THE APPLICATION OF FINISHING AGENTS VIA SOLUTION BLOWING (SBS) METHOD INTO TO DENIM FABRIC

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Abstract: In the study, the softeners and repellent finishing agents applied to the denim woven fabric via solution blowing methods (SBS) instead of conventional techniques. The SBS method is generally used to obtain nano fiber in the literature. The nano fiber got from SBS is usually used for filter sector [1-2-3]. This method is known hibrit format of electrospinning and melt spun techniques. The polymer is sprayed with the help of pressured air. In general, the nozzle used in this method can spray single polymer with air. In this research study, two important novel subjects were researched as type of nozzle and the nano spray of the finishing agent into denim fabric surface by SBS. The nozzle used in this study can spray two different polymers in same time without mixing each other, because it has two polymer channels with one pressured air channel (Figure 1). In addition, according to the literature, there isn't any study about spraying of finishing agents to denim fabrics by SBS. Because of the structure of the nozzle and high air pressure, the polymer sprayed to the opposite surface returned nano scale. The polymer turned nano scale showes the nano particle properties because of high surface area. The nano spray applications carried on the machine showed in the Figure 2. Two different softeners as hydrophile and macro silicon based, and one fluorocarbon repellent finishing agents applied to the unsized indigo dyed denim fabric with 45% pick up by SBS. To compare the success of the novel spray application, these agents were also impregnated to the same denim fabric by impregnation method. The color fastness, CIELab, GSM, stiffness, abrasion resistance, pilling, MMT and contact angle performances of finished specimens were measured. In addition, SEM-EDX and FTIR analysis were made to find out the presence of the agents on the fabrics. With this application method, two important outputs have been tried to be found out as novel low pick-up application and sustainable finishing process because of faster drying and low chemical consumption. The experimental plan of the research can be shown in Table 1. According to the results, we determined any change on the surface performances with pilling for softeners applications while half and 1 points improvement was found for the repellent finishes both methods. The spray test performance of the reference denim fabric was ISO 0 degree. After the repellent finishes, the performance was measured as ISO 3 and ISO 4 for impregnation and SBS performances, respectively. We did not find any change for the contact angels test for whole applications. When the MMT results analyzed, the OMMC results of the reference denim was measured 0,3447 while the spray one was 0,018, the impregnation was 0,0947. According to these results, it could be said that the repellent applications increased the hydrophobic character of the denim fabric. The hydrophobic performance of the SBS method was better than the others. In terms of fastness, the repellent finishes did not affect the performance. However, with the SBS spraying of softeners decreased the color fastness to rubbing, and the impregnation ones did not caused any change.

Keywords: *finishing, SBS, denim, nano spray, softeners, repellent finishes, impregnation*

Table 1 The experimental plan of the research

Type of Application	Table Column Head		
	Hydrophile Silicone	***Macro Silicone***	***Repellent Finish***
Impregranation	30 gr/Lt	20 gr/Lt	40 gr/Lt
Spray (SBS)	5 minutes spraying 40 ml/hour / 3 bar air pressure 30 ml agent transferred		

Figure 1 The picture of the nozzle

Figure 2 The picture of the SBS system

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