

**VISCOELASTIC PROPERTIES OF NATURAL
RUBBER UNDER DIFFERENT STORAGE
CONDITIONS**

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ABSTRACT

Latex is the only non-synthetic elastomer in wide use derived from the milk-like liquid of the *Hevea* tree. Rubber as a viscoelastic material, it consists with both viscous and elastic properties. Viscoelastic properties of raw rubber influence the processability of a rubber compound. Even though Sri Lanka is the one of the leading manufacturer of raw rubber, converting raw rubber into products are carried in other countries and those rubber should be kept under storage conditions. The objectives of this study were to study the effect of storage conditions on the viscoelastic properties of raw rubber, viscoelastic properties of compounded rubber and characterization of the different rubber grades. Crepe rubber (CR), Ribbed Smoke Sheet (RSS), Yellow Fraction(YF), Scrap Rubber (SR), Skim Rubber(SKR) and Technically specified rubber (TSR) were the considered as six different types of rubbers. These types of rubber were stored at different temperatures such as -10°C , 24°C , 100°C and 140°C for 5hrs. Rubber samples were analyzed for viscoelastic behavior by analyzing Mooney viscosity and stress relaxation. Plasticity Retention Index (PRI) and un-aged plasticity (P_0) of rubber were measured to study the thermo-oxidative respect to different storage temperature and time. Mooney viscosity was gradually increased with the temperature. YF was exhibited the highest Mooney viscosity by availability of high content of non-rubber. PRI gradually decreased with the increasing storage time and increasing storage temperature. Highest PRI values were exhibited by RSS, high percentage of natural antioxidants present. Un-aged plasticity increased with the storage temperature. High stress relaxation rates were exhibited by both CR and TSR. Low stress relaxation rate was exhibited by YF crepe because of the availability of low rubber content. Blended compound rubbers were exhibited comparatively low mooney viscosity and rapid relaxation rate than raw crepe rubbers. Low storage temperature conditions are more favorable for better processability of crepe rubber. Blending was done for extract the physical and chemical properties of RSS for rubber having poor properties (TSR). 1:3 ratio of RSS and TSR was identified as optimum ratio to blend to extract the properties.

Key words: Raw rubber, viscoelasticity, Mooney viscosity, stress relaxation, non-rubber substances, Plasticity Retention Index