Real-time Drop Analysis for Inkjet Printing

- KRÜSS is set to showcase the new Drop Shape Analyzer – DSA Inkjet – at two inkjet conferences in Hamburg (Germany) and Louisville, KY (USA)
- Integrated printer electronics and an intuitive waveform editor for direct print head control
- Live analysis of resulting drop properties such as volume, speed and trajectory

Hamburg, March 25, 2019 – In April, KRÜSS will unveil its new Drop Shape Analyzer – DSA Inkjet, a measuring instrument for analyzing the properties and flight behavior of ink drops after exiting the print head. Presentations will take place at two parallel conferences, the *IMI Inkjet Ink Development Conference* held in Hamburg from April 8 to 11, and the *InPrint* show held in Louisville, KY (USA) from April 9 to 11.

While inkjet technology is declining in the home and office sectors, industrial applications are recording strong growth. Common problems such as drying nozzles and blurred print images also occur during large-scale use and cause considerable costs. During ink development and quality assurance, the interaction between the print head control and the ink must therefore be perfectly adjusted and monitored. The DSA Inkjet was specifically designed for this task. With its integrated printer electronics, it communicates directly with the print head installed in the instrument and analyzes the ink drops in real time.

Innovative technology for drop imaging and analysis

Once the print head has been inserted into the instrument in a just few simple steps, the intuitive waveform editor realistically simulates the electronic control in a printing process. The microscopic lens depicts the drop beam in a sharp and high-contrast manner. The DSA Inkjet uses an imaginative method to precisely analyze ink drops of just a few picoliters at flight speeds of up to 40 m/s: Two different-colored light flashes in swift succession provide double exposure of the drop in a single color camera video image. By separating the color channels, discrete images of the same drop are obtained at intervals of a few microseconds.

This method opens up unprecedented opportunities for capturing the drop flight live, automatically analyzing the drops and obtaining result parameters that are relevant for the print quality. To name but a few examples, the software-controlled measurement provides mean values for the drop's volume and speed, trajectory (deviation from the vertical), length of the ligament and the number of drop parts, which is important when satellite drops occur. The data is generated as direct feedback on the dynamically adjustable print parameters and is particularly suitable for checking an ink or optimizing the printing process. Easy-to-create automation programs also enable measurements under repeatable conditions to test ink formulations in a standardized manner.

Observing the nozzles and automatically determining the image scale

Wetting the print head during printing can deflect the drop jet and clog the nozzles by drying out. A separate lens observes the nozzles from below to make unwanted ink drops visible on the rows of nozzles. Another innovative development makes it easier to measure real drop dimensions such as volume or ligament length. The image scale is automatically determined with the aid of a calibration grid regularly projected into the camera image. This eliminates the need for image calibration when changing the zoom, saving time and ensuring reliable results.

Thoughtful construction for practical suitability

The DSA Inkjet is designed for easy, versatile, and safe use. Inserting the print head and focusing on individual nozzles is a matter of a few simple steps thanks to the 3D fine positioning. The instrument is also equipped with a storage tank to supply the print head with ink during long-term measurements, whereby the drops are collected in a waste container. A suction device prevents exposure to harmful vapors. Thanks to a UV protection cover, UV-curing inks such as those used for 3D printing can also be examined.

Photo

Drop Shape Analyzer – DSA Inkjet for real-time analysis of ink drops

About KRÜSS

Advancing your Surface Science. As specialists in interfacial chemistry and the world's leading supplier of measuring instruments for surface and interfacial tension, we not only provide high quality product solutions – our offer is a combination of technology and scientific consulting. These include seminars and technical service as well as our Applications & Science Center for trainings and professional measurement services. Our exclusive distribution network and our locations in Hamburg (Germany), China, the US, Great Britain and France allow us to provide fast, flexible support for R&D labs and in quality control throughout the world. Our expertise, precision and passion have already convinced many prestigious companies in countless industries.

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