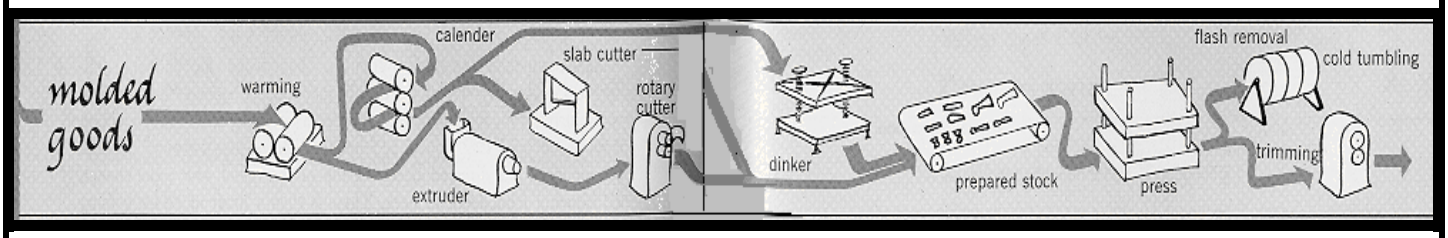
Chapter III.

What is Vulcanization ?



WHAT IS VULCANIZATION?

What is vulcanization of the rubber polymers? This is the term used that describes the chemical reaction that takes place, in the presence of heat and pressure, at the time when the thermoflowing rubber mixture has become thermosetting. The process, when complete, is irreversible and transforms the rubber compound in many ways.

Before vulcanization, or in layman's terms "cure", the rubber compound is a mixture of several ingredients comingled with the rubber elastomer as a carrier and processed into a semi-solid material. Each ingredient in the compound has been added to present a definite effect or property in the vulcanized compound or finished product. These ingredients include vulcanizing agents, accelerators, antioxidants, antiozonants, processing aids, fillers, extenders, acid acceptors, internal mold lubricants and others.

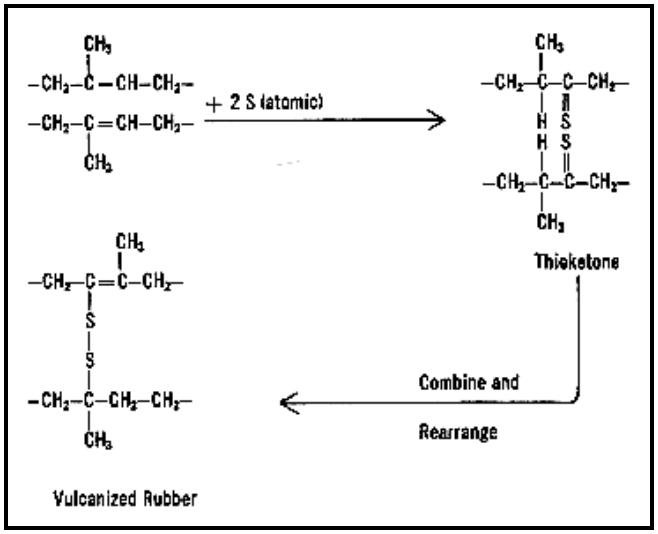
The green or unvulcanized rubber mixture is a chemical formulation based upon ratios of the various ingredients as compared to the amount of rubber hydrocarbon present. The mixture is one that is homogeneous in nature and can be likened to the recipe for a cake. In the instance of a cake, the various ingredients are held together in mixture by flour and milk or water, while in rubber the various ingredients are held together by the rubber elastomer and processing oils.

A simple analogy to explain the vulcanization of rubber compounds is to visualize each rubber elastomer to be made up of a series of long molecular chains laid side by side. Before vulcanization the chains can be pulled and slide by each other for there is no resistance caused by attachment of one to the other. During vulcanization a sulfur molecule reacts to form a crosslink from a carbon atom in one rubber molecular chain to another. A series of these crosslinks form a strong tie and when the rubber molecular chains are pulled, the chains will stretch to a certain elongation and then return to near their original position. The chains are held together by the sulfur crosslinks. The sulfur crosslinks give strength to the vulcanized rubber mixture and must be broken before the material would fail in tension. This in very basic terms is the summation of vulcanization.

Vulcanization transforms a rubber mixture from a material that possesses poor tensile strength, high plasticity, poor temperature (cold and hot) resistance properties, high tackiness and the inability to be used as a finished product to one that possesses good tensile strength, low plasticity, good temperature resistance, low tackiness and the ability to be used in a finished product.

Chemical reaction that leads to vulcanization of rubber compounds.

Indicated by crosslinking thru sulfur ions.



We live in the FUTURE and only occupy space in the PRESENT. The PAST is HISTORY and nothing can be done to change the record. Always plan for the FUTURE at least 12 months ahead. We are living today what was planned 12 months ago and we are planning what is expected 12 months from now. No surprises or obstacles should be in the way to explore all opportunities that are presented.THE FUTURE IS TODAY!!!

MONROE MIRSKY