

# RUBOLAB

Version Type	Max. (°C)	Max. (bar)
RuboSORP TGA-HP	1.000	100
RuboSORP TGA-HP2	750	150
RuboSORP TGA-ST	1.100	50
RuboSORP TGA-HT	1.200	30
RuboSORP TGA-HT2	1.300	20
RuboSORP TGA-HT3	1.400	20
RuboSORP TGA-LP	1.200	1
RuboSORP TGA-LP2	1.600	1



## RuboSORP TGA

### Thermogravimetric Analyzer

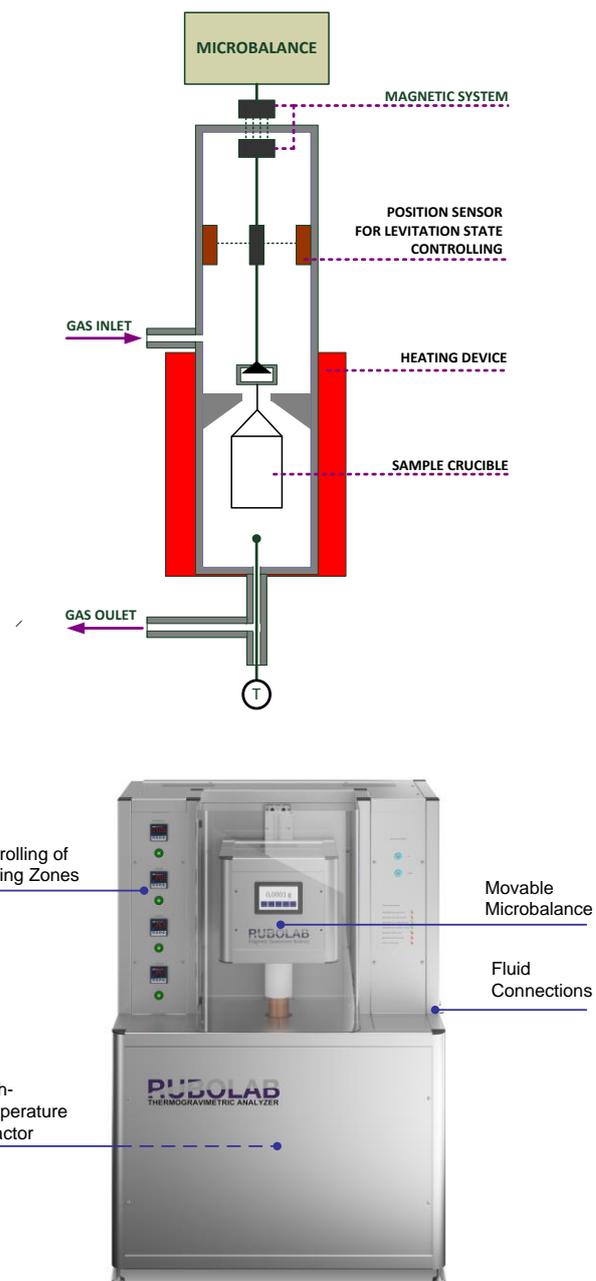
- Up to 6 MPa
- Up to 1600 °C
- Excellent long-term Stability
- Using of RuboSORP Magnetic Suspension Balance Technology
- 10 µg / 1µg Resolution

## Background

Many processes take place at particularly high temperatures, for example in the case of pyrolysis or catalysis, and biomass gasification. In this context, the highly accurate weighing of material samples under such measurement conditions is of great scientific interest. Against this background, Rubolab offers a highly accurate measuring instrument for performing long-term stable thermogravimetric analyses (TGA), based on the unique technology of a Magnetic Suspension Balance.

## The Instrument

RuboSORP TGA instrument uses the Magnetic Suspension Balance Technology. This allows high resolution mass determination under high pressure and high temperature conditions by utilizing resistant measurement cells. A scientific microbalance is located outside of the cell. Thanks to contactless magnetic suspension coupling, mass changes within the pressurized and heated measurement cell can be determined. When performing a measurement, the sample whose mass change is being measured is attached to the permanent magnet. The actual position will be detected and controlled via a high performance PID controller. In order to establish a free levitation position for the permanent magnet and measurement object, voltage is applied to the electromagnet outside of the measurement cell. This allows the sample mass to be measured under contact free extreme conditions. Load decoupling allows taring or calibrating of corresponding measurement signal. When this decoupling occurs, only the permanent magnet remains in levitation position (zero-point position). Taring in zero-point position ensures long term stable and drift-compensated measurements. When measuring point is selected, the measurement object is lifted, and the corresponding weight is detected by the microbalance.



## Features

### *Automatic Thermogravimetrically Measurement Instrument*

In combination with our gas dosing systems, the high temperature resistant version of RuboSORP Magnetic Suspension Balance can be used as a fully automated thermogravimetric measuring instrument. Thanks to programmable measurement sequences, fully automated steps can be performed overnight or over long time periods without any need of user interaction. Based on different standard versions, the gas dosing units can be modified according to your specifications, providing the best suitable TGA instrument being used for your specific measurement task.

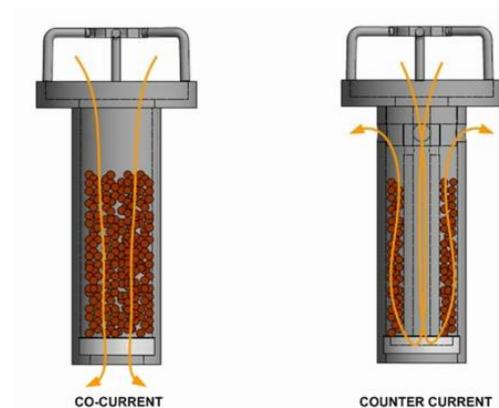


### *Extreme High-Temperature and High-pressure Measurement Conditions*

By using the most modern heating technology, the measuring cell of the magnetic levitation balance can be temperature-controlled of up to 1600°C. A new type of thermal insulation reduces heat loss and enables highly accurate thermogravimetric analyses.

### *Intelligent Software including Uncertainty calculation*

RuboSORP TGA instrument will be delivered with a powerful software package. With the help of this software all measuring parameters can be read, monitored and changed continuously. In addition to an integrated measurement data evaluation, a DIN ISO EN 9001 compliant uncertainty analysis of the obtained measurement data is carried out.

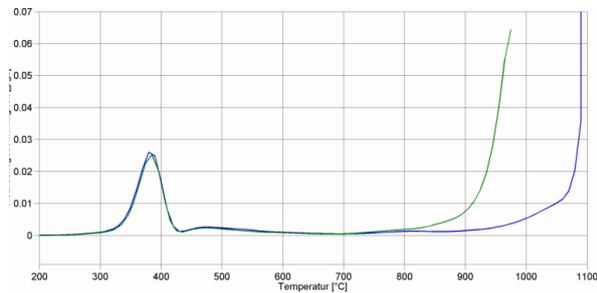


### *Best possible agreement of measurement data with real processes thanks to improved sample crucible concepts.*

The RuboSORP TGA can be equipped with forced-flow sample crucibles in order to reproduce processes as realistically as possible. Moreover, an improved mass transfer between the fluid atmosphere and the sample material reduces the required measuring time considerably.

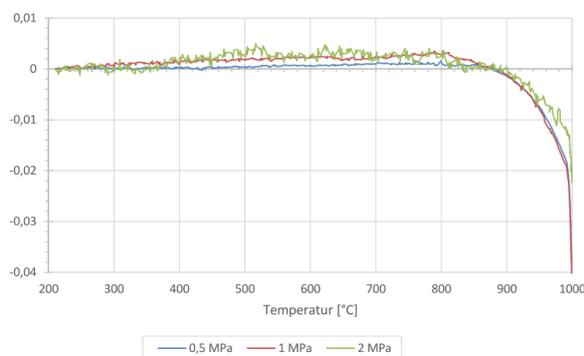
## Executable Measurements, Applications

### Pyrolysis, reaction rate of cellulose



The picture on the left shows the temperature-dependent reaction rate [g/g\*s] of cellulose measured in an inert atmosphere (blue) and in the presence of carbon dioxide (green). The results show that the reaction starts at much lower temperatures due to the presence of CO<sub>2</sub>.

### Gasification of graphite at different pressures



The picture shows the mass loss [g] recorded on a graphite sample as a function of temperature, measured at three different pressures. All three graphs show a significant weight loss at a temperature above 800°C, indicating that gasification of the material is occurring.

## Technical Specifications

Resolution	µg	10
Operating temperature*	°C	up to 1600
Operating pressure*	bar	up to 150
Temperature sensor		Type K thermocouple
Accuracy of temperature detection	°C	0.15
Pre-heated tubing		yes
Gas types		Non-corrosive
Vapor type		H <sub>2</sub> O, toluene, benzene and others
Number of gas connections		3
Number of inlet and outlet connections		2
Number of purge gas connections		1
Type of gas connections		6mm Swagelok™
Communication interface		Ethernet
Power supply		AC 110V/220V

\* please note the possible pressure-temperature combinations on the title page

### CONTACTS

For further information about our products please contact our head office or the corresponding local distributor.

Please find more detailed information about our sales network on [www.rubolab.de/distributors](http://www.rubolab.de/distributors)

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