



We transform the Solid Oxide Fuel Cell validation & testing

AVL SOFC system test bed

Test bed solutions for performance & certification testing

The Challenge

Solid Oxide Fuel Cell (SOFC) is a promising technology which has tremendous potential in the energy and power generation sector. As the market for SOFC expands, there is a growing demand for standardized test bed solutions and measurement devices.

Robust testing solutions paired with proven data acquisition and analysis tools not only make testing more efficient but lead to more effective test results.

This accelerates the development of high efficiency energy generators based on SOFC technology.

The Solution

AVL offers the complete solution for SOFC system testing:

- Power range from 5 to 400 kW_e net power
- Configurable for DC and AC output applications
- Solution classification:
 - ULD (Ultra Light Duty) for 5-50 kW_e
 - LD (Light Duty) for 50-160 kW_e
 - HD (Heavy Duty) for 160-400 kW_e

AVL's modular test bed solutions allow a high degree of customization and can be tailored to specific testing needs and expanded to future requirements.



Test bed automation & control system AVL PUMA2™ for fuelcell

SOFC specific test bed

Designed with the experience of SOFC developers and test engineers. With every testbed you additionally benefit from AVL's development know-how and testing methodology expertise.

Expand test cases

Empowered with a powerful test bed automation, AVL PUMA 2™ Fuel Cell, different customized and pre-defined test cases can be incorporated into SOFC system testing, thereby allowing you to expand your test procedures.

Test bed safety

The entire test bed is equipped with safety features to protect the unit under test, the test bed equipment and the test bed facility, giving you the customer absolute peace of mind.

Multi Gas capability

The system TB is equipped to operate with hydrogen, methane and mixtures of hydrogen and methane. The test bed can also supply a range of other gaseous and liquid fuels.

TECHNICAL DETAILS

Core features

Fuel measurement & control

Hydrogen – up to 30 kg/h, **Natural Gas** – up to 130 kg/h, 0.5 % measurement uncertainty
Methanol – up to 125 kg/h, 0.12 % measurement uncertainty

Fuel gas supply pressure

Up to 20 bar for fuel cell applications

Exhaust conditioning module

Active exhaust extraction unit with condensate trap and temperature conditioning (venting Temp. 60 °C)

Bi-directional DC load

275 kW, 1000 V & 1200 A, with latest SiC technology

Test bed automation

AVL PUMA 2™ Fuel Cell

Test bed safety

State of the art Gen 3 test bed safety

Optional features

Temperature control for Power Electronics

Can effectively handle 20 kW heat rejection

Intake air conditioning

Emulate air conditions independent of weather/climatic conditions. Flow rates from 330 kg/h up to 1050 kg/h

Advanced fuel measurement & control

AVL Gastron. Accurately measure hydrogen, CNG and Biogas with one device, temperature conditioning possible -20 °C to +50 °C

AC grid emulator

30 to 150 kVA with both 3 phase and 1 phase options available

Exhaust species measurement

Analyse emissions with the latest **FTIR principle**, multi-component species measurement possible

Air flow measurement

From 20 to 2900 kg/h, measurement uncertainty 1%, pressure 0.6 to 2.5 bar, temperature -20 to +80 °C

Exhaust thermal energy measurement

Thermal integrator based on calorimetric measurement principle

LV DC supply

12 V DC supply for electronics, sensors and other needs on test bed
Wide range of power levels up to 64 kW available

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