



R&D: The Competitive Advantage in Today's Dynamic Print Media Market

Print media is a dynamic, constantly evolving market. Every week, new printers and inks are being introduced. At the same time, new end products are being designed and quality expectations are increasing. Whether your customer is a creative director at an ad agency for Nordstrom or your neighbor down the street ordering a customized poster, end customers are demanding increasingly sharp, vibrant, life-like reproductions on textile print media.

Many factors in the marketplace are driving this, but competition between printers is a key factor. Great print quality is the objective, but as new printers, inks and substrates are being developed, the definition of "a great print job" is evolving almost daily. Meanwhile, demand for fabric-based print products is growing exponentially. Fabric substrates are increasingly the print media of choice for

original fine art, art reproduction, backlit materials, sophisticated retail signage, POP and customized products.

Nothing about this market is static, and at all levels — from printer manufacturers to ink sellers to substrate distributors to print shops — steady, aggressive R&D is needed in order to stay competitive and relevant.

Large-format is just one example of increased demand in this sector. In 2016, North American retail print sales of digital large-format are expected to grow to \$23.6 billion, up \$7.5 billion from 2011. And as inks and printers change, new substrates need to be developed.

Until recently, the predominant inkjet printing technologies were aqueous or solvent-based. But latex, UV and eco-solvent technologies are now available. These printers have new, exciting capabilities. This means that the

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By Marcia Ayala, Vice President, Aurora Specialty Textiles Group

rendering on fabric that was acceptable three years ago might now fall short. This creates the need for new and highly optimized substrates.

The New Role of R&D

Not that long ago, print media R&D took place within extended timeframes. Products that were developed over a period of years stayed relevant on the market for fairly long stretches. Now that doesn't necessarily apply. It stands to reason that if you change a printer, and then change the ink, you will probably need to change (or optimize) the fabric substrates being used on that printer with those inks. This is just as true for major printer manufacturers as it is for distributors and print shops. All can benefit — and capture a competitive quality advantage in their marketplace — by investing in R&D, or working with a fabric manufacturer or R&D partner that has the ability to test different coatings and fabric configurations on different printers.

An example would be the substrates needed to work optimally on the new latex printers, which are growing in popularity. Sales of latex inkjet printers are expected to grow by 35 percent over the next two years. These printers are becoming preferred for posters, banners, point of purchase, trade show graphics and for printing textiles.

Case Study: Optimizing for Latex

At Aurora, we have seen an increasing demand for R&D and have worked on several Joint Development Agreements helping our customers find products that will maximize existing markets and reach new ones.

One example involves the development of a new fabric for a new printer. In this case study, we were approached by an OEM (original equipment manufacturer) that had developed a sophisticated new series of latex printers. They were looking for a substrate that could yield an end product similar in quality and color vibrancy to dye sublimation.

Dye sublimation, also referred to as dye sub, is one of the best printer technologies available if you are trying to achieve color vibrancy, color pop and scratch resistance, but your choice of textile substrates is limited. Typically, the only fabric you can use is 100-percent polyester, but you can't print on canvas or other materials. Latex, on the other hand, is much more versatile. With this

technology you can print on canvas, polyester, paper and more, making it possible to serve multiple markets. But latex also has its deficiencies, and this project aimed to develop a new substrate designed to compensate for those issues.

For example, a latex-printed retail poster may not have the same scratch resistance and durability as one printed with dye sub. The manufacturer approached us looking for help developing a substrate that could provide both fire resistance as well as enhanced scratch resistance, along with superior visual and color reproduction. For this project, we were working with a lightweight banner fabric made from 100-percent polyester.

The manufacturer was also looking for an R&D partner that had wide width capabilities, an understanding of the general market, experience developing substrates for latex, a testing lab, and the ability to produce lab prototypes for evaluation on a timely, inexpensive, ongoing basis. They also needed a team that had the technical training to work closely and communicate clearly with their technical staff.

Working together, we tested a variety of chemistries on our lab's pilot coater, producing 18-inch width samples of fabric in a variety of lengths that could be printed with a latex printer. Our R&D staff tested each run in our labs and sent samples to the manufacturer to use on the new printer they were developing.

We ran several initial studies on the pilot coater. Each was evaluated for quality as we modified the chemistries. In this example, the manufacturer had added an optimizer to their "next generation" latex printer, which set down the functional equivalent of a primer to the fabric before the ink transfer. This changed how the ink would lie on the fabric, and we needed to make sure the fabric worked on the company's existing latex printers as well as the new one that had the optimizer function.

In summary, the R&D process involved production trials, test printings, cross evaluations and sample print runs at our manufacturing plant as well as in their labs. The final substrate was a jointly developed product fully optimized to work with a new generation of latex printers, as well as printers already on the market. When done, it was scaled up to full production.

It is important to add that the pilot coater played an essential role in this

process. The benefit of the pilot coater was that it gave us the option to test several different variations on the chemistry both quickly and efficiently, which in turn allowed us to swiftly evaluate the results. The end product is an optimized polyester that is fire retardant, vibrant, has beautiful color pop and excellent scratch durability.

Drilling further down, the R&D process involved many detailed conversations between both technical staffs. In this particular organization, the technical staff was very smart, very thorough and very capable. Working together, we learned a great deal from each other.

Case Study: Removing White Caps

We also recently worked with customers developing a new canvas product designed to provide an improved color and picture quality on eco-solvent printers. This project evolved out of several conversations with customers who were struggling to find a canvas that could provide increased end product clarity. Specifically, they were looking for a canvas product that would not leave white caps in the dark sections of each print run.

Working together, we developed product samples on our pilot coater and evaluated several different coating chemistries before isolating one we felt we could send to our customers for test runs on their printers.

This was an important step, because we wanted to best utilize our customers' time and resources by presenting the ideal product for testing on their equipment. After a series of internal evaluations, we took the prototype to our customer, tested it in their print shop, and refined the product from there. Within a few months, we had developed a new canvas product that was successfully commercialized. The final substrate is a semi-gloss 11.6 ounce (per square yard) polyester cotton blend canvas with an acrylic coating that improved performance on eco-solvent printers, as well as latex printers. We are developing gloss and matte versions of the same product.

What to Look For in an R&D Partner

Clearly, R&D is an essential ingredient for success in today's market. This applies to printer manufacturers, distributors, fabric manufacturers, ink manufacturers and even print shops. For each, it's important to know what to look for when selecting an R&D partner.

First, it's essential that they have an in-house department dedicated to R&D, which includes a trained staff with skilled chemists, process engineer and a quality engineer on the team.

It is also important to work with a team that is keeping up with the technology changes in the market. As inks and printers evolve, print media R&D needs to keep up and a good R&D partner — or good internal R&D department — will continually keep abreast of the new developments. For example, print technology on the dye sub platform is changing from transfer dye sub to direct dye sub. Direct dye sub allows the printer to print directly onto the fabric instead of printing first to paper and then transferring the print from paper to fabric. However, with direct dye sub, a print receptive chemistry must be applied to the fabric. You want an R&D team that can assist you with this change in print technology and work with you to determine the best substrates and level of chemistry ideal for your specific application.

Clear, effective communication between your staff and theirs is also key, and your R&D partners need to be able to work smoothly with your technical staff. The communication that takes place between your organizations is critical to success, and this involves working with trained engineers and chemists, not sales or administrative staff.

We also recommend working with a team familiar with the end products in demand in the market. This way they can best evaluate the various substrates that will provide the optimum performance with, for example, backlit applications printed with direct dye sublimation or décor canvas applications printed on latex and solvent printers.

Flexibility and the ability to travel to your facility to test products on your printers is also very important. The benefit to an R&D team traveling to your site is that it makes it possible for them to see the settings and profiles you are using on your printers. Knowing this will help all of the parties evaluate the test results accurately. Generally speaking, if you are looking for a vibrant color or an end product where the colors are highly differentiated, you need to be able to compare print runs side by side — and in person. This will also help facilitate communicating with each other accurately about the test results and make it easier to identify any unresolved issues.

It also helps to work with a lab that has a pilot coater. Testing a variety of chemistries on a manufacturing scale is impractical and involves unnecessary time and costs, which includes using much larger quantities of test fabric than needed on a pilot coater. The process of finding the perfect coating for a particular fabric/printer configuration could involve some trial and effort, and it's important to minimize the cost and time involved without sacrificing quality. That said, a pilot coater should have the same capabilities as a production coater.

In addition, their lab should have a light box and spectrophotometer for testing color gamut quality and a compatible printer onsite. It's also helpful to have an R&D partner that is ISO-certified, and that has a trained quality management staff and a system that follows standard processes.

Perhaps most of all, it's important to work with a dedicated team that does this work process on an ongoing basis. Their knowledge and partnership can help you compete successfully in a market that lives in a constant state of change.

Marcia Ayala is Vice President of Aurora Specialty Textiles Group (ASTG), a Meridian Industries company. Her primary responsibilities include product development and quality, as well as general operations. She also manages the company's R&D department. Ayala has been with ASTG since 2006, when she was hired as Director of Research and Development. In this capacity she and her team have worked closely with customers developing new products. In 2014 her role expanded to include new business development and that year she was promoted to Vice President Research & Development. She was promoted to Vice President in 2015.