

Excellence Award in 2001 Nikkei Outstanding Products and Services Awards Nikkei Business Daily Award

Polyimide resin belt in color transfer mechanism improves printing speed and resolution

== Date of Award ==

February 26, 2002

== Features of Award ==

The award is presented each year to particularly outstanding new products and new services. Nominations are not by open invitation; instead the Nihon Keizai Shinbun selects candidate products and services independently. The award winners are designated by a review committee and are announced in the newspaper.

== Reason for Award and Product Outline ==

The chief reason for the award was named as the use of large-diameter seamless semiconductive polyimide belts to realize high-speed operation (around 10 times existing speeds), higher image quality, and lower maintenance in full-color printers and copiers.

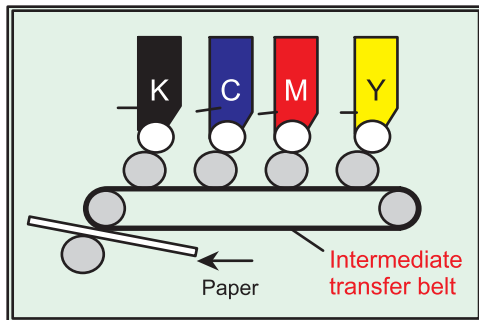
The year of the product's commercialization was termed Color Year Zero because of the switch at the time from black-and-white to color operation.



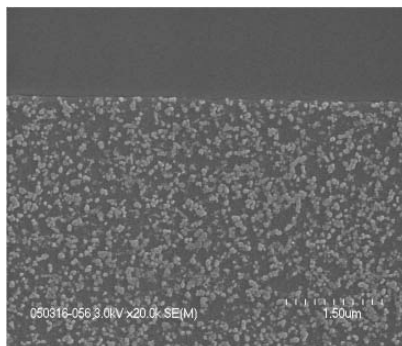
Polyimide belts

The development of the product was well timed to coincide with this. By establishing manufacturing technology able to produce a large belt with a diameter of 300~400mm, free of seams, of uniform thickness (no more than 5% variation in thickness of each belt) with good precision in circumferential dimensions (variation in circumference $\leq 0.5\text{mm}$) and with no surface defects, it became possible to create an intermediate transfer belt system arranged four color developing units in tandem, which contributed to realizing high-speed operation.

High image quality was achieved by new development of technology to reduce the coagulation of the carbon black and achieve even dispersion, thereby enabling precise control (variation of no more than one unit) of electrical resistance values in the semi-conductivity range (surface electrical resistance value $10^9\sim 10^{13}\Omega/\square$), which had previously been thought very difficult. Additionally, application of Nitto Denko proprietary synthesis technology allowed the synthesis of a high-precision high-durability polyimide resin which made possible low-maintenance characteristics.



Cross-sectional diagram of printer with intermediate transfer belt



Dispersion of carbon black in semiconductor polyimide belt