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The application of aramid materials for green tires

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The development of the tire industry shows a new trend of safety, green, environmental protection and intelligence, in order to adapt to the EU tire labeling law, China proposed the "Green Tire Technical Regulations", the skeleton material product structure and material quality put forward corresponding requirements. Ultra-high strength, extra high strength steel cord and bead wire, single twisted nylon 66 cord fabric, higher modulus, lower shrinkage polyester, nylon 66/para-aramid mixed twist composite cord, the development and application of aramid skeleton materials will be an important direction for the upgrading of skeleton materials. Industry insiders generally believe.

Tire industry

The goal of China's tire industry is to achieve green tire industrialization by the end of the "Twelfth Five-Year Plan", that is, to reach two 2%:50% or more radial tire manufacturers, 50% of tire production meets green tire standards. In the process of greening tires, skeleton materials should play a heavy role. Improving tire fuel economy is mainly to reduce the rolling resistance of the tire, and the rolling resistance and the weight of the tire itself have a high correlation, reducing the quality of the tire can reduce the fuel consumption of the tire.

Data from the well-known steel cord company Bekaert shows that when the strength of the steel cord in the tire skeleton is increased from NT (ordinary strength) to HT (high strength), the tire can be reduced by 2.5 kg, and when HT is increased to UT, it can be reduced by another 1.5 kg. When the strength of the steel cord is increased from NT to HT and UT, the rolling resistance of the tire is reduced by 3%~7%. For tire companies with an annual output of 1000 million, every 7% reduction in rolling resistance means saving 10 billion yuan of fuel and reducing 31,2 tons of CO₂ emissions for the society.

The application of aramid materials to green tires can reduce the average mass of radial tires for high-performance cars by 10% and rolling resistance by 12%. The data previously provided by Teijin shows that the rolling resistance of tires can be reduced by 3001%~15% using Sulfron30 aramid, and the higher the speed level, the more the rolling resistance of tires is reduced.

DuPont data shows that the application of Kevlar aramid to make car radial tire belt layer can reduce tire rolling resistance by 5%~7%; For load tires, the carcass mass can be reduced by 3~5 kg, and the fuel saving amount can be increased by 125%. Kevlar aramid cord 1500Dtex/2 is selected instead of 2×0.30HT steel cord, the tire quality can be reduced by 6.5%~7.5%, and the rolling resistance can be reduced by 8%~15%. Using para-aramid cord on high-speed or over-loaded car and aircraft tires can reduce the mass of each tire by 3 kg while increasing costs by only 10%. Aramid has thus become one of the fastest growing skeleton materials in recent years, growing at a double-digit rate every year.

Kevlar aramid cord 1500Dtex/2 instead of 2×0.30HT steel cord is used in 195/60R14 86H and 225/40ZR18 88W passenger car tires with bundle layer, tire weight is reduced by 6.4%~7.5%, rolling resistance is reduced by 12.5%. The durability, high speed, de-loop resistance and strength of the test tire far exceed the national standard, and the cost of each tire material only increases by 35 yuan.

The polyester cord cloth for semi-steel radial tires (car tires) is about 0.4 kg each. According to this calculation, the total annual demand for cord cloth is about 18,4 tons, and the export volume is 5,29~<>,<> tons. The annual production capacity of polyester cord fabric is <>,<> tons. Some domestic foreign-funded tire enterprises have no plans to use domestic polyester cord fabrics at all, and all import them from abroad.

Nearly 10 domestic enterprises have been exploring industrialization, and 2 companies have trial-produced samples with the performance of DuPont and Teijin products in the United States, but the production scale of domestic aramid has never exceeded the thousand tons.

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