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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 47122.1-2026

**Printed electronics - Inkjet printing equipment - Part 1: Imaging
based measurement of jetting speed**

印刷电子 喷墨印刷设备 第1部分：基于成像的液滴喷射速度测量
(English Translation)

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Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document is Part 1 of GB/T 47122 "Printing Electronic Inkjet Printing Equipment". GB/T 47122 has published the following...

part.

---Part 1: Imaging-based measurement of droplet ejection velocity;

---Part 2: Imaging-based Droplet Volume Measurement;

---Part 3: Imaging-based measurement of droplet orientation.

This document is equivalent to IEC 62899-302-1:2017 "Printed electronics - Part 302-1.Devices for inkjet imaging-based droplet printing".

"Jet speed measurement".

The following minimal editorial changes have been made to this document.

---To align with existing standards, the standard title has been changed to "Printing Electro-Inkjet Printing Equipment Part 1: Imaging-Based Droplets" "Jet speed measurement".

Please note that some content in this document may involve patents. The issuing organization of this document assumes no responsibility for identifying patents.

This document was proposed by the China Machinery Industry Federation.

This document is under the jurisdiction of the National Technical Committee on Standardization of Printing Machinery (SAC/TC192).

Introduction

Inkjet technology uses micro-nozzles to precisely eject droplets of ink. During the printing process, these droplets are patterned and ejected onto a substrate.

Inkjet technology is a mature technology that has been widely applied in home, commercial, and industrial sectors. When using inkjet technology, the droplet volume can be precisely controlled.

The droplets can be controlled to a precision of 0.1 pL. Furthermore, the droplets can be transferred onto the substrate with an accuracy down to the micrometer (μm) level. Due to these and other properties, the spray...

Ink technology has become one of the most powerful tools in fields such as electronic device patterning, drug formulation, and high-precision industrial applications. Compared to traditional photolithography...

The process differs; patterned inkjet technology in the electronics field is an additive manufacturing process that allows the addition of multiple layers of patterns without removing any already deposited material.

Therefore, inkjet technology significantly reduces the waste of often very expensive materials, and is also more environmentally friendly. GB/T 47122 aims to provide...

A standard inkjet measurement method is proposed to consist of five parts.

---Part 1: Imaging-based measurement of droplet ejection velocity. The aim is to establish a method applicable to measuring droplet ejection velocity using droplet analysis systems.

A method for determining inkjet droplet velocity by visualizing droplet images.

---Part 2: Imaging-based Droplet Volume Measurement. The aim is to establish visualizations applicable to droplet analysis systems.

A method for determining inkjet droplet volume using droplet images.

---Part 3: Imaging-based measurement of droplet orientation. The aim is to establish visualizations applicable to droplet analysis systems.

A method for determining the orientation of inkjet droplets using droplet images.

---Part 4: Media for Inkjet Printing Dot Position Evaluation. The aim is to establish a suitable medium for measuring inkjet dots in printed electronics applications.

The media measurement methods and specifications for actual placement effects.

---Part 5: Key Characteristics of Inkjet Printing. The aim is to establish key characteristics applicable to inkjet printing for printed electronics.

Features, parameters, and system properties are required.

As the applications of inkjet technology continue to expand, it is necessary to more precisely eject a wider variety of materials from the inkjet head. For new and...

Traditional applications require accurate measurement of the droplet state ejected from the inkjet printhead in order to assess and control the ejection behavior. In inkjet manufacturing...

Vision-based measurement techniques are widely used in the system because visual images provide an intuitive understanding of flight behavior. (From droplet diagrams...) Among the jetting performance parameters obtained, droplet jetting velocity and droplet volume are the two most frequently measured parameters.

By using information about inkjet droplet formation and properties obtained through vision-based measurement systems, developers can adjust ink formulations.

And injection parameters to improve performance.

However, please note that since there is no standard measurement procedure, the measured injection performance and evaluation results may vary depending on the measurement method used.

There can be significant differences. Due to the lack of fair testing methods, process engineers may find it difficult to evaluate the ink and inkjet printhead manufacturers' offerings.

The lack of proper inkjet performance data tables can lead to potentially unreliable results. Therefore, the purpose of this document is to provide a standard inkjet measurement...

method.

Printing electronic inkjet printing equipment Part 1: Imaging-Based Measurement of Droplet Ejection Velocity

1 Scope

This document specifies a method for determining inkjet droplet velocity using visualized droplet images obtained from a droplet analysis system.

This document applies to on-demand inkjet printing, not continuous inkjet printing.

This document includes the testing process, image processing software algorithms, and jetting behavior analysis.

2 Normative references

This document has no normative references.

3 Terms and Definitions

The following terms and definitions apply to this document.

inkjet printing

A digital printing method that creates images by spraying ink droplets onto a substrate.

droplet analysis system A vision device that can both image and measure inkjet droplets.

drop speed

The distance divided by the time it takes for the droplet to travel that distance.

drop delivery speed

The total distance between the inkjet printhead nozzle plate surface and the substrate (measurement position), divided by the distance between jet triggering and droplet arrival at the measurement position.

The time interval.

drop trajectory

The direction of droplet travel is usually described by the angle between the droplet and the nozzle plate.

Drop repeatability

The identical state of each droplet ejected from the nozzle.

Note: Droplet repeatability is typically visualized by displaying individual droplets, one droplet per