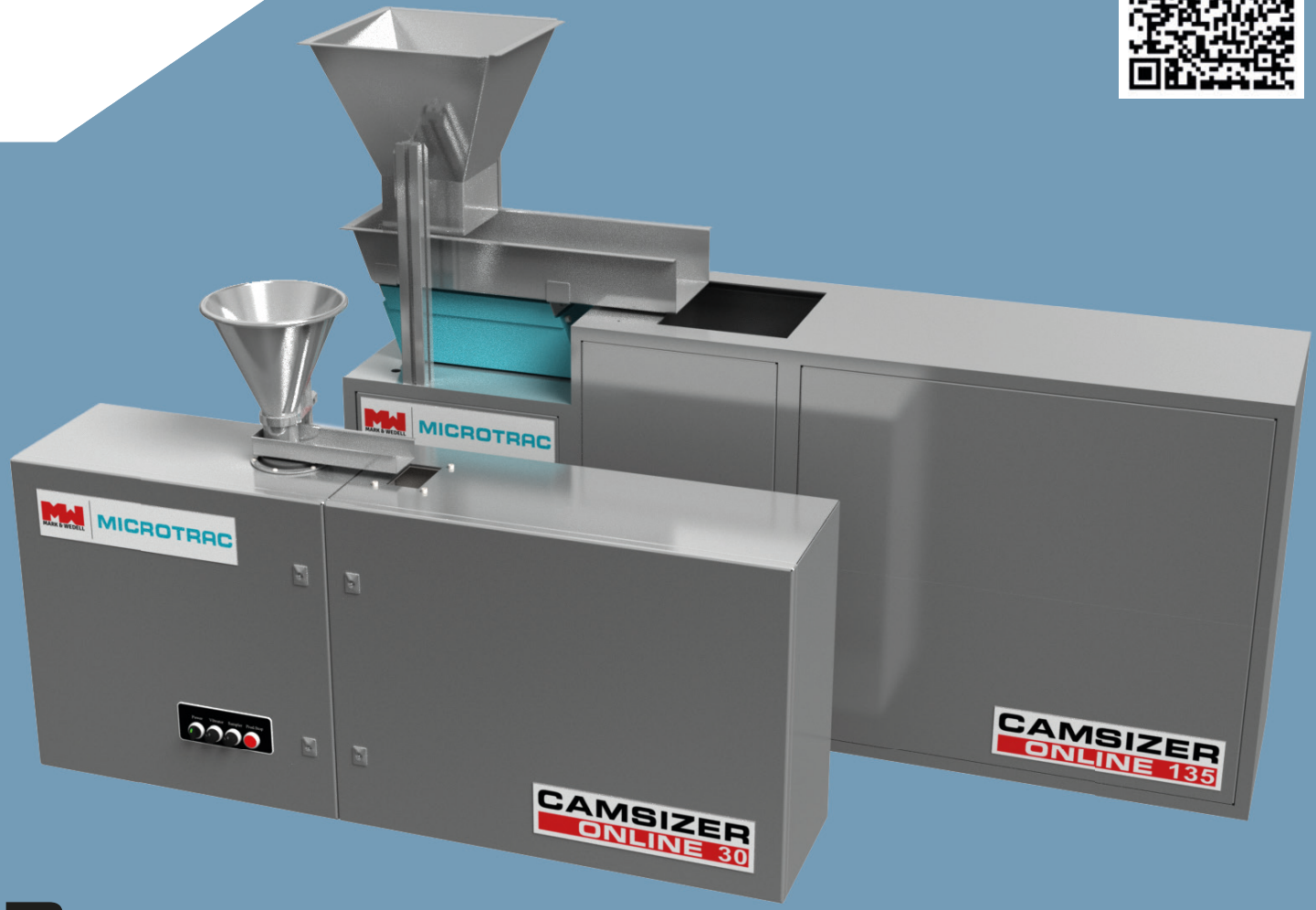
MARK & WEDELL



CAMSIZER ONLINE 30

CAMSIZER ONLINE 135

3D REAL-TIME PARTICLE SIZE AND SHAPE ANALYSIS FOR PROCESS OPTIMIZATION

- DYNAMIC IMAGE ANALYSIS

MARK & WEDELL

Introducing Mark & Wedell.

Ensuring Precision and Safety in Particle Analysis with Mark & Wedell's Advanced Sampling Solutions

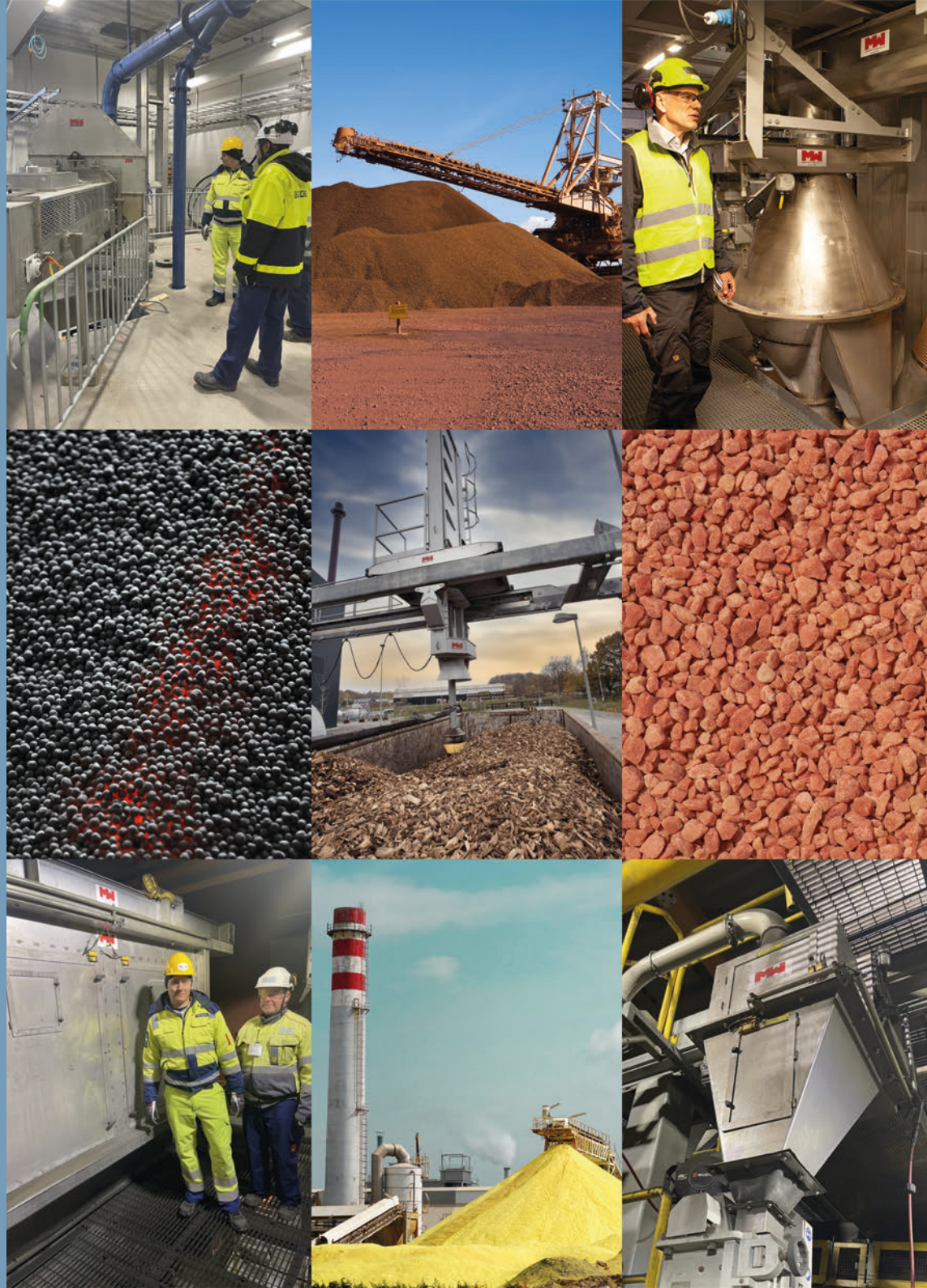
Since 1982, Mark & Wedell has been a global pioneer and leader in automated sampling solutions. Our specialized division, JAWO Sampling A/S, engineers and manufactures a complete range of automated and customized sampling systems for bulk materials and powders.

With over 1,000 projects in more than 85 countries, we are a trusted partner in sampling worldwide.

Our systems ensure consistent, accurate sampling, reduce contamination and improve safety and efficiency.

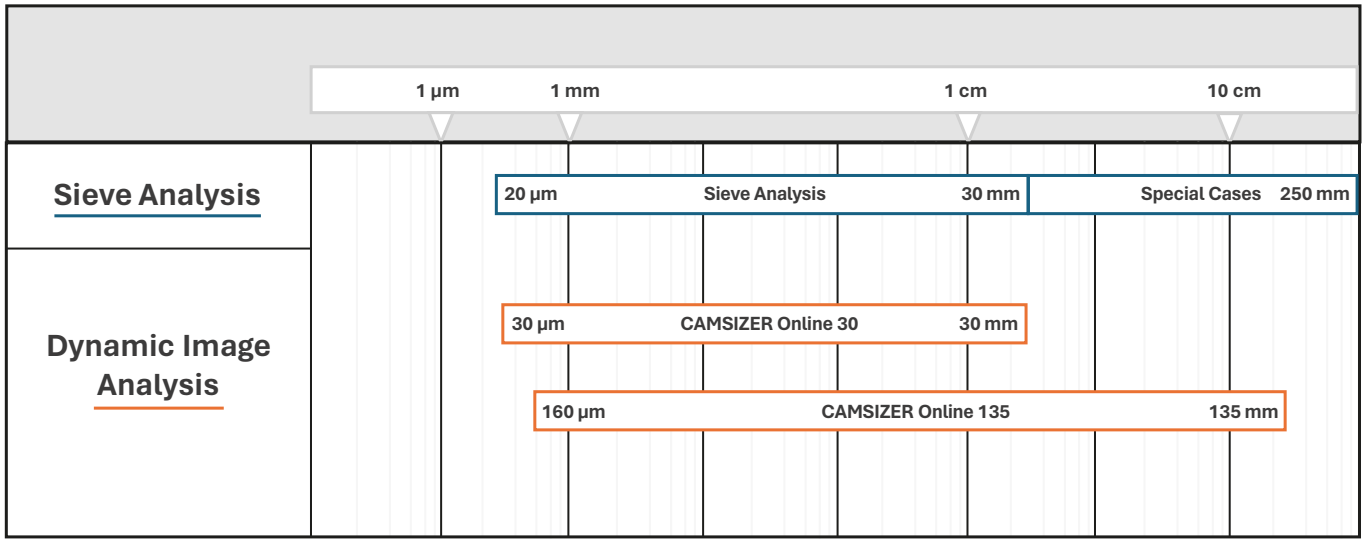
Seamless Integration of Automated Sampling Solutions with Camsizer Online Technology

Our sampling technologies play a critical role in the effectiveness of particle size and shape analysis using the CAMSIZER Online. By ensuring that samples are perfectly representative, Mark & Wedell enhances the accuracy of measurement data, allowing for immediate process optimization.



A NEW DIMENSION IN PARTICLE ANALYSIS

Dynamic Image Analysis vs. Sieve Analysis.



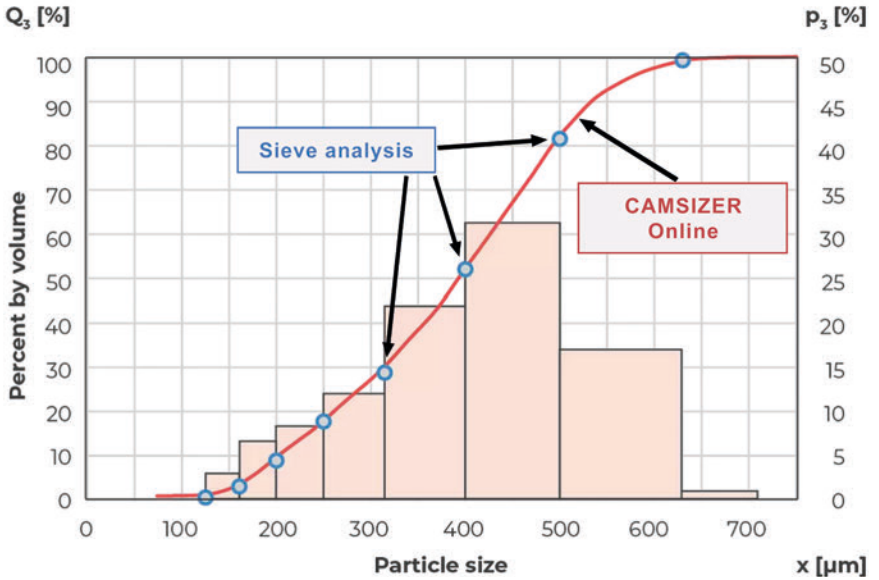
The CAMSIZER Online can entirely replace or supplement traditional sieving; from 30µm to 135mm

CAMSIZER Online

Traditional sieve analysis frequently forms the basis for quality standards and product specifications between suppliers and customers. A rapid and efficient alternative like the CAMSIZER Online takes this into account and produces results which are fully comparable. For particle sizes ranging between 30µm - 30mm (CAMSIZER Online 30) and 160µm - 135mm (CAMSIZER Online 135).

This is why the CAMSIZER Online software is provided with algorithms for emulating sieving processes.

Many users have **replaced time and labour consuming sieve analysis** by using the CAMSIZER Online **without having to sacrifice the familiar quality specifications.** The automated and wear-free measurement means that the results obtained are more reliable and reproducible over time.



100% Sieve Analysis compatibility with CAMSIZER Online

A NEW DIMENSION IN PARTICLE ANALYSIS

Revolutionizing Particle Analysis with CAMSIZER Online

The CAMSIZER Online brings the proven capabilities and advantages of traditional CAMSIZER technology from the laboratory into the production environment, offering a seamless alternative or complement to conventional sieving methods. This innovative system provides:

- **Real-time Process Optimization:** Immediate analysis of particle size and 3D shape for dynamic production adjustments.
- **Comprehensive Morphology Assessment:** Provides detailed measurements of particle size and shape, capturing critical aspects of morphology that significantly influence material behavior and performance.
- **100% Sieve Correlation:** Guarantees compatibility with existing sieving data and avoids 2-12 hours delay from traditional laboratory analysis.
- **Exceptional Accuracy:** Delivers precise measurements, ensuring higher quality and consistency.
- **Integrated with a Standard or Customized Sampling System:** To provide realtime data for process control and returns samples to the process.

What's the benefit?

Operations

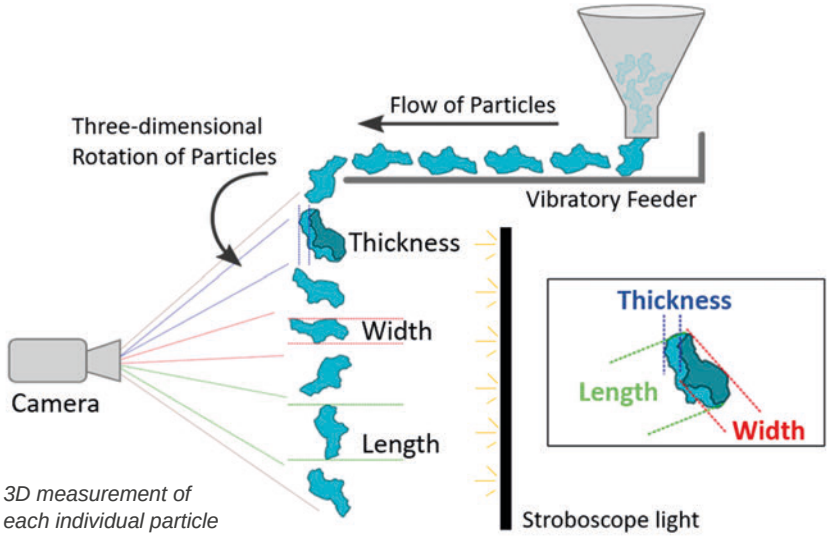
Enhanced Operational Efficiency and Safety with Camsizer Online

The Camsizer Online enables operators to monitor and control the production process with direct, real-time data, streamlining operations and better worker safety:

- **Instant Access to Data:** Immediate online information improves process optimization and avoids risk of out-of-spec production and delays by reducing dependency on slow lab results.
- **Enhanced Safety Measures:** Eliminates the need for manual sampling, lowering the risk of injuries and improving compliance with health and safety regulations.
- **Designed for Tough Conditions:** Operates reliably within an IP66 industrial hardened enclosure, suitable for harsh environments.
- **SOP Feature:** Standard Operating Procedure for unattended operation.
- **Low Maintenance and Reliable:** Features self-cleaning mechanisms, requires minimal maintenance and is designed for unattended operation.

CAMSIZER Online

How does it do it?



Particles are automatically sampled from the material flow and transported via a funnel to a vibrating tray. As particles travel down this tray, they fall in a tumbling motion. The system's high-speed, high-resolution camera, supported by stroboscopic lighting, captures up to 250 pictures per second as each particle falls through the sensing zone.

Thanks to the extended field of view and long drop distance, each particle is analyzed up to 30 times and in different orientations, making the actual, three-dimensional particle morphology accessible for analysis.

The patented 3D technology of the CAMSIZER Online tracks every particle in a sample, often numbering between 1-2 million particles. It captures multiple images of each particle to measure dimensions such as length, width, thickness, perimeter, and area, all within a short processing period of 5-10 minutes.

This allows for the computation of more than 35 different 3D size and shape parameters, e.g. width-thickness ratio, providing valuable and precise data for online analysis.

In the particle track, the software determines the width and the length of each particle projection:

- The largest value of all length measurements within a particle track is the “3D length” of the particle.
- The largest value of all width measurements within a particle track is the “3D width” of the particle.
- The smallest value of all width measurements within a particle track is the “3D thickness” of the particle.

Thus, for particles with three different dimensions (e. g. almonds), the size distributions of all three dimensions can be displayed separately.

3D Analysis is particularly advantageous for particles that are supposed to have a specific shape like spheres, rods (extrudates), lenses or ellipsoids (“rugby-ball”-shape).

Particle size distribution curves utilizing one or multiple size parameters can be reported, and powerful filter functionality enables the user to isolate groups of particles of particular interest.

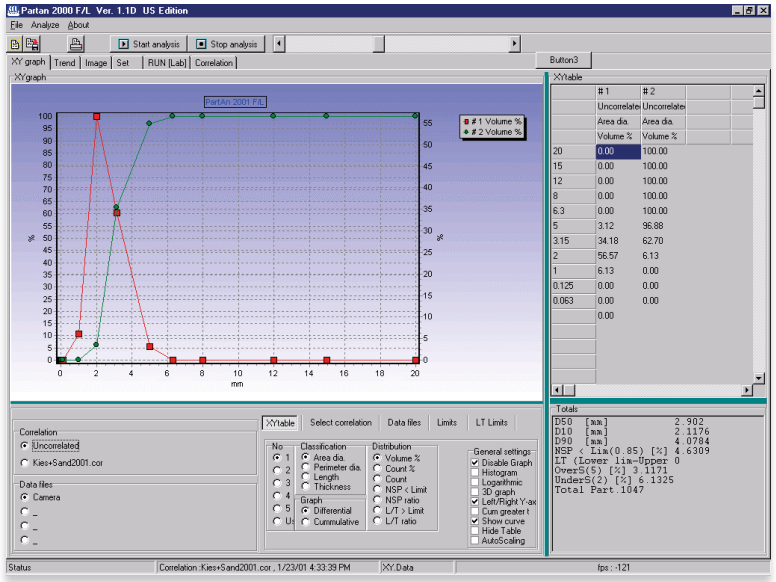
Applications.

I Industries and Materials

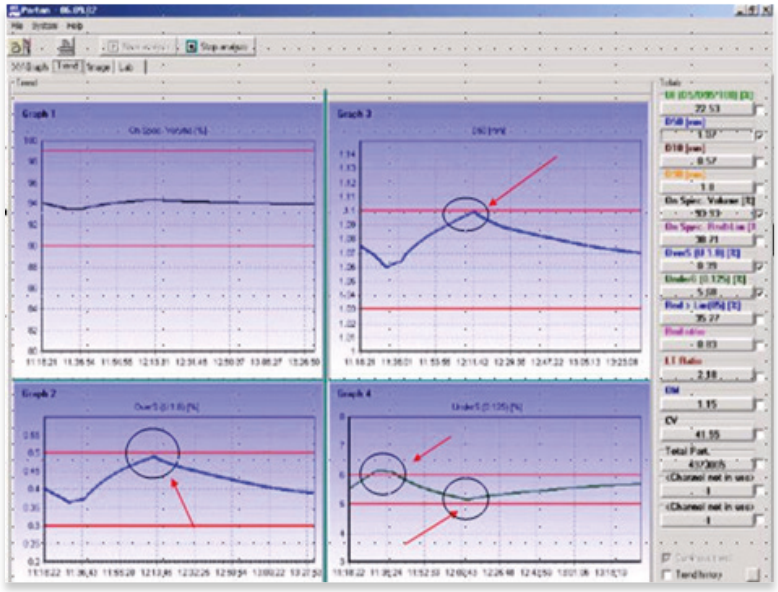
The CAMSIZER Online provides advanced particle size and 3D shape analysis, offering crucial distribution and trend data for quality control and process optimization. Its durable and precise design allows for continuous operation 24/7 with minimal maintenance.

The robust system is housed in an industrial-grade IP66 enclosure, ensuring that all electronics are safeguarded against harsh environmental conditions.

This versatile instrument excels in diverse industries, providing real-time results for free-flowing particles. By providing operators with essential data promptly, the CAMSIZER Online facilitates informed decision-making, enhancing efficiency and productivity in numerous applications.



Results on particle size distribution



Results on trending particle size

CAMSIZER Online

Industries and Materials.

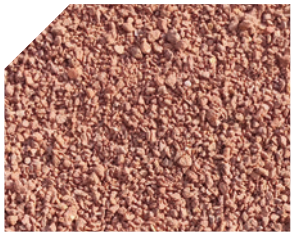
The CAMSIZER Online 30 and 135 are utilized across a diverse range of industries and materials.

FERTILIZER INDUSTRY

Nitrogen fertilizers, potassium salts and potash, phosphates and general multi-nutrient fertilizers.

CHEMICALS INDUSTRY

Abrasives, roofing materials, washing powders, polyurethanes, plastics/polymers, EPS, glass beads and other chemical products.



MINING

Ores, sintered products, pellets, coke, silica, bauxite, metallurgical powders, fine and grinding beads.

BUILDING MATERIALS

Aggregates and Building Materials such as industrial sands, aggregates and specialized construction compounds.

RECYCLING OPERATIONS

Battery recycling, plastics recycling and other specialized recycling processes.

BIOMASS

Wood pellets and chips

FOOD AND FEED PROCESSING

Foods, cat litter, salt, beans, sweets, fish feed and other consumable goods.

RESEARCH FACILITIES

Battery recycling, oil sands, wood fibers, catalysts, nuclear, slag powder and catalysts.

FERTILIZER
– FULL MANUFACTURING PROCESS CONTROL

The manufacture of fertilizers significantly benefits from the CAMSIZER Online's real-time material characterization capabilities at various stages of the production proces.

Drying Process
The CAMSIZER Online measures the particle size and shape of materials exiting the dryer, providing critical data to control the drying and granulation processes. Information is transmitted directly to the Control Room, enabling immediate adjustments that maintain high standards of product quality and process efficiency.

Sieving Process
Post-drying, materials are transferred to storage silos via a sieving process. Irregular particle shapes and sizes can affect the flowability of fertilizers, leading to clogging and inconsistent application. The CAMSIZER Online monitors this stage ensuring that both coarse and fine materials are effectively separated before storage.

A fertilizer blend for particle analysis, consisting of potash, urea beads, and DAP (diammonium phosphate).

The CAMSIZER Online can help fertilizer manufacturers achieving a higher level of process automation, ensuring efficient operations and superior product quality.

EXPANDABLE POLYSTYRENE (EPS)
– QUALITY CONTROL VIA REAL-TIME ANALYSES

Bead Size Uniformity
Particle size and roundness are crucial quality parameters for expandable polystyrene (EPS). Inconsistent bead sizes can lead to uneven expansion and poor structural integrity in the final EPS product. Also, the mechanical properties of EPS, such as compressive strength and thermal insulation, are highly dependent on the uniformity of the bead size. Real-time measurement with the Camsizer Online of size and roundness allows for faster control to maximize quality output of EPS-production compared to traditional sieving.

Foaming Efficiency and Moisture Absorption
Variations in particle size can affect the foaming process, leading to suboptimal foam density and cell structure. Furthermore, the particle size significantly affects the material's ability to absorb moisture. An excessive presence of fine particles can hinder this capability. Real-time measurement with the Camsizer Online of size and roundness allows for faster control to maximize quality output of EPS-production compared to traditional sieving.

Expanded polystyrene pellets for production.

Mold Filling and Surface Finish
Non-uniform particle sizes can cause problems in mold filling, leading to defects and poor surface finish in the final product. Real-time analysis of particle shape and size helps ensuring smooth mold filling, resulting in superior surface finish and accuracy of EPS products.

EXTRUDATES
– PRECISE & FAST 3D MEASUREMENT

A highly viscous paste, often composed of materials such as plastic granules, extrudates, or washing powder, is pressed through a matrix and then precisely cut using a sharp knife.

Typically, extruded particles are cylindrical. The CAMSIZER Online accurately measures the length to thickness ratio and the overall size of these cylindrical particles.

Leveraging its patented 3D technology, the device ensures rapid and reliable assessment of granulate quality, delivering essential metrics for process control and quality assurance

Blue plastic extrudates.

BULK MATERIAL
– RELIABLE MATERIAL CHECK AT LOADING STATIONS

Bulk materials are often stored before being transported as raw products to other processors. When these materials are loaded onto trains, ships, or trucks, it is crucial to ensure that the material precisely meets specified quality standards for the end users.

Historically, quality control at loading stations was conducted through sieve analysis, which involved manually taking samples that were then sent to a laboratory. There, the sieve analysis would be performed, and results could take between 30 to 120 minutes to be relayed back to the operators at the loading station.

The CAMSIZER Online changes this process by enabling fast and efficient measurements within just 5 to 10 minutes, and the results are immediately communicated to the control room. This advancement allows for real-time quality analysis during the loading process, ensuring that each batch of material meets the exact specifications before shipment.

Transportation and handling of bulk material.

What are the technical details?

General Specification.

Measurement principle	Dynamic image analysis
Type of analysis	Dry analysis of powders, granulates and bulk material
Detection system	High-speed and high-resolution camera with up to 250 fps Typical use case: 100 fps (each with 5 MP)
AC input	100 - 132 VAC (120 VAC model) 200 - 250 VAC (240 VAC model) 47 - 63 Hz, single phase
Power consumption	100 VA maximum
Material temp.	Max 140°C (284°F)
Explosion proof	Optional
Environmental	Temperature: 10°C to 35°C (50°F to 95°F) Humidity: 20% to 90% RH, non-condensing maximum Storage temperature: -10°C to 50°C (14°F to 122°F) (dry only) Pollution: Degree 2
Compliance	ISO 13322-2 Dynamic Image Analysis

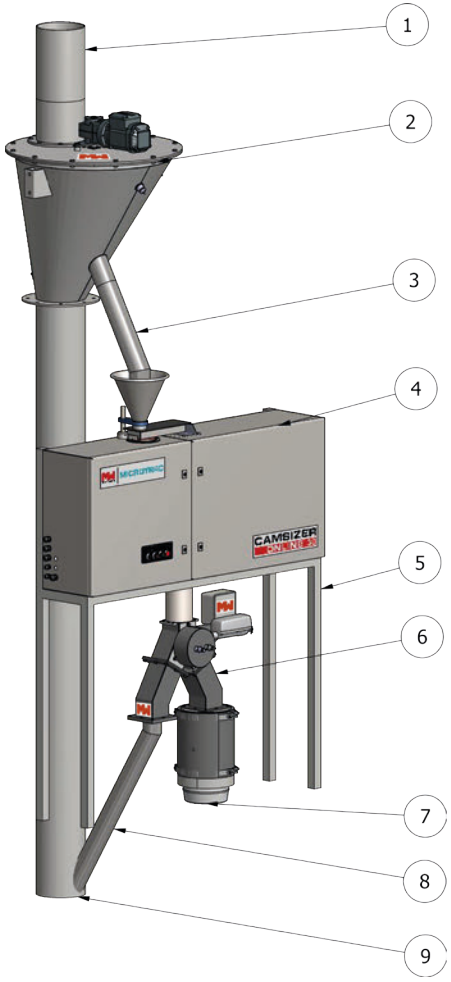
Type Specification.

	CZ-30	CZ-135
Particle size	30 µm - 30 mm	160 µm - 135 mm
Images per particle	Typically 8 (max 12)	Typically 8 (max 30)
Content of min. particles	1-5% < 0,1 mm	1-10% < 0,25 mm
Sample volume	0.1 - 1.0 kg (0.2 – 2.2 lbs) Max 2.0 kg (4.4 lbs)	0.5 - 30 kg (1.1 – 66 lbs)
Minutes per cycle*	3 -10	5 - 20
Cycles per hour*	6 - 20	3 - 12
Dimensions (H x W x D)	900 x 1400 x 300 mm (35 x 55 x 12 in)	1250 x 1700 x 400 mm (49 x 67 x 16 in)
Weight	60 kg (132 lbs)	90 kg (198 lbs)
Shipment weight	120 kg (265 lbs)	150 kg (331 lbs)
Sample tray	Stainless steel	Stainless steel
Casing	Stainless steel	Epoxy overcoat finish option

**Dependent on content of min. particles and sample volume.*

Fully automated integration!

- No manual labor needed.



Seamless integration between a M&W JAWO primary sampler and the CAMSIZER for continuos operation.*

Pos.	Pcs.	Description
1	1	Inlet pipe for Vezin Sampler
2	1	Vezin Sampler VS-200
3	1	Outlet pipe from Vezin Sampler
4	1	Particle Analyser CZ-30
5	1	Rack for Particle Analyser
6	1	Divider Gate DG-80
7	1	Sampling Bucket PB-3.6L
8	1	Outlet pipe from Divider Gate
9	1	Outlet pipe from Vezin Sampler

**Visit our webpage M&W JAWO Sampling | Automated Representative Sampling to explore various combinations of JAWO sampling integrated with the CAMSIZER Online CZ-30 / CZ-135, to see how they can be seamlessly incorporated into your process plant.*

MARK & WEDELL

Bridging theory, engineering & application for 50 years

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