

Woven fabric production on a loom.

Navigating Digital Textiles

What print providers should know when sourcing from suppliers

In digital textile printing, the ability to ask the right questions can be the difference between a successful first-run project versus a dumpster full of attempts. Print service providers — both newcomers and industry veterans — who feel they don't have a basic understanding of textiles are not alone. Navigating types of fabrics and constructions for different applications can get complex, but it is necessary for ultimately securing the optimal fabric from a supplier.

The following provides a solid textile foundation to enable printers to ask informed questions and hone their textile sourcing processes.

The roadmap to successful digital textile printing starts with understanding the differences in yarns and the three main types of fabric: circular knits, warp knits and wovens.

Yarns

Yarn is a continuous strand of textile fibers, or filaments, that can be used in

knitting and weaving. Yarns vary in size, quality and content. For example, yarns often used in the soft signage market typically are fine (40 singles (40s) or more), use a high-grade long-staple fiber, and are polyester in content.

When discussing yarn size, it's important to know how many filaments (single fibers) or "singles" make up the yarn. Singles can be twisted or plied together to create different sized yarn — 5s, 10s, 20s and 30s are considered large, while 40s, 60s, 80s and up are considered small/fine.

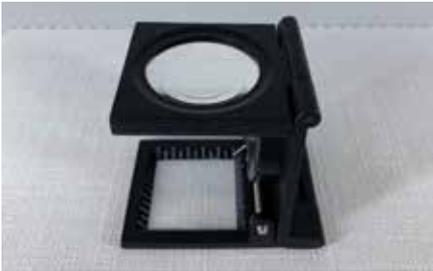
The numerical value of the singles corresponds to the number of yarns visible per square inch. This is why the larger numbers represent smaller/finer yarns. The yarns are analyzed using a pick glass, which is also used to calculate thread count. Thread count for both knits and wovens is determined by counting yarns per inch in both directions.

Large yarns under 40s are spun dry while small/fine yarns over 40s are spun

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By Michael Sanders, Director of Printable Textiles & Finishing Technology, Top Value Fabrics



Pick glass is used in yarn count measurement (top) and yarn spinning machine.

wet so that they don't break. Small/fine yarn above 40s will produce the tightest construction, which is ideal for achieving print clarity. Outstanding color and print characteristics can be achieved with larger or textured yarn, but the look will differ.

Polyester is a synthetic fiber, which means the variations are endless and consistently evolve.

There are two main types of polyesters: PET and PCDT. PET is made with monofilament, multifilament or spun yarns (spun poly), while PCDT is only made from spun yarns. Both PET and PCDT can be produced with three lusters: dull, semi-dull and bright. Dull yarn will produce a matte effect while bright yarn will have greater vibrancy. Semi-dull yarn falls in between.

Cellulosic fibers include, but are not limited to, cotton, rayon, modal, lyocell, hemp and bamboo. Cottons alone have a wide range of grades, including open-end, ring-spun, combed ring-spun and Supima (the highest quality long-staple cotton fiber). The length of the fiber plays a significant role in whether a fabric will become fuzzy over time and pill. The

longer the length of the fiber, the more durable the product.

When digitally printing textiles, it's important to know what type of yarn is utilized in the construction of the fabric, because it can change the printing profile. When comparing fabrics from different textile suppliers, printers may come across drastically different pricing for the same type of fabric. That's because the yarn is different in size or quality. The two samples may look and feel the same, but they will wear and print differently.

It's vital to work with a supplier who provides consistent goods. In other words, the yarn needs to stay consistent from lot to lot and be produced on the same machine. If a supplier decides to switch yarns, the fabric may seem identical, but the colors could differ drastically when printed. To ensure efficiency, printers should source consistent fabric produced on the same knitting or weaving machine with the same quality and size yarn.

Constructions

When evaluating fabrics, it's important to know the difference between the two

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methods for producing cloth: knitting and weaving.

Knitting

Knitting uses one set of yarn to form loops that interlock. Rows of loops are caught into the previous row to construct a somewhat elastic fabric, compared to the tightly twisted yarns used in weaving. There are two types of knitting: circular and warp.

Circular Knitting

Circular knit fabrics are produced by using a knitting machine in the form of a circle. The fabric is made in the shape of a tube and will eventually be cut to lay flat before being rolled or tubed on a cardboard core for storing and printing.

Circular knits are most prevalently used in the apparel market for top weight garments and leggings — e.g., someone's favorite casual T-shirt. There are many types of these knit constructions, with the most popular being jerseys, rib knits, interlock and pique. Circular knits are most commonly printed with dye sublimation or direct digital pigment printers, if the fabric is properly optimized for the ink set.

Warp Knitting

Warp knitting requires a chain loom in which yarns typically run lengthwise. The yarns are set up as warps on beams, and one or more yarns run through individual needles. Warp knits create a tighter knit construction than most circular knit fabrics and often have up to four times as many stitches per inch.

These knits are used in both the apparel and soft signage markets. For apparel, warp knits are most commonly used for high-performance garments such as sports jerseys, linings and pants. Warp knits are produced with a locking stitch, which increases the fabric's abrasion and tear resistance. If a warp knit tears, the fabric will lock, unlike a woven, which will rip. In soft signage, warp knits are the superior fabric choice because they offer dimensional stability, are easier to install into SEG frames, and do not fray. Some examples of warp knit constructions are mesh, satin and flag. Warp knits for apparel are typically printed with dye sublimation or direct digital pigment printers, while warp knits for soft signage can be printed by almost every print platform, if the fabric is properly optimized for the ink set.

Weaving

Woven fabrics are made on a loom



Circular knit (top) and warp knit production



Have questions?

Michael Sanders and the rest of SGIA's Digital Textile Committee are here to help you expand your business and grow your textile knowledge. Contact the Digital Textile Committee through PrinterLink at SGIA.org.

by interlacing two sets of yarns — the warp and the fill — at right angles to each other. Woven fabrics are used in the apparel, home furnishings and soft signage markets. It's important to note that using woven fabric for soft signage applications creates an additional set of challenges, including fraying and diagonal twill lines that can cause the graphic to look pixelated or blurry.

In the apparel market, most bottom-weight garments (e.g., pants) are woven, as are many shirt and outerwear garments. Most home furnishing fabrics are woven, with very little exception. Some construction examples of woven fabrics include, but are not limited to:

- Square (sheeting, poplin, canvas)

- Twill (left-hand twill (LHT) and right-hand twill (RHT), which have many different constructions: 3x1, 2x1, etc.)
- Herringbone
- Ripstop
- Dobby
- Sateen
- Jacquard

Woven fabrics are compatible with all print platforms if the fabric is properly optimized for the ink set.

Knowing these key attributes will ensure print providers ask suppliers the right questions about yarn quality and construction, and receive the optimal fabric for their projects. It's also important

to extend this knowledge to all involved staff, from purchasing agents to print technicians. Understanding the textile basics will allow everyone on the team to assess fabrics quickly and identify the ideal fabric for the job.

Michael Sanders is the Director of Printable Textiles and Finishing Technology for Top Value Fabrics. He has been part of the textile industry for over 40 years and has extensive knowledge and experience in dyeing, printing and finishing both natural and synthetic fabrics. His involvement and work with digital textile printing goes back to the early days of the discipline's existence. Today, Michael sits on boards, expert panels and gives lectures nationally.

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