

Antielectrostatic finishing of Polyamide fibres in exhaust processes

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Textiles manufactured from insulating synthetic fibers for example polyamide fibers show high electrostatic charge upon friction. Undesired electrostatic charge of such textiles lowers wear comfort and decreased anti – soil effects are observed.

A strategy to reduce electrostatic charge is to improve surface conductivity. Such effect can be obtained by film forming polymers which adsorb water and form a conductive layer on the fibre.

While for technical textiles the modification of fibers can be an efficient strategy, particularly in production textiles for cloths, for example underwear, tights the application of a suitable finish is preferable because of higher variability and flexibility in production. From many finishing processes the effects of anti – electrostatic finishing processes are quite satisfying however in many cases conductive films formed on the surface of the fibre exhibit low permanency to washing procedures. Based on selected film forming polymers, anti – electrostatic properties, measured as surface resistance of a fabric, can be kept over a number of washing cycles. Knitted polyamide was treated with quaternary polymers and conductive films were formed on the fibre by salt formation with selected anionic compounds. Electric surface resistance could be lowered from $1.2 - 4.6 \cdot 10^{12}$ Ohm to values of $7.6 \cdot 10^8$ Ohm after finishing. During 10 repeated washing cycles to resistance increased to $2.3 \cdot 10^{10}$ Ohm. The formation of water containing films can be demonstrated by the uptake of humidity from the surrounding atmosphere and a strong dependency of the electric properties on the climate present. Dependent on the formulation used, the electric resistance for example increases from $3.2 \cdot 10^8$ Ohm at 75 % relative humidity to $2.0 \cdot 10^{12}$ Ohm at 10 % relative humidity.

The results indicate new aspects for auxiliaries in polyamide finishing with improved anti – electrostatic properties.