microfluidic ChipShop

ChipGenie® edition E2

ChipGenie® edition E2 - In a nutshell

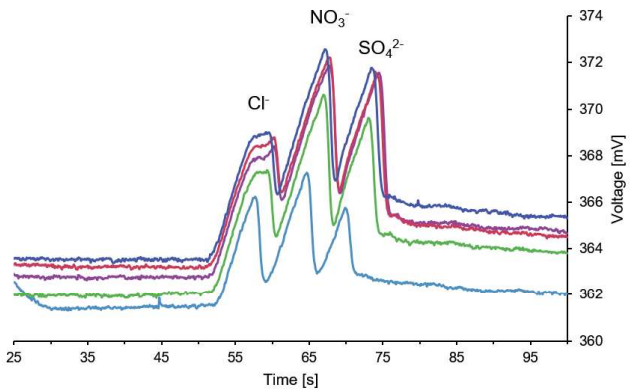
ChipGenie® edition E2 is a compact and ready-to-use laboratory device, which is ideally suited for your microfluidic-based label free detection of cations and anions. No need for time-consuming and costly setup, just connect the device to your PC and start measuring instantly.

The system concept

Analytes undergo separation through cappilary electrophoresis and detected using the contactless capacitively coupled conductivity detection (C^4D) scheme. This powerful separation technique allows for the fast detection of various ionic compounds.

What is capillary electrophoresis?

Capillary electrophoresis is a common technique for the separation of electrically charged molecules according to their size by generating an electrical field in a thin capillary.



Application Fields & Sample Types

- Food analysis (wine, milk, tea)
- Water analysis (hydroponics, fertilizers)
- Clinical analysis (blood, urine)
- Pharmaceutical analysis (counter-ions)

Possible Analytes

- Anorganic cations
- Anorganic anions
- Small organic acids
- Small amino acids

Light-weight Plug&Play Device

- Compact portable device
- Easy switch between anion & cation mode
- Energy-efficient and sample-saving

Robust Detection System

- Sensitive: detection limit $\leq 10\ \mu M$
- Fast: Only few minutes per run
- Reliable: Quick signal stabilization
- Qualitative and quantitative analysis

Easy-to-use Software

- All-in-one: System control and data analysis
- User-friendly: Without a long training period

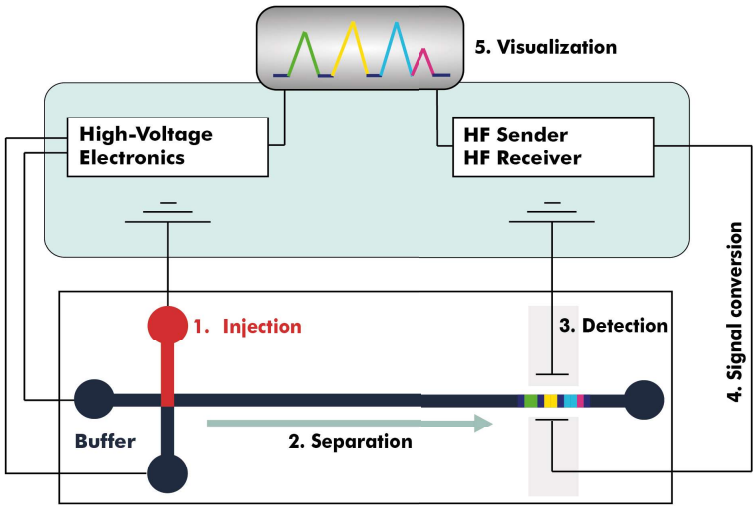
Chip Genie® edition E2

Analyte Separation and C⁴D Detection

C⁴D is a method to detect small changes of the **electrical capacitance** inside a capillary, owed to the relative permittivity of each analyte inside the sample mix.

The principle:

1. The sample is injected into the injection cross
2. Analytes are separated along the capillary
3. Analytes are detected based on the C⁴D principle
4. A trans-impedance amplifier converts the signal into a voltage signal
5. The signal is depicted in an output electropherogram



Principle of analyte separation and detection using ChipGenie® edition E

Applications

The ChipGenie® edition E2 is versatile, suitable for a wide range of applications, including water, food, and blood analysis. It provides the flexibility to monitor (an-)organic ions in various substances like river- or lake water, milk, and wine, as well as adjusting micronutrients in hydroponics. However, its utility extends beyond these mentioned applications, offering versatility for a broad spectrum of analytical needs. The compact and easy-to-use device can be installed everywhere and can be operated without extensive training.

Analysis of (an-)organic ions in food samples

Analysis of micronutrients in hydroponics

Analysis of human liquid samples (e.g. blood)

The Instrument - Compact and Easy-to-use

The ChipGenie® edition E2 is a compact, light-weight instrument which finds space in any laboratory. A high voltage (HV) source enables the injection and separation of charged analytes. Platinum electrodes and high frequency detection electronics enable anaylte detection based on the C⁴D principle. To run an experiment, the chip is simply placed inside the holding frame. After closing the lid, the device is ready for measurement.

Easy-to-use device:

Insert the chip

Push through to the end

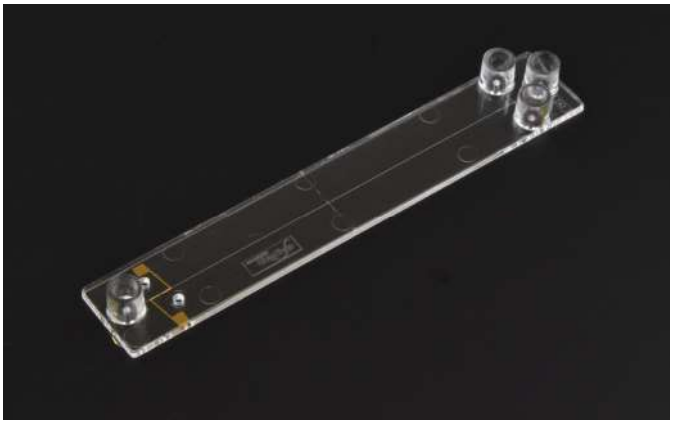
Close the lid & start measuring

Chip Genie® edition E2

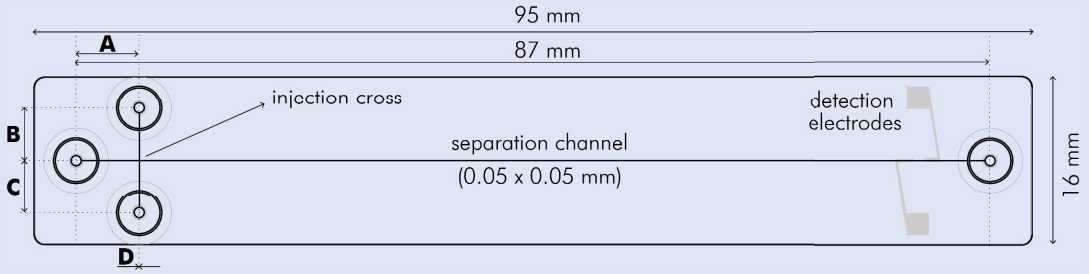
The Chip

The ChipGenie® edition E2 is operated with a variety of microfluidic chips in the cross-shaped channel design with Luer interface. They carry thin film detection electrodes (10 nm titanium, 100-150 nm gold), buffer and sample injection sites, and the separation channel. The electrodes are placed at the surface of the chip and have no contact to the liquid during the measurement (non-contact mode).

They are available in different materials whereby for most applications PMMA is the material of choice. To achieve maximum reliability of your analysis, the microfluidic chips are consumables and hence recommended to be replaced after each analysis.



Cross-shaped channel chip with Luer interface compatible with ChipGenie® edition E



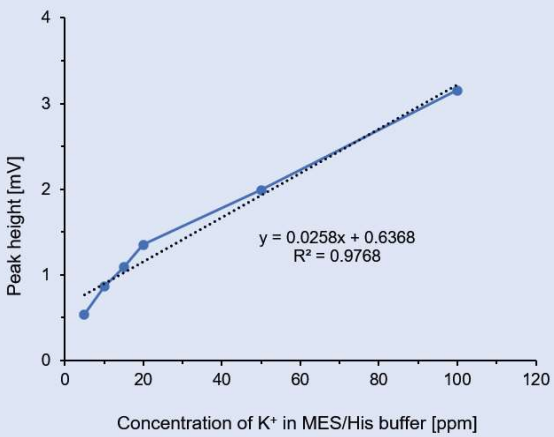
Dimensions of the cross-shaped channel chip with Luer interface compatible with ChipGenie® edition E

Product Code	Channel Width [µm]	Channel Depth [µm]	Channel Length [mm]	Geometry A [mm]	Geometry B [mm]	Geometry C [mm]	Geometry D [mm]	Lid thickness [µm]	Material	Price [€/chip] 1+	Price [€/chip] 10+	Price [€/chip] 100+
10001805	50	50	50	6.0	5.0	5.0	0	60	PMMA	125.00	85.00	32.50
10001804	50	50	50	6.0	5.0	5.0	0.1	60	PMMA	125.00	85.00	32.50
10001921	100	100	100	6.0	5.0	5.0	0	60	PMMA	125.00	85.00	32.50
10001338	100	100	100	6.0	5.0	5.0	0	50	Zeonor	125.00	85.00	32.50

The Software - Measurement, Optimization, Data Analysis

The ChipGenie® edition E2 software enables the control of the device, visualization of measurements and analysis of data. Only one click is needed to switch between anion and cation mode. Multiple replicates can be measured and saved using the Repeat Mode. To optimize analyte separation multiple parameters can be adjusted easily and measurements can be calibrated using supplied standard solutions. The measurement is visualized automatically in an eletropherogram. Using the build-in Peakanalyzing tool the data can be analyzed within the software or exported as excel file for further analysis and quantification

The software interface for measurement control, data visualization (electropherogram) and data analysis



Calibration curve for the quantification of potassium ions

Chip Genie® edition E2

Starter Kits

The ChipGenie® edition E starter kits include everything you need to develop a custom assay for detection of anions and cations precisely tailored to meet the requirements of your specific application. They consist of the instrument and standard chips as well as standard solutions to carry out capillary electrophoresis with contactless conductivity detection on chip.

ChipGenie® edition E2 - starter kit 1

ChipGenie® edition E2 - starter kit 2

Product Code	Description	Detail	Product Code	Price [€]
10001316	ChipGenie® edition E2 instrument	Dimensions: 19 x 13 x 25.7 cm	10001316	5,698.55
10001694	ChipGenie® edition E2 starter kit 1	- Cross-shaped channel chips (50 µm width/50 µm depth), T-junction, material: PMMA (2) - Cross-shaped channel chips (50 µm width/50 µm depth), double T-junction, material: PMMA (2) - Cross-shaped channel chips (100 µm width/100 µm depth), T-junction, material: PMMA (2) - Cross-shaped channel chips (100 µm width/100 µm depth), T-junction, material: Zeonor (2) - Single-use syringes, 1 ml (10) - 10 ml mcs buffer 03 (separation buffer) - ChipGenie® edition E starter kit 3 – standards: Cation standard solution, Li^+ , Na^+, K^+ (1 ml) Anion standard solution, Cl^- ; NO_3^-, SO_4^{2-} (1 ml) Organic acid standard solution, tartaric acid, succinic acid, citric acid (1 ml)	10001316 10001805 10001804 10001921 10000338 10000719 10000987 10000516	6,146.25
10001695	ChipGenie® edition E2 starter kit 2	- Cross-shaped channel chips (50 µm width/50 µm depth), T-junction, material: PMMA (2) - Cross-shaped channel chips (50 µm width/50 µm depth), double T-junction, material: PMMA (2) - Cross-shaped channel chips (100 µm width/100 µm depth), T-junction, material: PMMA (2) - Cross-shaped channel chips (100 µm width/100 µm depth), T-junction, material: Zeonor (2) - Single-use syringes, 1 ml (10) - 10 ml mcs buffer 03 (separation buffer) - ChipGenie® edition E starter kit 3 – standards: Cation standard solution, Li^+ , Na^+, K^+ (1 ml) Anion standard solution, Cl^- ; NO_3^-, SO_4^{2-} (1 ml) Organic acid standard solution, tartaric acid, succinic acid, citric acid (1 ml)	10001805 10001804 10001921 10000338 10000719 10000987 10000516	790.00
10000516	ChipGenie® edition E2 kit 3 – standards	- Cation standard solution, Li^+ , Na^+, K^+ (1 ml) - Anion standard solution, Cl^- ; NO_3^-, SO_4^{2-} (1 ml) - Organic acid standard solution, tartaric acid, succinic acid, citric acid (1 ml)		78.20

Frequently Asked Questions (FAQs)

Which background electrolyte (buffer) can be used?

Typical background electrolytes for capillary electrophoresis are MES/His (supplied in starter kits 1 and 2), TRIS or acetate buffer.

Do I need special equipment to handle the microfluidic chip?

The only equipment you need are a disposable syringe with Luer adapter for filling the chip with buffer and a 100-200 µL laboratory pipette for equally filling of the liquid reservoirs.

Does ChipGenie® edition E2 generate a lot of chemical waste?

No. A low waste of chemicals is one of the main benefits of ChipGenie® edition E2, as it uses minimal volumes of sample (70 µl) and buffer (~200 µl) for one separation run.

Did you know?
Application note available

Are you interested in the ChipGenie® edition E2 for capillary electrophoresis and you want to learn more about possible applications and parameters? Or you are looking for a little more technical information? Contact us for an application note or user guide or visit our website www.microfluidic-ChipShop.com

FIMA1CGE2V1
EFRE EUROPE FOR THURINGIA EUROPEAN REGIONAL DEVELOPMENT FUND
EUROPEAN UNION

microfluidic ChipShop GmbH • Stockholmer Str. 20 • 07747 Jena • Germany
Phone: +49 (0) 3641 34705-0 • Fax: +49 (0) 3641 34705-90 • inquiries@microfluidic-ChipShop.com • www.microfluidic-ChipShop.com