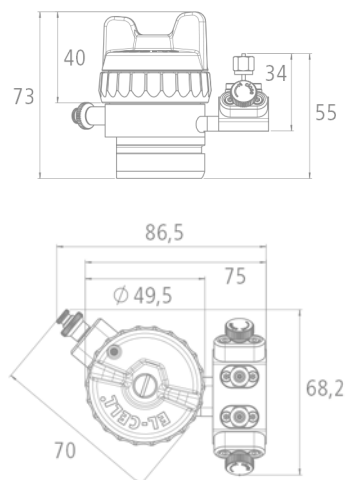




Measurements in mm:



PAT-Cell-Gas

Our versatile test cell for in-situ gas analysis.

The PAT-Cell-Gas is a test cell dedicated for in-situ gas analysis of battery materials in a flow-through set-up. It combines all capabilities of the ECC-Air, ECC-DEMS and PAT-Cell-Press test cells. For this purpose, the test cell features a gas inlet and outlet with self-locking couplings that are compatible with 1/16 in. Swagelok tube fittings. In addition, options that include a built-in pressure sensor or a valve port for gas sampling with a syringe are also available.

The cell stack is placed on top of a perforated or grooved current collector (flow field), which is to be purged with a gentle stream of gas. The lower electrode must be gas permeable, so as to allow for gas exchange with the feed gas. Typically, the cell is used with gas diffusion electrodes (such as for Li-air) or with Li-ion battery electrodes with a meshed current collector. The special design minimizes backmixing of the gas from the flowfield back into the headspace, and is thus very suitable for time-resolved gas analysis with a mass spectrometer, for example.

All PAT-Cell-Gas variants can be operated directly with the PAT-Tester-x potentiostat. If used with a 3rd party potentiostat, the PAT-Press-Box is required for all variants equipped with a pressure sensor.

Key Features

- Cableless test cell with all advantages of the PAT-Core
- PAT series test cell with gas inlet and outlet with 1/16 inch Swagelok Tube Fitting
- Optional pressure sensor (0 to 3 bar abs.) and gas sample port available
- PAT-Button for automatic cell identification in EL-Software

Use Cases:

- 2- or 3 electrode setup
- In-situ gas analysis in a flow-through setup
- Time-resolved gas analysis
- Quantifying gas evolution/ consumption
- Taking gas samples for subsequent analysis

Product website:

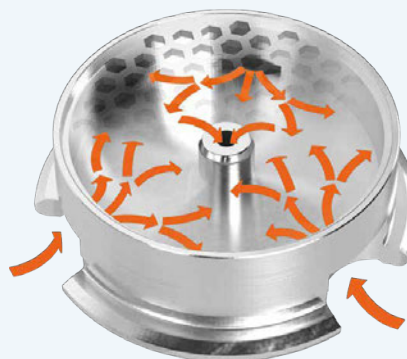


Manual (PDF):



PAT-Cell-Gas Working Modes

Mode 1: Air mode



Gas flow inside the lower plunger

The lower plunger with perforated plate allows for electrochemical characterization of gas diffusion electrodes used for instance in Li-air batteries. The lower electrode is contacted by and “breathes” through the perforated stainless steel current collector supporting it. During operation, the pressure gradient

building up between cell headroom and the gas volume below the perforated plate effectively prevents back-mixing. The relatively large volume below the perforated is at the expense of time resolution, but makes this solution robust against clogging of the gas path.

Mode 2: OEMS mode



Gas flow along the surface of the lower plunger

The PAT-Core setup using a lower plunger with flow field provides almost perfect plug-flow of the purge gas being essential for quantitative time-resolved analysis. Gases evolved or consumed at the working electrode may be analysed through the composition change of the gas stream that is to be passed along the spiral-type flow field below the working electrode.

The composition of the outgoing gas can be analyzed by e.g. mass spectrometry. The pressure gradient between cell headroom and spiral-type flow field effectively prevents back-mixing. This and the tiny gas volume of the flow field ensure best possible time resolution.

Specifications

Height / Width / Length	116 / 56 / 100 mm
Width with sample port	70 mm
Weight	0.6 kg
Electrode diameter	18 mm
Gas connection	1/16 inch Swagelok tube fitting
Dead volume (with PAT-Core)	3.9 - 4.6 ml (depending on lower plunger)
Range of pressure sensor	0 to 3 bar abs. (0.5 to 4.5 V signal output)
Resolution / Accuracy of pressure sensor	< 0.2 mbar / < 5 mbar
Operational temperature	-20 to 80 °C

Available variants



PAT-Cell-Gas SP

- ✓ PAT-Cell with gas inlet and outlet
- ✓ Laser-welded pressure sensor
- ✓ Gas sample port
- ✓ Optimized lid for use with metal seal
- ✓ Electrode feedthroughs with glass-to-metal seals



PAT-Cell-Gas P

- ✓ PAT-Cell with gas inlet and outlet
- ✓ Laser-welded pressure sensor
- ✓ Optimized lid for use with metal seal
- ✓ Electrode feedthroughs with glass-to-metal seals



PAT-Cell-Gas S

- ✓ PAT-Cell with gas inlet and outlet
- ✓ Gas sample port
- ✓ Optimized lid for use with metal seal
- ✓ Electrode feedthroughs with glass-to-metal seals



PAT-Cell-Gas

- ✓ PAT-Cell with gas inlet and outlet
- ✓ Optimized lid for use with metal seal
- ✓ Electrode feedthroughs with glass-to-metal seals