

Abrasion resistance of woven fabrics with linen/silk yarns

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Introduction

Abrasion resistance shows the fabric ability not to change its appearance during friction effect. Abrasion appears during wear and washing, which means that fabrics are affected by friction forces during usage [1]. Different scientists studied influence of woven fabric structure on different fabrics' end-use properties. V. Milašius et al [2] analyzed influence of fabric structure on air permeability and abrasion resistance. They established that when fabric structure is rigid its air permeability decreases and abrasion resistance increases. Abrasion resistance was analyzed by many scientists, but it is important to analyse behaviour of unique raw material such as linen/silk during abrasion test and to examine how finishing changes this fabric property. It is the main aim of presentation.

Materials and methods

Fabric was woven using innovative unexpected raw material yarns of linen and silk blend. These yarns were used in warp and in weft directions. Linear density of yarn was 26 tex. Warp setting was 220 dm⁻¹, weft setting was 220 dm⁻¹. Warp was drawn-in in broken draft into 10 harnesses (8 – for the background and 2 – for selvedge). Weave of fabric was combined – plain and compound double-layered. Fabric was woven using rapier weaving loom *Itama R9500* (Italy).

Fabric was treated to finishing. It was washed, dyed, rinsed and softened in machine *Brongo 100* (Italy). Fabric was washed 10-15 min in the temperature of 65°C. Dying continued 75-120 min in the temperature of 60°C. Warm and cold rinsing was done for the fabric (one rinsing took 5 min). After that acid and softener were poured down into machine. Active dyestuffs *Novotron* (Switzerland) were used for dyeing and softener *Eversol* (Japan) was used for softening.

Abrasion resistance test was done according to standard LST EN ISO 12945-2 using *Martindale* abrasion and pilling tester *MESDAN-LAB, Code 2561E* (England). Tester was stopped after each 2000 abrasion cycles till two threads break in the fabric surface. The mass of fabric samples was fixed after each abrasion period.

Results

In order to compare abrasion resistance of grey and finished fabric which was woven using new linen/silk yarns the abrasion tests were done for grey and finished fabrics. The results of mass change during abrasion are shown in the Figure 1. It can be seen from the Figure that mass of grey and finished fabrics changes different. Mass decreases during abrasion for both, grey and finished fabric. Mass of finished fabric always is higher than of finished fabric. Mass changes of finished fabric are lower than of grey fabric. Dependences of fabric mass on abrasion cycles are described by linear equations, the determination coefficients of which are high, i.e. 0.9536 and 1. So, the dependences of mass on abrasion cycles are strength.

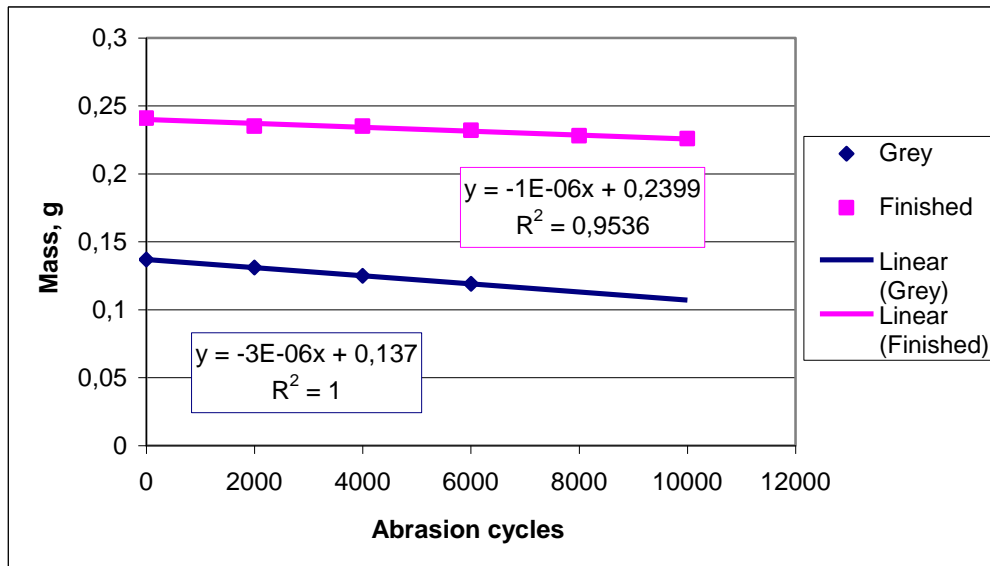


Figure 1. Dependences of mass on abrasion cycles of grey and finished fabrics from linen/silk yarns

It can be seen that mass of abraded fabric depends on fabrics finishing processes, i.e. mass of finished fabric is higher than of grey fabric but mass of finished fabric decreases more slowly than of grey fabric. So, it can be stated, that finishing enlarges abrasion resistance of woven fabric.

Conclusions

1. Mass of finished fabric is higher than mass of grey fabric during abrasion.
2. Mass change of grey fabric is lower than mass change of finished fabric.
3. Finishing processes enlarges abrasion resistance of woven fabric from linen/silk yarns.

References

- [1] Kaynak H K and Topalbekiroğlu 2008 *Influence of fabric Pattern on the Abrasion Resistance Property of Woven Fabrics (Fibres and Textiles in Eastern Europe vol 16 no 1)* pp 54-56
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