

THE USE OF DIFFERENT SILICONE POLYMER TO INCREASE THE PERFORMANCE OF DENIM GARMENT

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Abstract: Nowadays, the denim is a fabric type that is increasingly important and is at the globally center of fashion trends. Denim fabrics are highly preferred due to their durability, effectivity, and superior technical properties. The studies in the literature have particularly focused on the mechanical properties of denim clothing [1-2]. The touch, elasticity, good elongation performance and whiteness of the weft side are among the important expected features of denim clothing. The finishing processes of denim garments are carried out according to the exhaust method in drum washing machines (Figure 1) in garment format. In practice, the cationic softeners are used especially because they are cheap. However, this material improves the properties of denim fabrics to a limited extent. Within the scope of this study, washing experiments were carried out with silicone-based softeners based on different chemical structures. When the literature was examined, it was determined that silicone-based softeners were studied especially on knitted fabrics [3-4]. Within the scope of the research study mentioned in the study, trials were carried out at different concentrations, process steps and application times. To measure the performance of the fabrics obtained from the experiments, strength, pilling, stiffness, back staining degree measurement, elasticity and permanent elongation values were tested and recorded. When the results are examined, improvements have been achieved, especially in elasticity (%), residual growth and back staining performance, depending on the chemical structures of silicone-based softeners. The touching performance was also tested subjectively by hand. It has been determined that the softness and surface slipperiness of silicone-based softeners are better than cationic one. The elongation and growth of the garment was measured as 75% and 7,5%, respectively. With the silicone treatments, the elongation performance did not change while the growth value was improved to 3%. In addition, the stiffness value was measured as 1,45 kgf. When the process was applied with silicone polymer instead of cationic softener as showed in Table 1, the value was decreased 0,55 kgf and the softness performance got better. In addition, we did not determine any negative change on the tearing, tensile strength, color fastness and pilling performances. When all the whole performance results obtained in the study are examined, it has been determined that silicone softeners can be a good alternative for denim clothing and can improve the technological properties of the fabric by replacing cationic softeners.

Keywords: silicone, denim, softness, growth, back staining, cationic softener, strength



Figure 1 Picture of the washing machine

Table 1 The reference application finishing process of denim garment

The Name of Process	Recipe
Prewashing	Dispersing Agent: 500 ml
Washing	Only Water
Stone Washing	Stone: 75 kg Enzyme: 150 gram Dispersing Agent: 500 ml
Washing	Only Water
Enzyme App.	Acidic cellulase enzyme: 150 ml
Washing	Only Water
Drying	-
Spray	Potassium Permanganate/ Activator: 10/5
Neutralization	Crystal sulfide: 300 gram
Washing	Only Water
Softning	Cationic Softener: 2 Liter

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