Print Quality vs. Print Resolution

In the last few months, inkjet label printing has been at the center of an almost ideological debate about which print head technology achieves a better print quality. The assessment and any conclusions about the print quality, though, are based entirely on the native resolution of the printheads. Such an evaluation, based only on printhead specifications is not representative and resembles the PC marketing strategy of the 1990's, where the focus was placed solely on processing power, and not on the overall performance of the PC.

This strategy was later adopted by digital photography, where 40-mega pixel cameras would allegedly produce the better image. Print quality is effectively an arrangement of different parameters, such as printhead control, the most suitable ink, the print substrate, the correct material transport and of course the resolution. This in turn is subject to machine specification and configurations by the manufacturer.

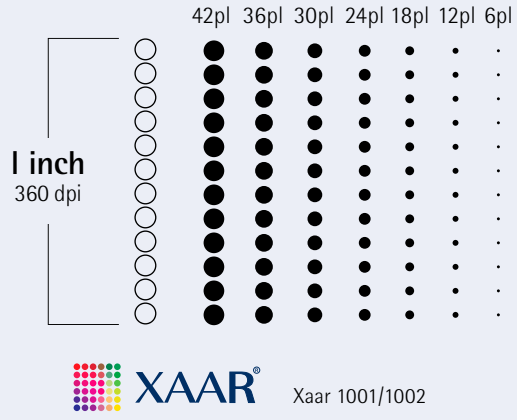
Printheads and Modifications

Currently there are two main printheads for digital inkjet label printers: The Xaar 1001 and the Kyocera KJ4A. The default printhead base-specifications are:

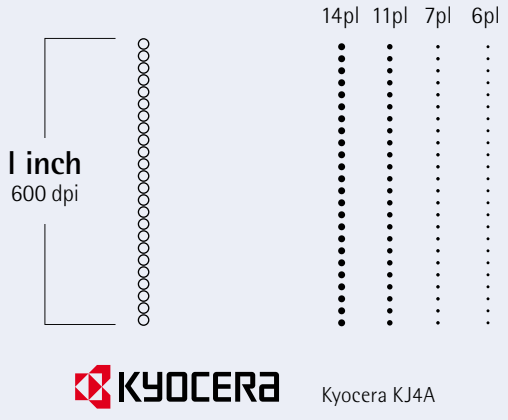
Features	Xaar 1001/1002	Kyocera KJ4A
DPI	360	600
Nozzles	1000	2656
Rows	2	16
kHz	6	20
Speed	25m/min	50m/min
Min drop size	6pL	6pL
Greyscale	8 levels 6–42pL	5 levels 6–14pL
Ink compatibility	UV	UV and water (KJ4B)
Ink viscosity range	7–25mPas	7–8mPas
Print width	70.5mm	108.25mm
Dimensions (WxDxH)	125 x 31 x 61mm	200 x 25 x 59.3mm

When only the specified resolution is assessed, the Kyocera KJ4A outperforms the Xaar 1001/1002.

Greyscale or drop sizes



Greyscale or drop sizes

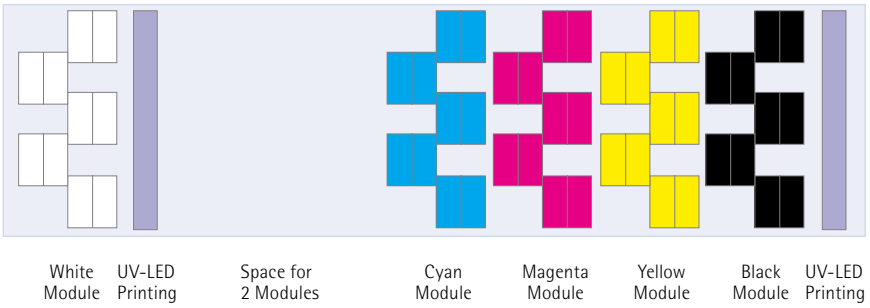


When only the specified resolution is assessed, the Kyocera KJ4A outperforms the Xaar 1001/1002, because it achieves a higher resolution for both print directions (cross and process directions). As previously mentioned, the key to performance is the alignment and modification of the printheads in the print ing machines.

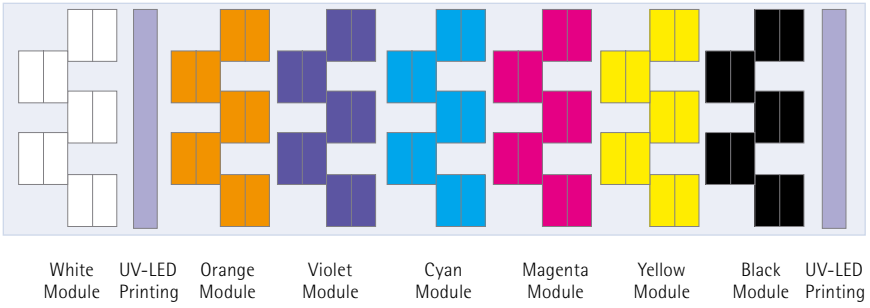
As early as 2008, Durst incorporated 2 Xaar printheads per color into the inkjet label printer Tau 150 8C to double the droplet-frequency and apply the ink with µm-precision. Later on, this design was refined and used in the Tau 330.

Printhead alignment in the Tau 330 UV Inkjet Printer

CMYK + White



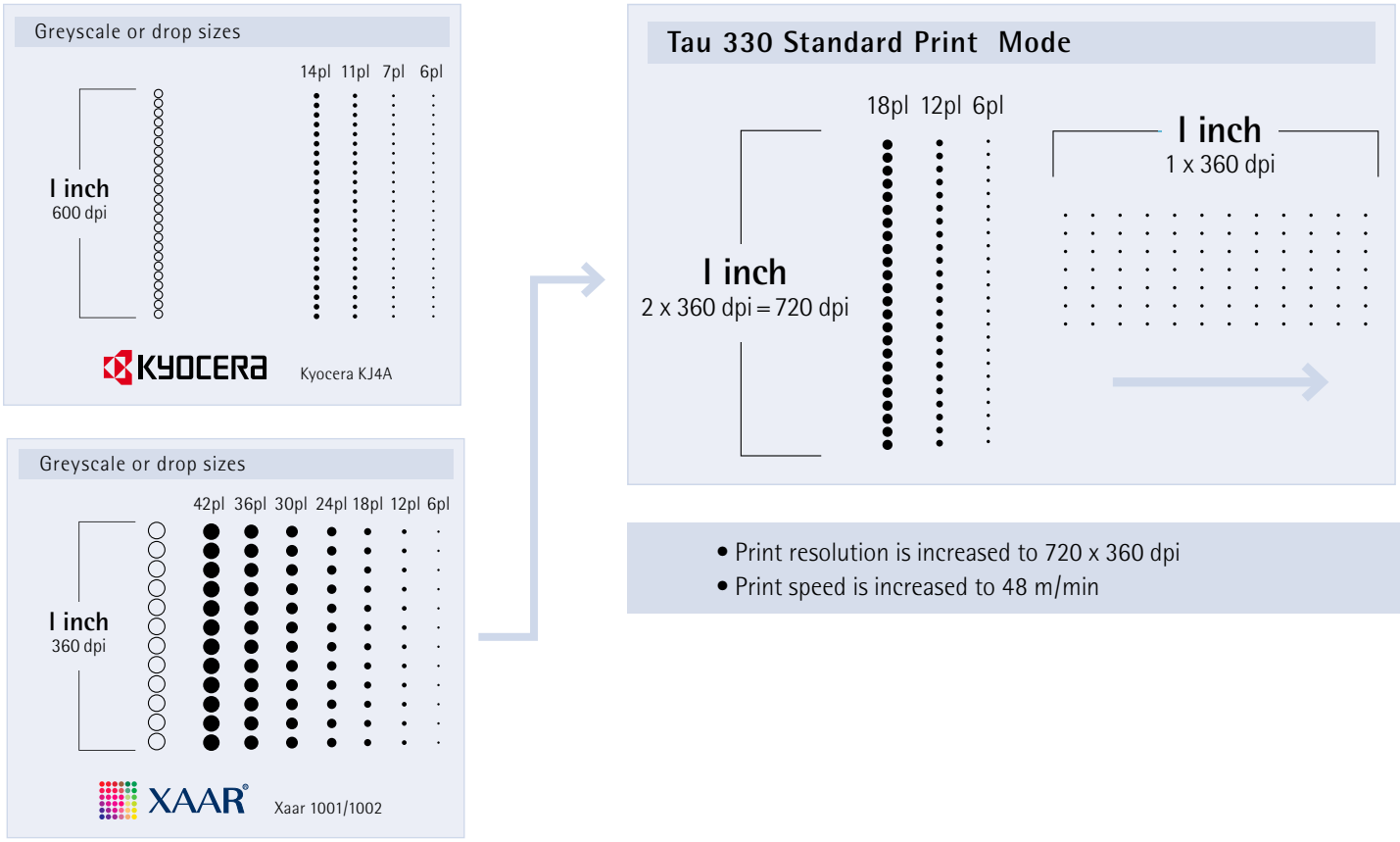
CMYK + White + O/V



This results in an improvement of the print resolution, both cross and process print directions, to native 720 dpi, and an increased print speed of 48 m/min.

This configuration and modification of printheads was soon adopted by other print machine manufacturers, albeit with limited success, because Durst's design of print bar architecture requires highest precision in the manufacturing process.

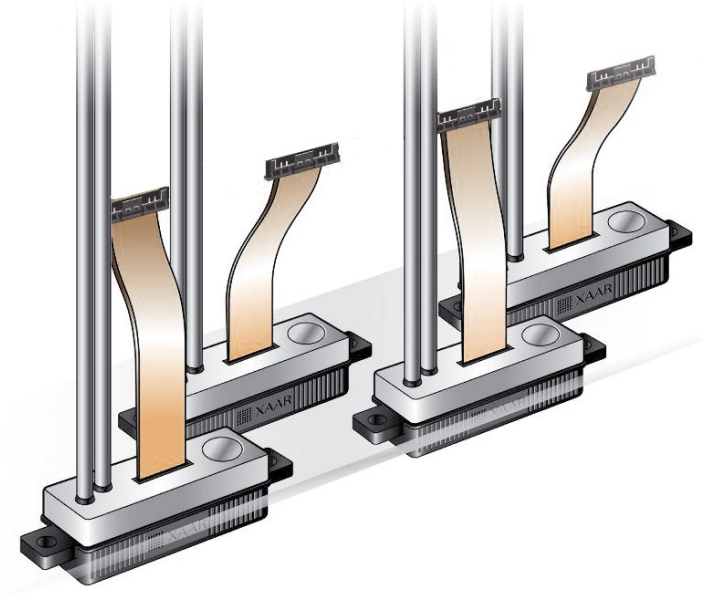
Native Printhead Resolution



- Print resolution is increased to 720 x 360 dpi
- Print speed is increased to 48 m/min

Durst print bar architecture enables users to benefit from the advantages of Xaar 1001 printheads, without compromising the print resolution and print speed. Compared with the Kyocera, the Xaar 1001 can print a highly-pigmented opaque white and can jet low-migration UV-inks, as well as additional process colors.

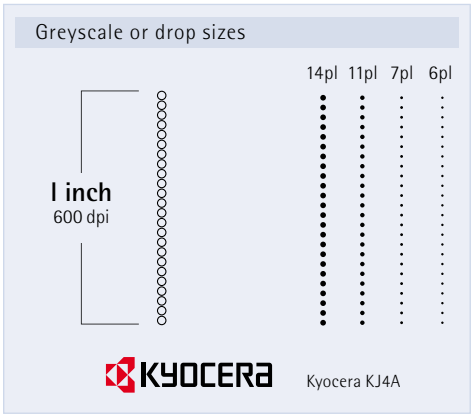
The Xaar 1001 also features ink circulation in all ink circuits, which results in higher reliability and less maintenance. In the event of a printhead exchange, customers will profit from lower prices, because fewer nozzles will have to be replaced (Xaar = 1000 nozzles, Kyocera 2656 nozzles).

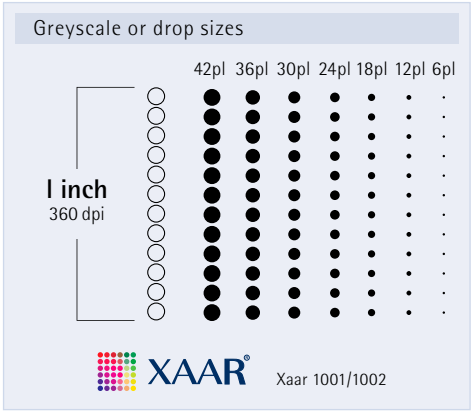


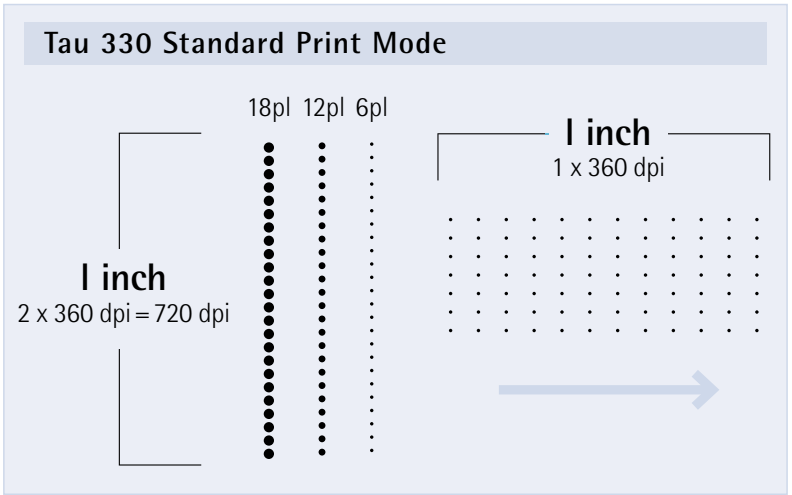
The new Tau 330 High Definition Print Mode

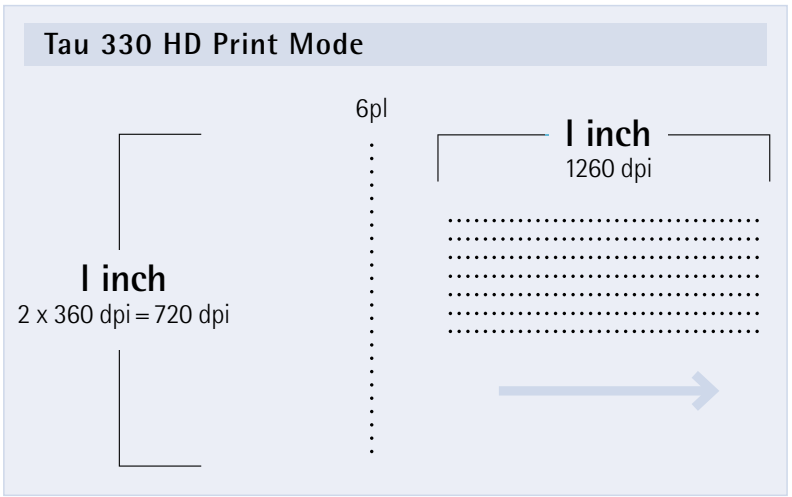
The Durst Tau 330 now comes with a new print mode, with a very high print resolution of 720 x 1260 dpi. It achieves a very good and pin sharp reproduction of texts, finest details of graphical elements, clear gradients and soft skin tones.

Native Printhead Resolution









Binary print vs. Greyscale technology

Inkjet label printing offers two print modes: binary print and greyscale technology. In binary print, the droplet size remains constant, there is only one droplet size. Therefore, binary print provides the only true comparability of dots per inch (dpi).

In greyscale print the ink droplet size varies, to create a more pleasing and photo-realistic image. Greyscale technology can therefore "compensate" for the lower resolution of a printhead.

Tau 330 Standard Print Mode

- Resolution 720 x 360 DPI
- Uses 3 variable droplet sizes
- Print speed: 48 m/min
- Up to 7 colors

Tau 330 HD Print Mode

- Resolution 720 x 1260 DPI
- Binary print with smallest droplet size
- Print speed: 35-40 m/min
- Up to 7 colors

Appendix: The new Xaar 1002 GS6

The new Xaar 1002 GS6 Printhead features 1000 optimized geometry nozzles. This significantly improves drop volume and drop placement accuracy as well as providing high print uniformity across the entire print width. The Xaar 1002 is easy to handle and integrate. It offers enhanced connectivity and is backwards compatible with the Xaar 1001.

The technical specifications, as well as the physical dimensions are identical to the Xaar 1001, with a resolution of 360 dpi and a print speed of 24-25 m/min.

From the middle of may 2014, Durst will incorporate the new Xaar 1002 GS6 Printhead in the Tau 330 label press.

Learn more about
Durst Labels & Package Printing

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