TECHNICAL TUESDAYS

YARN HAIRINESS

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Introduction

Hairiness is a measure of the amount of fibers protruding from the structure of the yarn. Earlier yarn hairiness was not given so important. But as high-speed looms and knitting machines came, the hairiness became a very important parameter.

Factors influencing yarn hairiness

Hairiness consists of protruding fibers, looped fibers and loosely wrapped fibres. High hairiness in the yarns is mainly due to presence of short fibres in excessive proportion, air currents disturbing the fibres in the yarn, rough surfaces abrading the yarn, generation of static charges while the yarn is being formed. Improper selection of fibre micronaire can also lead to hairiness. Cottons with higher micronaire leads to more hairiness compared to the finer micronaire cotton. Count and twist have considerable influence on hairiness. Coarser yarns have more hairiness than finer yarns because of higher number of fibres in cross-section in the former. Yarn count has the maximum influence on hairiness. Hairiness reduces with increase in twist. Hairiness is therefore more in hosiery yarns, which have low twist.

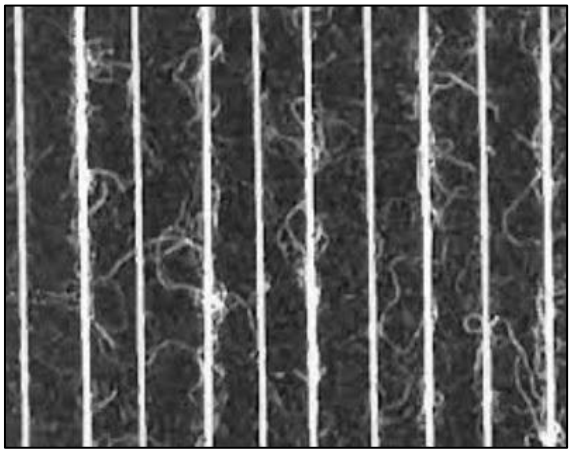

Fig 1.1 – Yarn hairiness

Drawbacks of hairiness

- Hairiness adversely affects the appearance of yarns and fabrics. It leads to fuzzy and hazy appearance of fabric. Yarns with hairiness, when woven into fabric, causes stripiness which is visible in dyed fabrics. The reason for this is that the protruding fibres take up more dye and consequently look darker.
- Hairiness affects performance of yarn in different stages.
- Excessive lint droppings in sizing, loom shed and during knitting are encountered with hairy yarns because of shedding of hairs and broken hairs.
- In printed goods, prints will be hazy and lack sharpness if yarn is hairy.
- In sewing, breakages will be high with hairy yarns.
- Pilling tendency will be more with higher hairiness. Pilling is a major problem with knitted and polyester blend fabrics.

Removal of hairiness

Hairiness is removed or suppressed by singeing, waxing, application of lubricant, enzyme treatment and sizing. Knitted fabrics are not singed. Yarn used for knitting is therefore waxed to lay the hairs on the surface. Sewing threads are passed through a liquid containing silicone based surface-active agent to lay the fibres on the body and make the surface smooth.
Application of wax or surface-active agent reduces hairiness. Enzymatic treatment for removing the hairs is preferable and the improvement is moreover permanent. Treatment with cellulase enzyme removes hairs and reduces pilling tendency.

Summary

In spite of the drawbacks, hairiness has some beneficial effects. It adds to the textile character of the fabric and contributes to comfort, liveliness, skin friendliness and warmth. This will be apparent from a comparison of fabrics made from filament yarn and staple fiber yarn of the same type of fiber and count. Fabric made from filament yarn will have 'plastic' feel. Hairiness is undesirable for knits, shirting and dress materials whereas hairiness is desirable for thermal insulation found in woolen cardigans, shawl and flannel fabrics.

Wishing you a great week ahead!

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