The Basics

Laser Printer Image Formation

Basic laser theory is the foundation on which a tech's knowledge is built.

1 Computer Converts Print Job, Sends to Formatter
When you hit the "print" button, the print software on the computer converts the data into a page description language and sends the print job to the formatter board in the printer.
Page Description Languages include: Adobe PostScript (PS), HP Printer Command Language (PCL), and Microsoft XML Page Specification (XPS).

2 Formatter Processes Job, Sends to DC Controller
The formatter separates the print job into image location information and print process instructions. It stores image information in memory until the DC controller requests it.
The DC controller synchronizes image formation with input and output, and also signals the formatter to send print data.

3 Conditioning: Drum Gets a Negative Charge
Inside the toner cartridge, the photoconductive drum is cleaned of toner by a rubber blade and receives an even, negative DC charge from the charge roller.
Before the drum is charged, a dose of AC bias is applied to the charge roller to eliminate residual images.

4 Writing: Laser Discharges Areas of Drum
Tiny areas of the photosensitive drum are exposed to a laser beam.
The exposed areas have no charge and form an invisible image.
The images on the drum and on the printed page consist of horizontal rows of closely spaced dots. On a 1,200 dpi printer, the dots would be 1/1,200 of an inch.

5 Developing: Toner Sticks to Discharged Drum Areas
Negatively charged toner particles attach to areas of the drum discharged by the laser.
The toner particles get a negative charge from the developer roller. Since like-charged objects repel each other, the toner does not adhere to the negatively charged parts of the drum, but only to the discharged areas.

6 Transferring: Toner attracted to charged paper
The transfer roller adds a positive charge to the back of the paper, attracting the toner from the drum to the page.

7 Fusing
Pressure and heat bond the toner on the drum to the paper.
The rubber lower pressure roller and the hot upper roller sandwich the page to fuse the toner.