

40 years
of
innovation

Hybrid Cell Manufacturing

The road to successful Battery Production in North America

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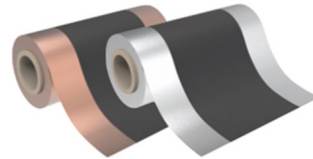
VP Sales & Marketing



What is Hybrid Cell Manufacturing?

Hybrid Cell Manufacturing fully disconnects:

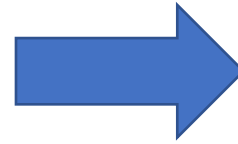
- Electrode Fabrication
- Cell Assembly
- Cell Activation



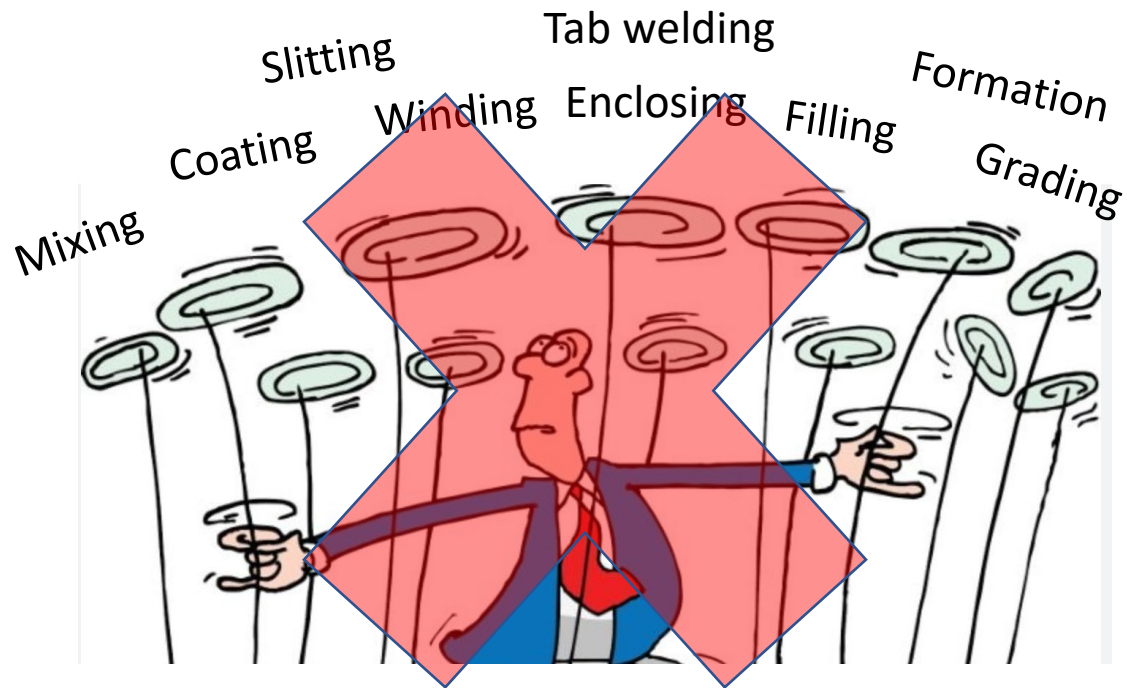
Different company, Different location, Different timing

Why?

Traditional Cell Manufacturing Approach



Hybrid Cell Manufacturing



Step 1

Decouple your Processes



Step 2

Gain Experience

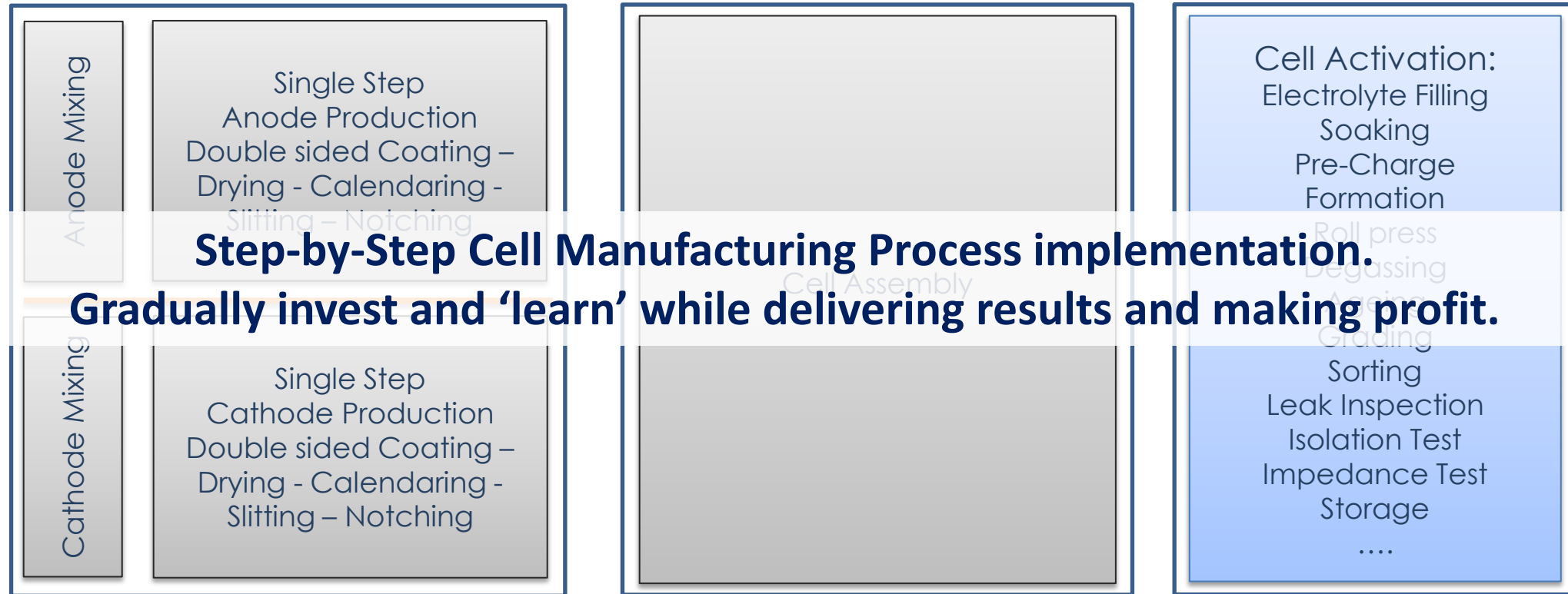


Step 3

Hyperscale your Production



A Step by Step Manufacturing approach is needed



What is Cell Activation?

- Cell Activation starts from a passive assembled cell, temporary sealed to avoid moisture entering the cell (a “dry” cell)
- Dry cells can be **shipped without any hazards**, as they are not activated, don't contain flammable electrolyte and cannot go in thermal runaway
- Cell Activation **converts this dry cell to an active, tested cell, ready for use, by:**
 - Electrolyte Filling
 - Soaking and Pre-charging
 - Final Degassing and Sealing
 - Formation, Ageing and EOL Testing



Cell Activation enables Hyper-Scaling Cell Production

Coated Electrodes



Dry Cells



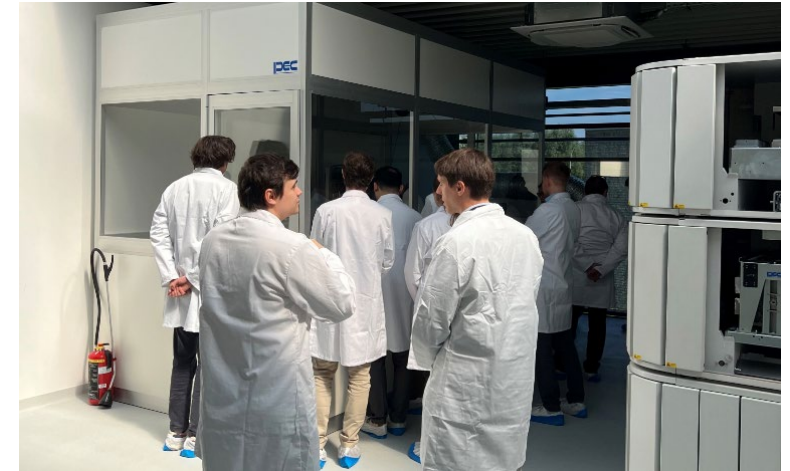
Activated Cells



- **Key players can scale up** their electrode production and cell assembly recourses locally before investing overseas
- **New players can grow more gradually**, build up expertise and be financial self supporting rapidly.
- Materials companies can expand their footprint to electrodes, with a higher **Materials IP** protection
- Cell users can develop their own electrolytes/activation process and protect their **Process IP**
- Cell Assembly is SOP oriented with limited IP

Why PEC?

- The **PEC Cell Activation Technology** is essential:
 - PEC's **Single Step RAPID Electrolyte Filling** is eliminating large dry rooms
 - All Formation, Ageing and Testing processes are done inline
 - **From a Dry to Finished Cell in a Single Line!**
- **30+ years global experience in Cell Production Equipment**
 - PEC Equipment is Certified in the EU and North America (CE/UL/OSHA/ATEX..)
 - Cell activation capacity of 1 million cells per day installed with PEC clients worldwide
- **Experience in 3 running Hybrid Cell Manufacturing projects**
 - Cylindrical 46XXX
 - Prismatic – regular and blade type cells
- **Inhouse PEC Tech Center with dry-room** for process validation and sample production
- The PEC solution is **hyper-scalable** due to modularity and standardization
 - 1 line = 1 GWh



How can we help?

- PEC as a supplier of **Turn-Key Cell Activation Lines**
 - For all cell types
 - 46XXX
 - Prismatic
 - Pouch
 - For all processes:
 - Single Step Electrolyte Filling
 - Soaking
 - Formation
 - Degassing and Final Sealing
 - Accelerated Ageing
 - End-of-Line Testing



How can we help?

- PEC as a supplier of **“Cell Activation As A Service”**
 - Based on standard form factors:
 - 46XXX
 - Unified cell
 - **2 GWh Planned for 2027**
 - In collaboration with our partner network:
 - Coating As A Service
 - Cell Assembly As A Service
 - Dry Cell Suppliers
 - Coated Electrodes Suppliers
 - Electrolyte Suppliers



Your Partner from R&D to Mass Production! **40** years of innovation

Lab Automation for QA/QC Test Labs



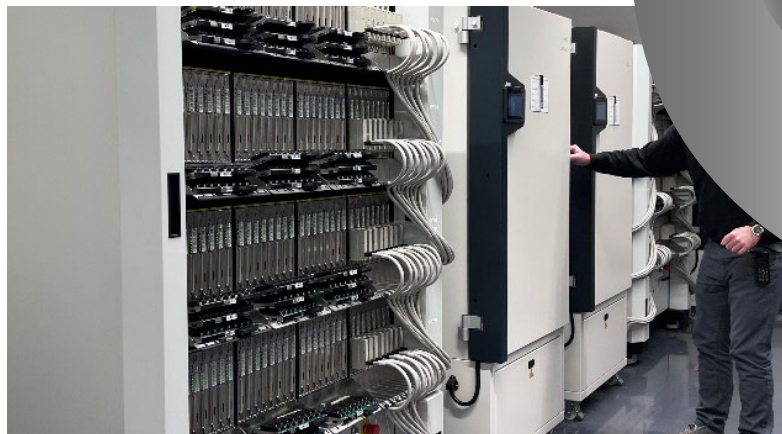
Automated GIGA Scale Cell Activation Lines



Lab Automation & MES Software

R&D Cell Finishing Lines

R&D Test Equipment



Hybrid Cell-Manufacturing!

The road to successful battery
production!

www.peccorp.com

www.HybridCellManufacturing.org