



Air handling solutions for battery production

Efficient and powerful systems for air cleaning and drying

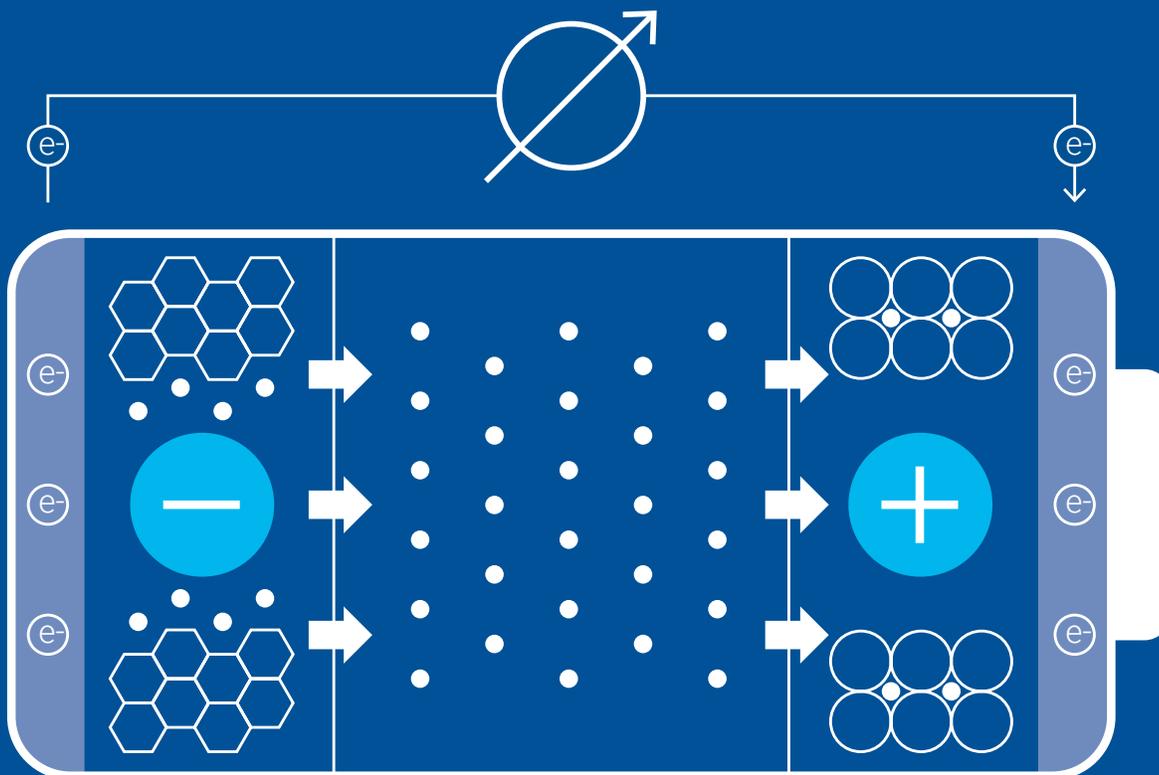
Process air – an critical factor in battery cell production

Process air needs to be carefully controlled during battery cell manufacturing. This includes managing both potential air pollutants and air humidity.

If, for example, very fine particles settle in the space between the anode and cathode of a battery cell, it can cause short circuits during later use, which may lead to malfunction or complete failure of the battery. Therefore, the battery cell manufacturing process must be extremely clean. In other words, the area between the cathode

and the separator must be particle-free. Process air is a critical factor in battery cell production.

If water molecules are present in the battery cell during or after the electrolyte filling process, they can react with the electrolyte components, especially lithium salts, and form acids. This can significantly reduce the battery's lifespan. This is particularly critical for batteries used in electric vehicles, which undergo frequent charging and discharging cycles over a long period.



A battery cell is a complex structure made through several technologically demanding process steps.

The production of battery cells – a complex process

ULT offers comprehensive solutions for all stages of battery production where air purity and moisture levels are critical.



Laser fume

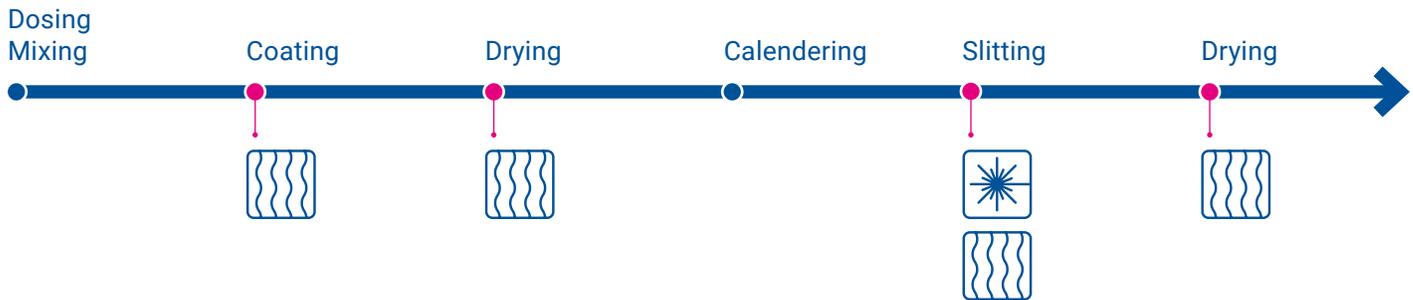


Gases, odors, vapors

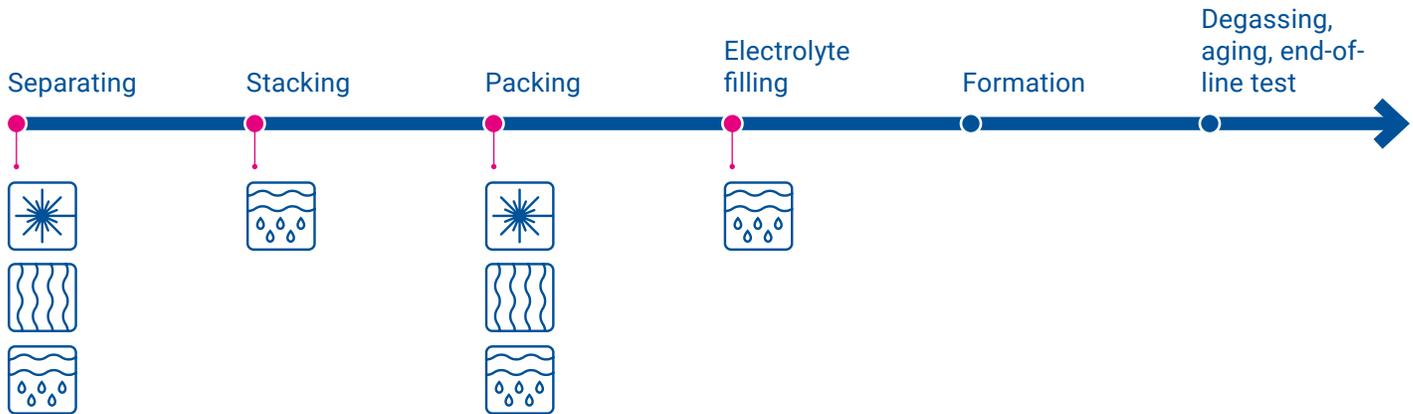


Process air drying

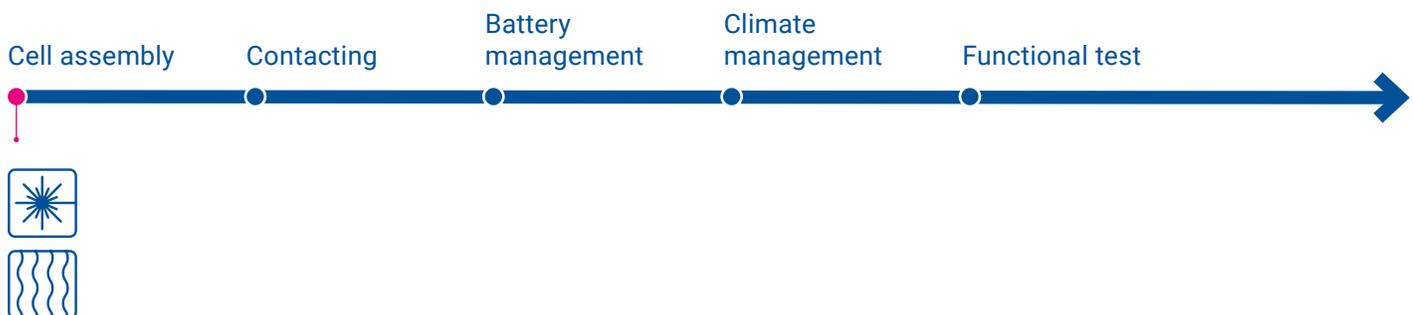
1. ELECTRODE PRODUCTION



2. CELL PRODUCTION



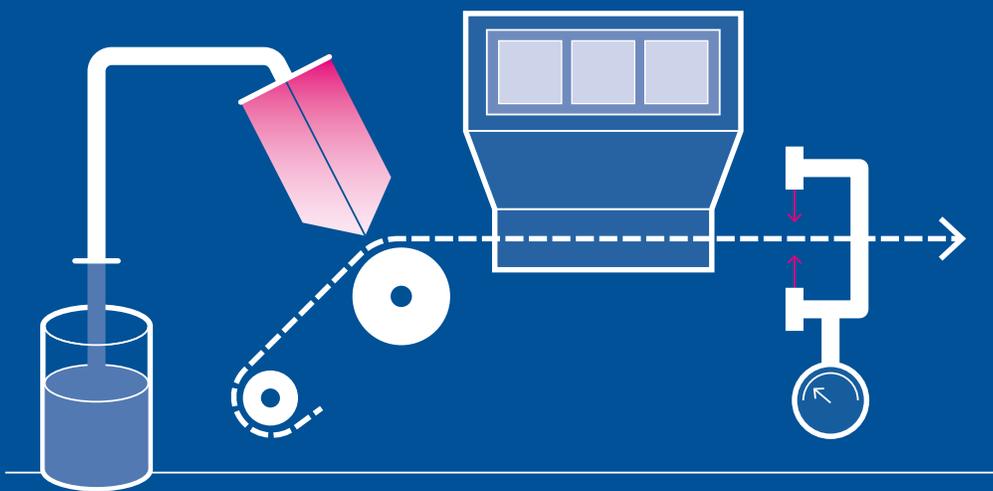
3. BATTERY PRODUCTION



Pure, dry, and conditioned air throughout the process

Coating

ULT offers advanced extraction and filtration solutions to remove particles and gases.

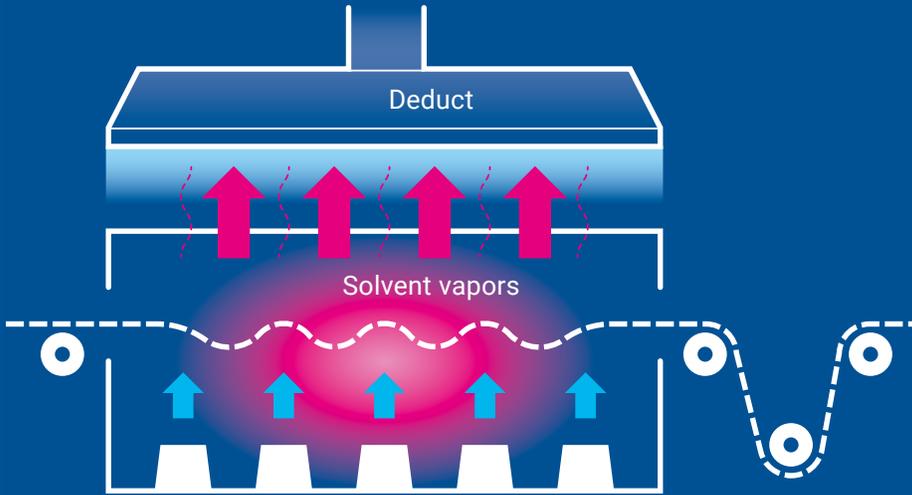


- The substrate foil is coated continuously or intermittently using an application tool

- Important parameters here are: surface finish, cleanliness, and preventing gas inclusions

Drying

ULT offers comprehensive air purification technology for removing solvent vapors.



• After coating, the substrate foil is dried

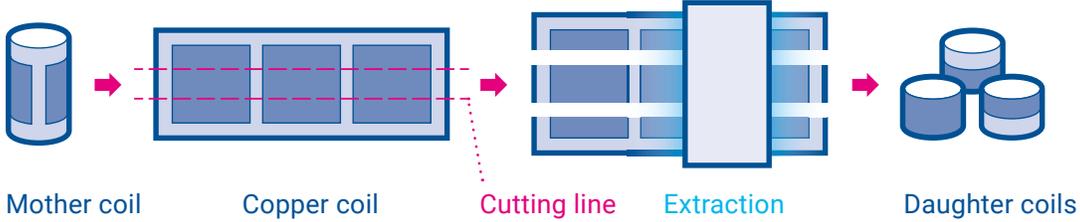
• Used solvents are removed from the substrate by heating

Slitting

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

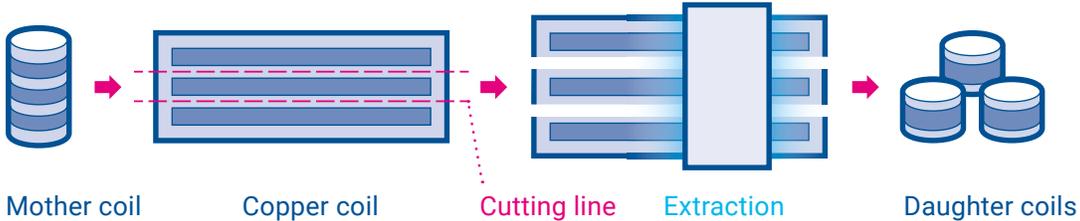
POUCH

Intermittent coating



PRISMATIC/ROUND

Continuous coating



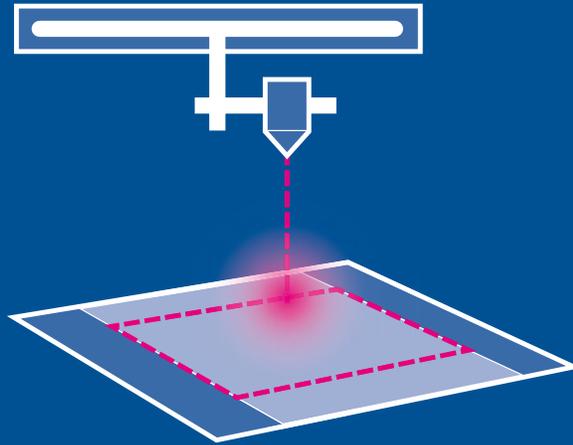
• The electrode strip (mother coil) is e.g. divided into several smaller electrode strips (daughter coils) by laser cutting

• An important quality factor 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

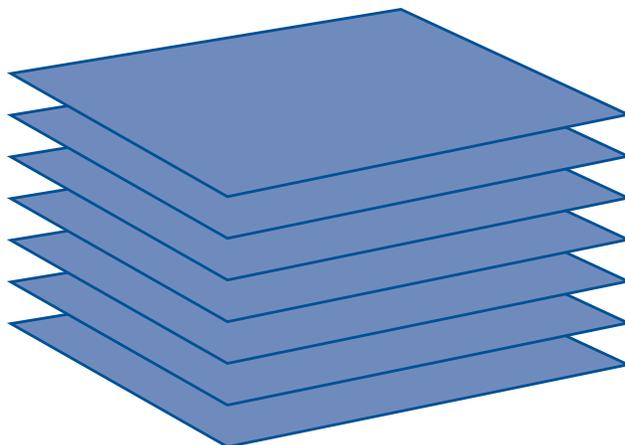


- Separation of anode, cathode, and separator sheets from the daughter coils by laser cutting

- The quality of the cut edges and the cleanliness of the surfaces must be guaranteed

Stacking

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

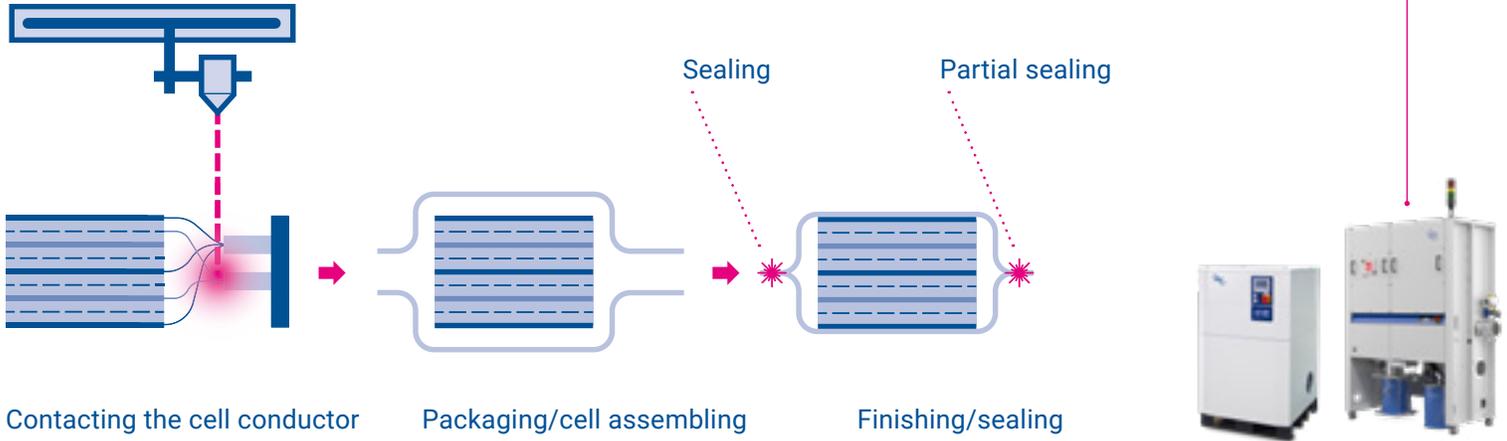


- Electrode stacks are welded together. In addition, the contact tab is attached to the uncoated edge of the sheets

- Laser welding produces fewer particles, but the resulting laser fumes and dust still need to be removed

Packaging

ULT ventilation systems remove laser fumes and maintain low humidity levels.

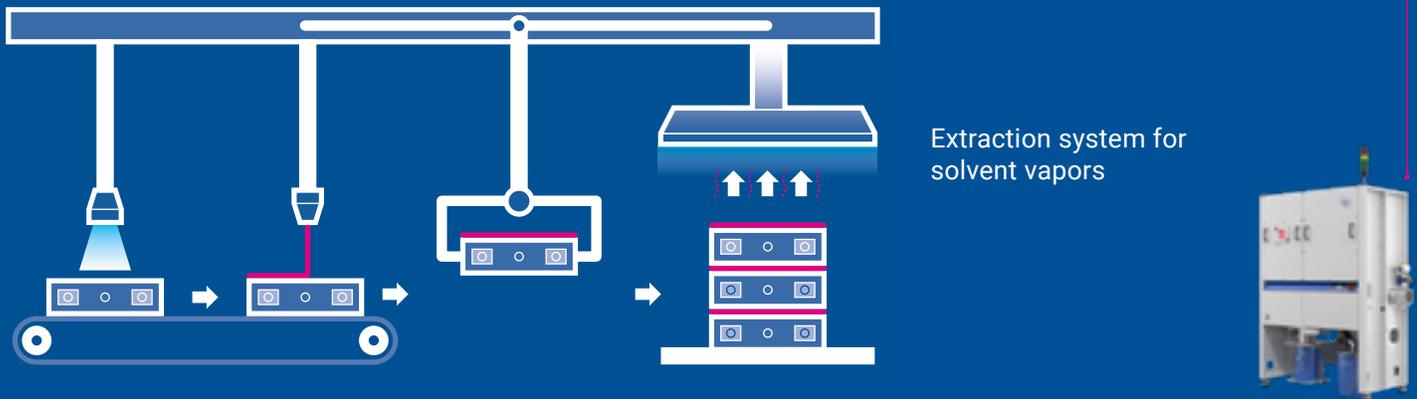


- The conductor foils are connected to the cell conductors by laser welding

- Laser welding is also used to seal the battery cell

Battery pack production

Using laser technology for marking, structuring, cleaning, or stripping cables requires advanced extraction and filtration systems. Additionally, solvent vapors from bonding processes and any generated dust need to be safely removed. ULT's ventilation solutions guarantee this.



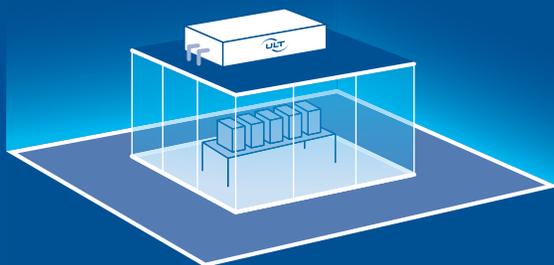
- Pre-assembly of the cell modules, during which the battery cells are assembled and stacked
- Insulation and bracing, including pressing, positioning and assembly

- Electrical contacting of the contact tabs, battery cells are connected in series

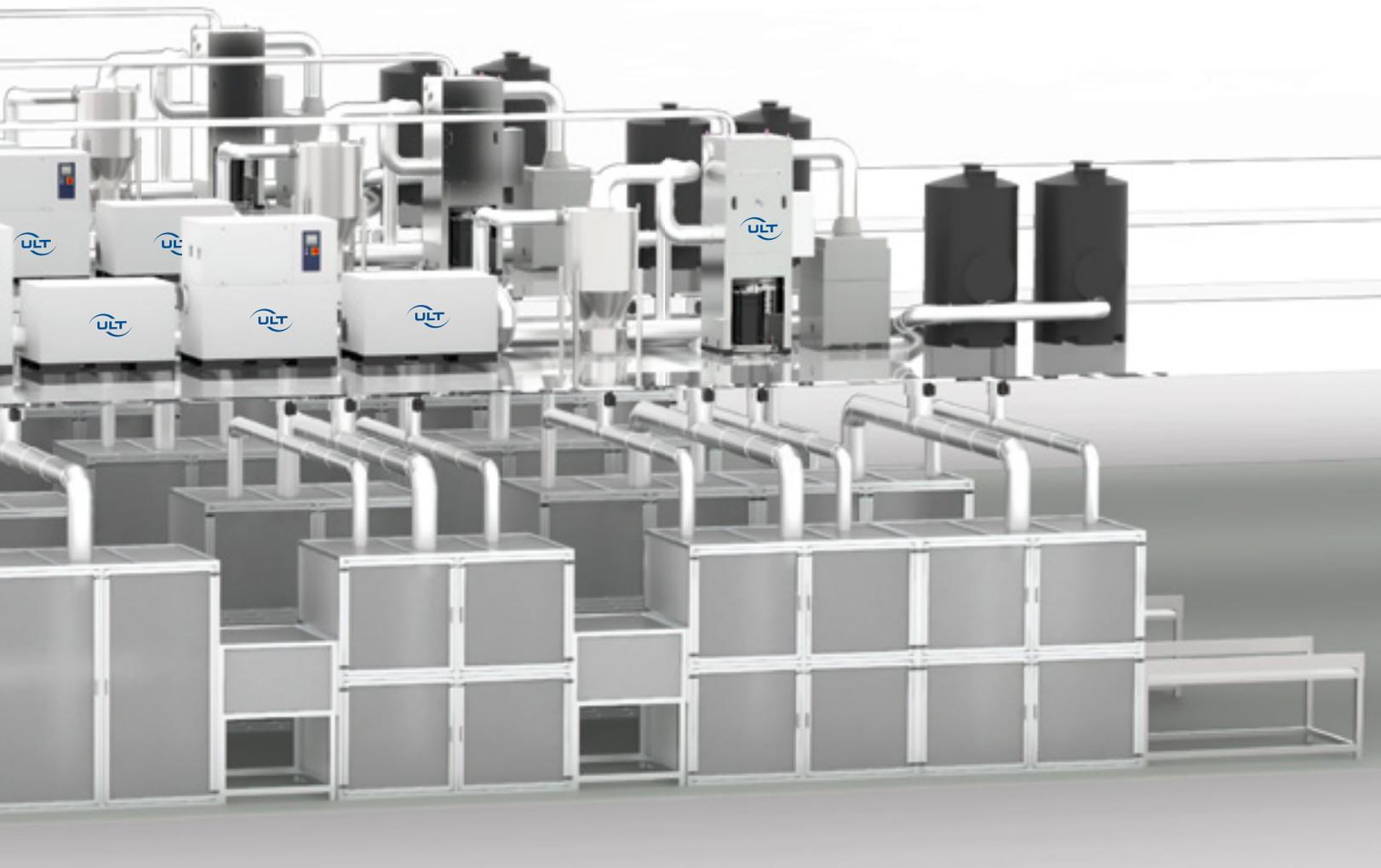


Dry air for battery cell production

Process air treatment sections for mini and macro environments



ULT develops specialized air drying solutions for use 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 -4°F and -76°F dew point temperature. Additionally, the contaminated air is captured and filtered at the respective laser cutting and laser welding stations.



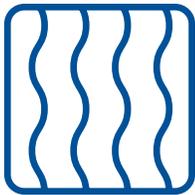
In the field of air drying and air filtration, ULT supports customers from initial consultation, system design, assembly, and installation of complete drying system technology.

The concept has significant benefits:

- Clean and contamination-free working environments to protect personnel, equipment, and products
- Significant increase in productivity
- Energy-optimized mini and macro environment processes deliver cost savings of more than 70 % over 10 years (sum of CAPEX and OPEX)

ULT systems and their typical applications

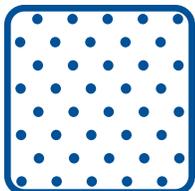
Extraction and filtration solutions for air cleaning



ODORS, GASES, VAPORS



LASER FUME AND DUST



DUST COLLECTION

Dessicant dryer for air drying and conditioning



PROCESS AIR DRYING



EXPERT CENTER



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 customers from the planning and conceptual design stages through system installation, and offers comprehensive, personalized service and consulting.

- Owner-managed company with 30 years in business
- Intensive research and development
- ISO 9001 certified



ULT





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