



Driving Fuel Cell production. Innovatively. Customized.

## AVL Fuel Cell Production Testing

### The Challenge

Fuel cell products are reaching the next level of industrialization. With that, stringent cost targets are pushing the increase of production volumes.

Production cycle times have to be reduced by optimizing handling and test cycle times. At the same time safety and product quality must be ensured.

Advanced automation as well as focused test methodologies must drive the optimization. In addition, big-data driven production processes are increasing the complexity.

Safeguarding a high technical availability during 24/7 operation is inevitable for the implementation and the final success.

### The AVL Solution

AVL as preferred partner for fuel cell engineering, simulation and testing is providing production test solutions for many decades. The base for high technical availability is provided by our industrialized hardware & software solutions.

AVL designs customized test solutions up to complete turnkey test fields with a fully automated level. The real-time automation system PUMA 2™ Production is building a robust automation and data backbone and guarantees 24/7 data availability and traceability.

With AVL's established global customer service network, we are the right partner to support you in the successful commercialization of fuel cells.



Fuel cell system solution for hot testing with trolley or pallet, docking plate and tailored test cell



Concept for direct stack integration to avoid preparations in a rigging zone



Fuel cell stack solution for cold testing with conveyor (and docking plate)

## Application

AVL's fuel cell production testing solutions cover a wide range from on-road and off-road applications to shipping, aviation, rail and stationary applications.

Our standardized solutions range from light duty with a nominal power of 30 kW up to 160 kW to heavy duty with a nominal power of up to 400 kW.

Beyond that AVL's technical expertise in a wide range of business fields allows us to support you with additional customized solutions up into the MW scale if required.

AVL's solution portfolio covers in-process verification (IPV), end-of-line (EOL) cold & hot, quality audit (QA) and conformity-of-production (CoP) testing and takes codes & standards as e.g. IEC62282.2 and relevant GB, GB/Ts into account.

Whereby the EOL cold tests are targeting mainly for confirmation of operational safety covering:

- Leak tightness
- Stack short circuit
- Potential equalization
- High-voltage & di-electrical strength
- Integration of fuel-cell-control-unit and resulting tasks and opportunities

and the EOL hot tests for performance, customer and factory assurance as:

- PEM fuel cell membrane activation
- Application specific performance
- Quality audit & conformity-of-production

## The Added Value

The success factors for our fuel cell production testing solutions are our decades of experience in the production environment, covering test solutions and planning for different applications, and our holistic hardware and software product portfolio for fuel cell development.

### AVL offers you:

- Customized production testing solutions based on industrialized products, from single test beds up to entire turnkey test fields
- From manual to fully automated design
- Fuel cell integration concepts aligned to your product design and production scenario
- Production proven hardware and software solutions
- PUMA 2™ Production, the robust real-time automation system
- Central data management solution for parameter and result storage according to ASAM ODS standard with guaranteed data availability and traceability
- Automatic on-site data analysis (pass/fail) and automated server based statistical data analysis and reporting to check for your KPIs
- An established global positioned customer service network to support 24/7 operation

January 2023, Public

## FIND OUT MORE

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