

*Particle Sizer*



**IDEAL FOR**

- ANALYSIS OF PARTICLE SHAPE AND SIZE
- POWDERS AND BULK SOLIDS – SUSPENSIONS AND EMULSIONS
- PARTICLE SIZES FROM 20  $\mu\text{m}$  – 20 mm | 20  $\mu\text{m}$  – 2.8 mm
- QUALITY CONTROL
- RESEARCH AND LABORATORY
- FAST ALTERNATIVE TO SIEVE ANALYSIS

**DYNAMIC IMAGE ANALYSIS**



# QUALITY MADE IN GERMANY

FRITSCH is more than just a brand: It is backed by a strong, medium-sized, family business in its fourth generation, which has been firmly embedded in the region since 1920 and globally active for decades. All FRITSCH-products are produced according to strict quality criteria, and our entire production is in-house. The innovative ideas of our development department are inspired by the close relationship with our customers and their practical work in the lab. Satisfied customers worldwide count on our quality, our experience and our service. This makes us proud and motivates us.

**FRITSCH. ONE STEP AHEAD.**



# ANALYSETTE 28 ImageSizer

## FAST ANALYSIS OF PARTICLE SHAPE AND SIZE

The **FRITSCH ANALYSETTE 28 ImageSizer** for **dry** and **wet measurement** is the ideal Particle Sizer for all applications that require accurate and reproducible measuring results for both particle shape and size. The optical process of Dynamic Image Analysis provides results for a wide measuring range, delivers multiple shape parameters and also offers a very easy and cost-effective alternative to sieving.

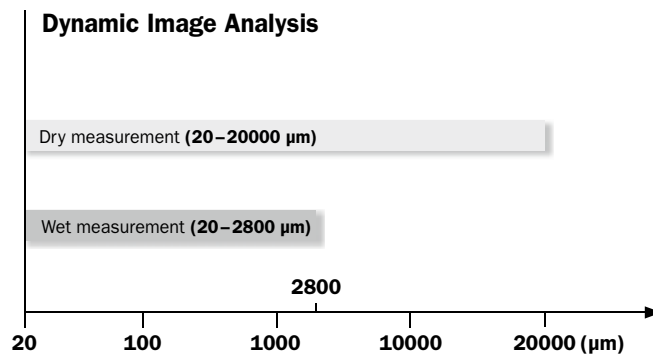
**Your advantage: Great flexibility for different measurement tasks – at a perfect price-performance ratio.**

- **Extra wide measuring range, individually adjustable**
- **High-performance camera with telecentric lenses**
- **Fast, simple operation via SOP control**
- **High-performance, integrated image analysis software ISS**
- **Extensive library for morphological analysis**
- **Useful tools for reliable quality monitoring**
- **Practical report generator for individual presentation of results**



**Measuring unit with feeder**  
Dry measurement  
of powders and solids

**Wet dispersion unit**  
Wet measurement of  
suspensions and emulsions



⊕ **Ideal for the analysis of:** Fertilisers | Refractory products | Glass and ceramics | Carbon products  
Catalysts | Plastics | Foodstuffs | Metals and ores | Pharmaceutical products  
Carbon black and coal | Salts | Sand | Abrasives | Cements



## Absolutely reliable quality control in 3 simple steps

Ensure higher quality, reduced rejects and lower costs: fast, safe and uncomplicated by measuring particle shape and size. With short measuring times of less than 5 minutes and reliable reproducibility thanks to pixel-accurate evaluation. For always consistent results.

1. ADD SAMPLE
2. START MEASUREMENT
3. READ EVALUATION

### Open configuration of the measuring process via SOPs

The ANALYSETTE 28 ImageSizer software contains predefined Standard Operating Procedures (SOPs) for typical measurement tasks, making operation especially easy. In the SOP you can set for example the parameters for the feeder, the dispersion and the camera. Own SOPs can also be created according to the measurement requirements and retrieved at any time via an input mask. Your advantage: a completely free configuration of the entire measuring process – for a simple and reliable reproducibility of the measuring process.

### Immediately ready to use, due to pre-installed ImageSizing-Software ISS

We make it very easy for you: each ANALYSETTE 28 ImageSizer is delivered with a computer\* on which the ImageSizing-Software ISS for the control, recording and evaluation of your measuring results is already installed. Plug it in, start it and off you go!

\* Except deliveries to CIS countries



## Dynamic Image Analysis instead of a microscope

With the principle of Dynamic Image Analysis, the ANALYSETTE 28 ImageSizer offers all benefits of an analysis via microscope, but records due to the fully automatic process with up to 75 images per second a considerably higher number of particles. Instead of just one image, any freely definable number of images can be recorded and evaluated. You can see the result of the analysis directly without any complicated evaluation just like with a microscope. Your advantage: Faster, representative results and higher precision in evaluation.



### One-camera-system with 5 megapixels

With only one high-performance industrial camera, the ANALYSETTE 28 ImageSizer covers an extremely wide measuring range and ensures thanks to its 5 megapixels, highest resolution of even smallest particles. Your advantage: In one image, large and small particles can be directly captured, displayed, edited and deleted. And a direct USB connection to the computer ensures the fastest possible data transmission for evaluation of the results.

### Heavy-duty for all applications

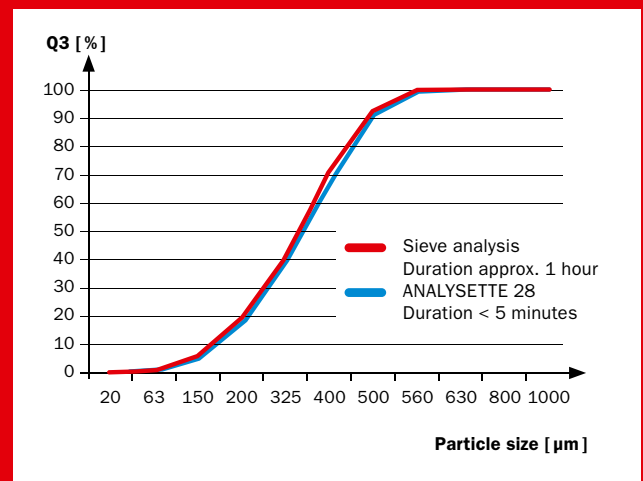
Even the lenses are optimised for industrial utilization: With a simple, heavy-duty design, and hermetically sealed against dust and moisture, a precise opto-mechanical setting and high optical performance are ensured at any time.

### Homogeneous illumination

The extra strong LED lighting guarantees a homogeneous illumination of the image field for perfect measurements. The flexibly adjustable exposure time ensures optimal adaptation to the sample and can easily be saved in the SOP.

### Fast alternative to sieving

If you conduct many and frequent sieve analyses, the ANALYSETTE 28 ImageSizer is the ideal, time-saving alternative completely without weighing, assembling of a sieve stack and time-consuming cleaning. And with substantially reduced follow-up costs, as there is no need to calibrate or purchase new sieves. And additionally, you receive besides the particle size distribution, also valuable information about the particle shape.





## Efficient dry measurement of powders and bulk solids

### YOUR ADVANTAGES

- Extra wide measuring range of 20 µm – 20 mm, individually adjustable
- 3 telecentric lenses are available
- Up to 75 images per second
- Agglomerates are preserved
- Practical Clean Design of the measuring chamber
- Optimal number of particles due to automatic adjustment of the feeder
- Easy handling

**The ANALYSETTE 28 ImageSizer is the ideal Particle Sizer for fast analysis of particle shape and size of dry, free-flowing materials.**

Via the optical analysis of the particle shape and particle size, you can identify damaged particles, contaminates, agglomerates or oversized and undersized particles accurately and fast and view them completely uncomplicated in single images. The measuring time depending on the sample quantity, is under 5 minutes. And the result is available immediately.

#### Efficient dry measurement

For measurement, the sample material is filled into the funnel and conveyed to the falling chute via the automatically controlled feeder, which its U-shaped cross section ensures a good material feed. There, the sample falls through the measuring chamber between the camera and LED strobe light into an easy to clean sample collecting vessel. The images recorded continuously during this process offer a variety of evaluation possibilities. And the sample remains undamaged and completely intact throughout the entire analysis process.

#### Lens with appropriate feeder

Choose for your ANALYSETTE 28 ImageSizer between three telecentric lenses the perfect one according to your specific measurement task. We will be happy to advise you and will automatically supply you with the optimally adapted feeder with funnel. And if your measurement tasks change, all lenses can be retrofitted at any time, and are easily to replace.





# 20–20000 $\mu\text{m}$

**MEETS THE REQUIREMENTS  
OF ISO 13322-2 FOR  
DYNAMIC IMAGE ANALYSIS!**



**Funnel and feeder** of the ANALYSETTE 28 ImageSizer can be removed for cleaning with just a few motions due to its quick-clamping locks.

Simple adjustment of the **funnel height** for optimal adaptation to the sample.

A rubber seal around the especially smooth moving **collecting vessel** prevents leakage of sample material.

### **Telecentric lenses for highest shape precision**

Thanks to the bi-telecentric lenses, the ANALYSETTE 28 ImageSizer guarantees always the same reproduction scale of each individual particle wherever it is located in the measurement volume. Your advantage: a more accurate measurement by a higher magnification consistency.

### **Clean Design of the measuring chamber**

Due to its special geometry, the measuring chamber of the ANALYSETTE 28 ImageSizer is automatically kept clean so air flushing is not necessary. And nevertheless, if soiling should occur, it is fast and easily cleaned.

### **Variable measuring time**

The duration of the measurement can be varied depending on the desired number of images (up to 75 images/sec.) or on the number of measured particles.

### **Optimal number of particles due to automatic adjustment of the feeder**

For exact reproducible measurements, the position of the feeder and the funnel height can be adjusted via a scale and stored as information in a SOP. The ideal feed rate, precisely adapted to the sample, can also be stored in the SOP. The particle concentration is determined and controlled by the software. Your advantage: always the optimal number of particles per image for a reliable and significant analysis.

**Our tip:** Ask for different coatings of the feeder when using special sample materials.



Typical sample quantity 10–100 g



## Easy wet measurement of suspensions and emulsions

### YOUR ADVANTAGES

- Extra wide measuring range of 20 µm – 2.8 mm
- Strong, freely adjustable ultrasonic power for deagglomeration
- Extremely quiet dispersion with strong pumping power
- Benzene, alcohol and many organic solvents can also be used as suspension liquid as a standard feature
- Automatic rinsing cycle
- No dead space in measuring and rinsing circulation system
- Fast and consistent cleaning

The **ANALYSETTE 28 ImageSizer** is in combination with the corresponding wet dispersion unit ideal for measurement of particle shape and size of suspensions and emulsions.

Wet dispersion is particularly suitable for fine particles, poorly flowing, fine-agglomerating or sticky materials, which do not react in water or other liquids.

#### Easy wet measurement

For perfect dispersion the sample material is feed into a closed liquid circulation system and is pumped with high power through the measuring cell between camera and LED strobe light. The continuously obtained images are the basis for the analysis with a variety of evaluation possibilities.

#### FRITSCH Advantage: Extremely quiet dispersion

Through the creation of a separate soundproof ultrasonic chamber, we have drastically reduced the unpleasant noise emission during the dispersion process. Your advantage: the quietest dispersion currently available.

#### FRITSCH Advantage: Illuminated dispersion bath

Ergonomically positioned making it incredibly easy to feed the sample and observe the dispersion process.



**Especially effective:**  
illuminated  
dispersion bath

# 20–2800 $\mu\text{m}$

**MEETS THE REQUIREMENTS  
OF ISO 13322-2 FOR  
DYNAMIC IMAGE ANALYSIS!**



For using the **wet dispersion unit**, simply insert the wet measuring cell into the measuring unit. If it is not in use, it is securely stored in the dispersion unit.

### **Optimal wet dispersion**

An integrated ultrasonic emitter with up to 100 Watt ultrasonic power and adjustable dispersion conditions, ensure fast and extremely efficient degradation of agglomerates – precisely adapted to each sample. Due to the integrated water connection, the wet dispersion unit can be automatically cleaned and refilled with new liquid after each measurement and is very quickly ready to be used again.

### **FRITSCH Advantage: Powerful pump**

A powerful centrifugal pump with individually adjustable speed ensures optimal transport of even heavy, high-density particles in the wet dispersion unit.



Typical sample quantity 0.1–1 g

### **Parameter: Water quality**

Generally, normal tap water is perfectly adequate for wet dispersion. In rare cases, it may be necessary to use distilled water. Just ask us – we will be happy to advise you.



# The FRITSCH Cloud

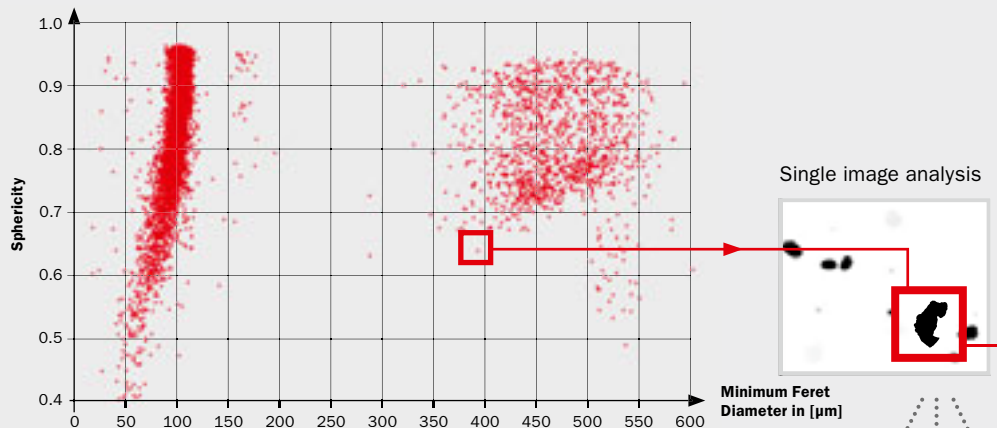
State-of-the-art evaluation with the ImageSizing-Software ISS

**For all applications where besides the size also the shape affects the critical properties of a particle system, the ANALYSETTE 28 ImageSizer shows you fast and easily whether, for example, the grains of abrasives have sufficiently sharp edges, whether the particles of a plastic granulate are more spherical or oblong or whether the surface of an absorber is rather smooth or jagged. And because the complex shape of any particle cannot be described with a simple figure, the ImageSizing-Software ISS offers a comprehensive library of morphology parameters.**

Even the evaluation of the measuring results is uniquely simple with the ANALYSETTE 28 ImageSizer. The evaluation software ISS displays each recorded particle clearly as a data point in the immediately available FRITSCH Cloud as well as in the FRITSCH Gallery. You freely choose which statement is of interest to you: for example the Sphericity in regards to the Minimum Feret Diameter, the aspect ratio, applied on the porosity, or the convexity as a function of the particle Cross Section.

**The FRITSCH Cloud:  
Each particle can be clicked  
individually**

The state-of-the-art of uncomplicated evaluation: For fast single image viewing, each individual particle can be opened directly with a mouse click from the clearly arranged FRITSCH Cloud. The really important information for you about the morphology will be shown by the position of the data point in the Cloud. Without time-consuming search, you can immediately analyse, evaluate and delete individual selected particles. All available size and shape parameters are automatically displayed.



**Each particle is one point in the FRITSCH Cloud:** for more than 10,000 particles, the Sphericity is applied against the Minimum Feret Diameter.

**The single image analysis** from the Cloud or the Gallery offers the possibility to evaluate each particle according to various shape values, such as for example: Contour (red), Circle (green) or Ellipsis (blue).





**FRITSCH Advantage: Freely configurable report generator**

For automatically displaying the results clearly arranged on the monitor, either as a Cloud, as a cumulative curve, as a bar chart or in a table form. Or define a layout according to your sieve analysis. The displayed results are printed out as you set it up on the monitor.

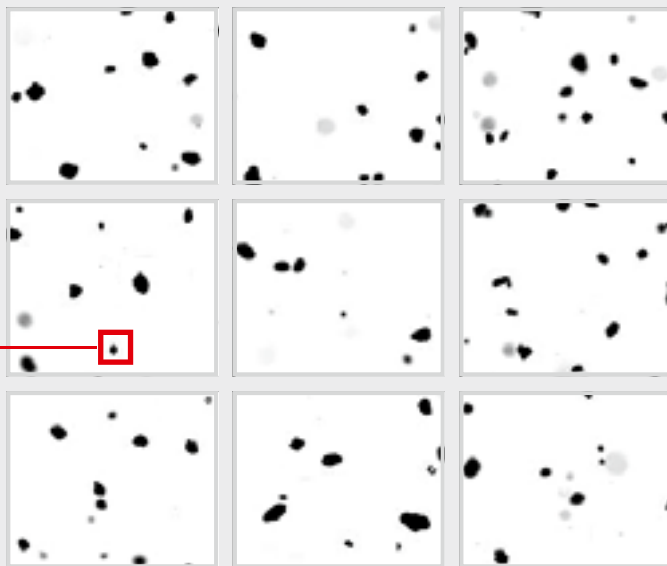
**FRITSCH Advantage: Several measurements in a chart**

Have several measurements displayed simultaneously in a chart and you will immediately see the differences between the respective samples. A direct visual evaluation - brilliantly simple, uniquely flexible.

**FRITSCH Advantage:**

**Also use ISS for your microscopic images**

Simply load digital images from other imaging systems, e.g. from your microscope, into the evaluation software ISS of the ANALYSETTE 28 and access the full functionality and scope of evaluation options. Your advantage: a high-value image analysis software at no extra cost.



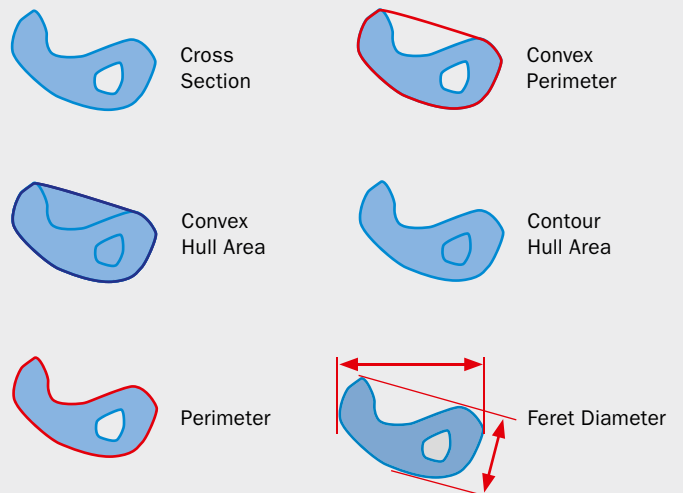
**The FRITSCH Gallery:**  
**Everything at a glance**

To get a quick overview of the typical particle shape of the analysed sample, view and evaluate all the images in a gallery which is integrated directly into the software for easy use. Individual particle images can be directly selected for single image analysis.



Area	
Contour Hull Area [µm²]	109440
Convex Hull Area [µm²]	114937
Cross Section [µm²]	109440
Diameter	
Area Equivalent Diameter [µm]	373.3
Circle Fit Diameter	372.2
Contour Hull Area Equivalent Diameter [µm]	373.3
ConvexHull Area Equivalent Diameter [µm]	382.5
Perimeter Equivalent Diameter [µm]	428.9
Ellipsis M	
Ellipsis Aspect Ratio	0.892
Major Ellipsis Axis [µm]	393.5
Minor Ellipsis Axis [µm]	351.2

**Selection of possible shape parameters**



## TECHNICAL DATA

ANALYSETTE 28 **ImageSizer**

	Dry Measurement	Wet Measurement
<b>Measuring range</b>	20 µm – 20 mm	20 µm – 2.8 mm
<b>Method of analysis</b>	Dynamic Image Analysis	
<b>Standard</b>	ISO 13322-2	
<b>Type of analysis</b>	Dry measurement of free-flowing powders and bulk solids	Wet measurement of suspensions and emulsions
<b>Measurement values</b>	Particle shape and particle size	
<b>Lenses</b>	<b>3 different, easy to change telecentric lenses</b>  <b>Measuring ranges:</b> 1. 90 µm – 20 mm 2. 40 µm – 9 mm 3. 20 µm – 4.5 mm	<b>Telecentric lens</b> (included in the wet dispersion unit)  <b>Measuring range:</b> 20 µm – 2.8 mm
<b>Size of the measuring field (FoV)</b>	<b>3 lenses:</b> 1. 53.8 x 45 mm 2. 24.1 x 20.2 mm 3. 11.5 x 9.62 mm	<b>Lens:</b> 6.34 x 5.3 mm
<b>Camera</b>	5 megapixel CMOS camera, 2,448 x 2,050 pixel resolution, USB 3.0	
<b>Typical measuring time</b>	< 5 min (depending on the desired measuring statistics)	
<b>Typical sample quantity</b>	10 – 100 g	0.1 – 1 g
<b>Measuring speed</b>	Max. 75 images/s	
<b>Evaluation</b>	Fast image analysis for morphology description and particle size determination	
<b>Computer</b>	Pre-installed ISS software for controlling, recording and evaluating your measuring results (deliveries to CIS countries without computer)	
<b>System requirements (for computers supplied by customer)</b>	Standard Windows PC with Intel Core i7 Quad Core processor or better, at least 8 GB system memory, primary drive: 256 GB SSD, secondary drive: at least 1 TB HDD, USB 3.0, monitor with 1,920 x 1,080 pixel or better, Windows 7 or higher (64 bit), PDF reader	
<b>Dimensions (w x d x h)</b>	90 x 30 x 55 cm	122 x 62 x 55 cm
<b>Net weight</b>	36.8 kg	68.6 kg

## ORDERING DATA

Order No. Article

### PARTICLE SIZER

#### ANALYSETTE 28 ImageSizer



28.2000.00 **Particle Sizer ANALYSETTE 28 ImageSizer**  
for fast analysis of particle shape and size  
with USB interface and computer\* with already installed software ISS  
for 100–120/200–240 V/1~, 50–60 Hz, 60 Watt



For dry measurement please order lenses according to the  
desired measuring range.  
For wet measurement please order wet dispersion unit separately.

### ACCESSORIES FOR DRY MEASUREMENT OF POWDERS AND BULK SOLIDS

#### Lenses with holder, feeder and funnel

- 28.2060.00 Telecentric lens enlargement 0.157x with feeder 50 mm  
and sample funnel 2000 ml  
(measuring range approx. 90 µm–20 mm)
- 28.2061.00 Telecentric lens enlargement 0.35x with feeder 20 mm  
and sample funnel 250 ml  
(measuring range approx. 40 µm–9 mm)
- 28.2062.00 Telecentric lens enlargement 0.735x with feeder 20 mm  
and sample funnel 250 ml  
(measuring range approx. 20 µm–4.5 mm)

### ACCESSORIES FOR WET MEASUREMENT OF SUSPENSIONS AND EMULSIONS

- 28.2500.00 **Wet dispersion unit**  
**incl. flow measuring cell and telecentric lens**  
**enlargement 1.33x – (measuring range approx. 20 µm–2.8 mm)**  
for automatic dispersion, volume 300–500 ml,  
100 Watt ultrasonic power  
for 100–120/200–240 V/1~, 50–60 Hz, 100 Watt

#### Spare parts for wet dispersion unit

- 28.2510.00 Flow measuring cell cpl.  
22.8566.26 Measuring cell glass 4 mm for low measuring cell

### ACCESSORIES FOR CALIBRATION

- 28.2170.00 Calibration plate with 0.5 mm dots for calibration of the  
ANALYSETTE 28 ImageSizer with telecentric lens 28.2060.00  
or 28.2061.00
- 28.2175.00 Calibration plate with 0.125 mm dots for calibration of the  
ANALYSETTE 28 ImageSizer with telecentric lens 28.2062.00  
and for telecentric lens of wet dispersion unit

\* Except deliveries to CIS countries

#### Sample division

For representative sample division, we recommend the Rotary Cone Sample  
Divider LABORETTE 27 – the foundation for any precise analysis.  
More information is available at [www.fritsch-international.com/l-27](http://www.fritsch-international.com/l-27).

A computer with already installed software for the control, recording of the data  
and evaluation is included in the scope of delivery of the FRITSCH Particle Sizer.  
(Deliveries to CIS countries without computer)

Maintenance and Recalibration of your Particle Sizer on request.

Colour ink jet printer and laser printer on request.



## BENEFIT FROM OUR EXPERIENCE!

Choose FRITSCH Particle Sizers to take advantage  
of the technical superiority resulting from over 30 years  
of practical experience in the field of high-tech particle  
technology. Our expert Dr. Günther Crolly is available to  
assist you in all questions regarding particle sizing.  
He will be happy to inform you about the applications  
of Dynamic Image Analysis for your specific task and  
advise you about defining SOPs.  
Just a phone call away!

+49 67 84 70 138 · [crolly@fritsch.de](mailto:crolly@fritsch.de)  
[www.fritsch-international.com/particle-sizing](http://www.fritsch-international.com/particle-sizing)

#### ANALYSETTE 22

NanoTec

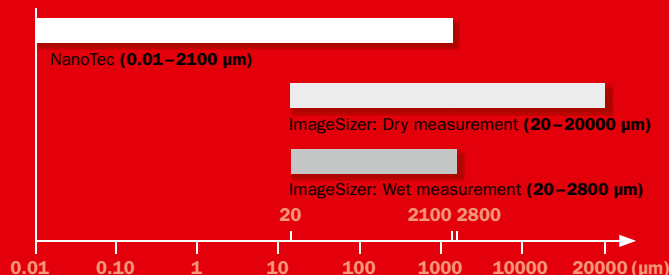
Static Light Scattering



#### ANALYSETTE 28

ImageSizer

Dynamic Image Analysis



## Showing you how it's done!

Our application laboratory will be more than glad to help you  
find the perfect Particle Sizer for your specific task. If desired,  
within the scope of a product recommendation, we will  
conduct a particle analysis of your material. Simply request at  
[www.fritsch-international.com/service/sample-analysis](http://www.fritsch-international.com/service/sample-analysis).  
The result will convince you.



Fritsch GmbH  
Milling and Sizing  
Industriestrasse 8  
55743 Idar-Oberstein  
Germany  
Phone +49 67 84 70 0  
Fax +49 67 84 70 11  
info@fritsch.de  
www.fritsch.de