Anton Paar

DMA|RXA

Combined Density/Refractive Index
Measuring System

RXA170

Digital Abbemat® by

A Unique Combined System

The innovative combination of density and refractive index measurement from Anton Paar.

In Quality Control and research work in numerous industries, knowledge of the density and refractive index is essential for identifying and characterizing samples.

The density is measured by one of the legendary density meters DMA 4500 or DMA 5000; the refractive index is measured by the RXA 156 or RXA 170 refractometer from Dr. Kernchen, the leading manufacturer in this field.

Oscillating U-tube principle

The oscillating U-tube of the DMA is excited into oscillation by a Piezo element. The oscillating frequency of the U-tube is directly related to the density of the filled sample.

The higher the density, the lower the oscillating frequency. The density of the sample can therefore be directly determined from the measured frequency of the oscillating U-tube.

Refractive index - measuring principle

The sample is in contact with the measuring prism and is irradiated by an LED. The critical angle of the total reflection is measured with a high-resolution sensor array.

The refractive index (nD) is calculated from this value. To obtain highly accurate results, the sample and measuring prism are thermostatted precisely via a Peltier instrument.

U-tube

Piezo-element

optical pick-ups

sample

prism

CCD sensor

filter

filter

lens

lens

LED
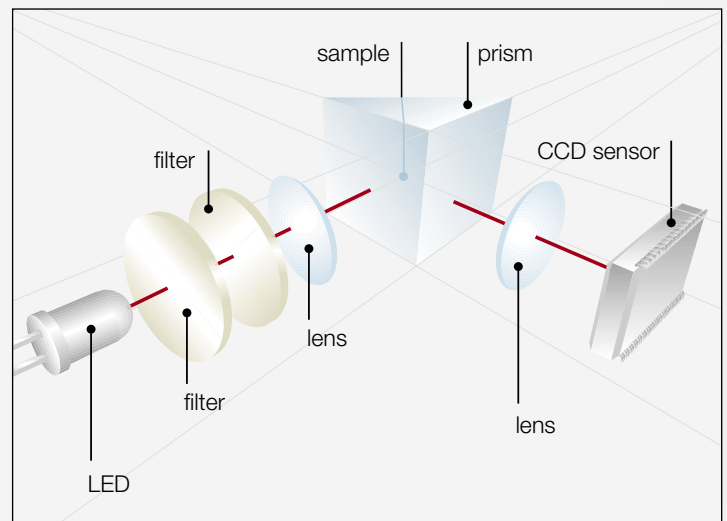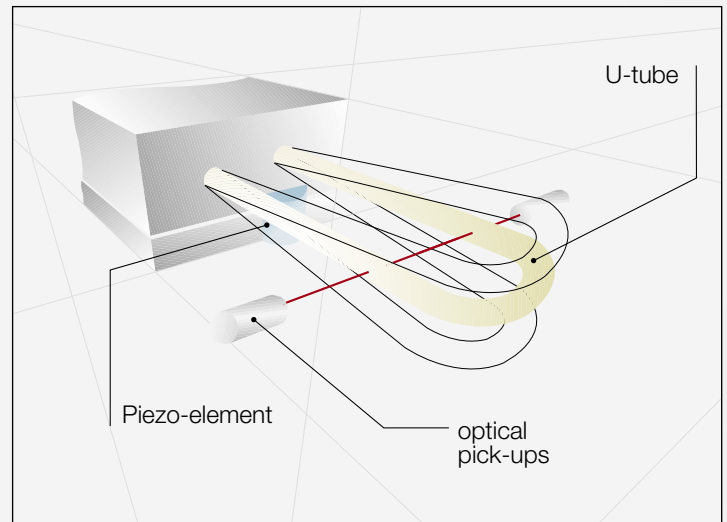
Quality Ensures Success

Both instruments are adjusted in one step with just air and water. To make working with the DMA/RXA as user-friendly as possible, the two instruments are operated via the display on the DMA 4500/5000. The settings for the output of measuring values on the display or to an optional printer can be defined by the user.

The modular design of the system allows the instruments to be used separately for special requirements (e.g. refractive index measurements of pasty samples). This makes the system very flexible.
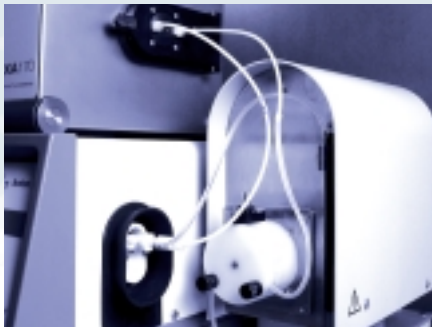
Sample filling

SP-1m

We recommend the SP-1m sample changer for the fully automatic filling of low viscosity samples. The SP-1m uses a peristaltic pump and operates up to a viscosity of 100 mPa.s.

Example application: Drinks

SH-3

The SH-3 sample handling unit is the ideal solution for users with low sample throughput and samples with a viscosity up to 500 mPa.s. The SH-3 provides automatic cleaning and drying after each measurement.

Example application: Chemical industry

Manual filling of the refractometer

The RXA can also be filled manually for pasty samples such as ketchup or face cream. This requires a syringe, spatula or similar tool.

Example applications: Food industry, cosmetic industry

Features and Benefits

- Calculation and output of numerous different properties based on density and refractive index using user-defined formulas, tables and polynomials
- All settings and operation from one instrument
- Alphanumeric sample identification via a keyboard and/or bar code reader
- Both instruments are filled in one step
- Small sample volume
- Built-in Peltier thermostat in both instruments
- Simultaneous measurement of density and refractive index
- Data memory for 100 measurements
- Maintenance-free
- Simple operation, compact

DMA/RXA - simple operation, many possible applications

The DMA/RXA is ideal for Quality Control in the flavors and fragrances industry and the oil industry, to give just two examples.

Numerous satisfied customers use the DMA/RXA to analyze chemicals, pharmaceuticals, foodstuffs, drinks, cosmetics, etc.

Our customers include breweries, leading vehicle manufacturers and the tobacco industry.

Technical Specifications

Instrument	RXA 156	RXA 170
Measuring range	1.32 - 1.56 nD	1.30 - 1.70 nD
Repeatability, standard deviation - Refractive index	2×10^{-5} nD	4×10^{-5} nD
Repeatability, standard deviation - Temperature	0.03 °C	0.03 °C
Temperature range	+10 °C to +70 °C	+10 °C to +70 °C
Temperature control	Internal Peltier thermostat	Internal Peltier thermostat
Data interfaces	RS 232 C, bidirectional	RS 232 C, bidirectional
Weight	Approx. 6 kg	Approx. 6 kg
Connection to density meter	Yes, DMA 4500 or DMA 5000	Yes, DMA 4500 or DMA 5000
Typical measuring time	1 minute	1 minute

Instrument	DMA 4500	DMA 5000
Measuring range	0 to 3 g/cm^3	0 to 3 g/cm^3
Repeatability, standard deviation - Density	1×10^{-5} g/cm^3	1×10^{-6} g/cm^3
Repeatability, standard deviation -Temp.	0.01 °C	0.001 °C
Temperature range	0 °C to +90 °C	0 °C to +90 °C
Temperature control	Internal Peltier thermostat	Internal Peltier thermostat
Data interfaces	2x RS 232 for RXA, printer and PC	2x RS 232 for RXA, printer and PC
Standard PC keyboard, bar code reader	Optional	Optional
Weight	Approx. 21 kg	Approx. 21 kg
Connection to refractometer	Yes, RXA 156 or RXA 170	Yes, RXA 156 or RXA 170
Integrated tables and customer functions	% alcohol, extract and sugar tables, API functions, acid and base tables, editable customer formulas, tables and polynomials	% alcohol, extract and sugar tables, API functions, acid and base tables, editable customer formulas, tables and polynomials
Measuring methods	10	10
Typical measuring time	Approx. 30 seconds	Approx. 40 seconds

Instrument	Sample Changer SP-1m	Sample Changer SP-3m
Sample throughput	10 to 30 samples per hour	5 to 10 samples per hour
Dimensions (L x W x H)	580 x 385 x 510 mm	580 x 385 x 510 mm
Automatic cleaning	No	Yes
Maximum viscosity	100 mPa.s	1000 mPa.s

The DMA/RXA can be operated with a wide variety of sample changers and sample handling units. Contact Anton Paar for details.

RXA 170

Anton Paar

RXA 170

Anton Paar

DMA 4500
Density Meter

Fotos: Croce & Wir

Anton Paar

Instruments for:

Density and
concentration measurement

Rheometry and viscometry

Sample preparation

Colloid science

Microhardness testing

X-ray structure analysis

CO_2 measurement

High-precision
temperature measurement

Specifications
subect to change
without notice

04/03 XDLIP06-C