



Amann Group

# What's in a stitch?

**B**esides the raw material and count, it is a sewing thread's construction that determines its properties. Sewing threads are yarn twists that consist of at least one and, usually, two or more yarns. The properties are specified by: construction, twist, ply and cord.

While a yarn's construction defines the individual thread type, twist, ply and cord define the general construction parameters of all threads.

## Twist

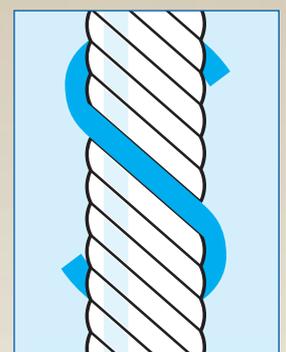
Yarns and threads are twisted. In the course of this process the fibres or filaments are twisted on a longitudinal axis to interconnect them and it is this twisting and the resulting consolidation that produces the strength. Basically, twisting provides a compact thread and defines its sewing performance.

There are two twist directions that are best described as 'S' and 'Z.' Depending on the direction of twist the centre stroke of each letter coincides with the diagonal twist of the yarn. They are sometimes also referred to as left and right twists or clockwise and counter-clockwise.

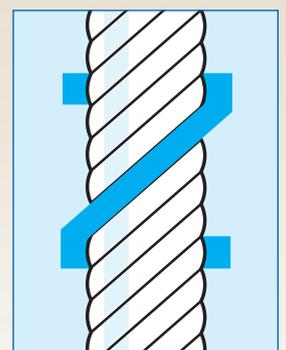
Threads are usually twisted in the S direction and yarns in the Z. To stabilise a thread and provide a perfect sewing performance, it is important that yarns and threads have a counter-rotating twist. The reason that a Z twist is used for ply yarns and an S twist for yarns lies in the different areas of application. Z twist threads are more suitable for standard lockstitch machines because they tighten, as a result of the needle and hook positions and the movement of the needle thread from the eye of the needle, whereas S twist threads loosen, which adversely affects the sewing process.

The number of turns in a yarn or thread defines the helix angle, which is expressed in turns per metre. Those with a low number of turns have a large angle, while high numbers have a small one. The level of twist defined for a specific thread construction is of utmost importance in order to guarantee the optimal sewability and performance.

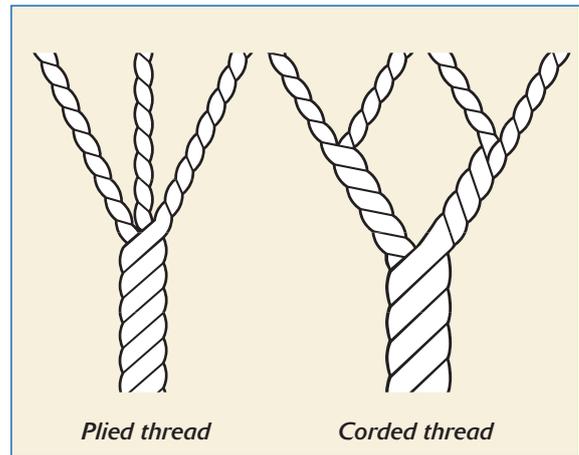
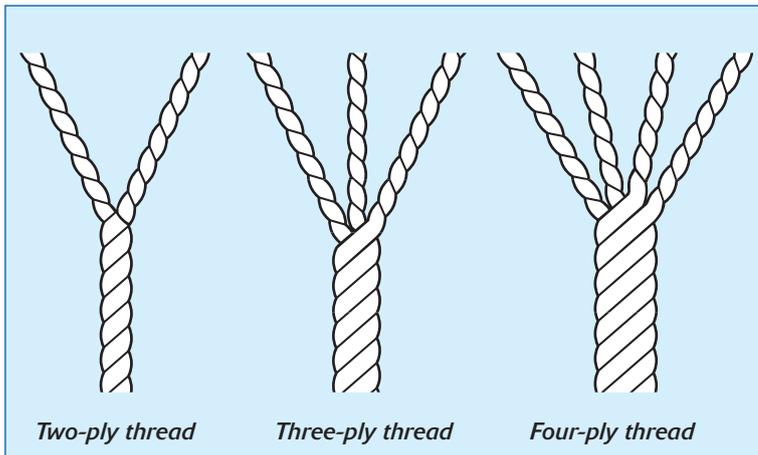
Threads with a level that is too low are said to be 'open' and, on lockstitch machines, the hook may grab right into the open thread and cause it to tear. Those with too much twist tend to snarl and are too lively, which can cause knots and



S twist



Z twist



loops, leading to erratic sewing and possible thread breaks. Coarser yarns or threads have less twist than finer ones, so the level of twist must match the weight of the material involved and the requirements of the sewing process.

### Ply

This identifies how many single yarns make up a thread. At the same time, it identifies the way in which the single yarns are combined. Most sewing threads are two- or three-ply constructions consisting of two or three component yarns. Very rarely, there are one- or four-ply threads. When stating a thread size, the ply is also usually given. Ply also affects sewing performance and appearance. Three-ply threads are generally preferred in terms of aesthetics for coarser seams as their cross sections are almost circular. Two-ply threads have a flatter look.

Two-ply threads also perform better than three-ply and usually have more twist, so they are more compact and uniform. For demanding operations, particularly on multi-directional automated sewing machines where there is a tendency for twist displacement, two-ply threads are preferable.

### Cord

Practically all commonly used sewing threads are one-level or direct threads. This means that the thread consists of two, three—or infrequently—four yarns, and was 'directly' made from these yarns in one operation. In contrast, multi-level or corded threads are made of more than one ply, which requires more than one operation; from yarn to ply and from ply to corded thread. Corded threads are now rarely used and only where a coarser thread cannot be obtained by the ply of available ticket numbers.

### Yarn

Sewing thread type, whether multifilament or corespun, is determined by the yarn construction. Fibres and filaments in their different forms (schappe spun or cut staple spun fibres, smooth multifilaments, monofilaments,

textured filaments), or a combination of these are the foundation of every thread except monofilament.

### Sewing thread types

**Spun threads** – these have single yarns consisting of short, cut staples that are joined by twisting. Raw materials include cotton, schappe silk, Lyocell, polyester and aramide. Cut staple threads consist of fibres of the same length as with synthetics such as polyester, which are then torn to a uniform length of 40mm in order to match high quality cotton fibres. Schappe-spun fibres consist of long irregular fibres ranging from 20 to 70mm and are used in the manufacture of schappe silk.

Polyester fibre yarns or yarn plies are widely used for apparel and are manufactured in a wide range of sizes. For technical applications, there are additional synthetic fibre yarns made from schappe-spun para- or meta-aramide. Spun cotton or silk yarns or threads are now rarely used due to their relatively low performance compared with synthetics.

**Corespun threads** - in these, the single yarns consist of a multifilament core surrounded by fine fibres which combine the strength of multifilament threads with the good sewability and textile surface properties of those made from spun yarn. A key quality factor is a well-balanced ratio of core and cover. This is usually two thirds to one third, with the core sheathed but not fully covered. This construction refers to the single yarns as described above, so a corespun thread includes two, three or even four multifilament cores, depending on the ply. The core's multifilaments are, as a rule, made of polyester and, very occasionally, polyamide. The spun cover is either polyester or cotton fibres, although almost all polyester corespun threads are now braided with 40mm cut polyester staple fibres.

The thread character of corespun threads is comparable with those made from fibre yarns and has a smooth grip and textile surface. But, because of the combination of multifilament and

spun fibres, both strength and abrasion resistance are far higher. They also have outstanding sewability, offering trouble-free processing even in difficult applications such as multi-directional sewing operations and buttonholes. They are well-suited for the most versatile applications in the clothing sector, including technical textiles.

**Multifilament threads** – here, single yarns are made of the finest continuous filaments, with up to 200 in a single yarn. They are mainly made from polyester or polyamide, but for technical applications other raw materials such as para-aramide, meta-aramide, polypropylene and polyetheretherketone are sometimes used. Multifilament threads are predominantly used in applications such as footwear and leather goods. They have a smooth, glossy surface and, because of the use of continuous filaments, high strength, abrasion resistance and a more even thread character compared with spun threads.

They are also ideal for use as embroidery threads when made from trilobal polyester or viscose. Only this construction offers the superior level of gloss that is so important for this application.

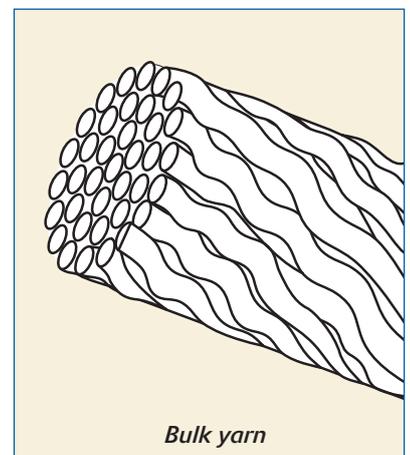
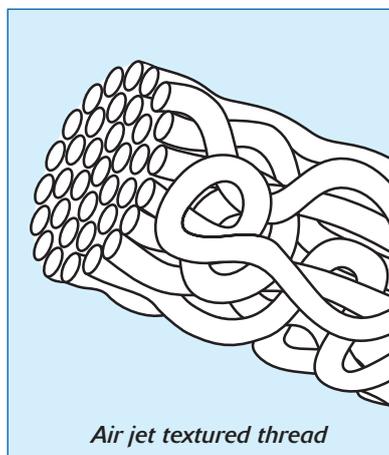
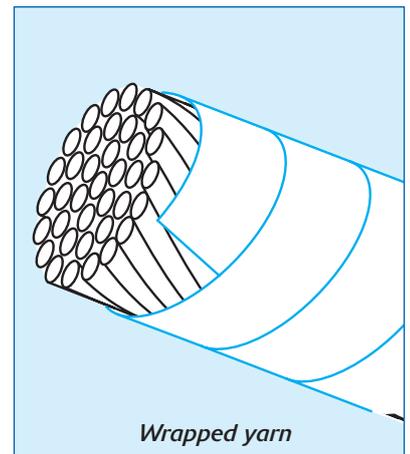
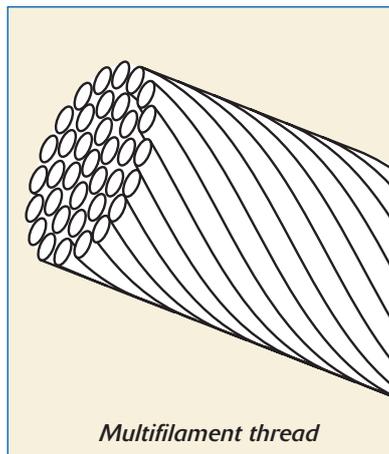
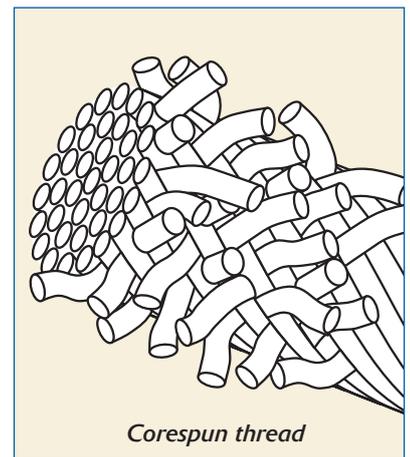
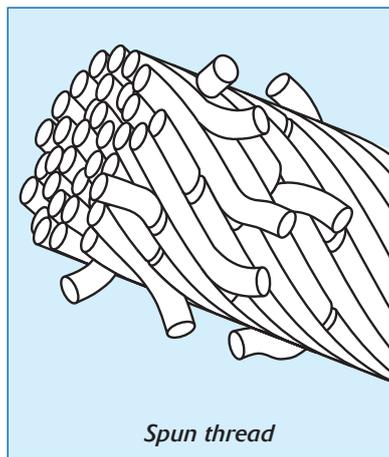
**Wrapped yarns** - this is the construction used for metallic embroidery threads. It is actually a one-ply thread consisting of a multifilament core (polyester, polyamide or viscose), wrapped with a band of metallic foil.

**Air jet textured threads** – these consist of single, multifilament yarns produced by air jet technology. The swirling of the single filaments forms loops that create the textile character of the yarn. Thus the advantages of filament threads are combined with the positive characteristics of the textile surfaces that are so typical of corespun threads.

They were only developed in the mid 1980s and, so far, have not been used very much in apparel. They do, however, represent an alternative to corespun threads and those made of fibre yarns. They may well come to be used in similar applications such as work clothes.

**Bulk yarns** - these are permanently crimped multifilament yarns or threads. The crimping is achieved through a false twisting process, whereby thermoplastic filament yarns are permanently formed through a twister and subsequent heat treatment. Bulk yarns to be used as sewing threads are mainly made of polyester filaments and are normally textured by the false twisting method.

Bulk yarns with different degrees of crimp rigidity are often used in swimwear, sportswear and outerwear. As the name suggests, these



yarns are bulky, but the crimping also creates a soft grip, a matt surface and a high degree of elasticity. They are particularly suitable for overlock and flatlock seams in clothing production.

**Monofilament threads** – these consist of a single filament produced with a single-jet injection nozzle. They are made of either polyester or polyamide and come in a wide range of sizes. They are normally transparent and tend to be comparably hard and stiff, with a shimmering glossy look and a smooth surface. 

*All details and images courtesy of Amann Group.*