

## Optimization of Mixing Parameters using Mooney Viscosity of Top & Bottom Profiles in Off-the-Road Rubber Track Compounds

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Rubber tracks are used in off—the-road heavy duty vehicles. The tread of tracks consists of two layers namely top profile and bottom profile. Rubber Compound ATR 6112 (A) & Compound ETR 5271 (B) are used to manufacture top profiles, while Compound TR 5237 (C) is used in bottom profile. The high Mooney viscosity of such compounds leads to reject the batches of compounds. Therefore, compound mixing parameters were optimized during the study using Mooney Viscosity (MV). Also cure time, scorch delay & hardness of compounds were evaluated. Mixing cycle (s) defined as time for pre-mastication & mixing of curatives and number of mill turns were selected as the major parameters and assessed separately for compounds. Number of mill turns was varied as 3, 2 & 1 for all three compounds. Mixing cycles are Compound A (40,60), (20,60), (0,50,50) & (30,70), and Compound B (20,90), (40,60), (0,50,50) & (30,80), while Compound C at (20,80), (30,70), (0,50,60), & (40,60). Complete Randomized Design with 10 replicates were used. Compounds A and B with the mixing cycle of (0,50,50) where mixing of curatives and rubber compound together, used internal mixer without allowing pre-mastication time. The best mixing cycle was achieved at (30,70) for Compound C with a lower MV. The number of mill turns has not significantly affected on MV, scorch delay, curing time and hardness of all three compounds. The scorch delay was affected by mixing cycle only in Compound B. The curing time was affected by mixing cycle in only Compound A and C. The hardness of the compounds has not significantly affected by mixing cycle. Finally, better cure characteristics of the compounds could be obtained along with reduced Mooney Viscosity by adjusting the mixing cycle.

**Keywords:** Mixing cycle, Mooney viscosity, Mill turns, Rubber track compounds