White Paper
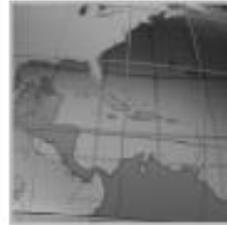
January 2015

Expanding the Production Capabilities of Inkjet

The KBA RotaJET L Series

Service Areas

On Demand Printing & Publishing

On Demand Printing &Publishing Europe

Color Digital Label & Packaging

Functional & Industrial Printing

Comments or Questions?

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A Questex Company

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Executive Summary

KBA's RotaJET is a production color inkjet platform built by a company with decades of experience in production printing with both web-fed and sheet-fed presses. Begun as a collaboration with the commercial printer R.R. Donnelley, RotaJET benefits from real-world experience, German engineering, application flexibility, and environmental sensitivity. Poised for success in a range of print applications, the RotaJET architecture brings the benefits of digital to the high productivity levels of traditional presses.

Key Findings

- **Robust platform** – Validated through the development of the RotaJET 76, KBA has created a robust platform for the new RotaJET L series, offering web widths ranging from 89 to 130 centimeters (approximately 35 to 51 inches) and supporting a wide range of print applications.

- **Web handling** – As roll-fed inkjet systems take on higher levels of productivity and use wider webs, the complexities of paper transport (including the handling of heavy rolls) can become overwhelming. KBA's experience with large-format roll-fed traditional presses puts it in an ideal position to support the high-volume evolution of inkjet printing.

- **Flexibility** – The RotaJET L platform has been designed with flexibility in mind. Specifically, it offers wide web support for varying formats, which is important in general commercial print or any environment where a range of applications are being printed. Upgrades can convert a monochrome device to color. Customers can also upgrade the print width of narrower models up to 130 centimeters (51 inches). Both types of upgrades can be done on site.

- **Efficiency** – RotaJET's ability to produce sellable print not only at full speed but also during ramp up and ramp down significantly reduces paper waste and improves productivity during change-overs.

- **Environmental sensitivity** – KBA's RotaJET has passed the stringent INGEDE guidelines for deinkability, which is key in assuring the recyclability of paper printed with inkjet inks.

Recommendations for Those Acquiring an Inkjet System

- Consider the implications of high productivity when you invest in an inkjet system. Substrate range, automated roll handling, and application flexibility all have an impact on a system's ability to meet your environment and application needs.

- Choose a system vendor that understands the requirements of your print applications. The success of an inkjet system requires much more than just innovative printing technology.

- Carefully evaluate each system vendor's paper strategy. Paper is a key component of overall cost, and access to application-appropriate substrates is one of the most critical success factors for any inkjet system. This includes an environmental strategy that takes paper recyclability and deinkability into account.

Introduction

KBA first showed RotaJET at drupa in 2012. This followed the 2011 announcement of a development collaboration with R.R. Donnelley. Right before Graph Expo 2014, KBA announced the RotaJET L series, a flexible inkjet platform suitable for a range of high-volume print applications. In this KBA-sponsored white paper, InfoTrends will examine the RotaJET platform and explore the implications for the production print market.

About KBA

With its international headquarters in Würzburg, Germany, Koenig & Bauer AG (KBA) has a rich history going back 200 years to the first steam-driven newspaper press. Today, the company's products include commercial and newspaper web presses, sheet-fed offset presses, flexographic presses, specialty presses (for currency, securities, metal-decorating, smart cards, glass, and plastic decorating), and inkjet systems like RotaJET. KBA's offset press brands are very familiar to print service providers. These include Genius and Rapida for sheet-fed offset; Cortina, Continent, Comet, and Commander for web offset newspaper presses; Compacta commercial web offset presses; and Evo/Flexotecnica for flexographic presses. Particularly relevant for roll-fed inkjet is KBA's Patras brand for integrated paper logistics for newspaper and commercial presses. Leveraging Patras for RotaJET is one of the key advantages that KBA brings to the production inkjet market.

Setting the Stage at drupa 2012

The world first saw RotaJET at drupa in 2012. Targeted at the production of four-color books, brochures, commercial products, mailings, and magazines, KBA's first iteration of RotaJET had a maximum web speed of 150 meters per minute (493 feet per minute) and handled web widths up to 780 millimeters (30.7 inches). Measured in A4 page equivalents, this resulted in productivity of approximately 3,000 A4 pages per minute (or 85 million pages per month). The system used water-based pigment inks, drop-on-demand piezo inkjet heads, and a tight web configuration with an unwind and infeed unit that were designed specifically for RotaJET. The product's design also supported duplex printing, but without having to use turn bars. This design consideration allows better tension control and precise web handling. It also makes it easier to support thin and heavy substrates. In the case of heavier substrates, this design means that they do not have to be flexible enough to bend around a turn bar. Automatic web control and an automated roll unwind unit with integration into KBA's paper logistics system provide additional productivity benefits. One other important aspect of RotaJET is its ability to produce sellable print as the device ramps up to full speed. (The same holds true as the device slows down.) Not all inkjet devices are capable of this, and it is an important differentiator since it significantly reduces the amount of paper waste and makes for faster job change-overs.

The RotaJET 76 print engine leverages two arrays of 56 inkjet heads each (for a total of 112 heads). The system's spatial print resolution is 600 dots per inch and the quality is enhanced through 2-bit variable droplet size. RotaJET uses the Job Definition Format (JDF) standard and an Adobe PDF Print Engine (APPE) workflow.

The KBA RotaJET 76 configuration shown at drupa 2012 included Müller Martini's SigmaLine digital production system with a SigmaFolder variable-format section folder module and a Primera Digital saddle stitcher system for applications such as magazines and brochures. As demonstrated by its collaboration with Müller Martini, KBA is well-connected with the leading solution providers and frequently partners with them to meet its customers' finishing needs.

The RotaJET 76, commercially available since May 2012, has been enhanced since then with improvements to the RotaColor inks, the XLO RIP front end system, and the finishing options.

The RotaJET Platform

With the announcement shortly before Graph Expo 2014, KBA's RotaJET platform has expanded to include two versions: M and L. The existing RotaJET 76 is now labeled the 'M' version, while the new 'L' versions encompass some of the widest production digital print systems available on the market today. We will start with an overview of the new RotaJET L series.

Figure 1: KBA RotaJET 130

The RotaJET L series is built on a modular platform and consists of five models that handle maximum web widths ranging from 895 to 1,300 millimeters (35.2 to 51.1 inches). Custom models such a RotaJET 160 (160 centimeters/63 inches) or even larger are available on request. All RotaJET models are intended for a range of applications including monochrome and color books, direct mail, magazines, newspapers, and single-sided industrial printing. They can be configured as one- to four-color simplex or duplex systems, and are upgradable in terms of number of colors and print format. (These upgrades can be performed at the customer site.) Given that the web widths are comparable to existing offset printing presses, KBA expects them to be easy to integrate into existing offset environments.

The specifications for the five L Series models plus the RotaJET 76 M Series are shown in the table below.

Table 1: RotaJET L and M Series Model Comparison

Description	RotaJET 130	RotaJET 123	RotaJET 112	RotaJET 100	RotaJET 89	RotaJET 76
Series	L	L	L	L	L	M
Web width (max.)	130 cm / 51.18 in.	123 cm / 48.43 in.	112 cm / 44.09 in.	100 cm / 39.37 in.	89.5 cm / 35.24 in.	80 cm / 31.50 in.
Web width (min.)	65 cm / 25.59 in.	61.5 cm / 24.21 in.	56 cm / 22.05 in.	50 cm / 19.69 in.	45 cm / 17.72 in.	30cm / 11.81 in.
Print width (max.)	129.3 cm / 50.9 in.	122.5 cm / 48.23 in.	111.3 cm / 43.82 in.	100 cm / 39.37 in.	88.8 cm / 34.96 in.	77.6 cm / 30.55 in.
Speed (max. in meters & feet per minute)	150 mpm / approx. 500 fpm	150 mpm / approx. 500 fpm	150 mpm / approx. 500 fpm	150 mpm / approx. 500 fpm	150 mpm / approx. 500 fpm	150 mpm / approx. 500 fpm
Resolution	600 x 600 dpi / 2-bit	600 x 600 dpi / 2-bit	600 x 600 dpi / 2-bit	600 x 600 dpi / 2-bit	600 x 600 dpi / 2-bit	600 x 600 dpi / 2-bit
Duty cycle (in A4 pages per month)	175 million	145 million	145 million	116 million	116 million	85 million
Applications	Books, news-paper, direct mail, and industrial	Books	Some specialty appl-ications, including industrial	Some specialty appl-ications; good fit for DIN A5 format	16 page web offset market, 4-up, books, and direct mail	Books and news-papers
Dryer	Infrared & warm air	Infrared & warm air	Infrared & warm air	Infrared & warm air	Infrared & warm air	Infrared & warm air
Upgradability	Next-generation heads; mono to color	Next-generation heads; width; mono to color	Next-generation heads; width; mono to color	Next-generation heads; width; mono to color	Next-generation heads; width; mono to color	Mono to color

All of the L series products come standard with the Paper Logistics Patras M (manual reel logistics system) and the KBA AutoSplicer, which supports reel diameters up to 1280 millimeters (50.4 inches) and supports automatic webbing up and fully automated web tension control. (Note: Patras M and AutoSplicer are options on the M Series.)

Figure 2: Customized RotaJET Configurations Are Possible

Also available as options on the M and L Series are:

- KBA Patras A – A fully automatic reel logistics system

- RotaColor Control Station – This is a pre-coater that applies a priming solution called RotaColor Control Fluid, which enhances print quality and improves paper recyclability. (See more on deinkability below.)

- DFE Expansion Kit

- KBA Turret Rewinder

The RotaJET M and L series have some aspects in common. They use the same RotaColor aqueous pigment polymer inks, benefit from features like web tensioning and the ability to upgrade on site from monochrome to four-color, and they all offer variable cut-off. The RotaJET L series is differentiated from the M Series by the ability to upgrade to support a web of up to 130 centimeters (51.18 inches). The L Series uses the latest printhead technology and is designed so that future developments in inkjet head technology can be leveraged as they become available.

Figure 3: Side-by-side Comparison of RotaJET L Series Upgradability Partial-width Monochrome (left) and Full-width Process Color (right)

The Importance of Web Handling in an Inkjet System

KBA has extensive expertise in handling, loading, printing, and stockpiling paper rolls in production environments. As rolls get wider (and heavier), this becomes more and more important. KBA's experience with features like Auto Splicing and the Patras integrated paper logistics system is transferable to inkjet systems like RotaJET.

The importance of web handling can be seen in how KBA controls and adjusts the web tension. This begins at the unwinder and continues with a tight web throughout the press. One important benefit of the tight web is that it facilitates the ability of the system to run at variable speeds. This allows the system to print accurately during ramp up and slow down, which contributes to reduced paper waste.

An auto webbing up feature, integrated paper logistics, and the unwind reel stand all contribute to enhanced productivity. The optional unwinder, part of KBA's offset offerings, supports roll weights of up to 1.3 tons. Managing rolls is also facilitated through KBA's Patras logistics capabilities. With the RotaJET L Series, roll changes can be made on the fly. In addition, the design of the RotaJET L series facilitates its support of substrates as light as 36 gsm and as heavy as 250 gsm. Support for lighter and heavier stocks beyond this range can be implemented in collaboration with KBA's development team.

Figure 4: KBA AutoSplicer

The Paper Recyclability

Environmental friendliness is tremendously important, and part of that is assuring that products printed on inkjet systems can be recycled. Print from offset print and many other traditional print processes can be recycled relatively easily using existing deinking methods. Dry toner-based (electrophotographic) digital printing systems generally have good characteristics for deinkability, but unfortunately that has not always been the case for inkjet systems, particularly those using dye-based inks (which may bleed and stain the recycled paper fibers and contaminate the water used in deinking). Just before IPEX in London earlier this year, INGEDE (the International Association of the Deinking Industry) announced that it had lab tested KBA's RotaJET inks and found them to be "good deinkable" on standard uncoated newspaper stocks.

KBA notes that its RotaJET inks use a water-based (aqueous) polymer pigment ink and that the polymer stops the pigments from bleeding into the paper fiber. It holds the pigments together, which improves color quality and density and aids recyclability. KBA also offers a solution called RotaColor Control Fluid that improves deinkability even further; this fluid can be applied via a control station that sits ahead of the printing unit and expands the range of supported stocks. This contributes to the environmental benefits and is the underlying factor behind the positive INGEDE test results. KBA holds a leadership position among the inkjet printing system vendors in this aspect as one of the few inkjet vendors receiving a "good deinkable" result from INGEDE testing. When using KBA's RotaColor Control Fluid, the deinking results improve further and are considered "excellent" by INGEDE.

InfoTrends' Opinion

With the RotaJET L series, KBA has applied its expertise to production digital printing. The implementation of KBA's RotaJET portfolio takes into account the application needs of the highest volume printers in the marketplace, bringing the automation efficiencies of production digital print into new application areas. This combines the best of traditional and digital print and brings mass customization and just-in-time manufacturing capabilities into high-volume press rooms, providing additional benefits such as immediate change-overs, more flexible use of color, significantly less paper waste, simplified operation, flexible cut-offs (allowing different formats on the same width roll), and very consistent color registration. All of this signals a new era in high-volume production digital printing.

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