

# Print on Demand Versus Offset Printing

Contributed by Sid Smith  
Sunday, 09 July 2006  
Last Updated Sunday, 09 July 2006

Talk to someone who has only used offset printing, and they'll swear that print on demand is for amateurs. Print on demand advocates, on the other hand, will tell you that offset printing is a waste of money. Who's right? As it turns out, neither is right. These two primary methods for printing a book will be around for some time. Isn't it about time you learned the difference between them and the advantages and disadvantages of each?

## Print on Demand Versus Offset Printing

On this site we talk quite a bit about print on demand, and we compare it to offset printing. This article provides a brief description of the two processes, and the advantages/disadvantages of each.

More detailed information about the offset printing process described below can be found at How Things Work ([www.howthingswork.com](http://www.howthingswork.com)).

## The Printing Process

There are nine main types of printing processes:

- Offset lithography - what we are exploring in this article
  
- Engraving - think fine stationery
  
- Thermography - raised printing, used in stationery
  
- Reprographics - copying and duplicating
  
- Digital printing - used for Print on Demand publishing
  
- Letterpress - the original Guttenberg process (hardly done anymore)
  
- Screen - used for T-shirts and billboards
  
- Flexography - usually used on packaging, such as can labels
  
- Gravure - used for huge runs of magazines and direct-mail catalogs

Most books printed by traditional publishers and many self-publishers use the offset lithography process. It wasn't long ago that everyone considered the quality of offset printing to be vastly superior to digital printing. But all of that has changed. Recent advances in digital printing have helped them catch up in quality, although it may be years before they can match the price points of offset printing.

How Things Work: "Offset lithography works on a very simple principle: ink and water don't mix. Images (words and art) are put on plates (see the next section for more on this), which are dampened first by water, then ink. The ink adheres to the image area, the water to the non-image area. Then the image is transferred to a rubber blanket, and from the rubber blanket to paper. That's why the process is called "offset" -- the image does not go directly to the paper from the plates, as it does in gravure printing."

With offset printing, the document must be converted to film and "plates." While these film negatives might be created from digital files, this is different from digital printing. The images are transferred to the printing plates, and when the plates are exposed to light, a chemical reaction occurs that allows an ink-receptive coating to be activated. This results in a transfer of the image from the negative to the plate.

These printing presses can be quite expensive because of the cost of the plates (made from aluminum). Thus, they get economies of scale by printing thousands of copies of a book at once. They want to use those plates as much as possible to keep the cost per book down. It would be cost prohibitive to print one or a few books after creating these plates.

And, to top it off, each of the four primary colors (black, cyan, magenta, and yellow) must be on a separate plate. [This is what is called the four-color printing process]

The paper is fed through the machine as one giant roll, then cut to size after printing. While they can also use individual sheets, they won't get the same cost savings as they do from using large rolls.

## Print on Demand

With digital printing (print on demand), the book is stored in digital format (PDF, Postscript, or TIFF, typically), and printed one at a time. A single copy of a 300 page book can be printed in less than one minute and bound in less than five minutes. Try that with your ink jet printer at home.

Most print on demand printers are what are called Electrographic printers. These are essentially laser printers that fuse toner on paper. Now, the big guys, especially Lightning Source, which has printed well over 30 million books, use high-end printers, such as the IBM Infoprint 4100 series.

The Infoprint 4100-HD1/HD2 and 4100-PD1/PD2 printers are continuous-forms printers (not cut-sheet) that use laser and electrophotographic technology to print text, images, graphics, and bar codes at up to 762 ipm (impressions per minute).

That's fast.

Advantages and Disadvantages of print on demand versus offset printing

This part is really quite simple. Offset printing relies on big rollers that can print books at an extremely high rate. The cost per book is four to ten times less than the cost of printing one book with digital printers. They can print more books at a fast rate and at a lower cost.

When you need a couple thousand books, you'll find offset printers who will do it for less than a dollar a book. Order more books at one time, and your cost will go down. If you can find an offset printer who will do an order for less than 1500 books, you won't save much money over digital (print on demand) printing.

One print on demand book from Lightning Source (paperback, about 250 pages) will cost you about \$3.00. Ten books will cost you \$30.00. One thousand books will cost you \$3,000. Get the point? The cost is the same whether you order one or five thousand books.

But - and this is important - you CAN order just one book.

For the beginning author, print on demand has been a major blessing. Finally, you can get your book published without mortgaging your house (which has been known to happen!) This is why you'll see even the big traditional publishers using digital printing for book reprints, which are done in much smaller quantities. As you can see, offset printing will be around for some time - at least until someone figures out how to dramatically reduce the cost of digital printing.