Digital Textile Printing

Key Highlights:

- Make an impression in digital textile printing
- Learn how PDF is the document format for the digital textile industry
- Get inkjet printing done with Adobe
- Transform your business into a digital printing powerhouse
- Get ready for a digital printing future

Make an impression in digital textile printing

Adobe has been transforming the world of printing and graphic design since the 1980s. Be it for large or small format applications, Adobe's wide-ranging portfolio has played a critical role in the evolution of printing industries, including textiles. In the last two decades, the textile printing market has evolved following the emergence of inkjet technology and Adobe's design-to-manufacture workflow. This end-to-end workflow comprises the Adobe PDF Print Engine, Adobe PDF, and various creative software solutions, including Photoshop and Illustrator. It has been inspiring textile print mills, print service providers, and OEMs that produce digital textile devices and digital front ends along with brands, converters, and textile designers across the digital textile printing landscape. Adobe's presence at ITMA 2019, where it demonstrated the Adobe Textile Designer technology is evidence of that.

Adobe invented the Portable Document Format (PDF) to present and exchange documents reliably. Adobe PDFs look exactly as it were intended to and preserve all the data in the original file format even when color, artwork, mixed content, metadata, and more are combined in a single file. PDF is the most trusted file format for printing around the world, and it is increasingly popular in all digital textile printing workflows.

Adobe's market-leading print solution, the PDF Print Engine, continues to answer the growing needs of the inkjet textile printing market. Competing with analog processes in terms of speed and cost per square meter has been a long-term ambition of digital textile printing OEMs and so far, PDF Print Engine (RIP software) has been a weapon that the industry has used to its advantage. The technology has been a triumph and it has directly improved the performance and efficiency of both low and high-volume inkjet textile printers.

PDF Print Engine can reproduce prints of any color, size, or grade, particularly when paired with Adobe PDF because it employs the same core technologies as in Adobe Photoshop, Illustrator, Acrobat, and the PDF Print Engine. Everyone benefits when the end-to-end design-to-manufacture workflow employs the same core technology at every stage, from design to approval to final output.

More power and possibilities with Adobe solutions

The textile & apparel value chain knows the importance of interconnectivity with Adobe solutions. Aquario Design is now utilizing Adobe Textile Designer's underlying technology through a collaboration that will result in the launch of new innovative design software for textile designers. Further collaborations include announcements that Aquario Design and NedGraphics textile design products will be fully compatible with the Adobe PDF Print Engine.
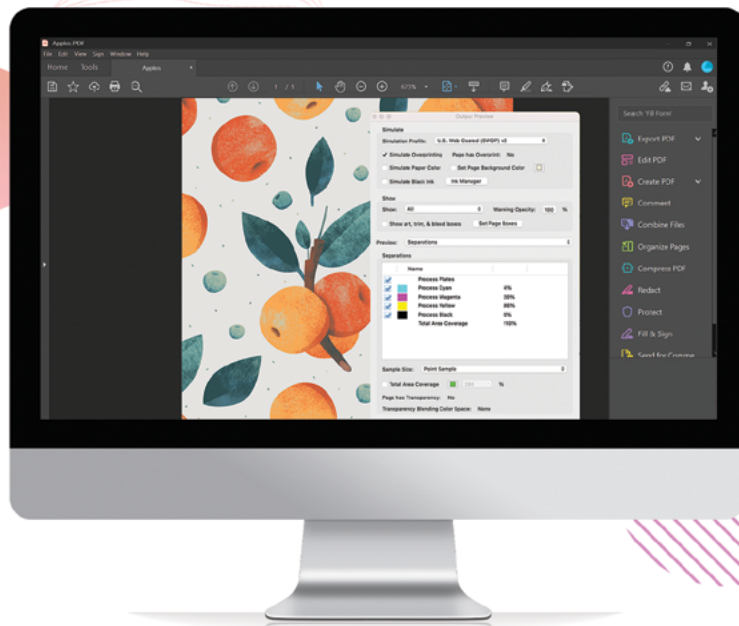
PDF: The document format for the digital textile printing industry

At the heart of Adobe's solutions for the textile industry is its PDF expertise and, by utilizing PDF files alongside other Adobe solutions, users can be assured that motifs, gradients, vectors, and fonts can be reproduced in multiple sizes without pixilation. Moreover, colors can be accurately requested and printed, whether that is with screens or digitally, and all information for a print is included in a single file. Meanwhile, for cut and sew applications, the outline for the cutting pattern can be included in the same file as the print.

Adobe PDF files continue to be a valuable tool in print workflows, and the file format is especially popular among textile printers. A PDF file provides a convenient way to move content from a native application to a standard workflow, including all the components necessary for digital textile printing.

For example, if a fashion brand or print service provider worked with TIFF workflows, one TIFF per color would have to be exchanged. Then if the brand wanted the same design in another colorway, it would have to send another large number of TIFFs dependent on the complexity of the design. This is a convoluted and time-consuming process in which PDF files simplify by providing all the necessary information for each colorway, along with additional information, in a single file.

Other mills might receive JPEG files. While these have color information in a single file, they are often compressed to reduce size resulting in ambiguous color information and loss of detail. A print service provider would have to modify such a file which could risk the integrity of the original design.

There are similar benefits to be had in moving to PDF if existing design workflows are previously wedded to a TIFF workflow, or if the review process is wedded to a TIFF workflow. Using PDF files and creative tools from Adobe, the user can mix content from different sources, thus combining sketches, drawings, photos, scans, paintings, and digital creations. All the information can be preserved throughout the entire process, even applying different colorways, while keeping all aspects of the design editable. Once ready, sharing the design as a PDF is just a click away. Additionally, if TIFF files are being passed around, complex workflows to view the results or create proofs and strike-offs are required.

A PDF file makes this process much easier because holds all the information about the design and the colors are held unambiguously. The PDF file can be viewed on a screen using the free Adobe Acrobat Reader, where digital notes and comments can be made directly on the PDF without affecting the ability to print it. But if a paper version or a fabric strike-off is required, the PDF can be printed digitally. Meanwhile, with the right print solutions powered by the Adobe PDF Print Engine, colors can be reproduced locally on a proofer. The same PDF file that was viewable on-screen, and which was used to create the local sample, can then be sent to the mill for manufacture, ensuring the same information used for the final print is applied at every stage of the review and approval process. Therefore, while certain textile enterprises are reluctant to change their approach when it comes to file formats, there are solid arguments for executing the switch to PDF.

Digital Textile Printing

Powered by Adobe PDF

ONE

- Document format for the entire design-to-manufacture workflow with complete device, platform, resolution, and substrate independence.

- File that contains all the information needed for manufacturing with complete preservation of details.

SIMPLE

- Document review process for notes and feedback (with the free Acrobat Reader).

- Workflow to create local samples, proofs, and strike offs.

ACCURATE

Final print output by using the same PDF file at every stage of the review and approval process.

Inkjet Printing: Get it done with Adobe

The rapidly evolving inkjet printing segment is growing in value and competition is rising as more print service providers look to profit from its recent success. This segment has flourished in the last five years and production capacities have expanded with the implementation of both low-volume multi-pass and high-speed single-pass printers.

Inkjet was undoubtedly a disruptive technology when it broke into the textile printing arena in the 2000s, but it was far from the complete solution we see today. Initial adoption was slow as print speeds struggled to compete with analog printing processes. High device costs and questionable printer reliability limited technology adoption primarily to printing samples.

Lots of research and development (R&D) has been carried out to enhance the three key components of digital textile printing: the machine, print heads, and ink. The compatibility of these three elements is integral if a print service provider is to achieve high-quality output – Adobe PDF Print Engine (raster image processing software), enables that goal to be achieved.
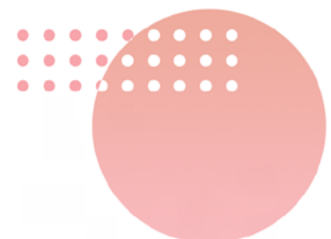
Transform your business into a digital printing powerhouse

Adobe's longstanding PDF expertise was the catalyst for the PDF Print Engine which, unbeknown to some, powers the most recognizable, textile-specific RIP software solutions from the likes of **Caldera**, **ColorGATE**, **Epson**, **EFI**, and **Onyx**. One of the many reasons why PDF Print Engine is so popular is because it maximizes the performance of every print run.

Unlock next-level color management and more

How exactly has RIP software transformed digital textile printing? Well, most printed images, including digitally printed textiles, are based around the halftone concept, where the image is broken down into a series of dots that are so small that our eyes blur them into a complete image at normal viewing distances. So, to print an image, an inkjet printer is simply laying down a pattern of dots. However, there are multiple variations in inkjet printing, whether that be the number of colors used, the size of the ink laydown, or the ink chemistry.

To print an image accurately, a raster image needs to be created for each printer in use and this is the job of the RIP software – in Adobe's case, the PDF Print Engine.

The last decade saw super high-speed printing become reality for the digital textile market which broke down a critical barrier that halted the technology's expansion; the ability of the original equipment manufacturer (OEM) to sell to high-volume print service providers around the world. The fashion industry is the most profitable market for print service providers, but many inkjet machines were not capable of printing the volumes required for fast fashion. Adobe was quick to recognize this obstacle and responded by developing a PDF Print Engine which is the fastest rendering technology for rich graphics: rendering algorithms are continually optimized to ensure the fastest output times for complex effects created by the latest features in Adobe Creative Cloud applications. Another key optimization feature is Mercury RIP Architecture, a scalable, dynamic platform that maximizes parallel processing on multiple computers.

Take color management, a problem that has been plaguing the inkjet textile printing industry for too long despite the availability of spectrophotometers. With brand and consumer demands increasing, right-first-time production is critical; to this day, print service providers are losing revenue because of their failure to efficiently manage color which is wasting valuable resources.

Adobe understands that traditional color management techniques need to be blended with sophisticated color emulations to ensure colors are accurately and consistently reproduced across multiple fabric types - irrespective of the ink being used - which the PDF Print Engine supports. Adobe's overriding ambition is to enable textile print service providers to print exactly what the designer produces on-screen.

There are more features within PDF Print Engine that improve color management. The rendering technology is equipped with the Adobe Color Engine and can also be integrated with 3rd-party proprietary color management modules (CMM).
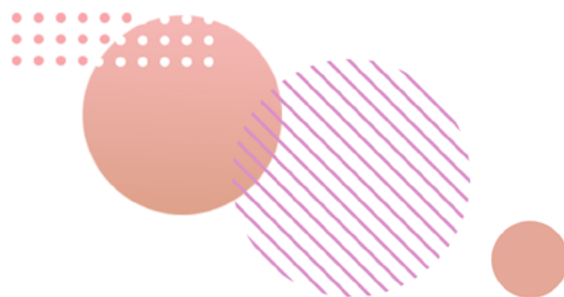
Job elements profiled with any combination of color spaces can be converted to the intended print condition, per the output profile.

Moreover, PDF Print Engine supports and will always support the latest PDF color capabilities such as black point compensation (BPC), spectral data for spot colors, and page-level output intent. Continuous shades are rendered smoothly, regardless of length. Color planes for images and graphics containing any bit- depth up to 16 bits per channel to render subtle color shifts and achieve absolute color precision.

In addition to color management, PDF Print Engine helps unlock next-level performance, robustness, and versatility. But the issue of color management is just one of many factors driving the implementation of RIP software in the inkjet textile printing industry: performance, robustness, and versatility are among the others.

Nevertheless, Adobe realizes more can still be done to streamline digital textile printing workflows, and this is driving R&D. Despite improvements to design and production workflows, the market still has hurdles to overcome.

A digital future

The traditional textile industry has often adopted the 'better the devil you know' approach when confronted with alternative solutions. But in the textile printing sector, companies with an already established digital workflow were better prepared to navigate the recent supply chain breakdowns and economic turmoil instigated by the COVID-19 pandemic.

The economic contraction in 2020 resulted in fewer digital textile printer installations, but investment in the technology is forecast to accelerate beyond the pandemic for both the roll-to-roll and direct-to-garment (DTG) printing sectors for which RIP software is equally beneficial. According to various industry reports, the digital textile printing market is projected to reach US$3 billion by 2027, and it is growing at a CAGR of 19.1% from 2019 to 2025.

Digitalization has increased machine uptime, improved production speeds, enhanced mechanical reliability and performance, and has reduced the textile printing industry's environmental footprint. But arguably, most importantly of all, digitalization has improved manufacturing versatility. In the digital textile printing industry, print service providers can easily transition between different fiber applications, print long runs and short runs, and even offer personalized prints, a trend that is gathering momentum - RIP software is playing a crucial role in managing those workflows.

Digitalization is also enabling print service providers to meet growing end-consumer demands; not only do they expect fast turnaround times, but the consumer is demanding more complex eye-catching prints whether that be for fashion, home décor, or soft signage.

The evolving requirements of consumers are fuelling the need for RIP software while at the same time designers, by utilizing the latest design features, are being more imaginative. This is particularly true for the textile printing market, where inkjet technology is facilitating more complex prints and vivid colors.

There is also a disparity between the consumer-facing end of the textile & apparel value chain and the manufacturing process - think shopping on our smartphone vs rotary screen printing. As a result of digitalization, print service providers and textile print designers now have the tools at their disposal to enhance creativity and streamline workflows.
With PDF Print Engine, Adobe PDF, and Adobe Textile Designer technology, the digital textile printing market is benefiting from advanced capabilities.

But innovation is ongoing and the switch to digital is not complete. Adobe is continually looking for ways to improve textile printing workflows and is confident its wide-ranging solutions will achieve just that.
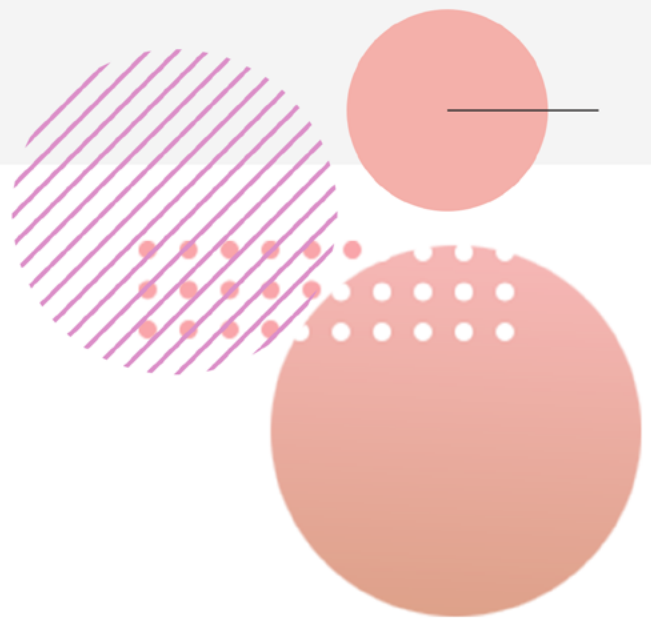
Get started

For more information on how Adobe is powering digital textile printing workflows,

Contact us at: **textileprinting@adobe.com**
Or visit: **http://adobe.com/go/TextilePrinting**

Learn more about Adobe PDF Print Engine,
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