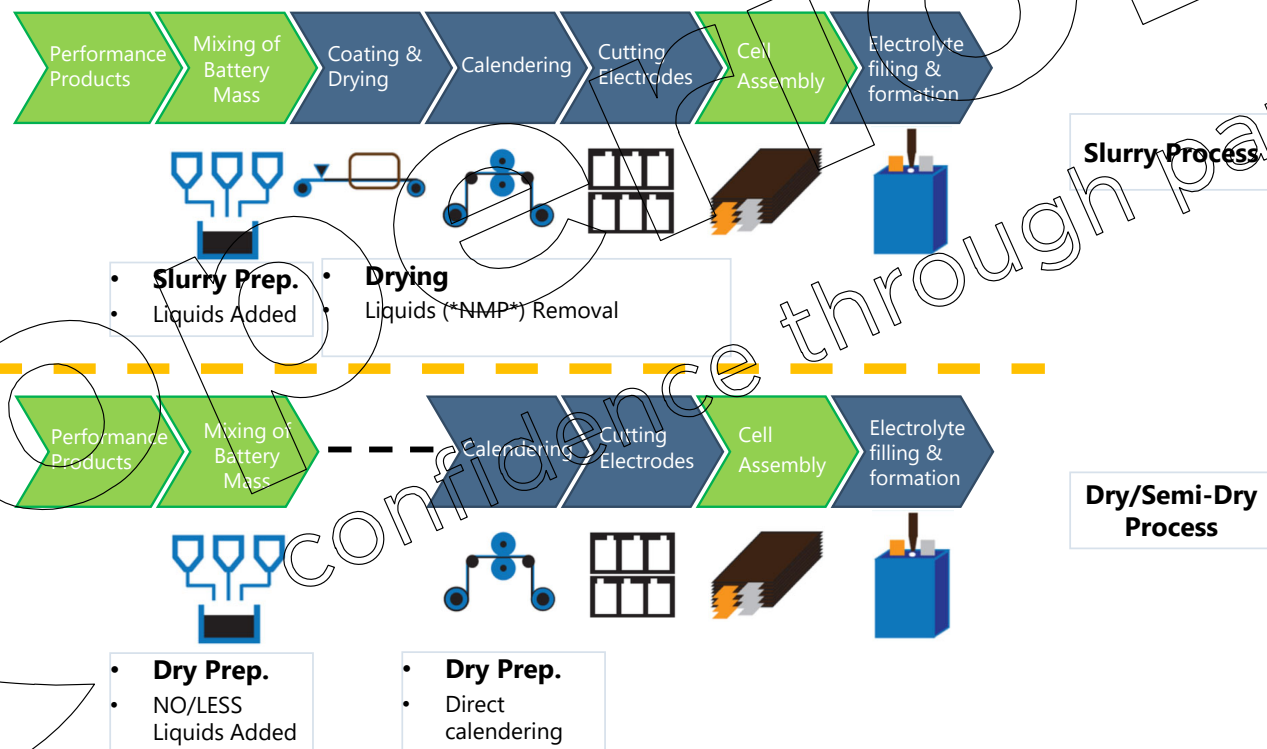


Giga-Factories

Typically plant layout



Process Chain – Slurry vs Dry ** latest technology



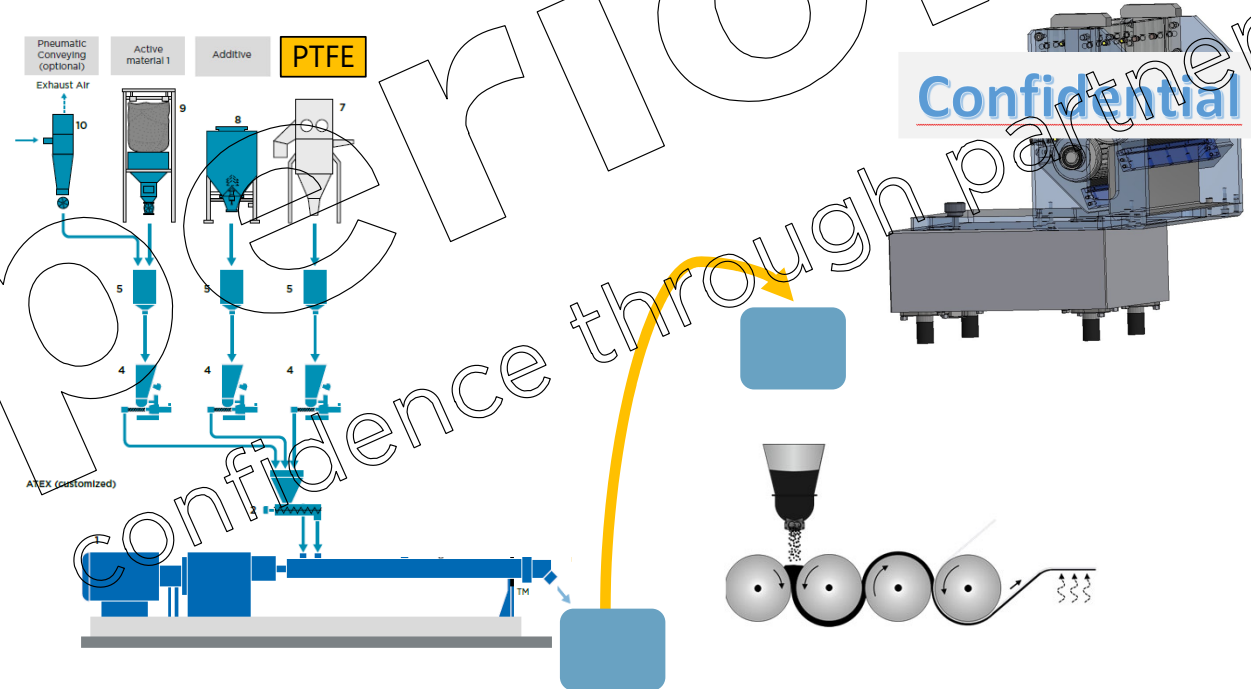
Solution – Dry Continuous

- Continuous Mixing

- Continuous systems
- High accuracy
- Toxic & non-toxic material
- Similar to slurry
- ++ PTFE Handling

- Calendering

- ++ PTFE Handling
- ++ Calender feeder
- * Prototype in development



Continuous Production

why continuous?



Efficiency

- Level of automation
- Modularity
- Feed intake
- Fast set-up
- Broad viscosity range

Quality

- Low thermal stress
- Intense mixing
- Safe degassing
- Reproducibility

Availability

- Short residence time
- Long machine lifespan

- >> Faster Return on Investment
- >> Reduction of raw material cost

- >> Margin increase at steady production volume
- >> Reduction of personnel cost
- >> Small Footprint



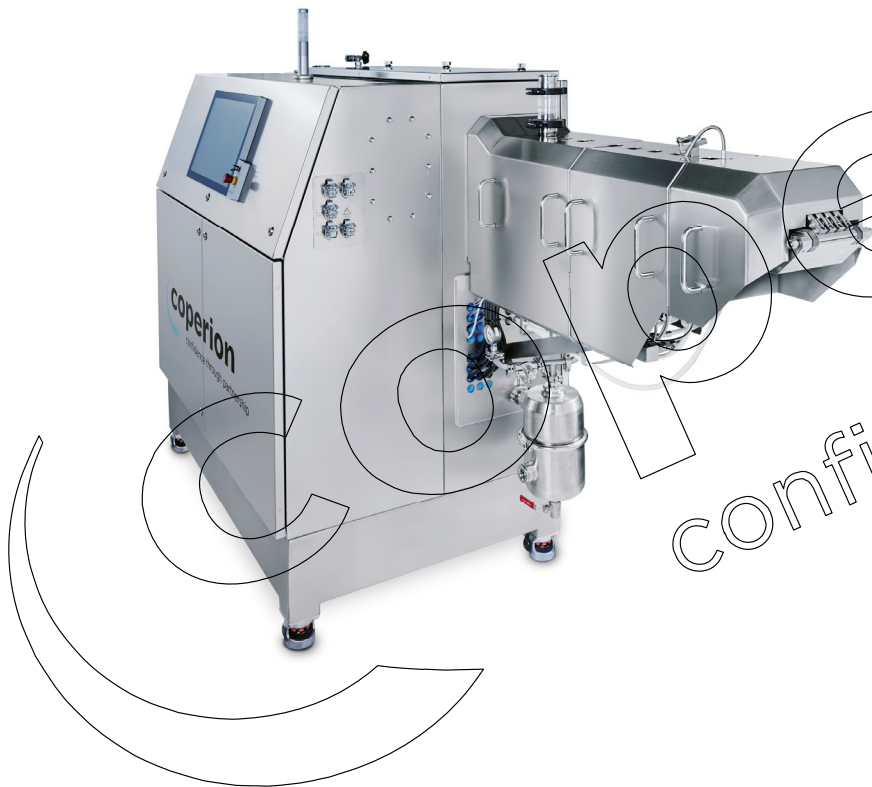
With **most**
comprehensive
equipped test centers
worldwide – 25 in total



Lab Lines



Continuous mixing of Battery masses in labs with a containment proved system





Thank you
very much for
your attention.

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