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Modelling the Behavior of Commercial and Test Textiles against Laundering Process by Statistical Assessment of Their Performance

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Abstract : Various exterior factors have perpetual effects on textile materials during wear, use and laundering in everyday life. In accordance with their frequency of use, textile materials are required to be laundered at certain intervals. The medium in which the laundering process takes place have inevitable detrimental physical and chemical effects on textile materials caused by the unique parameters of the process inherently existing. Connatural structures of various textile materials result in many different physical, chemical and mechanical characteristics. Because of their specific structures, these materials have different behaviors against several exterior factors. By modeling the behavior of commercial and test textiles as group-wise against laundering process, it is possible to disclose the relation in between these two groups of materials, which will lead to better understanding of their behaviors in terms of similarities and differences against the washing parameters of the laundering. Thus, the goal of the current research is to examine the behavior of two groups of textile materials as commercial textiles and as test textiles towards the main washing machine parameters during laundering process such as temperature, load quantity, mechanical action and level of water amount by concentrating on shrinkage, pilling, sewing defects, collar abrasion, the other defects other than sewing, whitening and overall properties of textiles. In this study, cotton fabrics were preferred as commercial textiles due to the fact that garments made of cotton are the most demanded products in the market by the textile consumers in daily life. Full factorial experimental set-up was used to design the experimental procedure. All profiles always including all of the commercial and the test textiles were laundered for 20 cycles by commercial home laundering machine to investigate the effects of the chosen parameters. For the laundering process, a modified version of ‘‘IEC 60456 Test Method’’ was utilized. The amount of detergent was altered as 0.5% gram per liter depending on varying load quantity levels. Datacolor 650®, EMPA Photographic Standards for Pilling Test and visual examination were utilized to test and characterize the textiles. Furthermore, in the current study the relation in between commercial and test textiles in terms of their performance was deeply investigated by the help of statistical analysis performed by MINITAB® package program modeling their behavior against the parameters of the laundering process. In the experimental work, the behaviors of both groups of textiles towards washing machine parameters were visually and quantitatively assessed in dry state.

Keywords : behavior against washing machine parameters, performance evaluation of textiles, statistical analysis, commercial and test textiles
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