

Technical Tuesdays

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YARN QUALITY - IMPORTANT TERMS

YARN EVENNESS

“ UNEVENNESS ” OR “ IRREGULARITY ”

The mass per unit length variation due to variation in fibre assembly is generally known as “ Irregularity ” or “ Unevenness ”

1. The Irregularity U% - It is the percentage mass deviation of unit length of material and is caused by uneven fibre distribution along the length of the strand.
2. The Coefficient of variation C.V.% - In handling the large quantities of data statistically, the coefficient of variation (C.V %) is commonly used to define variability and is thus well suited to the problem of expressing the yarn evenness. It is currently probably the most accepted way of quantifying the irregularity .It is given by

$$C.V \% = (Standard\ Deviation / Average) \times 100$$

CV can be determined extremely accurately by electronic means, whereas the calculation of the irregularity U is based on an approximation method.

It can be considered that if the fiber assembly required to be tested is normally distributed with respect to its mass variation, a conversion possibility is available between the two types of calculation .

$$C.V \% - 1.25 * U \%$$

IMPERFECTIONS

Yarns spun from staple fibres contain “ Imperfections”. They are also referred to as frequently occurring yarn faults .They can be subdivided into 3 groups

1. Thin Places
2. Thick Places
3. Neps

The reasons for these different types of faults are due to rawmaterial or improper preparation process . A reliable analysis of these preparations will provide some reference to the quality of the raw material used.

Thick places and Thin places lie in the range of +- 100% with respect to the mean value of yarn cross-sectional size . The Neps will overstep + 100 % limit .

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Thick places over +100 % are analysed by the CLASSIMAT system, are cut by the clearers in winding depending upon the enduse of the yarn .

Imperfection Indicator records imperfections at different sensitive levels.

1. Thin Place

- # - 30 % : Yarn crossestion is only 70 % of yarn mean value
- # - 40 % : Yarn crossestion is only 60 % of yarn mean value
- # - 50 % : Yarn crossestion is only 50 % of yarn mean value
- # - 60 % : Yarn crossestion is only 40 % of yarn mean value

2.Thick place

- # + 35 % : Yarn crossestion at thick place is 135 % of yarn mean value
- # + 50 % : Yarn crossestion at thick place is 150 % of yarn mean value
- # + 70 % : Yarn crossestion at thick place is 170 % of yarn mean value
- # +100 % : Yarn crossestion at thick place is 200 % of yarn mean value

3.Neps

- # 400 % : the crossestion at the nep is 500 % of the yarn mean value
- # 280 % : the crossestion at the nep is 380 % of the yarn mean value
- # 200 % : the crossestion at the nep is 200 % of the yarn mean value
- # 140 % : the crossestion at the nep is 140 % of the yarn mean value

The standard Sensitive levels are as follows

Thick Place : - 50 %

Thin Place : + 50 %

Neps : 200 % (280 % for open -end yarn)

YARN HAIRINESS

Yarn hairiness is a complex concept, which generally cannot be completely defined by a single figure. The effect of the yarn hairiness on the textile operations following spinning, especially weaving and knitting, and its influence on the characteristics of the product obtained and on some fabric faults has led to the introduction of measurement of hairiness .

Facts about Hairiness

HAIRINESS occurs because some fibre ends protrude from the yarn body, some looped fibres arch from the yarn core and some wild fibres in the yarn.

^ There is a high corelation between the number of protruding ends and the number of fibres in theyarn cross-section.

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^ Torsion rigidity of the fibres is the most important single property affecting the yarn hairiness. Other factors are flexural rigidity, fibre length and the fibre fineness.

TWO MAJOR MANUFACTURERS OF HAIRINESS TESTER IN MARKET .

1. USTER

USTER is the leading manufacturer of textile testing equipment .The uster hairiness H is defined as follows :

H = total length (Measured in centimeters) of all the hairs within one centimeter of yarn.

The hairiness value given by the tester at the end of the test is the average of 40,000 individual values .The Hairiness H is an average value thus giving no indication of the distribution of the length of the hairs. As a result Two Yarns with similar H value might have vastly different distributions of the length of the individual hairs.

2. ZWEIGLE

Zweigle is a somewhat less well-known manufacturer of yarn testing different lengths are counted separately, and these values are displayed on the equipment .In addition, the S3 value is given , which is defined as follows .

S3 = Sum (No of hairs 3 mm and longer)

S2 = Sum (No of hairs 2 mm and longer)

S1 = Sum (No Of hairs 1mm and longer)

S3yarn 1 = 2

S3yarn 2 = 4

Yarn 2 is more hairy than Yarn 1.

Expression for Rkm Value .

Rkm stands for Reisskilometer in German and Resistance Kilometrique in French. Rkm means the kilometers of yarn for break : that length which can support at breaking point.

Rkm value = $\frac{\text{Single yarn Strength}}{\text{Tex number of yarn}} \sim \frac{\text{lea CSP}}{150}$

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