

# AIR PYCNOMETER

You will return to the contents of P1 SOIL by clicking the pictogram



P1.86

In general the soil consists of various substances:

- ❑ Solid mass: mineral- and organic parts.
- ❑ Soil humidity: mainly water.
- ❑ Soil air: a mixture of several gasses and vapors.

If the soil contains water and air there must be pores between the solid particles.

For many reasons it is important in forestry and agriculture as well as in soil and water management studies to know the ratio of the different components.

Growth is hampered if there is not enough water and air, and the soil is less suitable for agriculture if it is too porous: the strength of ground is reduced.

It is important, therefore, to know the ratio between the amount of solid mass, water and air in a given volume.

The air pycnometer has been developed to determine the volume and the density of the solid components (for instance soil).

The apparatus is also extremely suitable to measure the volume of irregular shaped objects (provided they are not too big).

With the data obtained it is possible to calculate the specific weight.

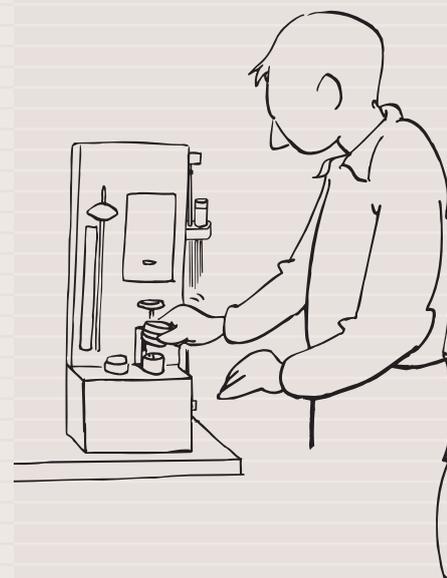
## 08.60 Air pycnometer according to Langer

The air pycnometer is supplied as a complete set, including a calibration block.

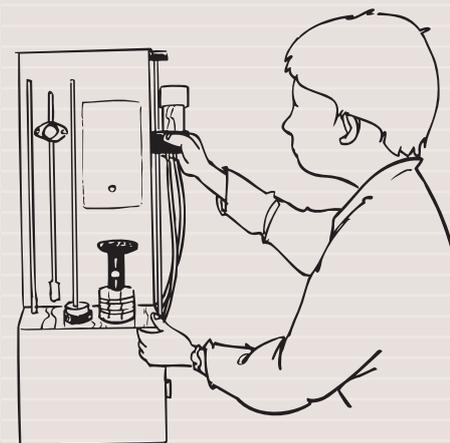
The apparatus is suited for sample rings with a maximum diameter of 53 or 60 mm (max. height 51 resp. 40 mm). The instrument has a measuring range of 0-115 cm<sup>3</sup>.

The time period of the measurement is approximately 1 minute. The maximum measuring accuracy equals 1%.

The vacuum bell is placed over the sample.



As soon as the under pressure is stable the value can be read and the levelling vessel is placed in the upper position.



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## The principle

An under pressure is created in the vacuum bell in which the object to be measured is placed.

Depending on the gas volume present in the bell, more or less air will be extracted. The quantity of the air present is independent of the volume taken by the object to be measured.

After the under pressure has stabilized the volume of the object can be read from the calibrated scale.

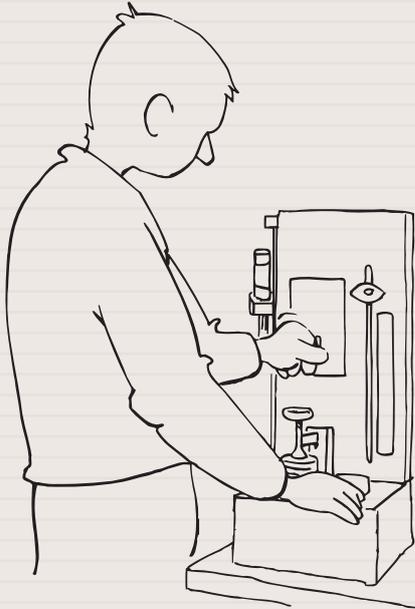
## Applications

The pycnometer is applied where there is an interest in knowing the specific weight.

- ❑ Soil research, for instance the determination of the porosity of soil samples.  
It is recommended to use soil sampling rings with a 100 cc contents when taking undisturbed soil samples.
- ❑ Powder- and granulate research in the pharmaceutical industry.
- ❑ Measuring the pore volume of tarmac (road construction) or clay and bricks (brickworks).
- ❑ Volume determinations of seeds, coffee beans, legumes, etc. in the food industry.

Limitation: Temperature variations influence the measurements (can be prevented by climate control in the laboratory).

After the leveling vessel has been placed in the upper position the de-aeration cock is placed in position 0.



Measuring scale



Vacuum bell



Various objects can be measured

## BENEFITS

### 08.60 Air pycnometer

- Simple calibration
- Fast measuring procedure
- The volume can be read immediately and accurately