

# BreathSpec®



**Sensitive Analyser for Metabolic  
Marker Substances in human Breath**



## BreathSpec® – Gas Chromatograph coupled to an Ion Mobility Spectrometer

The BreathSpec® represents the synergies of a fast gas chromatograph and the outstanding sensitivity of an IMS. Thus traces of Volatile Organic Compounds (VOCs) even in highly humid matrices like the human breath become detectable without any special sample preparation. Results are available within a few minutes and markers are typically detectable even at ppbv-/pptv-levels. The technical configuration, its menu as well as its extremely easy and reliable sampling through an attached CO<sub>2</sub>-/O<sub>2</sub> device allows to simply generate data bases and run clinical studies with respect to different diseases.

### Features

- Stand-alone unit with integrated computer
- Sampling unit including precise spirometry for side stream measurement of CO<sub>2</sub>/O<sub>2</sub>
- Heated IMS, column, lines (< 80°C)
- Purification mode
- Access to all relevant parameters for method development: temperature control of IMS, column, drift and carrier gas flow rate
- Software controlled switching between positive and negative ionization mode
- Manual or fully-automatic operation incl. data acquisition, -analysis, visualization and data transfer to external devices
- Storage of data on internal memory or external network shares
- PC-Software package

### Applications

- Monitoring of work related exposures to hazardous substances
- Detection and/or monitoring of diseases
- Control of drug decomposition (pharmaceuticals)

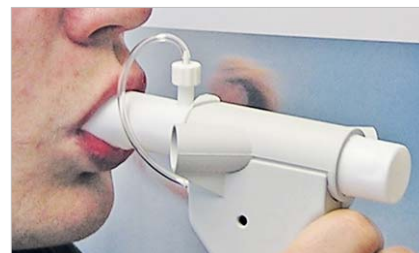
### Technical Specification

<b>Working principle:</b> Ion Mobility Spectrometry
<b>Ionisation:</b> β-radiation source (Tritium ( <sup>3</sup> H))
<b>Activity:</b> 300 MBq, below the exemption limit of 1 GBq, EURATOM guideline
<b>Drift voltage polarity:</b> Positive and negative, switchable
<b>Sampling:</b> Direct through mouthpiece, controlled by precise Spirometer
<b>Range:</b> Semi-quantitative, typically low ppbv
<b>Dynamic range:</b> 1-3 orders of magnitude
<b>Display:</b> 6.4" TFT, VGA-Display
<b>Input unit:</b> Rotary pulse encoder
<b>Processor:</b> 400 MHz X-scale
<b>Data acquisition:</b> Ultra-fast ADIO-board
<b>Data processing:</b> X-board / Baseboard
<b>Data storage:</b> 2 GB Compact-Flash
<b>Communications:</b> RS232, USB, Ethernet
<b>Electrical connectors:</b> 2 x D-Sub 9-pole (for modem, console), D-Sub 15-pole (for external devices), RJ45 (for digital modem or SSH), 2 x USB-A
<b>Power supply:</b> 100-240 V AC, 50-60 Hz (external supply), 24 V DC / 5A, XLR-connector (internal)
<b>Power consumption:</b> < 180 Watt
<b>Dimensions:</b> 449 x 375 x 177 mm (WxDxH)
<b>Weight:</b> 15.5 kg
<b>Housing:</b> 19" compatible, IP 20 enclosure, EMC certificated
<b>Cooling:</b> Axial ventilator, temperature controlled, max. 5.5 m <sup>3</sup> /h
<b>Gas connectors:</b> 3 mm stainless steel Swagelok connectors for gas in- and outlet

## Detection of Volatile Organic Compounds in human Breath

The BreathSpec<sup>®</sup> enables a fast screening of volatile metabolites in human breath without any sample preparation. Good differentiation of breath patterns after consuming various candies (Wildberry, Black current and Peppermint) were achieved.

Marker substances within the human breath as valuable carrier of implicit information on several diseases as well as exposition to hazardous compounds become feasible by using the BreathSpec<sup>®</sup>.


 BreathSpec<sup>®</sup>


Spirometer for sampling

### BreathSpec<sup>®</sup>

**Total analysis run time:** 10 minutes

**Column type:** MCC - 20 cm length, OV5

**Column Temperature:** 50 °C

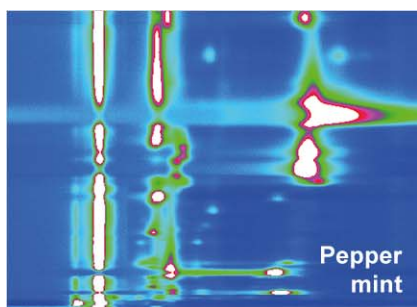
**Column carrier gas flow rate:** 100 mL/min

**Drift gas flow rate:** 500 mL/min

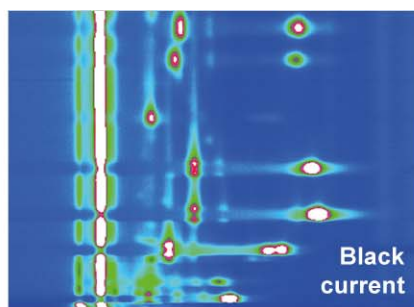
**Drift gas/Carrier gas:** Nitrogen 5.0 (99.999%)

**IMS temperature:** 45 °C

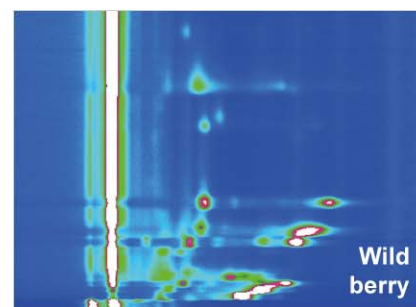
**Injector temperature:** 45 °C



Peppermint

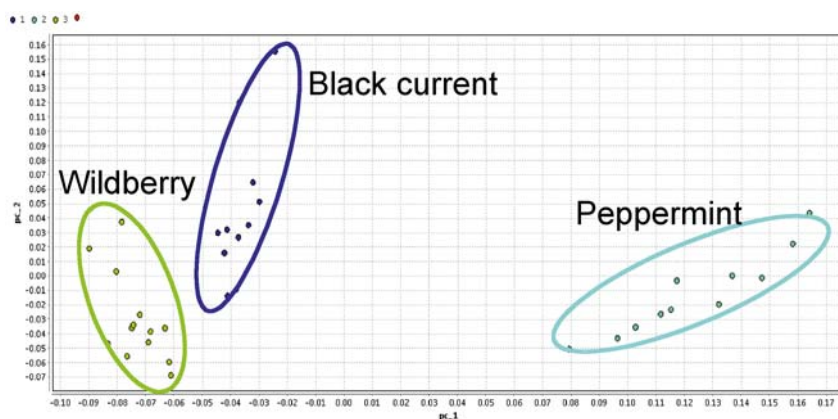


Black current



Wild berry

Topographic plot of IMS Chromatogram



Classification