

INVESTIGATION OF EFFECT OF DIFFERENT FRICTION BEHAVIOURS ON THE FIBER LOSS DEGREE FOR RAISED 3-THREAD FLEECE FABRIC

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EXTENDED ABSTRACT

In the study, it was investigated the effect of the three types of friction behaviour on the fibre loss tendency of the raised 3-thread fleece fabric, known as futter fabric. Face of 3-thread fabric contacted with the skin is raised for having well touch feeling and thermal comfort. The fabric is napped with the effects of the raising process. By raising, some fibres hold to the fabric at least one side, while others could be standing freely on the surface though fibre ends leave the fabric construction. During the usage of the raised fabric, the fibres standing freely on the surface could be caused some disadvantages for customers. There are not any standards that could measure the fibre loss degree from surface of raised fleece fabrics. In this experiment, three different test devices having different friction character were used and it was investigated the fibre loss degree on the rubbed surface as qualitative and quantitative approaches by using subjective evaluation and SEM analyses. In the study, the 3-thread fleece fabric, which is called 30-70-14, contain combed ring yarn (Ne 30) for the front face, %50/50 cotton/PES blended open-end yarn (Ne 14) for the back face and filament PES (70 denier) as connection, was used as specimen. The fleece fabric was dyed to black colour by using both the reactive and the disperse dyestuffs. In the study, during the test, the woven, single jersey and rib knit fabrics were chosen as adjacent fabrics in terms of friction on the raised face of the fabric. The tests were repeated at two conditions by using dry and humid adjacent fabrics because of the changeability of the friction coefficient between dry and humid surfaces. The fibre loss tests were made by martindale devices having different friction character. In these devices, beside differences of the type of friction, the test period was also accepted as test parameters. According to tests, it was seen the friction character was crucial effect on the fibre loss and the most fibre loss on the raised fabric was found at Martindale test device having sinusoidal movement. Moreover, the fibre loss at the raised fabric increased with using of humid adjacent fabrics, associated with the escalating of friction coefficient and friction time by using subjective and SEM analyses. Thus, it could be said, it must consider these three parameters while developing fibre loss performance test for raised fabric.

Key Words: Futter fabric, raising, fibre loss

1. INTRODUCTION

Fleece is one of the oldest knitted fabric designs which still command huge popularity in today's modern fashion world. It has the unique characteristics of being warm, easy to care, easy to sew, washable and hang to dry. Recently, 2- thread and 3- thread fabric have been used for sports and outdoor cloths thanks to their good thermal comfort lower air permeability and cold protection. Two-thread fleecy and three-thread fleecy fabrics are mainly produced on plain circular knitting machines. On the technical back side of these fabrics yarn floats along

the rows and is inlay tucked at intervals into the fabric base. Such yarns are called back or fleecy yarns. In the three-thread fleecy fabric structure, the back yarn is invisible on the technical front even when using yarns with different thickness. The structure is composed of fleecy yarn, binding yarn and face yarn. These knitted fabrics are usually obtained by using thicker back yarn with the same thickness of front and binding yarn [1]. In addition to the above-mentioned advantages, the biggest disadvantage of these fabrics is high amount of fiber loss after raising process. When consumer used garment made from these raised fabrics, this high amount fiber loss causes attachment of the fiber on the body or staining the other cloths. This problem affects consumer comfort negatively. In order to identify this problem, the term “raising fastness” is used (In-house term for LCW). In literature, it was encountered a few studies on 2-thread and 3-thread raised fabric, which are related to the thermal comfort properties, weight loss depending on fibre blend in the back-yarn, twist effect of the back-yarn, air permeability, changes of the burst strength and tensile strength of the fabric [2,3,4,5,6,7]. However, it was not observed any studies about fibre loss performance 3-thread raised fabric. However, when the information about test method is investigated in the literature, it was not found any work. In this study, the effect of friction behaviour on the fibre loss was investigated. With the help of this information, we will try to develop new test method.

2. MATERIAL AND METHOD

2.1 Material

In the study, the 3 thread raised futter fabric was used. In addition, two different adjacent fabric which was rubbed to futter fabric of raised back face was used in order to develop test such as woven and ribana knitted fabric.

2.2 Method

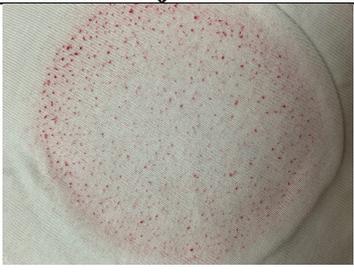
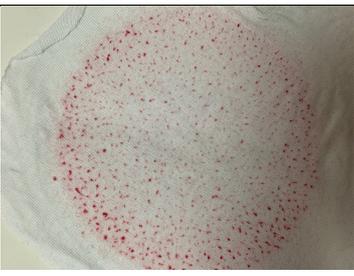
The friction behavior was tested via martindale pilling tester and crockmeter. While applying test in martindale, two parameters were also investigated as type of adjacent fabric, the count of rubbing cycle (5-50-100-150 cycle). The tests were repeated at two conditions by using dry and humid (nötr-acidic perspiration-basic perspiration) adjacent fabrics because of the changeability of the friction coefficient between dry and humid surfaces. In addition, the SEM images were taken from original and adjacent fabrics.

3. RESULTS AND DISCUSSIONS

In Figure 1, the only one example of tested fabric can be seen. In this experiment, 48 tests were done. According to this Figure 1, the fibre loss was changed depending on the type of adjacent fabric. The bigger loss was found out at knitted fabric because of surface structure.

When the whole results were investigated, it could be said that the fibre loss and staining of adjacent fabric by fibre raised by increasing of rubbing cycle. In addition, the humidity of the adjacent fabric rubbed to futter fabric were also changed the fibre loss. The type of humidity was also affected the futter performance. The acidic perspiration impregnated adjacent fabric was the most effective on the rubbed surface, because the effect of acid on the cotton based fabric.

The other factor investigated in the study was the type of the adjacent fabric rubbed to the futter fabric.

Futter Fabric	Adjacent Fabric
	
Woven Adjacent Fabric	Woven Adjacent Fabric
	
Knitted Ribana Fabric	Knitted Ribana Fabric
	
Knitted Single Jersey Fabric	Knitted Single Jersey Fabric

4. CONCLUSION

As a conclusion, it was found out that the condition of this in-house test was effective. The friction behavior changed according to the count of rubbing cycle, humidity and type of adjacent fabric.

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