Anton Paar

PRACTICAL TIPS FOR DENSITY METER
เทคนิคการใช้และการบำรุงรักษาเครื่องวัดความหนาแน่น (DENSITY METER)

11 August 2021

Agenda

- Introduction to Anton Paar (Thailand) Ltd.
- Density principle and instrument
- Practical tipsOperating and Cleaning
- Q&A

Anton Paar: History

1922

Locksmith **Anton Paar** establishes the company in Graz.

Margarete Platzer, Anton Paar's daughter, launches **high-precision manufacturing**.

1932

1957

Production of the **first scientific instrument**: the Kratky Small-Angle X-ray Camera.

Presentation of the **first digital density meter** for laboratories (DMA 02C).

1967

1989

First steps in **rheometry**, **viscometry,** and **digestion technologies**.

Acquisition of: MSB Morocutti (A), Dr. Wolfgang Kernchen GmbH (D), Petrotest GmbH (D), CSM Instruments (CH).

2007 – 2013

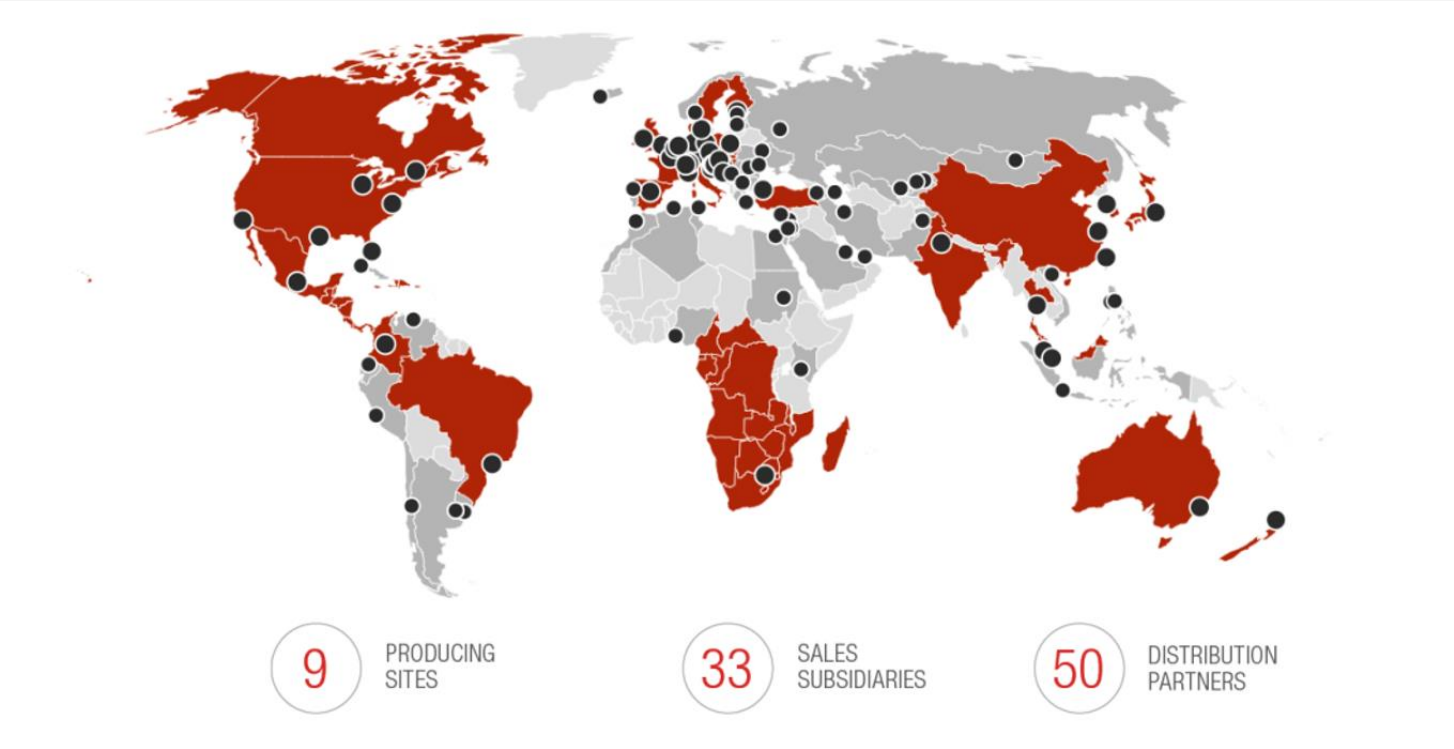
First instruments for **particle characterization**, **Raman spectroscopy**, and **atomic force microscopy.**

2016 – 2017

Acquisition of Quantachrome Instruments (Florida, USA).

2018

Anton Paar: Operating Worldwide



Anton Paar Thailand

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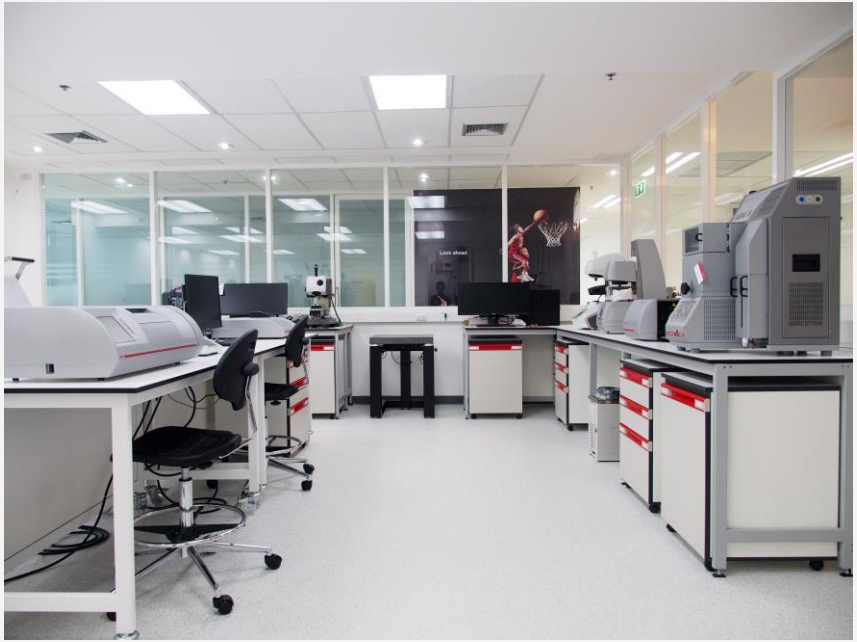
Demo Laboratory



Instruments & Solutions

Business Unit

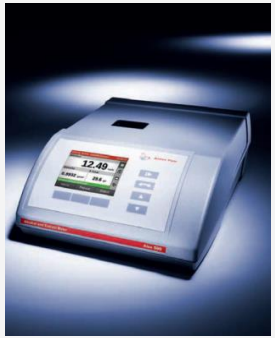
Measurement

Material characterization

Solution

Business Unit - Measurement

Density & Concentration



Polarimeter & Refractometer

Business Unit - Measurement

Viscometer

Volatile & Consistency

Business Unit - Material characterization

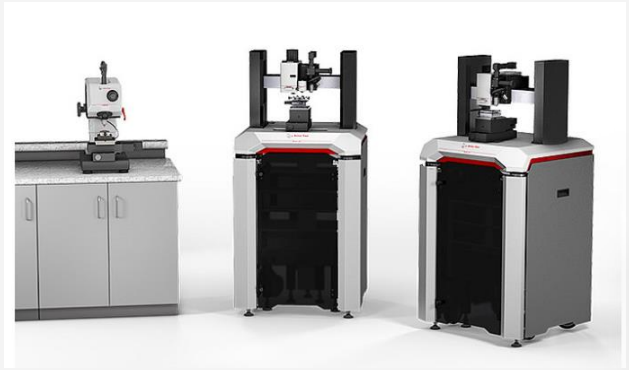
Rheometer

Particle size & Raman

Solid Density & Gas adsorption

Business Unit - Material characterization

Scratch Tester



Atomic Force Microscopes

Coating Thickness

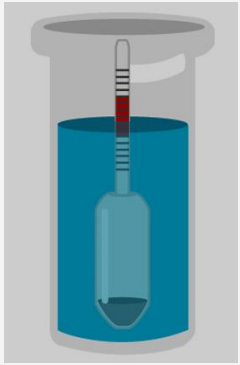
Business Unit - Solution

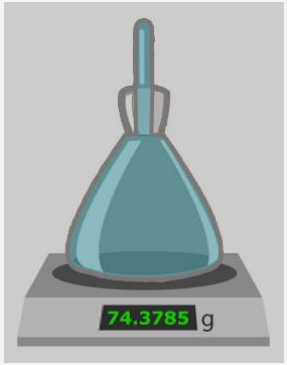
Process sensor

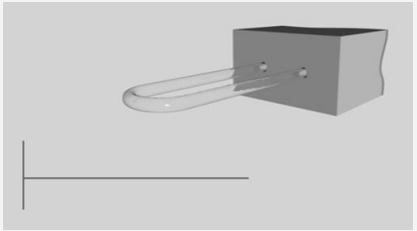
Microwave Synthesis, Digestion and Extraction

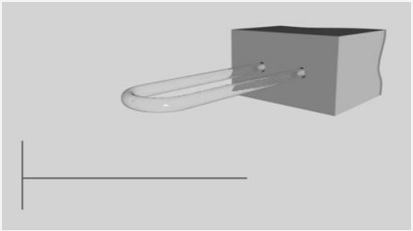
Advantages of the Oscillating U-tube Technique

- Measures true density
  - No influence of buoyancy in air
  - No influence of gravity
- Small amounts of sample
  - 1 mL
  - Easy to control the temperature
- Highest precision
  - No human influence
- Extremely fast
  - 1 to 5 min per measurement
- For lab and process applications







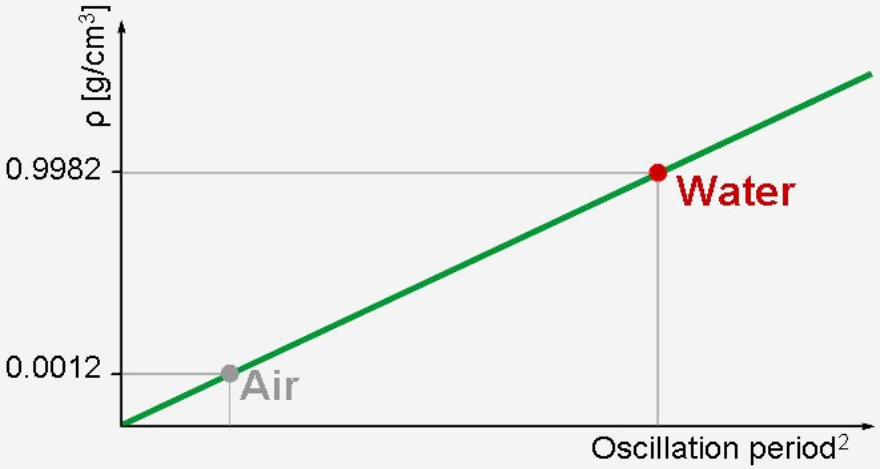


https://wiki.anton-paar.com/en/density-of-fluids/

Density Measurement

- Density determination and adjustment
  - Relation between oscillation period and density
  - Apparatus constants A and B

$$\rho = A \times P^2 - B$$



ρ .... Density
P .... Oscillation period
A, B .... Apparatus constants
(Calculation: using two samples of known density, e.g. air and water)

Power Features

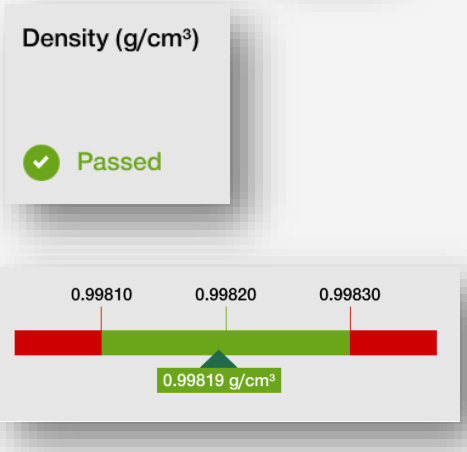
Ahead of Competition

- U-View™ (crystal clear and high resolution)
- FillingCheck™ (fast reaction and detection)
- ThermoBalance™ (best in class fast temperature stability)
- Full range viscosity correction (8 x better at highly viscous and dense samples)

launched in 2018

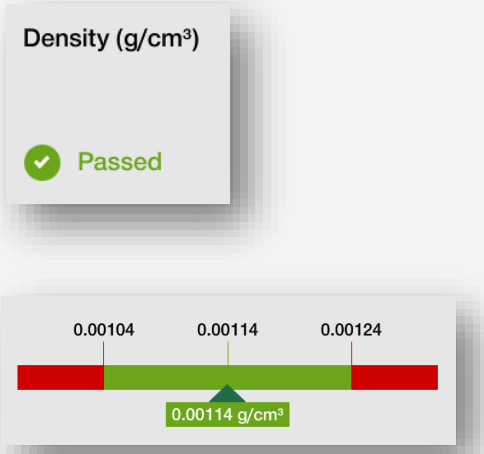
Pulsed Excitation Method

Checks



Performing a check to ...

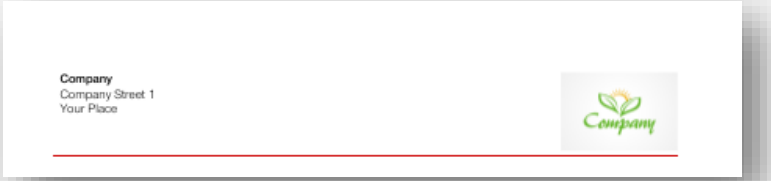
... evaluate the accuracy	... detect cleaning problems
Water Check	**Air Check**
Predefined	
Custom Check	
Reference Samples	

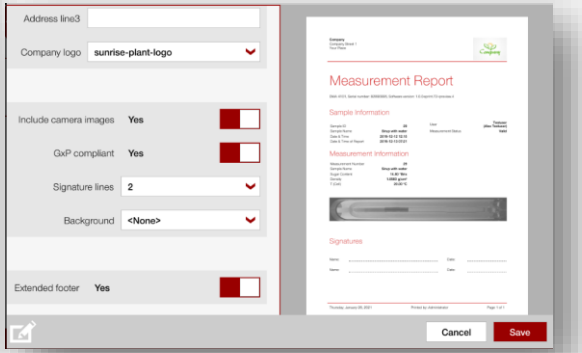


Automatically performed with the chosen product settings. A check always refers to a product!

Reports & Results

- Simple pre-defined standard report
- Customize with address line and logo
- GxP compliant if needed





- Check Report
- Adjustment Report
- Measurement Report
- Instrument Settings

Enhanced Data Management with DMA

Simple USB
File I/O

Ready for
AP Connect
www.anton-paar.com/apc

AP Connect

Network File Share

LIMS

RS-232 LIMS

Davis 5
Data Recording Software

Practical tips - Standard Operating Procedure

General Info

- Set of written instructions to document a routine within a working process
- Written in a concise, step-by-step, easy-to-read format
  - Improves work consistency, training (personnel changes)

Including

- Was the water/air check passed successfully? If not…
  - Clean and dry the measuring cell
  - Repeat the water check
  - Perform an air/water adjustment if the check failed again
- Has the sample been degassed?
- Was the sample filled without bubbles?
- Is the correct method displayed?

Practical tips - Preventive Maintenance

The answer to all questions has to be "YES" to get correct results with DMA

Before starting a measurement

- Are the adapter connections leaktight?
- Was the water check passed successfully?
- Has the sample been degassed?
- Was the sample filled without bubbles?
- Is the correct method displayed?
- Is the measuring temperature set correctly?

After measurement

- Was the measuring cell cleaned and dried thoroughly?
- Was the air check passed successfully?

Practical tips - Cleaning Recommendations

"Remove the sample from the measuring cell immediately after the measurement, and clean your instrument regularly."

- Make sure that all wetted parts are resistant (check in the instruction manual)
- Be aware of contamination: Radioactive materials, infectious agents or other materials constituting health hazards
- Samples can chemically react with the previous sample

Filling of Samples

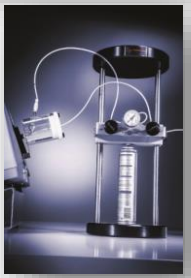
Sample changer

Xsample 320 / 330 / 520 / 530

(Xs 340 / 610 / 630) …..to come

- Freely programmable sample list
- Plug & Play installation

PFD / SFD
Aerosol Adapter
Heating Attachment



Modularity

Wide range of modules

- Alcolyzer 3001 Beer + Option Color 430nm
- pH 3101/3201, CarboQC ME + Option O_2 Plus, PFD/PFD Plus
- Sample conditioner

- Haze 3001 …..to come

Q&A

www.anton-paar.com