

## **Effect of degradation by temperature onto nitrile rubber elastomer mechanical properties**

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### **ABSTRACT**

One of the important aspects of ensuring safety for vehicle users is maintaining the best tire condition. This is due to the rubber elastomers in tires being able to be degraded by environmental factors such as heat, humidity, UV radiation, and others. This degradation of quality, in other words, "rubber aging," will make the tire lose its traction performance as well as its safety. The aging behavior of an elastomer is complex as it involves various parameters, and it is needed to understand the relationships between these parameters to obtain the suitable formulation related to elastomer degradation. Therefore, the objective of this study is to observe the effect of temperature on the mechanical properties of the selected elastomer, which is nitrile rubber (NBR). In this research, a set of aging chamber hardware is constructed to perform the accelerated aging process on nitrile rubber. Nitrile rubber (NBR) elastomer material is a type of polymer that is commonly used in various industrial applications. An aging chamber is designed and fabricated to model the aging phenomenon. The specimen is prepared using the ASTM D412 standard. As a result, at certain temperatures and aging length, aged nitrile rubber specimens face high pressure point failure and are prone to cracking. It can be proven that, the temperature can be considered as one of the aging factors of the elastomer, as heat is related to the chemical reaction of the NBR polymer chain degradation.

### **KEYWORDS**

Elastomer; Material aging; Material hardness; Nitrile rubber; Tensile strength

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