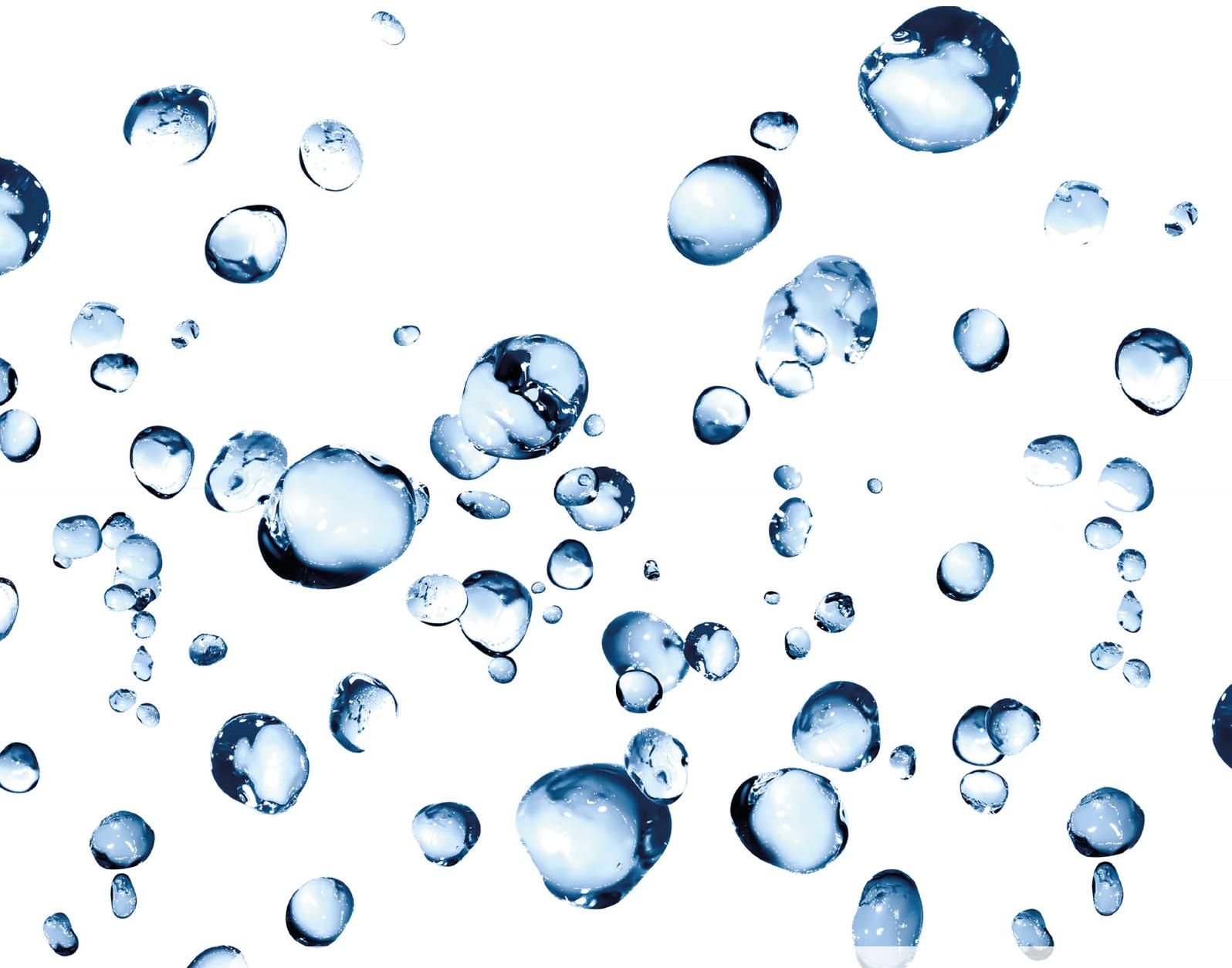
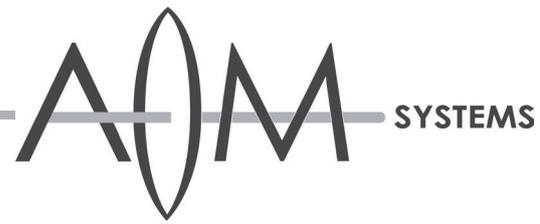


AOM-Systems

Your Partner for *Smart Sprays*



SpraySpy[®] ProcessLine

Spray Monitoring & Spray Digitization
for Quality Monitoring in Production





SpraySpy® Model PL100

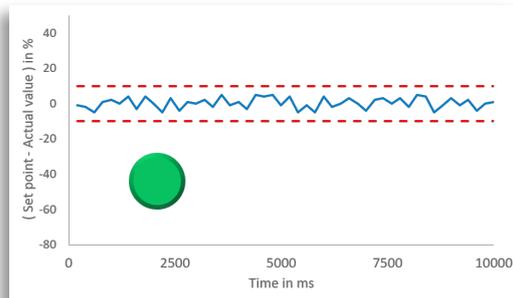
SpraySpy® ProcessLine - for highest process stability

Even small variations within a spray can lead to a significant decrease of coating quality in production processes. For decorative or for functional coatings this can incur unnecessary post-production costs or even rejection of units. Therefore, it is of great interest to insure that a spray is properly functioning and that deviations from nominal operation are kept to a minimum.

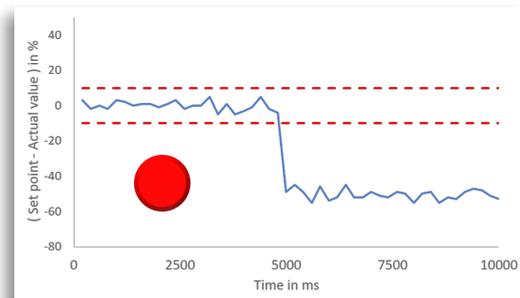
The solution for this task is the SpraySpy® ProcessLine. This laser based sensor system monitors the spray and detects even the smallest variations in spray operation, and this is achieved inline and in real time. Deviations from the set-point value of the spray are detected and the operator is immediately notified by the process control system. This allows counteractions to be invoked, before rejections or extra costs are incurred.

The measurement system detects up to 60% of the most common coating defects during the production process. The integrated artificial intelligence Software SprayAI® collects digital process data. This data can be used for further Internet of Things (IoT) applications. The SprayAI® software is easy to use, achieves a high precision of detection rate and is sensitive to anomalies of spray characteristics down to 2%.

SpraySpy® ProcessLine reliable monitoring of spray stability:



Classification of an okay spray



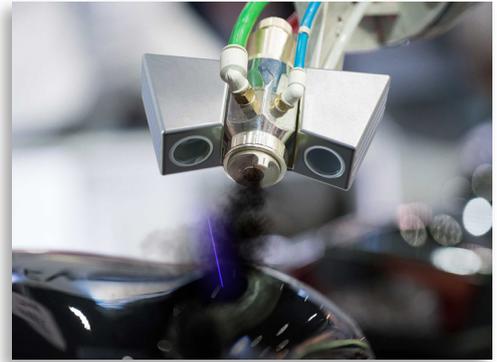
Classification of a not okay spray

SpraySpy® increases production and decreases costs

With the SpraySpy® ProcessLine, production runs are more stable. The comprehensive data collection allows an ongoing and complete documentation of the product quality, a predictive maintenance, pattern recognition of failures, and the implementation of closed-loop control of the coating process. As a result, SpraySpy® insures a higher Spray quality and lower costs.

SpraySpy® ProcessLine highlights:

- Detects anomalies in the spray of 2% or higher
- Inline monitoring of deviations in the spray
- No training time for the operators
- Relays status signals in real time to process control system
- Automated process documentation
- Objective and stable classification of production quality
- Digitalization of the spray process (IoT-ready)
- Applicable for fixed or moving nozzles
- Measurement probe can be mounted on the gun or bell
- Suitable for explosive atmospheres (ATEX) & High-Voltage Application
- Minimize lost production
- Increase machine availability



The SpraySpy®-Technology

The **SpraySpy®** technology is based on the scattered light from a moving droplet or particle, illuminated by a light beam. The resulting light scattering is separated by the acquisition time into the individual scattering orders and registered by photodetectors. The characteristics of the scattering orders are correlated with the spatial and temporal flux density in the spray. Therefore, even the smallest fluctuations in spray properties are detected.

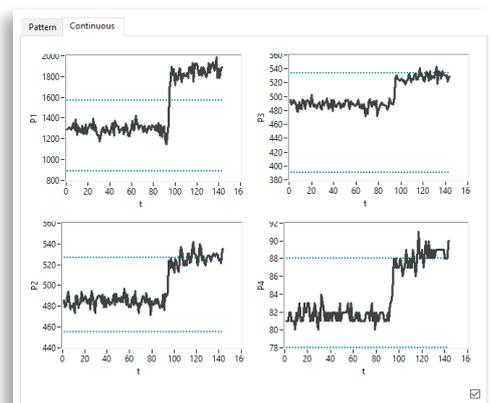
SpraySpy® & SprayAI® application

SpraySpy® monitors the droplet size, the droplet velocity, the spray angle and the volume flow rate in the spray by correlating light scattering parameters and assigned set values.

If the parameters of the spray are within the defined ranges, your spray is okay. However, if the integrated artificial intelligence, **SprayAI®** detects a deviation from the set value, an alarm signal is generated and made available in real time.

The measured spray parameters can be transferred to a local database or to a cloud. Here the data can be automatically analyzed.

The digitization of the spray provides the operator the data-driven certainty for process control and regulation.



SpraySpy® ProcessLine Model Specification

Model	SpraySpy® ProcessLine	
	PL100	PL200
Monitored spray / process parameters	<ul style="list-style-type: none"> • Drop size • Drop velocity • Number of drops <ul style="list-style-type: none"> • Volume flow • Spray angle & geometry <ul style="list-style-type: none"> • Viscosity • Nozzle contamination / defect 	
Measurement range <ul style="list-style-type: none"> • Size • Velocity • Amount of Drops 	> 1 µm < 100 m/s 1	
Conditions <ul style="list-style-type: none"> • Explosive Atmosphere (ATEX) • High-Voltage Application 	No No	ATEX: Zone 1 & 2 Yes
Drop characteristics	Transparent, Semi-transparent & Non-transparent	
Repeatability <ul style="list-style-type: none"> • Drop size • Drop velocity • Number of drops 	1,7% 0,6% 1,5%	
Sampling rate	250 MS/s	
Interfaces	Ethernet, ProfiNet, Current loop or others	
Database (optional)	SQL database administration & WebApp	
Hardware size <ul style="list-style-type: none"> • Measurement probe • Processing unit 	~115 x 95 x 45 mm ~600 x 482 x 222 mm	
Operating parameters <ul style="list-style-type: none"> • Power supply • IP-Class 	24 V / 4 A IP 67 (Measurement probe)	

AOM-Systems - Your Partner for Smart Sprays

Since years, **AOM-Systems** (Advanced Optical Measurement Systems) has been involved in droplet and spray measurements. The development of an easy to use and ATEX conform measurement technology has had a major influence on droplet and spray analytics.

The newly developed ProcessLine for the application in production lines, monitors spray anomalies and provides digitization data inline and in real time. **SpraySpy®** is equipped with the artificial intelligence **SprayAI®**, and supports the data-driven coating process of current and future generations of atomization technologies.

AOM-Systems GmbH

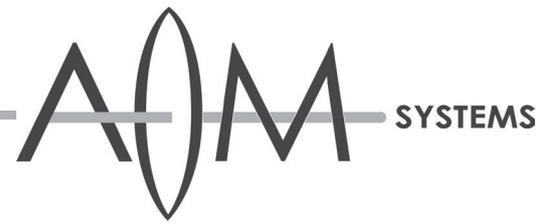
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AOM-Systems

Your Partner for *Smart Sprays*



SpraySpy[®] LabLine

Spray & Droplet Analysis

for Research & Development





SpraySpy® Model LL450

SpraySpy® LabLine - Spray analysis for highest demands in R&D

SpraySpy® LabLine is the next step in droplet and spray analytics, which has long been awaited by the Research & Development community. SpraySpy® LabLine measures the individual size, velocity, opacity and kinetic energy of droplets, as well as the flux density of the spray.

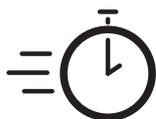
The laser based system copes with highly demanding liquids, like automotive effect lacquers, coatings, or bondings - even with the latest application methods, such as ultrasonic atomizers, pneumatic atomizers or rotating bell atomizers.

Using the patented SpraySpy® technology, atomization in extremely challenging environments, such as explosive atmospheres can be analyzed. This provides new options in research and development and a new, in-depth insight into atomization. It increases your knowledge about the spray and therefore, the quality of your products, already in the development phase. Consequently, the ratio of rejected to accepted units and the production costs for your customers decrease.

SpraySpy® LabLine measures:



Size



Velocity



Momentum



Flux density



Opacity

SpraySpy® LabLine highlights:

- Single droplet measurement of size and velocity
- Characterization of the momentum and flux density
- Online measurement of the digital spray pattern
- Analysis of individual transparent and non-transparent drops
- Storage and analysis of all droplet events
- Easy-to-use without adjustment
- Suitable for explosive atmospheres (ATEX)

The SpraySpy®-Technology

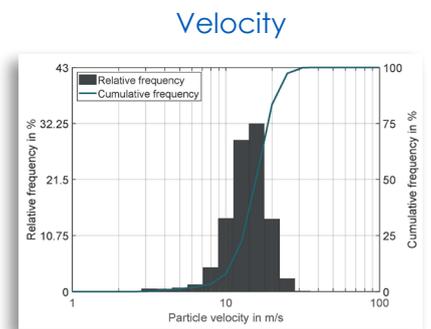
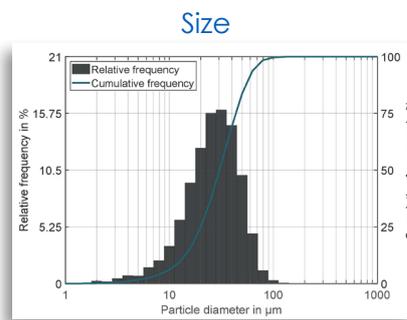
The SpraySpy® technology is based on scattered light from a moving droplet or particle, illuminated by a light beam. The resulting scattered light is separated by the acquisition time into its individual scattering orders and registered by photodetectors. The characteristics of the scattering orders are correlated with the size, velocity, number and opacity of particles in each individual droplet. Therefore, the SpraySpy® technology is a direct counting measurement method.

SpraySpy® Case Studies

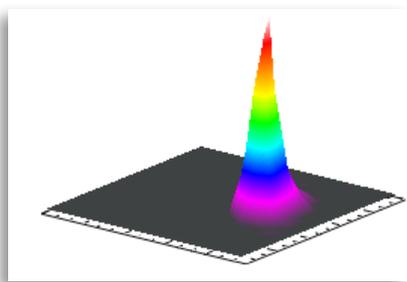
Automotive Coating: Rotary Bell Atomizer

Operating parameters:

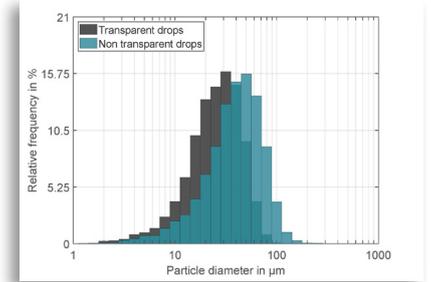
- Shaping air 1 = 250 NL/min
- Shaping air 2 = 250 NL/min
- Paint flow = 150 mL/min
- Rotationfrequency = 45,000 rpm
- Medium = Base Coat



Size, velocity & quantity



Size of transparent vs. non-transparent

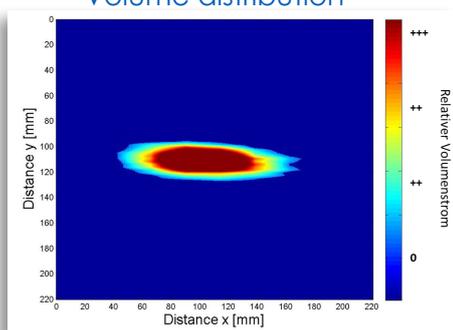


Digital Spray Pattern: Pneumatic Atomizer

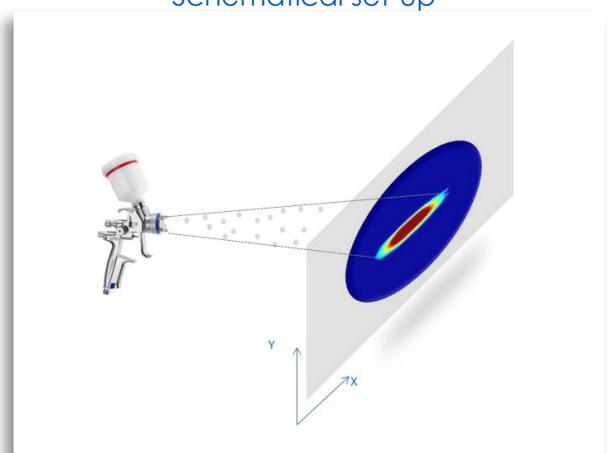
Operating parameters:

- Air pressure = 1,3 bar
- Medium = Base Coat

Volume distribution



Schematical set-up



SpraySpy® LabLine Model Specification

Model	SpraySpy® LabLine		
	LL350	LL450	LL550
Measured parameters	Droplet size Droplet velocity Number of drops	Drop size Drop velocity Detection timeline Number of drops Drop momentum Drop flux density Drop transparency ratio	
Measurement range	<ul style="list-style-type: none"> • Size • Velocity 		
Conditions			ATEX: Zone 1 & 2
<ul style="list-style-type: none"> • Explosive Atmosphere (ATEX) • HV-Application 	No	No	Yes
Repeatability			
<ul style="list-style-type: none"> • Drop size • Drop velocity • Number of drops 	1,7% 0,6% 1,5%		
Drop characteristics	Transparent	Transparent, Semi-transparent & Non-transparent	
Sampling rate	250 MS/s		
Interfaces	Ethernet, current loop, ProfiNet, others on request		
Hardware size			
<ul style="list-style-type: none"> • Measurement probe • Processing unit 	220 x 150 x 50 mm 600 x 482 x 222 mm	200 x 167 x 150 mm 600 x 482 x 222 mm	
Operating parameters			
<ul style="list-style-type: none"> • Power supply • IP-Class 	24 V / 4A IP 67 (Measurement probe)		

AOM-Systems - Your Partner for Smart Sprays

Since years, **AOM-Systems** (Advanced Optical Measurement Systems) has been involved in droplet and Spray measurements. The company has developed into a renowned address for droplet and spray measurement technology. The development of an easy to use and ATEX conform measurement technology has had a major influence on droplet and spray analytics. The latest innovation from AOM-Systems, the integrated measurement of transparent and non-transparent droplets, makes the development of sprays even more efficient and sustainable.

AOM-Systems GmbH

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