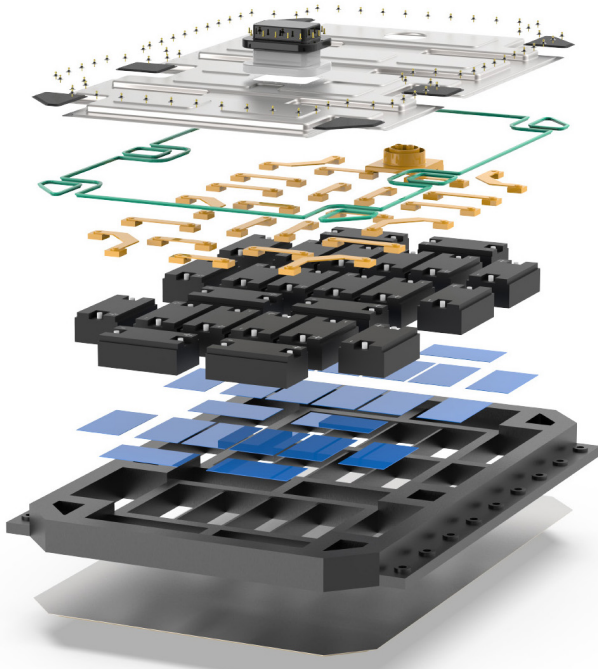
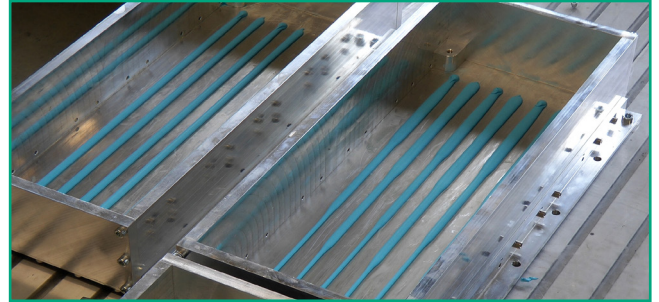


## Gap Filling for Battery Assembly

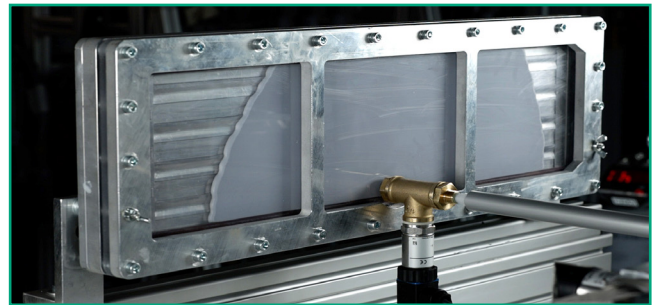
System Technology for ideal Thermal Management



Gap Filler (blue) as an essential component in the battery structure



Gap Filler-Application



Gap Filler-Injection

### Areas of Use of Gap Filler

Charging and discharging processes of battery cells generate high temperatures. Gap Fillers (also known as Thermal Interface Materials) are an essential part of the battery structure. They serve to dissipate the heat generated during operation and prevent the battery from overheating. Due to their design, the battery components have air gaps and cavities in which the heat is not optimally dissipated. The application of Gap Fillers fills and eliminates these cavities and guarantees optimum heat dissipation. Active thermal management thus ensures increased safety and durability of the battery modules.

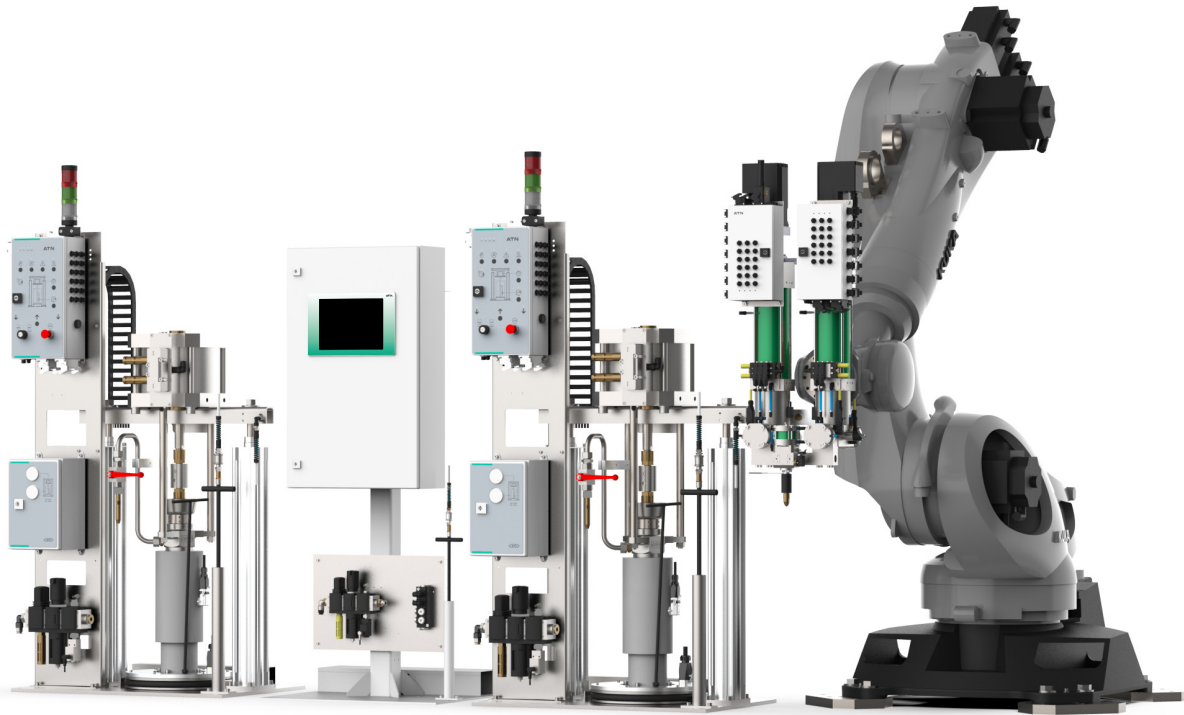
### Challenges

The cost-intensive Gap Fillers usually consist of silicones to which special fillers are added. These increase the weight and abrasiveness of the Gap Fillers. Applying too little material can lead to insufficient filling of the cavities, while applying too much material can damage the battery cells. Resistant and robust as well as efficient and precise application technology is therefore required for conveying and applying Gap Fillers. Resource-saving handling of the material is essential in order to minimise material costs as well as production and logistics costs.

### Solutions by ATN

- ✓ Our robust and wear-resistant application technology ensures efficient and resource-saving application of Gap Fillers
- ✓ Our high process quality prevents excessive material consumption and minimise logistic efforts
- ✓ Our component control system enables seamless customisation during the application, which allows to fill all types of cavities
- ✓ Our technology is customised according to your process specifications and can be implemented both as a Gap Filler-application and as a Gap Filler-injection process
- ✓ In addition, we offer an expert-supported preliminary investigation and consultation of your process through our Engineering Consulting service

# Application Technology of the ATN



\* schematic illustration

## Barrel Pump

- Container sizes from 20 - 200 litres
- Residue-optimised follower plate enables almost complete conveying of the cost-intensive Gap Fillers
- Double drum system ensures uninterrupted conveying of the material
- Optional heating of individual components for simplified material transport

## Dosing Unit

- System design can be realised for 1C or 2C materials
- Adjustment of the material discharge during application
- Repeatability over 99%
- Simple and intuitive setting of all application parameters via ATN control system
- Special material adaptations of certain components for processing Gap Fillers

## Applicator

- Broad product portfolio and experience enables almost any possible material composition
- Specific adaptation of the bead diameters of the heat-conducting pastes
- Use of needle valves VN8 and VN14
- Robust and resistant products for long service lives

## Functional enhancements & additional ATN services

- Expansion and use of vision technology from renowned suppliers
  - Detection of the material properties of the battery tray and regulation of the discharge quantity
  - Seamless monitoring of the application
- Realisation of further upstream or downstream processes in battery assembly
  - Surface pre-treatment of the workpieces to be processed
  - Robot-guided and fully automated insertion of battery cells
  - Application of sealants such as Hot Butyl for the battery covers
  - Screwing and sealing of battery covers