

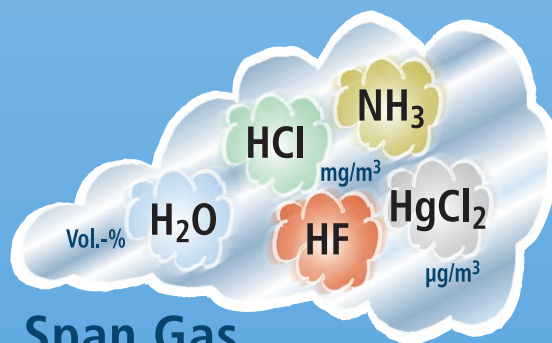
HOVACAL BROCHURE

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HoVACAL

Hot-Vapor-Calibration



Span Gas
without Gas Cylinders

Specification

HOVACAL DIGITAL

Typical concentration range

Water vapor	0,1 – 80 Vol. %
Hydrogen chloride	0,1 – 2000 mg/m ³
Ammonia	0,1 – 1000 mg/m ³
Hydrogen fluoride	0,1 – 1000 mg/m ³
Mercury chloride	1,0 – 100 µg/m ³

Other components and ranges on request

Performance

based on reading

Linearity	< 2 %
Setting accuracy	< 2 %
Fluctuation	< 2 %
Stability	< 2 %/year, liquid measured by weighing

Time characteristics

Warm-up time	30 min
Response time	< 1 s to 30 s, depending on component and total flow

Adjustable parameters

Carrier gas flow	3 – 10 l/min
Liquid flow	0,01 – 8 ml/min
Total flow	up to 1000 l/h
Evaporation temperature	up to 200°C
	Other parameters on request

Gas connections

Supply unit	6 mm Swagelok®
Evaporator	6 mm Swagelok®

Supply

Carrier gas:	Compressed air, dry and oil free, Nitrogen, Span gas, 2 – 6 bar, reagent solution, distilled water, organic solvents
Liquid:	

Power supply:

Alternating voltage:	110 V or 230 V, 48 – 62 Hz
Power consumption:	max. 1000 W

System design

Supply unit	portable case
Dimensions	approx. 510 x 160 x 440 mm (WxHxD)
Weight	approx. 15 kg
Degree of protection	IP54 (closed case)
Ambient temperature	5 – 40°C

Evaporator

Dimensions	approx. 245 x 100 mm (H x Ø)
Weight	approx. 3,0 kg
Ambient temperatures	5°C – 200°C

Subject to technical changes!

Array of Products

HoVAGAS
High Versatile Gasmixer



Digital version

HoVAPOR
Hot-Vaporizer



Evaporator



For field work
solid portable case



HOVACAL

Hot-Vapor-Calibration

HOVACAL is a portable calibration gas generator for highly accurate gas-vapor mixtures with selectable humidity. Due to the sophisticated HOVACAL evaporation technology, nearly all kinds of liquids, like water, acids, alkaline solutions and organic solvents can be evaporated continuously and pulsation free and mixed with carrier gas. The advantages of this technology are:

- high variety of gas components
- low operating costs
- high accuracy due to mass flow technology
- traceable to primary methods
- independent of temperature and pressure
- quick gas response time
- high stability of concentration value

Typical applications

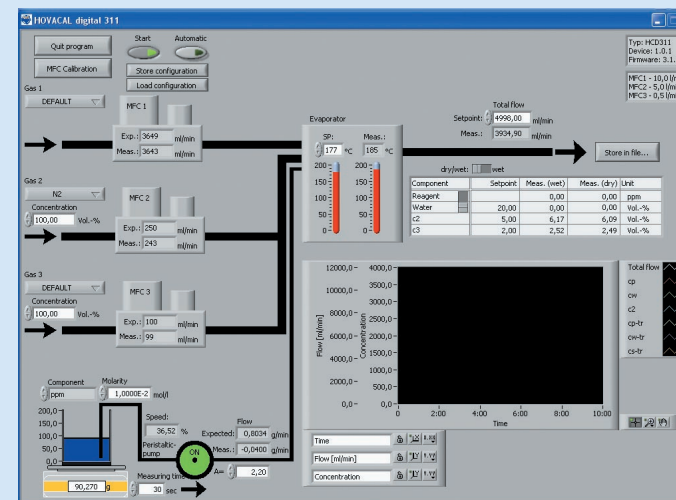
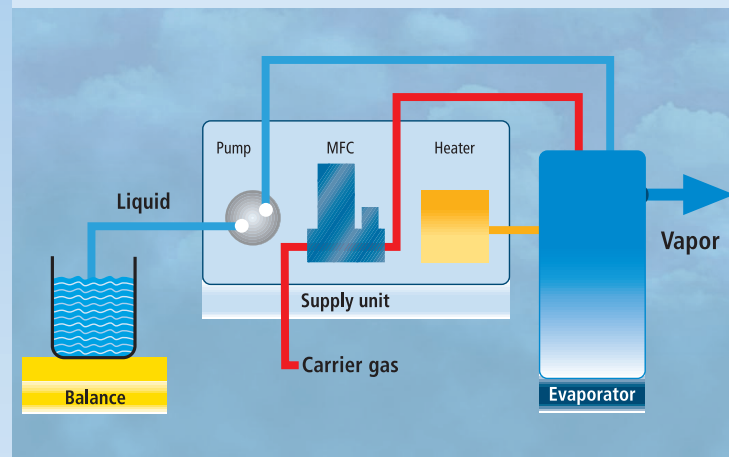
- Gas analysis
- Continuous emission control
- Fuel cell development
- Process control
- Moisture and humidity measurement
- Mercury analysis
- Ambient Air Quality Monitoring
- Catalyst development



HOVACAL is based on the principle of dynamic evaporation of liquids and mixture with carrier gas. Liquid is continuously pumped into an electrically heated evaporator, vaporized and mixed with carrier gas. Liquid pump, flow controller for carrier gas and temperature controller are installed in the supply unit.

The evaporator is installed separate from the supply unit. Both are connected via a link for carrier gas, liquid and power supply. The gas output of the evaporator can be fed in a heated line or directly in the gas analyzer.

Accuracy, reproducibility and stability of the calibration gas mixture are achieved with precision mass flow controllers for carrier gas and a metering pump for liquid. The liquid flow can be verified with the help of a balance, the carrier gas flow by means of a gas meter. This guarantees the verification with primary standards at any time.

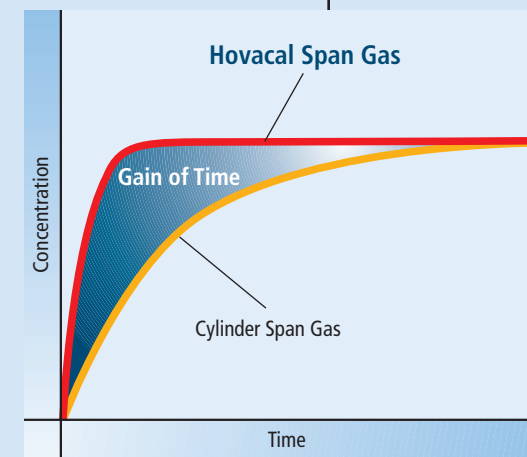


HOVACAL is available as a digital and an analog version. The digital HOVACAL is an autonomously running device and can be operated remote with the software viewCAL and an external PC. HOVACAL digital is able to mix up to three span gases with a vaporized liquid.

For the calibration and testing of continuous emission monitoring systems the components hydrogen chloride, ammonia, hydrogen fluoride and mercury chloride, are generated by evaporating their aqueous solutions and mixing them with nitrogen or air.

Pure water vapor mixtures for the calibration of moisture analyzers or for gas humidifying are produced by evaporating distilled water. Vapor gas mixtures with organic components can be generated from pure solutions or organic reagents. Span gas for multi component analysis can be easily obtained with mixed reagents.

The elevated temperature of the gas vapor mixture avoids adsorption and corrosion at gas exposed surfaces and minimizes gas response times.



Economic benefits

- **Saves operating costs:** only pressurized air and standard solution are necessary for producing span gas.
- **Immediate availability of the span gas:** standard solutions can be delivered ex store and can be kept without limitation
- **Versatile:** one device for many gas components as only the standard solution is changed
- **Saves time:** HOVACAL is quick to install, has short warm-up and gas response times
- **Saves space:** 5000 liters of span gas are typically produced from one liter of standard solution
- **No storage costs** or costs for safety installations as usually incurred for gas cylinders

Technical benefits

- **Traceable on primary methods** like gas meter and balance
- **Quick gas response time** due to minimized adsorption effects
- **Water vapor content up to 80 Vol.-%**
- **Wide range of output,** continuously adjustable
- **Gas flow up to 1000 l/h** as standard, higher gas flows as options
- **Independent of temperature** since complete evaporation
- **Gas temperatures** adjustable depending on the application
- **Quick change of components** by replacing the standard solution
- **Gas mixtures** produced from combined standard solutions
- **Customer-defined components** can be generated by the user
- **Point-of-use generation:** the separate evaporation unit generates the span gas where it is needed
- **Easy portable** in the portable case for quick change of location

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