

**MECHANICAL AND PHYSICAL PROPERTIES OF CARBON
BLACK FILLED ELASTOMER (NR AND EPDM)**

by

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ABSTRACT

Carbon black is well known as a filler in producing synthetic rubber compounding. Ethylene-propylene-diene terpolymers (EPDM) are extensively used in many latest and present innovative creation such as wire and cable, automotive radiator hose, white sidewalls of tires and many other specialty applications due to their excellent resistance to oxygen, ozone, heat and ionization effects, as well as for their unusual ability to accept high loadings of fillers and oils.

The main objective of this experiment is to study and compare the physical and mechanical properties of ethylene propylene-diene terpolymer (EPDM) filled with carbon black and Natural Rubber (NR) filled with carbon black. Various percentages compounding of carbon black with rubber (NR and EPDM) and to study the curing characteristic of compounded material.

In this study also gives the on-hand experience on handling machine that is available in most of the polymer industries in Malaysia.

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CHAPTER 1

INTRODUCTION

Ethylene-propylene-diene terpolymers (EPDM) are extensively used in wire and cable, automotive radiator hose, white sidewalls of tires and many other specialty applications due to their excellent resistance to oxygen, ozone, heat and ionization effects, as well as for their unusual ability to accept high loadings of fillers and oils.

The main objective of this experiment is to measure the physical and mechanical of ethylene-propylene-diene terpolymer (EPDM) rubber filled with different loadings of carbon black and compare the result with natural rubber filled with the same loading of carbon black. The physical properties of carbon black-filled rubbers are affected mainly by the distribution of filler, carbon black properties and polymer-filler interactions. A number of experimental methods and approaches for characterization of the dispersion state of filler in rubber-carbon black composites and an investigation of polymer-filler interactions will be review. The processability of rubber compounds and indeed filled polymers generally depends upon their rheological properties. While there gave been many investigations of the rheological properties of filled raw elastomers and these investigations have generally totally focused upon carbon black fillers. The properties on the dispersion condition of filler particles and their principal relevant properties (e.g. particle size, surface area, aggregate structure and surface activity) and on rubber-filler interaction will be study. Properties like tensile strength, tear resistance, abrasion resistance and resistance to cut growth of rubbers could be improved considerably by incorporation of reinforcing particulate filler like carbon black. The characterization of the degree of filler dispersion in the polymer matrix and the polymer-filler interactions thus seems to be inevitably important.