



Characterization of  
particles • powders • pores

## graviSorb Series

- Measurement of adsorption and desorption isotherms
- Study of kinetics: time-dependent sorption experiments
- Variable measurement temperature for determination of sorption enthalpies



Gravimetric Water  
Sorption Analysis

# graviSorb Series

## Applications

Water vapor adsorption plays an important role in product development and quality assurance in many application fields. Typical examples are pharmaceutical products, the shelf life of food, ceramic components (i.e., hydrophobicity/hydrophilicity), coatings, building materials and much more.



Building Materials



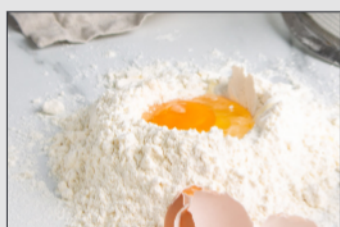
Pharma



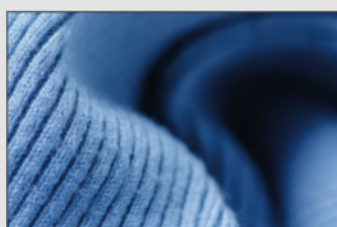
Paper & Wood



Polymers



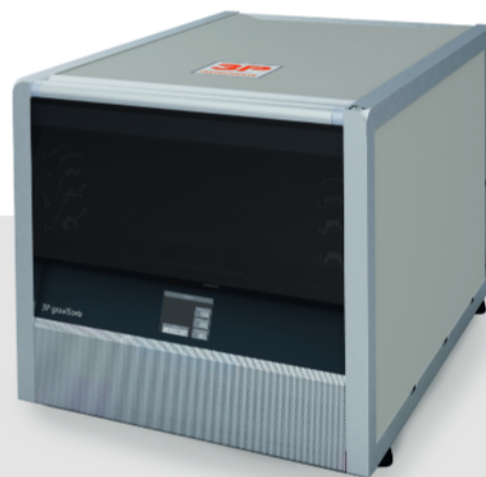
Food



Textiles

## Features

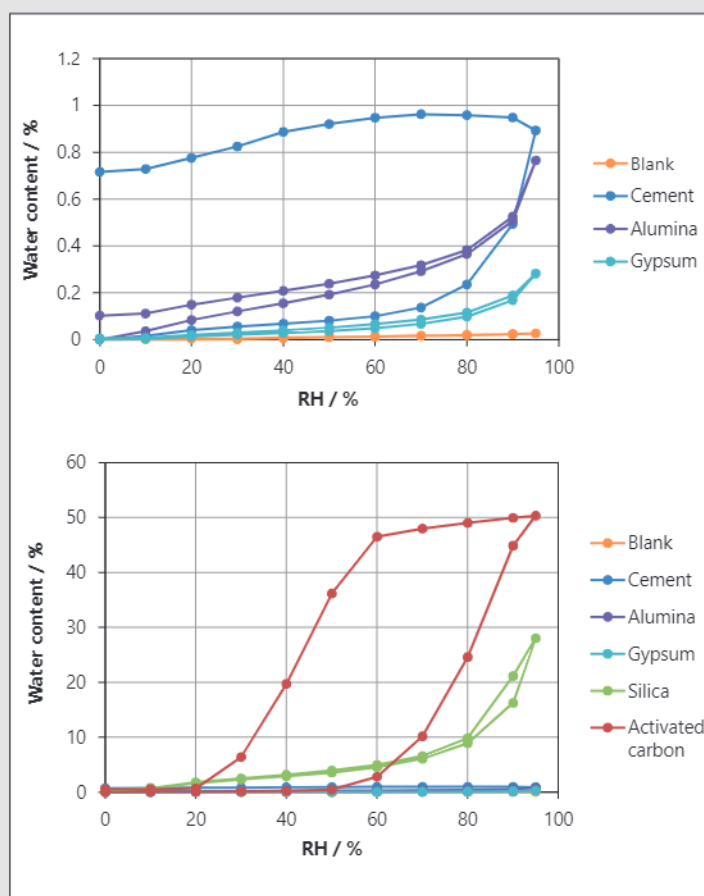
- Completely automated system: automatic weighing & changing of climate according to user settings
- Easy-to-use, with a minimum of maintenance
- User-friendly software with advanced Excel export
- Result storage in database with backup function
- High sample weight capacity, up to 125 g (up to 250 g as an option)
- High resolution & precision by using a 0.01 mg resolution balance
- 12 (11+1) samples can be measured simultaneously



## The 3P graviSorb series at a glance

The 3P graviSorb instruments are fully automated, gravimetric, multi sample, high load capacity, high resolution, and dynamic water vapor sorption analyzers.

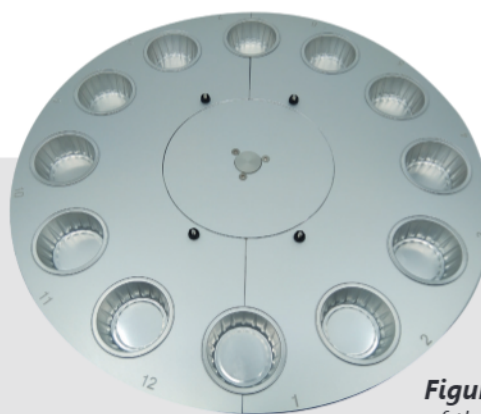
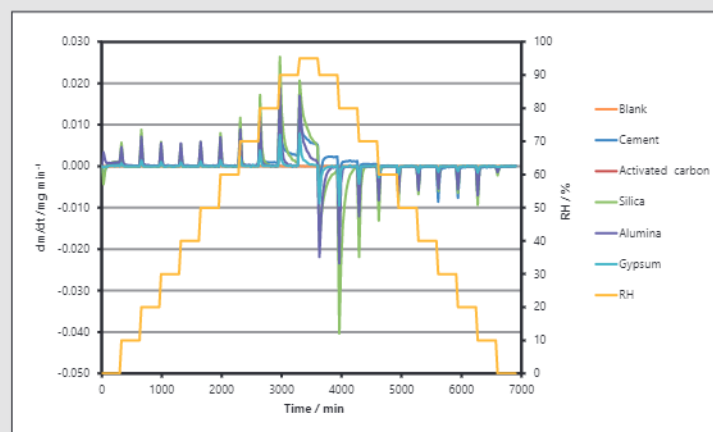
They measure adsorption and desorption isotherms of water vapor both accurately and sensitively, including sorption kinetics, with minimal operator involvement. The weight of up to 12 samples is monitored and recorded as the relative humidity is automatically varied by the blending of dry carrier gas with a saturated gas stream.



**Figure 1** Water sorption isotherms of a wide range of materials with different water sorption capacity



The carousel balance design of the 3P graviSorb series allows increased analysis throughput by simultaneous investigation of up to 12 different samples, or 11 + 1 if one station is running an empty sample chamber or even a reference material for direct comparison. The 3P graviSorb series is an ideal solution for the determination of water uptakes for research and quality assurance. The complete automatic measuring process together with the precise balance, broad climate range and the user-friendly software make them the ideal instruments for high sample throughput with a minimum of costs and maintenance.



**Figure 3** Carousel design of the sample holder

## Measurement Capabilities

- **Isotherms:** Mass change as a function of changing relative humidity, increasing mass during adsorption (increasing % RH), decreasing mass during subsequent desorption (decreasing % RH).
- **Kinetics:** time-dependent sorption studies give the rate of ad- and desorption.
- **Effect of Temperature:** isotherms and kinetics change as a function of temperature. Can be used to determine sorption enthalpies.

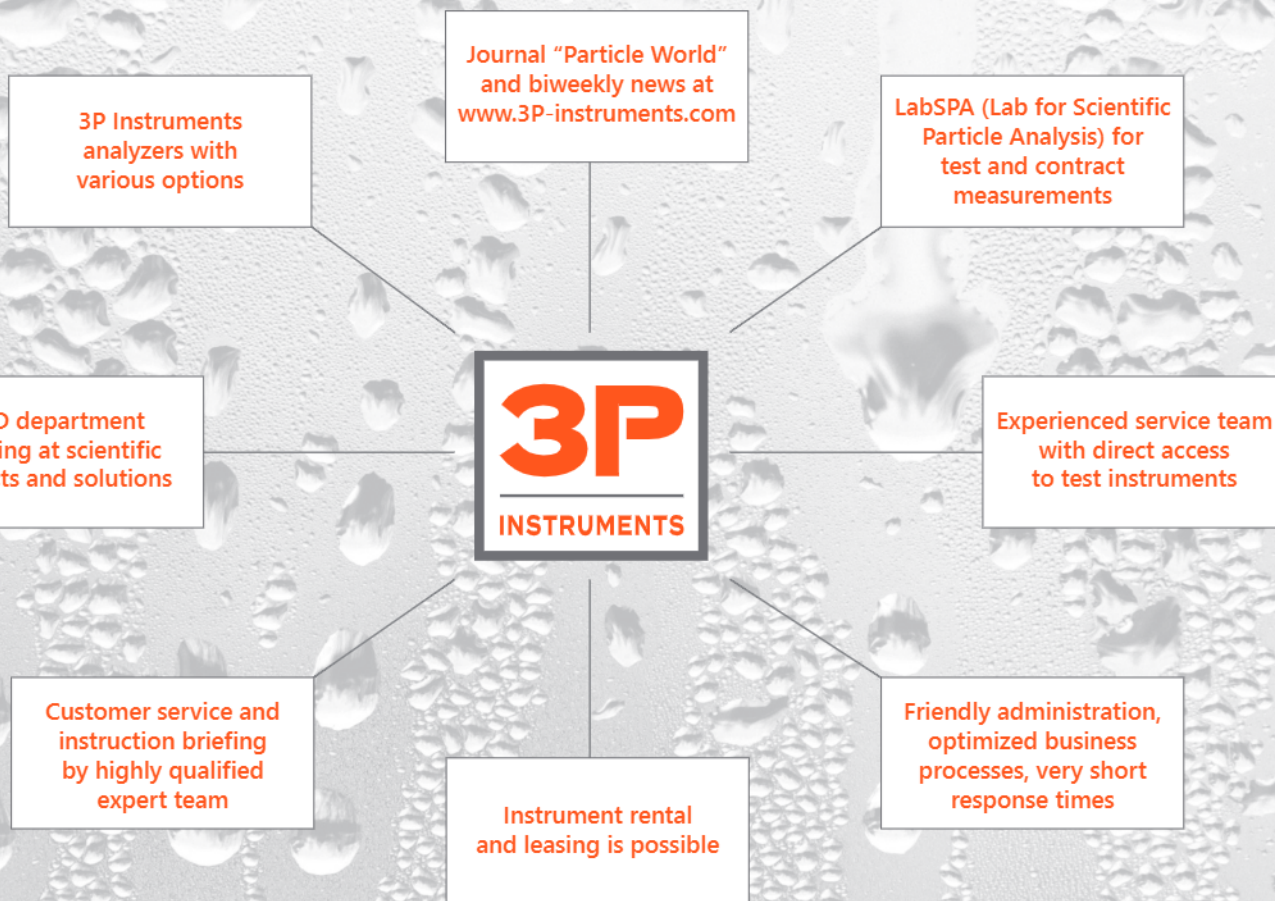
**Figure 2** Ad- and desorption kinetics of selected materials

## Specifications

Dimensions (L x W x H)	725 mm x 520 mm x 500 mm
Weight	42 kg
Balance capacity (each)	125 g (3P graviSorb 125) or 250 g (3P graviSorb 250)
Balance resolution	0.01 mg
Minimum sample weight	1 mg
Maximum sample weight	120 g (3P graviSorb 125) or 240 g (3P graviSorb 250)
Integrated humidity control	0.1 – 98 % RH (room temperature up to 40 °C)
Accuracy of humidity control	+/- 1.5 %
Integrated temperature control	10 °C below ambient temperature up to 40 °C at full RH, 50 °C at 50 % RH
Voltage	110 ... 240 V / 50-60 Hz
Number of samples	12
Control	Microprocessor controlled
Control of air velocity	Integrated control of air velocity over the sample: 0.15 – 4 m/s
Condition sensor	Integrated sensor for measuring the atmospheric conditions
Operator interface	Integrated touchscreen display for checking the operating conditions
Data transfer	USB for data-transfer with the PC
Software	Easy-to-use and user-friendly input of all measuring parameters in a Windows® based PC software
System requirements of PC	Windows® 7 or higher, min. Excel® 2010 or higher, USB port
Standards / Norms	DIN 66138:2008-09, ASTM C 1104/C 1104Ma:2013, and others

# Your partner in particle characterization

3P Instruments has over 30 years of profound expertise in the characterization of emulsions and dispersions, of particles and powders as well as surfaces and pores.



We also offer sorption analyzers for gas / vapor-mixtures:



### mixSorb S series

Complex dynamic sorption processes for adsorbent materials in R&D (> 100 mg; up to 68 bar)



### mixSorb L series

Complex dynamic sorption processes for industrial adsorbent material (up to 100 ml; up to 68 bar)



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