

INFLUENCE OF SINGEING OF LINEN/SILK FABRICS ON PILLING RESISTANCE

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Nowadays the pilling resistance of fashion fabrics is very important and frequent problem during the cloths everyday wearing. Properties of woven fabrics are influenced by raw material compositions. In this research were used woven fabric from linen/silk yarns (70% linen/30% silk). It was looking for finishing methods and possibilities for improvement of this fabric property (pilling resistance). One of mechanical finishing method is singeing. Pilling tests of grey and dyed fabrics with and without singeing were done during the experiment. The influence of singeing on linen/silk fabric was not very significant and this kind of mechanical finishing can be used as additional mean for improving pilling resistance.

Key Words: singeing, pilling resistance, linen/silk fabric, finishing.

1. INTRODUCTION

Different scientists have investigated abrasion and pilling resistance of both, woven and knitted fabrics; for example, . S. A. Smiriti and Md. A. Islam [1] researched knitted fabrics of different fibre blends. They analysed pilling resistance of fabrics before singeing and after singeing using pilling box method. It was noted that mechanically singed samples show better pilling grade (3-4) than those without singed samples (1-2) and bigger amount of PES fibre influences the lower pilling resistance of the fabrics.

In research “Study of Pilling in Polyester/Cotton Blended Fabrics”, V. R. Sivakumar, K. P. R Pillay [2] investigated the reasons of pilling resistance and possibilities of its decreasing. They established that such physical characteristics as length, fineness, etc. of the component fibres, the yarn twist and the density and type of weave of the fabric influence rise of pilling resistance. In addition, such processes as singeing, cropping and heat setting reduce the pilling tendency significantly.

H. Shakhawat [3] determined that the pilling tendency of CVC knitted fabric can be reduced easily by singeing and heat setting keeping the other physical and chemical properties unaffected.

Pilling resistance of knitted and woven fabrics after singeing were investigated by different scientists, but were not found information about woven linen/silk properties after this mechanical finishing. In this case were analysed linen/silk fabric before and after singeing.

2. MATERIALS AND METHODS

Object of investigation was woven fabrics from single blended yarn 26 tex, 70 % linen / 30 % silk in warp and in weft. Warp setting was 220 dm⁻¹; weft setting was 223 dm⁻¹. Fabrics were woven using double-layer weave with layer changing.

Fabrics were treated with different finishing. At first, grey fabrics and dyed fabrics without any additional finishing operations were investigated. After that grey and dyed fabrics after singeing were analysed.

All finishing procedures (washing, dyeing, rinsing, softening, and drying) were performed in machine BRONGO 100 (Italy). Fabrics were washed 10-15 min in temperature 65⁰C, dyed 75-120 min in temperature 60⁰C. Active dyestuff Novotron (Hausmann, Switzerland) was used. Fabrics were rinsed in cold water twice and in hot water twice after dyeing. One rinsing took 5 minutes. Softening was performed in acid environment; softener Eversol (Japan) was used.

Singeing for loomstate fabric was performed in gas singeing machine VOLLENWEIDER with open flame. Two different sets of burners were used for singeing for both sides of the fabric by threading the fabric suitably. In a gas singeing machine, the fabric in open-width passes with speed of 55 m/min.

Samples were put on the plain horizontal surface, where weather can go through the fabric, and they were conditioned at least 24 hours in standard weather conditions (standard LST EN ISO139: 2005 / A1: 2011) before testing, i.e. temperature was (20 ± 2)⁰C and relative humidity was (65 ± 4) %.

The pilling resistance tests were performed using universal pilling and abrasion machine MESDAN-LAB, Code 2561E according to standard ISO 12945-2:2000 “Determination of fabric propensity to surface fuzzing and to pilling – Part 2: Modified Martindale method”. Three pairs of circular samples, three from which were put on holders and another three – on pilling table, were cut from the fabrics investigated. Each sample was evaluated by three experts according to organoleptic evaluation after certain number of cycles. Marks of pilling of each sample were written and average result of all evaluations was established after evaluation of samples appearance. Evaluation of pilling marks is described in Table 1.

Table 1. Evaluation of pilling marks

Mark	Description
5	Appearance does not change.
4	A slight fuzzing on the surface and (or) partially formed pills.
3	A medium fuzzing on the surface and (or) medium pilling. Pills of different magnitude and density covers partially fabric surface.
2	Significant fuzzing and (or) significant pilling. Pills of different magnitude and density covers large part of fabric surface.
1	Extremely significant fuzzing on the surface and (or) extremely significant pilling. Pills of different magnitude and density cover whole fabric surface.

2. RESULTS AND DISCUSSION

The diagrams of pilling resistance of grey and finished fabrics without singeing Figure 1 and with singeing Figure 2. In beginning of pilling test (125 cycles) the results shown very good quality of dyed fabric without singeing 4.5 mark. After (500 cycles) the situation changes better results are in Figure 2, the fabrics with singeing have equal 4 marks. In the middle of pilling test (after 1000 cycles) the marks were almost similar, i.e. they shower 3-3.5 mark. At the end of the test the pilling mark was the same in both Figure 1 and Figure 2 equal 2,5 mark.

In comparison diagrams without and with singeing it can be seen that the character of diagrams are different.

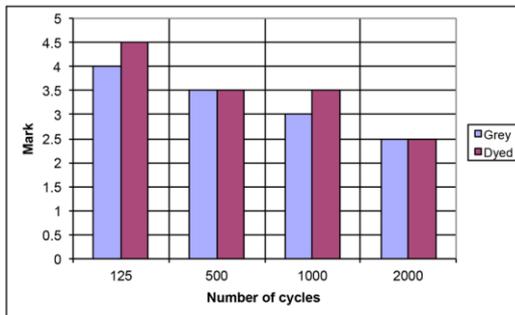


Figure 1. Pilling marks of fabrics without singeing.

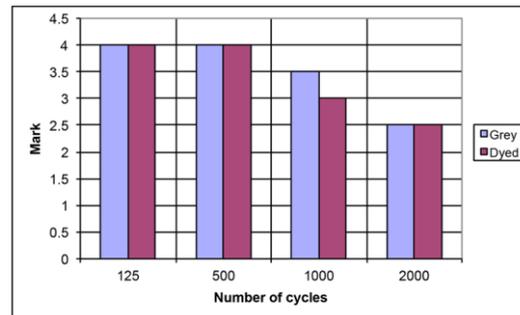


Figure 2. Pilling marks of fabrics with singeing.

It can be stated, that the results of pilling resistance became better, because the character of diagrams are better for fabrics after singeing, i.e. these fabrics preserve the higher mark of pilling resistance longer during the abrasion cycles. So, singeing has influence on fabrics pilling resistance, but it is not significant. So, we have to use that kind of mechanical finishing just as additional finishing for better pilling resistance.

3. CONCLUSION

- Mechanical finishing (singeing) influences on character of changing of linen / silk fabrics pilling resistance without changing of final pilling resistance mark.
- Pilling marks of fabrics after singeing at first changed less, and marks of fabrics without singeing changes more or less gradually.

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