

Effect of Technically Specified Rubber (TSR) Variations on Rheological Properties of Soft Compound of Solid Tires

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The soft compound of solid tires is used to produce the middle section (cushion) of the solid tires which enhanced to provide the cushioning effect. Medium hardness, low heat buildup, high elasticity and high resilient are the most expected characteristics from the soft compound. TSR from different suppliers may lead to unexpected deviations in the rheological properties of the soft compound produced. Such deviations in the rheological properties significantly affect the performance of soft compound. The objectives of this study were to investigate the effect of TSR variations of suppliers on rheological properties of soft compound and identify the raw rubber property or properties which cause such variations. Rheological properties such as t_{52} (Scorch time) and t_{c90} (Optimum Cure time) of soft compound produced from TSR supplied by three different suppliers (thirty samples each) were measured to check the effect of TSR variation of the suppliers on rheological properties of soft compound. Raw rubber properties such as dirt content, ash content, volatile matter content, nitrogen content, Wallace plasticity (Po) and Plasticity Retention Index (PRI) of three samples of TSR from each supplier were measured to identify the cause of the TSR variations. The results revealed that the rheological properties of the soft compound are significantly affected by the TSR variation of the supplier ($p < 0.05$). Dirt content, ash content, volatile matter content, nitrogen content were having a significant effect for the resulted variation of TSR ($p < 0.05$). Findings of this study will be useful in selecting the best TSR supplier to produce best soft compound in solid tire manufacturing.

Keywords: Rheological properties, Soft compound, Solid tires, Technically Specified Rubber