Effect of Anti Pilling Finish Concentration and Fabric Type on Pilling Resistance of P/C Fabrics

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ABSTRACT

The purpose of this research is to investigate the effect of anti pilling finish concentration and fabric weave type on the pilling performance of P/C fabrics. Three types of bleached fabrics i.e. plain weave, satin weave and twill weave fabric samples were treated with anti pilling agent DICRYLAN BSRN. For finishing treatment three recipes were prepared using three concentrations of anti pilling finish i.e. 20 g/l, 40 g/l, 60 g/l. The process was accomplished by padding fabric through anti pilling finish solution to a wet pickup of about 60%. After padding all samples were dried at 120 °C temperature. After finishing treatment all samples were evaluated for pilling, whiteness and tensile strength using ISO and AATCC standard test methods. The results showed that by increasing concentration of anti pilling finish pilling rating of all fabric samples was improved. Further it was observed that anti pilling finish has no effect on whiteness of fabric samples while tensile strength of fabric samples was decreased very slightly after treatment with anti pilling finish agent. From the overall results it was concluded that anti pilling finish can be safely used for minimizing the problem of pilling because pilling resistance of P/C fabrics was improved significantly after the application of anti pilling finish.

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INTRODUCTION

Pilling is a phenomenon that has a long cause trouble in textile industry. It is the formation of pills or knops on the surface of woven or knitted fabrics caused by friction and abrasion. If fabric has a pronounced tendency to pilling, its appearance suffers severely after a short period of use. Pilling proceeds in two stages. Individual fibers start protruding from the surface of the fabric and form an uneven nap. The protruding fibers rolls together become entangled and felt to form knops.

The pill is a ball of tangled fibers that is held to the fabric surface by several anchor fibers. This problem became more severe because of the conversion to higher strength and lower denier polyester in order to utilize high speed spinning equipment. Generally pills are made of fibers entanglements and sometimes contain a polluting nucleus. They are produced by rubbing action against the same fabric or different surface. For pilling to occur, it is necessary to have fabric using yarn spun from staple fibers and weave structure loose enough to permit fiber migration to the surface. Migration of fiber from yarn to fabrics surface depends upon the fiber properties, the way they are spun, fabric weave structure and its set, as well as finishing processes (Gintis& Mead, 1959).

Natural fibers like cotton exhibit some pilling, but it goes unnoticed because of its inherent weakness: the pills are tiny and fall off quickly. Standard type polyester fibers have higher mechanical strength. Consequently, pilling is often a real problem with these fabrics, the smooth surface and round cross section of these fibers make it easy for them to work their way out of the textile fabric. The higher tear strength and outstanding flexural strength, although beneficial for the service ability of the finished goods, prevents the pills from tearing or being torn of the fabric during wear. Textiles composed of pure polyester staple fibers have more tendencies to pilling than blends of polyester fibers with natural or regenerated fibers. (DuPont, 2011)

An analysis of the conditions giving rise to pilling on fabrics shows that its development is promoted by a number of factors. Fiber characteristics such as the length and fineness of the component fibers influence the pilling tendency of fabrics to a significant extent. Certain yam factors, i.e. low twist, hairy and bulky yams, singles yams, and a high proportion of the polyester component, also influence fabric-pilling. The construction of

fabric is also very important in determining its susceptibility to pilling. A very tight, compact construction, such as denim, usually exhibits little or no pilling. However, a loosely knitted or woven fabric will have more of a tendency to show such damage when continually worn or cleaned (Ukponmwan*et,* Mukhopadhyay&Chatterjee, 1998).

For pilling evaluation, a number of testing instruments have been designed to reproduce the effect of pilling that occurs in normal wear. Fabrics are subjected to form pills by tumbling, brushing, or rubbing specimens with abrasive materials, and then are compared with visual standards to determine the degree of pilling on a scale ranging from 5 (no pilling) to 1 (very severe pilling).