

How Twaron pulp minimizes NVH in brake systems

Summary

The high-performance properties of Twaron pulp make a major contribution to reducing noise, vibrations, and harshness (NVH) in automotive brake systems.

With lower NVH, car manufacturers can extend product lifetimes, increase driver comfort, and improve safety. In addition, Twaron pulp is an easy-to-use material: its chemical properties provide the basis for a stable matrix that does not compromise the manufacturing process.

Trends

Increasing consumer expectations and changing legislative standards require car manufacturers to produce ever better brake pads, particularly with regard to noise, vibration, and harshness. Specifically, **while brake pads need to be increasingly efficient, they also need to be smaller.** In light of these developments, the performance of the materials used in brake pads needs to be continuously enhanced. As a result, manufacturers of braking systems are increasingly looking to para-aramid fibers for their high-performance properties.

Formulation is key

Understanding the specific added value of each raw material allows formulators and suppliers to improve brake systems, as, in combination with the production process, **the basic properties of raw materials determine the final performance and cost of a brake system.** Using the right formulation of certain raw materials can significantly improve the efficiency and life cycle of brake pads.

Furthermore, the choice of raw materials has a significant impact on the manufacturing process of friction products. Manufacturers want to guarantee a homogenous mixture of their products, so avoiding segregation is key.

Science behind the solution

For friction applications, the ideal aramid fibers have an optimized ratio between length and fibrillation. These fibers also have an available surface area that allows fine fillers and powders to be retained during mixing, the right amount of moisture content to allow the fiber to be opened during mixing, and the right mechanical strength to improve pre-forming strength. In other words, the fibers need to have the right ratio between length and diameter, surface area and weight, and also the right fiber length, in order to offer optimal performance in friction applications.

Twaron pulps are high-tenacity, high-modulus fibrillated fibers with excellent strength, thermal and chemical resistance. This **unique combination of properties makes Twaron pulp an ideal product for friction applications**, as it has been developed to obtain the best combination of fiber length, specific surface area, moisture content, and mechanical strength. Twaron pulp has been developed to be cost-effective, and offers improved segregation resistance, pre-forming strength, mechanical strength, cracking resistance, and reduced NVH in friction applications.

Easing the production process

The properties of Twaron not only allow it to improve the characteristics of the end product, but also the production process. By adding Twaron pulp to a brake pad formulation, for example, manufacturers can guarantee a more homogenous mixture of materials, a high dust-binding capacity, and a high pre-form stability, which makes it ideal for cold pre-pressing.

Testing

Twaron pulp is constantly and extensively sampled and tested in Teijin Aramid's specially designed application laboratory. These tests show that the chemical structure of Twaron pulp has a significant impact on the process ability of friction materials. In particular, Twaron adds strength and thermal stability, which lowers the wear rate and stabilizes the friction coefficient (μ value) of brake pads. There is a high correlation between the degree of fibrillation and the performance of the pulp.

For many years, Twaron pulp has been extensively used in friction applications, such as in the brake pads, linings and clutch facings of many automotive vehicles. In all these applications, Twaron has shown to have a distinct advantage over other fibers when improving strength, wear resistance and noise reduction of friction materials.

Types of Twaron pulp

In order to meet different market requirements, Teijin Aramid has tailored three high-quality grades of Twaron pulp: Twaron premium performance pulp, Twaron performance pulp, and Twaron eco-advance pulp. All of these different types of Twaron pulp can help reduce NVH and enable safer driving.

Twaron pulp can be provided both wet and dry, in different lengths, and with varying degrees of fibrillation. For more information on how Teijin Aramid can tailor this pulp to different specifications, please email support@teijinaramid.com

Key benefits of using Twaron pulp in braking systems

- Reduced noise, judder and vibrations
- Lower wear
- Polishing effect
- Less corrosion
- Improved strength
- Improved stability of edges
- Prevents cracks forming in pads

Teijin's customer service: Thinking global, acting local

Teijin Aramid provides a high level of customer support. With international sales offices in the United States, China, France, and Brasil, and with agents all over the world, Teijin Aramid is well placed to offer advice and technical support. Teijin's technical support staff, sales account managers and business managers are available to discuss the individual requirements of different friction applications and businesses. For more information about the global support offered by Teijin Aramid, please visit www.teijinaramid.com