

Test Protocols for Segmented Cell Tests at DLR

Cell specifications:

The segmented cell used in the set-up at DLR comprises a continuous anode/electrolyte/barrier layer half-cell and a segmented cathode. The total active area of this cell is 54 cm² for all 16 segments. The amount of segments is 16, with 4 segments in the flow direction and 4 segments perpendicular to the flow direction.

Mounting:

Gases available for the set-up are:

- Fuel: H₂, N₂
- Oxidant: compressed Air

The oxidant is preheated up to a maximum of 120°C. The humidification of fuel is 3% H₂O. Prior to heating, the oxidant flow is set to 2 slpm air per cell, and the fuel flow is set to 1 slpm (H₂ + N₂) per cell.

Heating:

The standard operation temperature is 750°C, being the maximum and minimum temperatures, 650 and 850°C, respectively.

Test protocol:

Gas and temperature variation at the beginning.

Constant load @ 300 mA/cm² (maximum 1.0 mA/cm²).

Perform polarization curve + EIS every 500 h.

Stop either at desired operating time or if cell/segment is below 0.5 V.

Polarization curve + EIS at the end.