

A Review on Coating & Lamination in Textiles: Processes and Applications

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Abstract Coating and lamination are two functional processes which are used make a proper finishing to the textile material. The coating formulation with different textile grade polymer like PVC, PU, acrylic, PTFE are hugely used to make a textile product with multipurpose way like- waterproof protective clothing, tarpaulin, protective clothing, electrical insulation etc. on the other hand lamination process is used to prepare some important textile products with daily uses in our practical life like- blackout curtains and blinds, and e. In this current work is related to details of lamination theory, various processes, formulations, application, recent developments of the coating and lamination in the textile field.

Keywords Coating, Lamination, PVC, PU, Acrylic, Waterproof Protective Clothing, Tarpaulin, Tarpaulin, Lamination Theory, Processes, Formulations, Application, Recent Developments

1. Introduction

Coating and laminating are increasingly important techniques for adding value to technical textiles. Coating and lamination enhance and extend the range of functional performance properties of textiles and the use of these techniques is growing rapidly as the applications for technical textiles become more diverse. Cheaper fabric structures may be coated or laminated to provide higher added value to end-users and higher profit margins to manufacturers. The key to success in textile coating and lamination depends upon the application of appropriate technology using modern machinery[1-3]. Machine productivity is important, but flexibility in terms of production speed and the versatility of coating/lamination methods are important factors to consider, as well as a high level of process monitoring, process control and automation to satisfy demanding technical specifications.

2. Coating Technology

Coating is a process in which a polymeric layer is applied directly to one or both surfaces of the fabric. The polymer coating must adhere to the textile and a blade or similar aperture controls the thickness of the viscous polymer. The coated fabric is heated and the polymer is cured (that is, polymerized). Where a thick coating is required this may be built up by applying successive coating layers, layer on

layer. Interlayer adhesion must therefore be high[2]. Finally, a thin top layer may be applied for aesthetic or technical enhancement of the coating. Depending upon the end-use requirements, heavy-duty technical textile coatings may be applied at high weight, while other end-uses for high-technology apparel may require coating weights very low. The chemical formulation of the coating, the coating thickness and weight, the number of layers, the form of the technical textile and the nature of any pre-treatment (such as to stabilize the fabric dimensions prior to coating) are of great importance. Traditionally, coating has been applied to woven technical textiles, but increasingly warp-knitted, raschel[3], weft-knitted and nonwoven fabrics must be coated on the same line. The machinery and method of application of the coating formulation must be versatile, minimize tensions on the fabric that may lead to distortion or stretch, and eliminate problems in knitted fabrics such as curling selvages. Scroll opening equipment, weft straightening, tension bars and selvedge uncurlers may thus be fitted[4-6]. The lighter the weight of the technical textile the more prone will be the base fabric for coating to weft line distortion and selvedge curling.

2.1. Coating Formulations

The formulation of a coating is complicated, and it can contain a wide range of chemicals depending upon the nature of the polymer, the necessary additives for the specific end use, whether the coating has to be foamed prior to application, and the type of coating machinery to be used. Coatings may be coloured, translucent or opaque, fluorescent, photoluminescent or retro-reflective, according to the end user requirements[7]. Some thermoplastics are used as they allow the material to be used as they allow the material to be used as hot melt adhesive and in some cases for welding techniques. They are used as coating polymers.

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