Air handling solutions for battery production

Efficient and powerful systems for air purification and drying

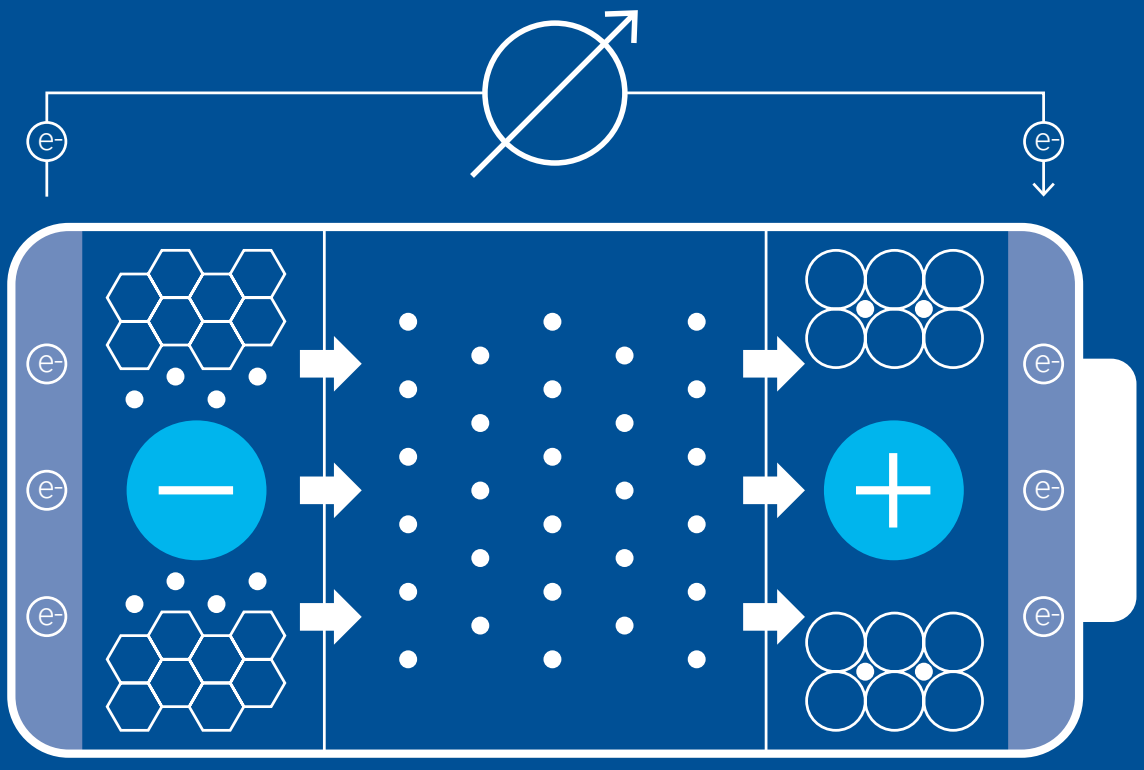
ULT
air quality

Process air – an important parameter in battery cell production

Process air must be kept in focus during battery cell manufacturing. This applies to both possible effects of air pollutants and air humidity.

If, for example, very fine particles settle in the process between the anode and cathode of a battery cell, this can lead to short circuits during later use, which may result in dysfunction or complete destruction of the battery. Therefore, the battery cell manufacturing process must be kept extremely clean, i.e., the area between the cathode and the separator must be particle free.

In the case that water molecules are in the battery cell during the process of filling the electrolyte or afterwards, they can react with the elements in the electrolyte - especially lithium salts - and form acids. A significantly reduced battery life may be the result. This is particularly important for accumulators for electromobility, which are charged and discharged over a long period of time.



A battery cell is a complex structure that is manufactured in several technologically demanding process steps.

The production of battery cells – a complex process

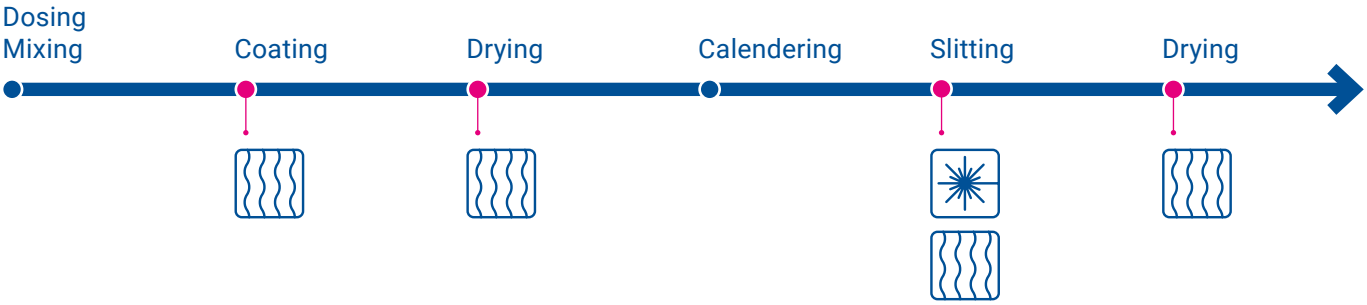
ULT offers comprehensive solutions for all process steps in battery production where air quality is crucial in terms of purity and residual moisture.

Laser fume

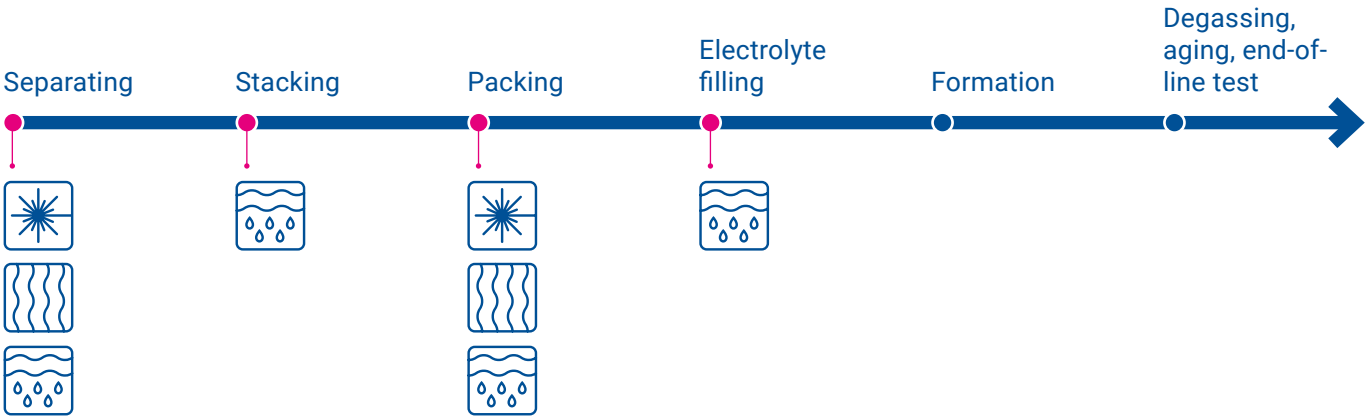
Gases, odors, vapors

Process air drying

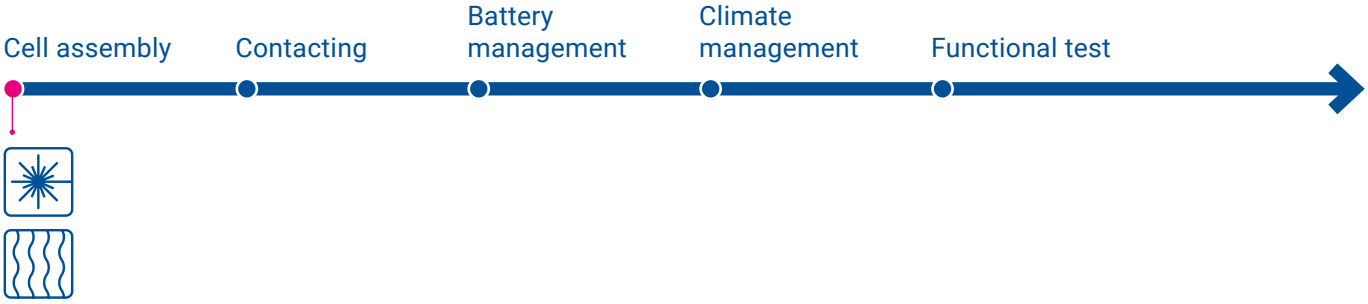
1. ELECTRODE PRODUCTION



2. CELL PRODUCTION



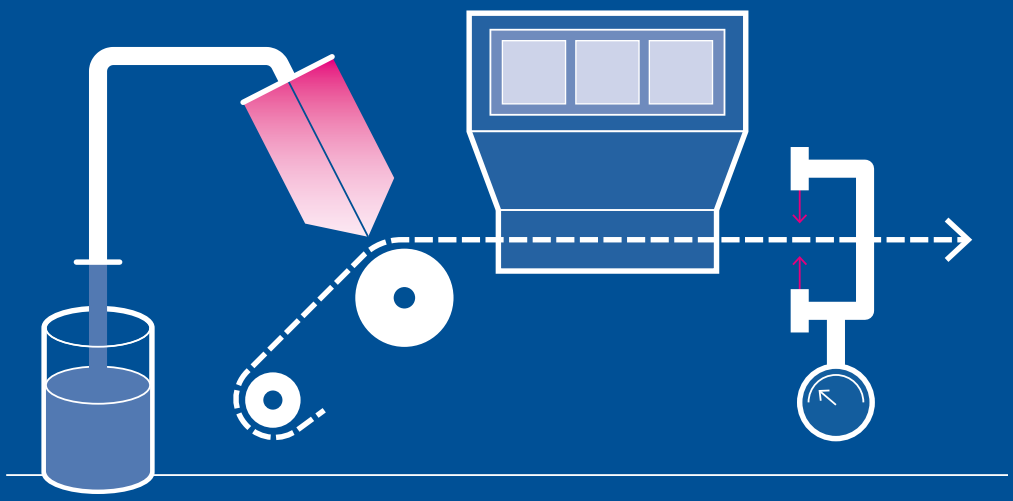
3. BATTERY PRODUCTION



Pure, dry and conditioned air along the process chain

Coating

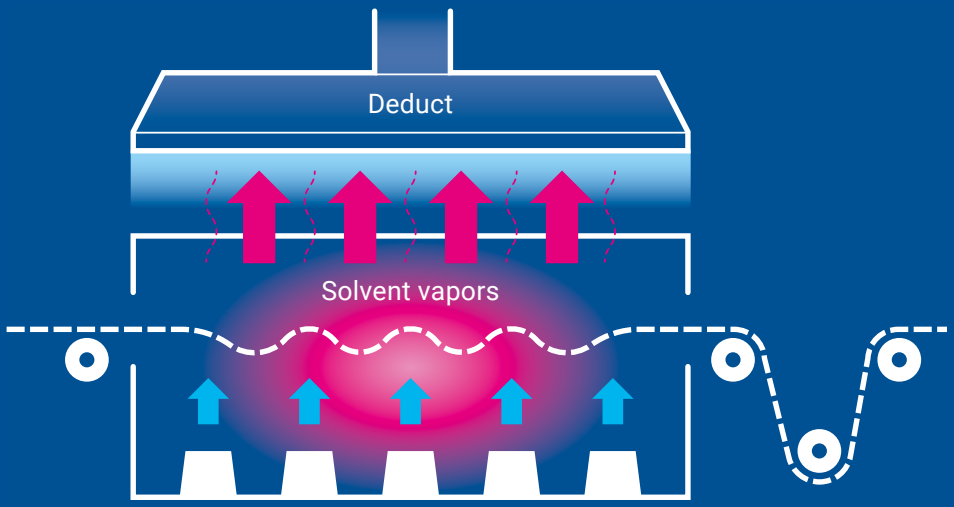
ULT offers sophisticated extraction and filration solutions to remove particles and gases.



- The substrate foil is coated continuously or intermittently using an application tool
- Important parameters here are: the surface quality, cleanliness and the avoidance of gas inclusions.

Drying

ULT offers comprehensive air purification technology for removing solvent vapors.

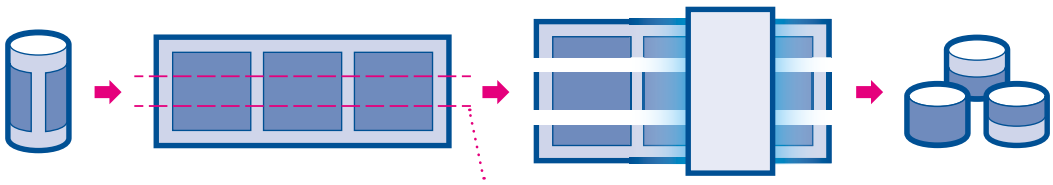


- After coating, the substrate foil is dried.
- Used solvents are removed from the substrate by heating.

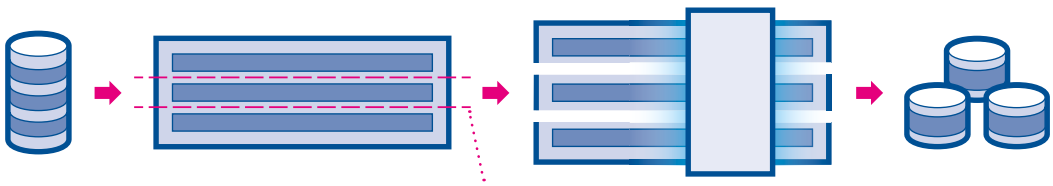
Slitting

ULT offers specially developed extraction and filtration technology to eliminate laser fume and dust.

POUCH
Intermittent coating



PRISMATIC/ROUND
Continuous coating

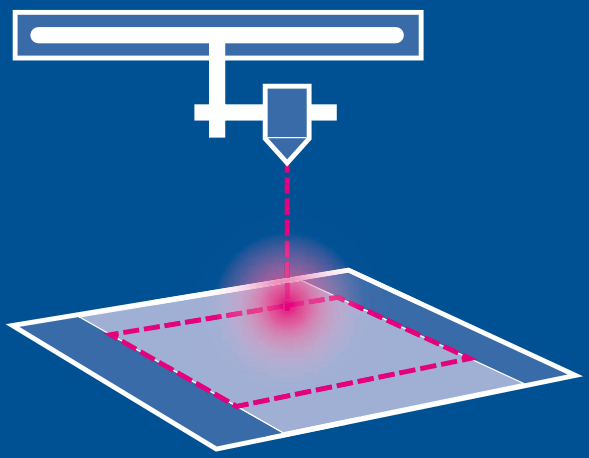


- The electrode strip (mother coil) is e.g. divided into several smaller electrode strips (daughter coils) by laser cutting
- An important quality parameter is the cleanliness of the coils or electrode strips

Separating

ULT provides technologically leading solutions for laser fume extraction as well as process air drying.

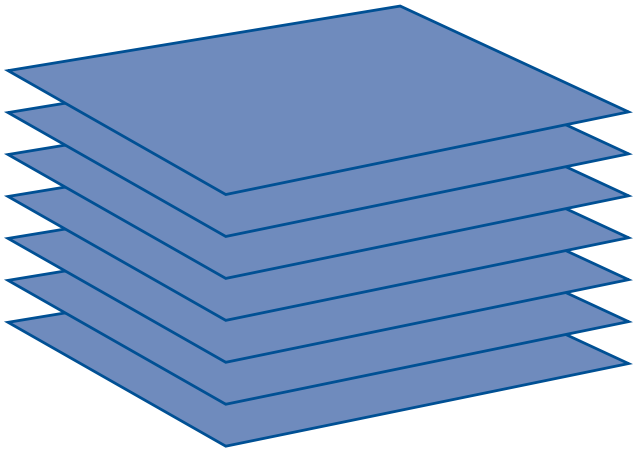
Laser cut



- Separation of anode, cathode and separator sheets from the daughter coils by laser cutting
- The quality of the cut edges and the cleanliness of the surfaces must be ensured

Stacking

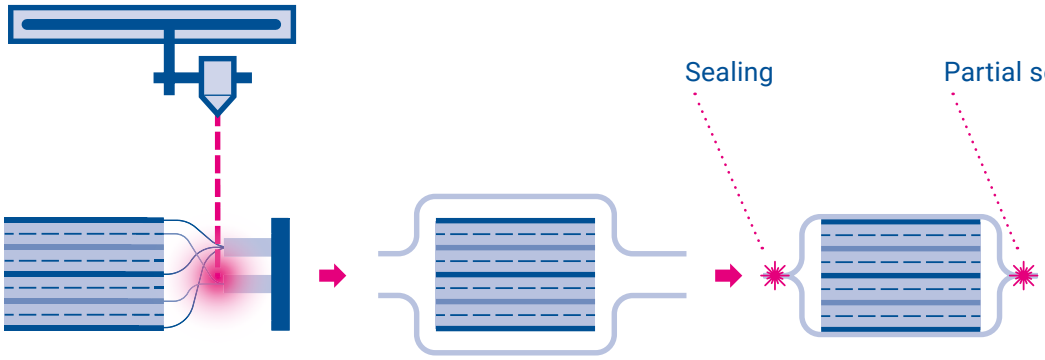
ULT offers a wide range of extraction and filtration technology as well as air conditioning solutions for laser welding.



- Electrode stacks are welded together – furthermore, the contact tab is attached to the uncoated edge of the sheets
- Laser welding generates fewer particles, but the occurring laser fume and dust must be removed

Packaging

The ventilation systems from ULT eliminate laser fume and ensure low humidity.



Contacting the cell conductor

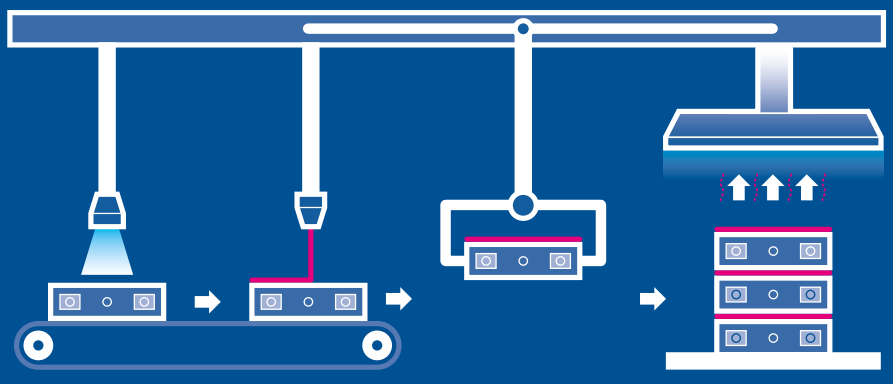
Packaging/cell assembling

Finishing/sealing

- The conductor foils are connected to the cell conductors by laser welding
- Laser welding is also used to seal the battery cell

Battery pack production

The use of laser technologies for marking, structuring, cleaning or stripping cables requires sophisticated extraction and filtration technology. In addition, solvent vapors during bonding processes and occurring dust must be safely removed. This is guaranteed by the ventilation solutions from ULT.

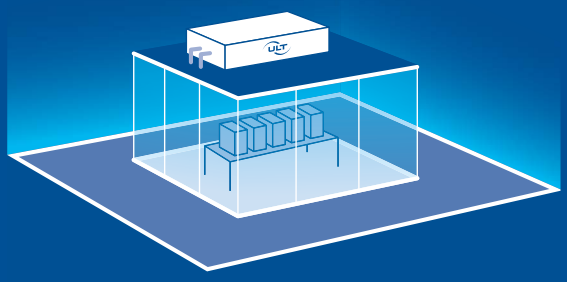


Extraction system for solvent vapors

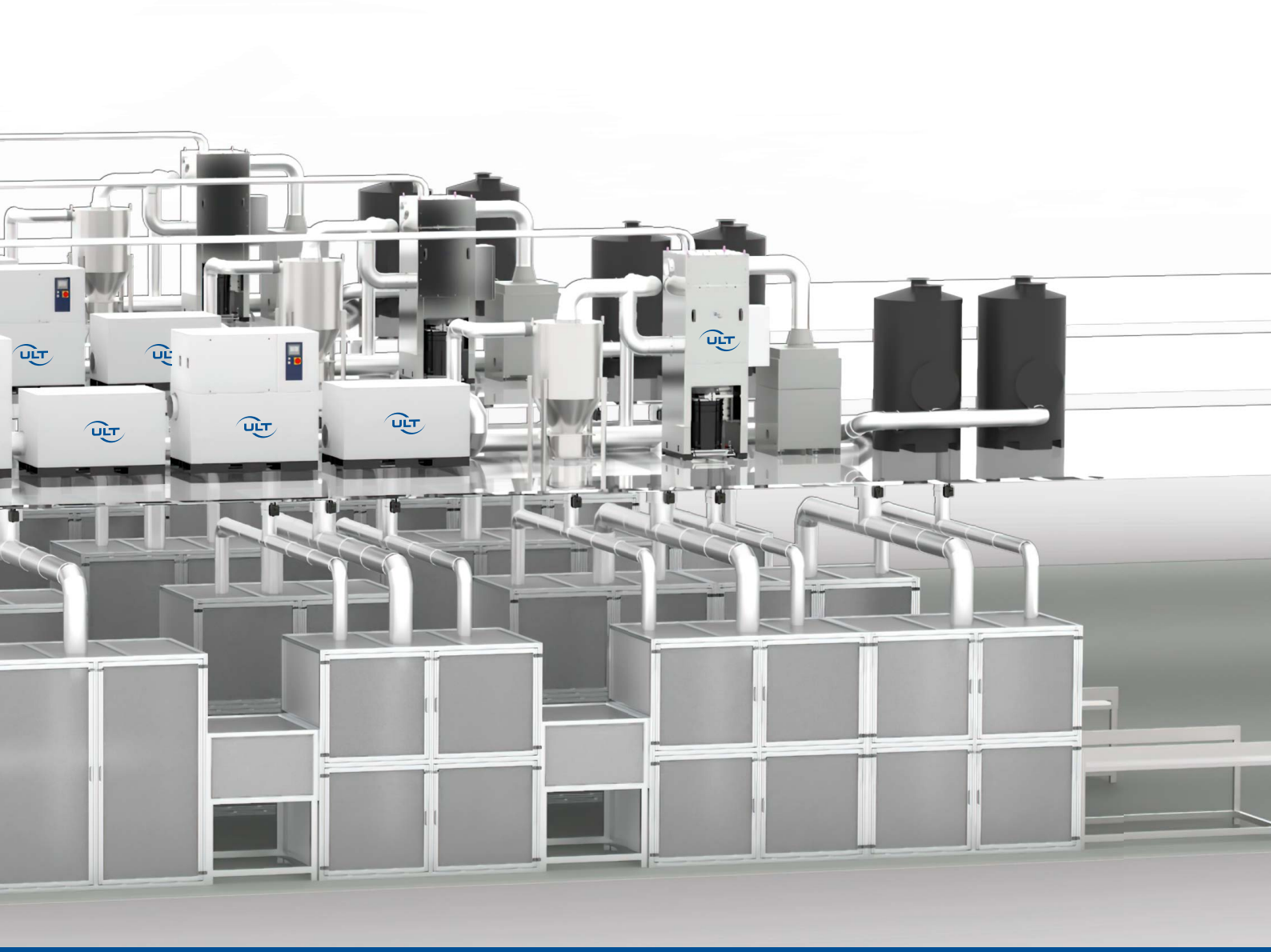
- Pre-assembly of the cell modules, during which the battery cells are assembled and stacked
- Insulation and bracing, including pressing, positioning and assembly
- Electrical contacting of the contact tabs, battery cells are connected in series

Dry air for battery cell production

Use of process air treatment sections for mini and macro environments



ULT develops special air drying solutions to be utilized in mini and macro environments. The production machine for battery cell production is completely enclosed or completely encapsulated and its air is dehumidified to the required level, depending on the process step between -20°C and -60°C dew point temperature. Additionally, the contaminated air is collected and filtered at the respective laser cutting and laser welding units.



In the field of air drying and air filtration, ULT supports operators from conceptual consulting, system design, assembly and installation of the entire drying system technology.

The concept has significant advantages:

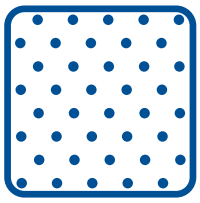
- Clean and contamination-free working conditions to protect personnel, plant technology and products
- Significant increase in productivity
- Energy-optimized mini and macro environment processes ensure cost savings of > 70 % over 10 years (sum of CAPEX and OPEX)

ULT systems and their typical fields of application

Extraction and filtration solutions for air purification

ODORS, GASES, VAPORS

LASER FUME AND DUST



DUST COLLECTION

Sorption dryer for air dehumidification and conditioning

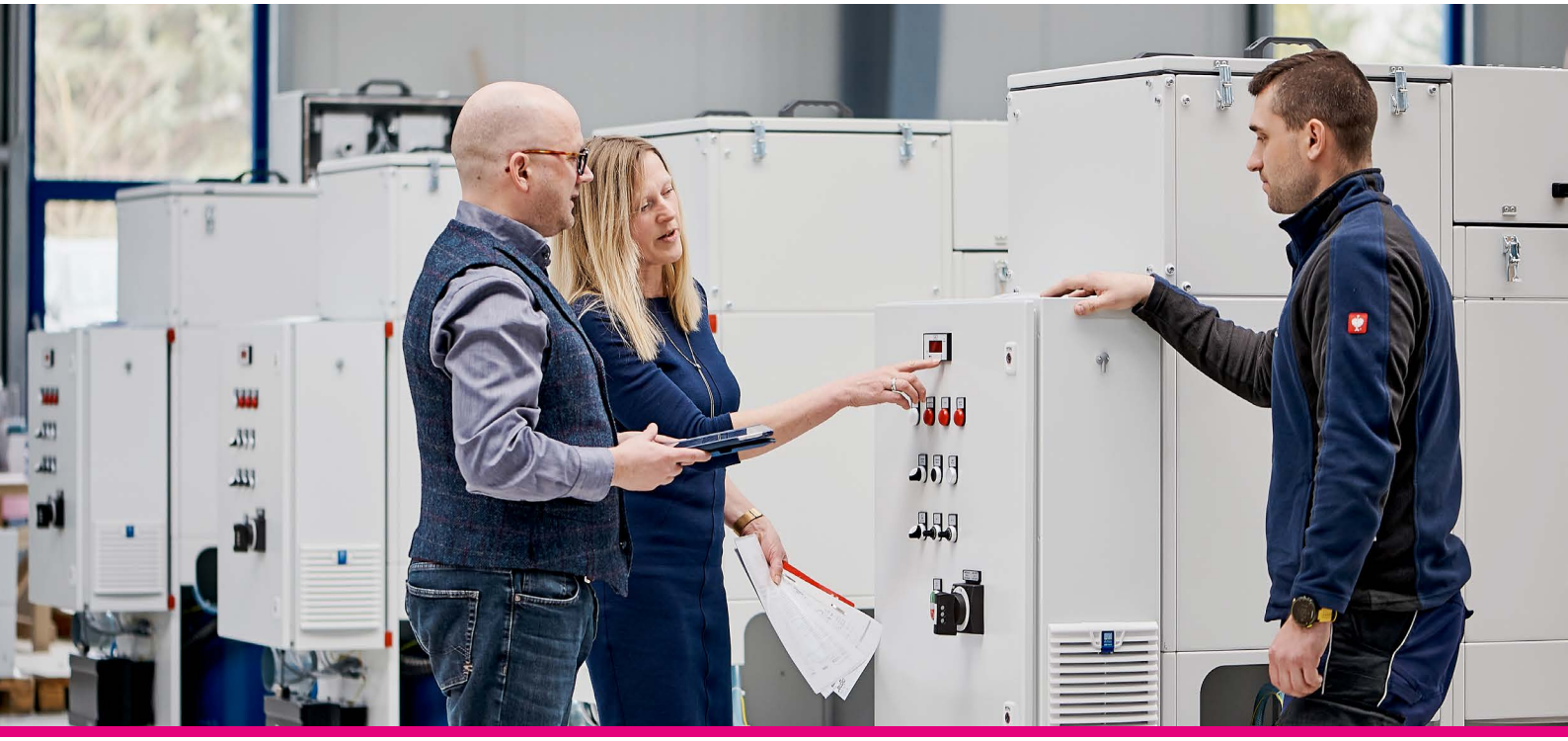
PROCESS AIR DRYING

More detailed information on the use of ULT air technology in battery production can be found online in the ULT Expert Center

ULT EXPERT CENTER

We are your partner!

Our performance promise



ULT supports users from planning/conceptual design through system installation to comprehensive, individual service and consulting.

- Owner-managed company - on the market for 30 years
- Intense research and development
- ISO 9001 certified

ULT AG

The ULT AG team.

Made in Germany.

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