



SPECIALTY TIRES OF AMERICA
Manufacturing Quality Tires in the USA Since 1919

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Tire Manufacturing Process

Building the highest quality tires requires the best of men, materials and machines – all of which are found in the Specialty Tires of America manufacturing process.

The first step in our process begins with the weighing and measuring of the raw materials which go into Banbury mixers. Following a formula which has been developed, tested and perfected in our laboratory and on test vehicles, the compounder prepares the ingredients for mixing. The composition of a tire tread stock, for example, is rubber (natural and synthetic), carbon black (to give strength and abrasion resistance), sulphur (which causes vulcanization), accelerator (to speed up vulcanization), age resistors (to minimize the effect of sunlight water and air), zinc oxide and stearic acid (to help activate the accelerators and aid in processing) and oils (to aid processing).

Mixed rubber must be given further mixing and kneading. This is accomplished on the mill where the batch is rolled into sheets and worked until it is the proper consistency for the next operation. A sample is taken and tested by the laboratory. Depending on the intended use of the stock, it may be sent either to the tuber, bead former or calendar for further processing into treads, beads, ply coats and sidewalls.

If the stock is destined for tire treads, sidewall or bead filler, it is taken by means of conveyor to the extruder, or tuber, where warmed stock is fed into the barrel and forced by screw out through a die. The die has been carefully made to obtain the shape and thickness desired by the tire designers. From the tuber, the treads are sent to the skiver where they are cut to exact lengths for use in tire building.

If the stock is to be used in the carcass of the tire, it is sent to the calender. Tire cord fabrics, cushion stock, and the inner-liner stock are all prepared at the calender. Nylon, polyester, Fiberglass, steel, Kevlar®, and rayon cord is purchased already coated with an adhesive to give a better bond between the rubber and the cord.

The adhesive treated fabric then goes through another process called calendaring. In this process rubber is squeezed around the cords to insulate them from each other and make heat-resistant tire plies. The rubberized fabric is cut mechanically on a bias cutter into the proper angle and sized ply strips. In the tire building operation, these are placed at alternating angles, or biased angles, to give the tire body maximum strength. The angle chosen by the tire engineers is aimed to meet the requirements of comfort, inflation, load and dynamic stresses.

Another component that must be assembled is the bead wire bundle which holds the tire to the rim. The bead wire is bronze plated to resist corrosion and to promote good adhesion of the rubber. It is then coated with a rubber compound and bent around the circumference of a wheel to give the bead a circular shape. Finally, lengths of woven nylon are wrapped around the bead bundle to make it ready for use in the tire building operation.

Tire building begins on a revolving drum. The operator is a highly skilled craftsman who takes the previously calendared cut fabric (called a ply) and wraps it around the drum. After the appropriate number of plies have been applied to the revolving drum, a bead bundle is placed on each edge. The fabric is crimped over its edges. These plies are then turned up over the bead bundle, thus enclosing it. Additional plies may then be put on the drum and turned down over the bead-ply bundle.

When the correct number of plies have been assembled on the drum, the thick, tough, wear-resisting tread rubber is placed on top of the plies. White sidewall or white-lettered tires require that a strip of white rubber is placed on the sidewall then covered with a thin layer of black rubber. The "green" (uncured) tire is removed by collapsing the drum and then conveyed to a vulcanizing mold.

The "green" tire is transformed into a final product during the curing (vulcanization) process. This process begins with the green tire being placed into a press which contains the mold for the tire. When the press closes the green tire is pressed into the mold forming the sidewall and tread design. Heat and pressure are applied to the tire for the prescribed "cure" time to yield a resilient and durable finished tire. Each finished tire is carefully inspected at this point. Finished tires are subject to additional selected tests and inspections including: inflated dimensions, balance, x-ray, section analysis and wheel testing. Only after these checks are satisfactorily completed are the tires released to become worthy of the Specialty Tires of America name.

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