

Improving of Adhesion in Laminated Rubber Glove Process and Incorporation of Recycled Coagulated Centrifuged Latex

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Abstract

As latex based product laminated glove is coming under household category use for the heavy duty purposes and for construction industry. Laminated Rubber sheet is used as a composite to palm area with textile fabrics (Kevlar, Cotton). The low adhesion causes to separate of laminated rubber sheet from the fabric and low quality. The emphasis was placed on enhance the adhesion ability while introducing of new method to incorporate recycled coagulated centrifuged latex with the laminated rubber sheet manufacturing. The research was conducted at the Workwear Lanka (Pvt) Ltd at Biyagama. Preliminary trails were based on common formulas of adhesive and the existing process line. To fix the accurate secondary solvent (SBP) amount and the accurate viscosity and the TSC of the adhesive, the amounts (SBP) were adjusted into 0ml, 50ml, 100ml, 200ml, 300ml and 400ml. Then modifications of the current process line by changing smoothing turns (one, two), maturing period (0.24, 48 hours), curing temperature (120,155,160 °C), time (30,40,90 minutes) and the adhesive formula under different curing temperatures and times were done using modified adhesive blend to enhance the adhesion. Adhesion test was done for all experiments. Then the coagulated centrifuged latex (5kg) with high moisture content was recycled and incorporated it as the filler to the laminated sheet compound. Mechanical testing, moisture content and rheograph characteristics were measured, for the incorporated sheet and data were analyzed by using Tukey method and Dunnett test of MINITAB 16 statistical software. The adhesive blend with 200ml (SBP) has significant difference ($p < 0.05$) among other treatments and the T16 process line has the significant different ($p < 0.05$) among other process lines. The high wood resin amount with the lowest temperature and longest time period has the significant different ($p < 0.05$) between each other treatment levels. There are no significant differences ($P > 0.05$) the results of mechanical tests, rheograph characteristics and the moisture content between the existing and the incorporated laminated sheet. The best conditions for the highest adhesion ability are the 200ml, optimum SBP amount with 78.7 viscosity and 93.7 TSC value, double time smoothing, 24 hours maturing period, 120 °C low curing temperature, 90 minutes high curing time and with high amount of wood resin and there is a potential to incorporate of recycled rubber as the cost reduction filler ingredient.

Keywords: Adhesion, cotton, kevlar, coagulated centrifuged latex, (secondary solvent) SBP