



FACT SHEET UNDERSTANDING YARN COUNT



UNDERSTANDING YARN COUNT AND THE USES OF AUSTRALIAN COTTON

A key yarn quality parameter is the yarn count, which specifies the linear density or mass per unit length of a yarn. Understanding and measuring yarn count is important to fabric technologists and designers, because it is key in predicting a fabric's quality in terms of structure, weight, comfort, porosity and movement.

WHY SPINNING MILLS LOVE AUSTRALIAN COTTON

The conversion of cotton fibre to a textile starts with the spinner, for whom price and quality are the most important attributes. Higher quality fibres, such as Australian cotton:

- command a premium, as they produce better yarns and fabrics (finer, lighter, stronger, cleaner and more even)
- achieve better productivity in the spinning mill (improved machine efficiency, less waste, fewer quality rejections)
- are one of the least contaminated cottons in the world

YARN COUNTS EXPLAINED

There are different ways of expressing yarn count. The most direct measure is to express the value in terms of the grams (of yarn) per km, known as the tex of a yarn. The bigger the number, the thicker the yarn. The smaller the number, the finer the yarn.

In general terms, fine count yarns range from 20 tex, or 20 g/km, to less than 10 tex or 10 g/km. Medium-count yarns range from 20 to 50 tex whilst coarse count yarns range from 50 tex up to >300 tex. These ranges are arbitrary, but the median values reflect the trade's general descriptions for yarn counts:

- Yarn counts less than 15 tex are used in light weight shirting fabric or knits
- 20 to 40 tex yarn is used in underwear, t-shirts and singlets
- >50 tex yarn is used in denim and heavier outer layers.
- At >300 tex, yarn is used for bulky knits, very coarse fabric, e.g., blankets, and/or industrial fabrics.

Note these count ranges describe single counts, i.e., one single end of yarn. Any count yarn can also be plied (twisted together) in different multiples to provide bulkier, stronger and/or more even yarns. When a yarn is plied, the count is described thus: 20/2 tex. This notation describing 2 x 20 tex yarns plied together to provide a resulting 40 tex yarn.

WHAT DOES THE MARKET WANT?

In terms of market volume, the most popular yarn counts spun are those in the 20 to 40 tex range. The price/kg for yarn jumps exponentially from 30 tex through to 10 tex. For example, 10 tex yarn will be >50% more expensive than a base 30 tex yarn. This reflects the slower spinning delivery because of the higher twist required in fine count yarns, the higher quality fibre (finer and longer fibre) required for fine count yarns and the additional preparatory processes required, e.g., combing, before spinning.

LINEAR DENSITY

Linear density is also used to describe cotton fibre fineness, and the fineness of synthetic fibres or filaments like polyester, nylon, viscose and acrylic.

Linear density in cotton is measured in terms of 'millitex', or milligrams of fibre per kilometre (mg/km). Very fine cotton fibres from the *Gossypium barbadense* species or 'Pima' type cottons will have fineness values ranging between 100 and 140 mtex, fine Upland cotton (*Gossypium hirsutum*) will have fineness values ranging between 160 and 180 mtex with average Upland cottons ranging between 180 and 220 mtex.

Coarse Upland cotton is >220 mtex and tree (*Gossypium arboreum* & *G. asiaticum*) cottons will have fineness values >250 mtex. Australian cotton is typically in the range of 160 to 220 mtex with a good proportion (depending on the season) in the fine Upland range.

Dividing the yarn linear density (tex) by the fibre fineness (mtex) allows spinners to determine the number of fibres required in the yarn cross-section. As a very general rule, 75 fibres are required in a yarn cross-section to make it viable. Fine yarns therefore need fine (and long) fibres.

Because yarn count is a fundamental structural parameter of any yarn, the average count and its variations are of paramount importance in virtually all facets of textile performance and specifications.



WHAT HAPPENS WHEN YARN COUNTS VARY?

Undue variations in yarn count, or off-specification count, lead to problems in terms of fabric weight per unit area, performance and aesthetics.

Typically, 100m of yarn is used to measure a yarn's count, although shorter lengths, e.g., 1m or 10m can be used to provide an indication. Traditionally, the average and variation (coefficient of variation or CV) in count from a production period are determined by weighing 100m lengths of yarn from multiple yarn packages or bobbins.

Count variations of less than 2% based on weighing 100 m lengths from 10 bobbins/packages are considered acceptable.

DIFFERENT MEASURES OF YARN COUNT

There are also other measures of yarn count that continue to be used in the trade. These include English cotton count (ECC) or Number English count (Ne or Nec), which measures the number of 840 yd wraps of yarn per pound. This is a very old but still widely used measure. In this measure a high number refers to a fine yarn and a small number refers to coarse yarn. English cotton count and tex values can be converted between each other using the following ratios:

Number English count = Ne = 590.5/tex

Tex = 590.5/Ne

Because the constant 590.5 is close to 600, which is a simpler mental division, more often in trade conversations, the conversion is discussed using 600 as the constant, e.g., a fine count yarn of 20 tex is discussed in terms of being a Ne 30 count yarn, when technically it is a Ne 29.5 count yarn. However, the true constant must be used when yarn spinning parameters like twist and production (yarn delivery speed) are determined.

There is also the New Metric (Nm) count system, which counts the km of yarn per kg. Nm and tex can be converted between each other using the following ratios:

New metric = Nm = 1000/tex

Tex = 1000/Nm

Table 1. Spinning systems by yarn count

| Yarn count (tex) | Yarn count (Ne) | Spinning system | Percent AUS cotton |
|------------------|-----------------|-----------------|-------------------------------------------------------|
| >300 to 40 | <2 to 15 | Open-end | <10 |
| 40 to 10 | 15 to 60 | Ring | 100 up to Ne 50 <25 up to Ne 60 |
| 40 to 10 | 15 to 60 | Air-jet | <10 |
| <12 | >50 | Compact ring | 100 up to Ne 50 <25 up to Ne 60 <15 up to Ne 70 |
| <8 | >80 | Compact ring | <5 |

Table 2. End product uses by yarn count

| Yarn count tex | Yarn count Ne | The products in which these yarns are used |
|----------------|---------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| >200 | <3 | Mops, coarse ropes and very coarse knits/weaves |
| Up to 120 | Up to 5 | Braided ropes, outer wear knits and woven fabric including denim. |
| 100 to 30 | 6 to 20 | Medium and fine weight carded and combed knits, denim, drill and upholstery woven fabrics, towels, standard bed linen. Australian cotton is used in the medium to fine weight fabrics category within these specifications, but not usually in upholstery or denim. |
| Up to 50 | Up to 12 | Medium to fine weight combed knits, medium to fine weight combed woven fabrics including shirting and bed linen fabric. Australian cotton is used in these products. |
| Up to 30 | Up to 20 | Fine weight combed knits, medium to fine weight combed woven fabrics including shirting and fine-count plied bed linen fabric. Australian cotton is used in these products. |



**100% AUSTRALIAN COTTON IS USED
IN A VERY WIDE RANGE OF PRODUCTS
FROM TOWELS TO T-SHIRTS,
BED SHEETS TO DENIM**



AUSTRALIAN
COTTON



MORE INFORMATION

www.australiacotton.com.au
cotton2market@cotton.org.au