

Effects of Normal Load and Temperature on the Frictional Characteristics of Hydrogenated Nitrile Butadiene Rubber Composites with Varied Filler Concentration

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Viscoelasticity; Rubber friction; Persson's contact mechanics; Low temperature

ABSTRACT

We present experimental results for rubber friction of carbon black filled Hydrogenated Nitrile Butadiene Rubber (HNBR) composites on a rough surface having isotropic surface roughness. The experiments are carried out in a custom built linear reciprocating rig capable of measuring friction force over decades of velocity in the temperature range from -40 to +20°C (see Figure 1). Viscoelastic properties of the rubber compound are characterized by dynamic mechanical analyzer (DMA) and then used for tackling the load, velocity and temperature dependences of rubber friction with the help of Persson's contact mechanics and models of rubber friction.

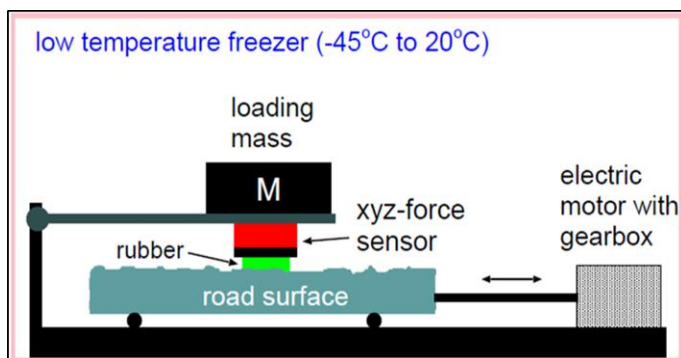


Figure 1. Linear reciprocal friction tester capable of measuring friction from -45 to +20°C.

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