Stack Testing

EBZ

INDEPENDENT SOFC TEST LABORATORY

EBZ has nearly one decade of experience in testing of Solid Oxide Fuel Cells (SOFC). Stacks from different developers have been installed and successfully tested: Fraunhofer IKTS, Staxera, FZ Jülich and HTceramix. Furthermore, EBZ was partner for stack testing in the European research project REAL-SOFC. Based on these experiences, EBZ offers its knowledge in standard testing procedures and benchmark conditions as engineering service. As independent testing laboratory, EBZ verifies the performance of your SOFC stack:

- I/V – curves, performance maps
- Performance at different gas compositions
- Degradation experiments
- Thermal cycling
- Redox cycling
- Long-term tests for several 1000 hours

TECHNICAL DATA

The stack testing capabilities are based on furnace type and stack module test stands. They are integrated in our laboratory in Dresden. The following features guarantee a save operation of the customers stacks:

- Multi-stage safety management system
- Temperature and pressure safeguards
- Purge gas (Ar/H_2) for safety states and emergency stops
- Remote control system
- Event manager via SMS

Customized parameter definitions are used for testing, e.g.:

- Current density
- Fuel and oxygen utilization
- Gas composition
- Temperature

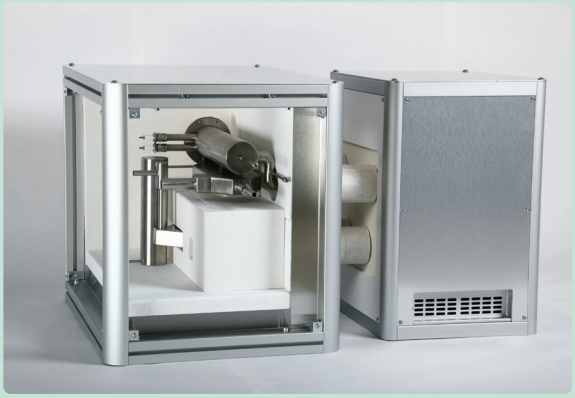
Stack Test Rig

STANDARD EQUIPMENT OF TEST RIGS

	Test Rig 1	Test Rig 2
Furnace dimensions (length × width × height) height over stack adapter installed adapter	Test Rig for Stack modules	360 × 360 × 400 mm^3 250 mm 220 x 145 mm^2
Fluid supply H_2 CH_4 N_2 H_2O Air Purge Gas (Ar/H_2) Purge Air	- 8 Nl/min - 1200 g/h 350 Nl/min x -	20 Nl/min 3 Nl/min - 200 g/h 100 Nl/min x x
Gas processing Evaporator Air Preheater Gas Preheater Heated Prereformer Furnace integrated air and gas heat up	60 ... 1200 g/h 20 ... 800°C 20 ... 800°C x -	15 ... 300 g/h 20 ... 650°C 20 ... 650°C x -
Electronic load	**80 VDC, 200 A**	**60 VDC, 100 A**
Voltage Measurement	16 channels 0…$10V_{DC}$	8 channels 0…$10V_{DC}$
Stack compression: static weight	-	x

OPTIONAL

- Mass flow controllers for synthetic gas mixtures
- Air and gas preheaters
- Evaporators
- Reforming units (steam reforming, CPOX)
- Additional voltage and temperature measurement channels
- Alternative electronic loads
- Furnaces with larger dimensions
- Testing of stand-alone stack hotboxes with gas and air preheaters and reforming units



Testing of Stack Module with an EBZ Integrated Reforming Module

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