THERMAL PRINTING TECHNOLOGY

YOUR DATA, OUR EXPERTISE

For over 20 years, thermal printing has been a core offering for Rimage. The first technology patents around thermal printing were issued to Rimage in the mid-1990's and Rimage has continued to refine and improve the technology ever since. Thermal printing offers high-quality, sharp, photo-realistic images with durability that will last for years to come.

Introduction

Thermal printing provides an ideal solution to your printing needs. In this paper, we'll answer the two basic questions behind this type of printing:

First, we'll address the two basic technologies behind the solution: direct thermal printing and thermal retransfer printing. After discussing the two technologies, we'll explain how the benefits of one thermal printing technology are superior to the other.

What is thermal printing?

There are two different types of thermal printing: direct thermal printing and thermal retransfer printing. Each process uses heat and pressure to transfer ink from a ribbon to the surface being printed on. Although the processes vary slightly, the results differ significantly.

Direct Thermal Printing

As its name suggests, direct thermal printing transfers ink from an ink ribbon directly to the surface. Through a mix of heat and pressure, the print head transfers wax-based ink from a thermal ink ribbon to the top of the material. The material itself may or may not be treated with a special top-coating that is optimized for thermal printing. Although both results are acceptable, you will achieve superior durability results with a coated surface. In either case, the printing can withstand modest handling and can endure a moderate amount of water and sunlight. However, if the printed surface is going to be handled a lot, you will see the effects of abrasion over time. Therefore, direct thermal printing is often used for onetime or limited use situations.

Most of the wax-based inks in direct thermal printing complete print jobs inexpensively. In the United Sates, the cost of thermal printing is under two cents per print on the size of an optical disc. However, you will not achieve bright and vibrant labels with this thermal print technology; the ribbons are strictly monocolor (black print on a white or silver surface). If you can live with basic, single-color labels, direct thermal printing will work well for you.

Thermal Retransfer Printing

Your second option for one-at-a-time printing is thermal retransfer printing. Never heard of thermal retransfer printing? You may have a couple examples in your wallet right now. The most common use of thermal retransfer printing is for customized credit and debit cards. The credit card market and much of the optical disc market requires high-quality color, high-resolution, great durability, permanence and low cost per print, and thermal retransfer printing delivers it all. The main difference between thermal retransfer printing and direct thermal printing is that thermal retransfer printing is a two-step process. How does it work? During the initial stage, the image is printed to a clear retransfer ribbon. The color is applied from the printer's supply ribbon, which contains a colored ink coating of cyan, magenta, and yellow in sequential panels. The second stage is the retransfer process. During this process, the image and the color is applied to the surface to be printed. Using heat and a small amount of pressure, the heat roller moves over the ribbon, thereby retransferring the color image from the ribbon to the surface, hence the name thermal retransfer printing. The whole process takes about one minute to print the size of an optical disc.

Another difference between the two thermal print technologies is that the surface used in retransfer printing is not optional, it must have a top coating designed for thermal retransfer. Because the color image is applied to the retransfer ribbon and then the surface, the ink gets fused into the optimized surface and it is there to stay. Thermal retransfer print is not a laminate— remember, your credit card doesn't have a layer that someday peels off. Thermal retransfer print is permanent. The ultimate result is a photorealistic, color printing that is clear, smooth and highly durable.

What are the greater benefits of thermal retransfer printing?

In terms of label design and durability, thermal retransfer printing rises above direct thermal printing. But why the two-step process of thermal retransfer printing, and is it worth it? Absolutely. There are six key benefits of thermal retransfer printing.

A Perfected Two-step Process

Thermal retransfer printing is a two-stage process, and each stage is optimized for high-quality and durability. The print portion is simple— the image is printed to the retransfer ribbon. The second stage—the retransfer stage—uses an exact amount of heat and pressure to fuse the ink to the surface. Each step in the thermal retransfer printing process does its specific job to perfection.

Consistency

The print head mechanism always prints to a consistent surface—the retransfer ribbon. Unlike the printable surface, the retransfer ribbon surface is a constant parameter. As a result, the print head lasts longer and the print consistency is optimized with each print.

Dramatically Improved Throughput

If the case of Rimage automated systems, which both record media and prints to it, the thermal retransfer printer can actually print the image to the retransfer ribbon while the media is still being recorded. The result? Dramatically improved throughput, which means you can print and record a disc in less time to increase your business potential.

Predictable and Low Cost

With thermal retransfer printing, the cost per print is predictable and low. Each print uses only three-color panels and just a portion of the retransfer ribbon. The cost per print is less than 35 cents pre disc and each print costs the same each time. In addition, print ribbons are long, resulting in extensive print runs that eliminate the need for you to reload the printer or scramble for inkjet cartridges. Predictable costs mean predictable customer quotes and production budgets for your business.

Durability

Retransfer print technology results in printed images that are scratch-proof, water-proof, fade-resistant and UV-protected. The images will look good and last the entire life the printed media. These durability benefits simply cannot be achieved with direct thermal print technology.

High-quality, Photo-realistic Color Labels

High print resolution allows thermal retransfer printers to deliver photo-quality images with a level of sharpness and detail that is not available in other print technologies. Thermal retransfer printers are able to print the entire media, taking full advantage of the surface area. In addition, retransfer printers are optimized for computer graphics and large areas of solid color, allowing a variety of color changes and gradients to be applied to the print surface.

Conclusion

We've discussed, direct thermal printing as well as thermal retransfer printing. So, which print process is best? The good news is that both work and are widely available. You can select the print process and printer based on your needs; and you don't have to make a certain process work for you if the fit just isn't there. However, if you are looking for high-quality color, high-resolution, superior durability, permanence, low cost per print and photo-realistic labels, you can't deny the outstanding technology and benefits of thermal retransfer printing.