If you’re traveling thousands of kilometers, you better be sure.
And, with increasing pressure from markets, regulatory authorities and consumers, it's now or never for the automotive and tire industry. Why? Because vehicles need to be safer, more reliable and less polluting. Manufacturers need to step up to meet these challenges and demands. This isn't a choice – it's the bottom line for viability.

Together with our partners, Teijin Aramid is helping to deliver game-changing tire solutions. With Twaron® aramid technology, tires can have higher fuel efficiency, better grip, and higher durability – making electric vehicles and other automotives more reliable, comfortable, and eco-efficient for longer. The future of tires is within reach.

A proposition you can trust

We offer the latest technology, but we're not new to this market. Over the last 30 years, we've become the world's leading experts in aramid-based tire technology. From electric vehicles to Formula One, automotive tires that integrate our aramids make vehicles safer and more eco-efficient – every time, without fail. Want to discuss your requirements? Our experts are always available to guide, support and deliver tailor-made advice.

Quicker, busier, more connected – life around us is changing faster than ever. As our global population continues to grow, more people are using road transport, and vehicle tires are covering more and more ground. This won't stop any time soon. In fact, experts predict the total amount of cars in the world will double by 2040.

A world that goes round and round.

Key benefits when using Twaron®:
> Superior performance to other reinforcement materials
> Lower weight and emissions
> Better fuel efficiency
> Improved product durability
> Higher dimensional stability and tire uniformity

"Teijin Aramid won the EcoBalance Award because their Customer Benefit Model really supports sustainable decision making and communication in a reliable way and justifies sustainable business cases."

Martin Baitz
Director of Thinkstep

Read more on our website
www.teijinaramid.com/tyres
New levels of performance

It all starts with Twaron®. Our unique manufacturing process enables a material structure that offers an extraordinary set of chemical and physical properties. Specifically, Twaron® outperforms other commonly used tire reinforcement materials – rayon, polyester, polyamide 66 and steel – on strength and modulus when compared by weight. These properties enable designs of tires with less reinforcement, such as carcass or cap ply cords, while still guaranteeing performance under high stress and in all road conditions, even at extremely high speeds. No matter how hard drivers push their car, Twaron® will perform when it counts.

Comparison of different reinforcing materials based on mass

<table>
<thead>
<tr>
<th></th>
<th>Tenacity (mN/tex)</th>
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</thead>
<tbody>
<tr>
<td>Twaron®</td>
<td>2,500</td>
</tr>
<tr>
<td>Steel</td>
<td>2,000</td>
</tr>
<tr>
<td>Rayon</td>
<td>1,500</td>
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<tr>
<td>Polyester</td>
<td>1,000</td>
</tr>
<tr>
<td>Polyamide 66</td>
<td>500</td>
</tr>
</tbody>
</table>

Elongation at break (%)

In particular, compared to polyester and polyamide 66, Twaron® has a much better dimensional stability because of the high crystalline structure of the polymeric molecules. This is particularly important for electric vehicles, where uniformity of tire shape is crucial to providing sensors with correct data – whether that’s about punctures, tire pressure, tread wear or beyond. And, as cars become more and more reliant on electronics, and even become driverless, tire uniformity will become even more important than it is today. Dimensional stability and tire strength also ensure higher levels of driver comfort, eliminate undesired flat-spotting and reduce the chances of punctures. So, wherever you’re going, Twaron® will be with you all the way.

Twaron® is most often used to improve the performance of tires for electric vehicles and other automotives. But that’s not all. Manufacturers of bicycle and aircraft tires are also taking advantage of the special qualities of our material to deliver higher performance. Bicycle tires with Twaron®, for example, can be made foldable, lightweight and with better puncture resistance. Equally, aircraft tires are more resistant to Foreign Object Damage (FOD) at a much lower tire weight, making air travel safer and reducing CO₂ emissions. Curious to know more? Talk to our experts!

Building tire performance layer by layer

From the cap ply to the carcass reinforcement cords, Twaron® can be used in many parts of the tire to add strength and reduce weight, that way driving safety and lowering carbon footprints. That’s why, wherever you’re going, Twaron® will help you get there.

Did you know?

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Monomers of Twaron®

- p-phenylene diamine
- terephthaloyl chloride

Structure of Twaron®

- polysaraphenylene terephthalamide (aramid)
Driving emission reductions

A better, brighter world tomorrow can only be achieved by making positive changes today. We enable vehicles to be more energy efficient, reducing their total weight, fuel consumption and carbon footprint, while also enabling tires that last longer and need replacing less often. Even a little Twaron® will go a long way: at five times the strength of steel weight for weight, this aramid will take you all the way.

It’s not only the lower weight and optimized rolling resistance that leads to reduced carbon emissions. Due to its higher strength, Twaron® can reduce the number of reinforcement layers, meaning that less rubber is used overall. As rubber heats up more during dynamic stresses, it also consumes energy generated from the fuel. In short, by reducing rubber thickness through the use of Twaron®, manufacturers can go one step further in reducing their CO₂ emissions.

Eco-efficiency within reach

At Teijin Aramid, eco-efficiency underpins who we are and where we want to go. We aim to optimize the environmental footprint of all our solutions, resulting in cost savings across the entire value chain. We take this task seriously, and we regularly assess the total eco-efficiency impact of our solutions. How? We undertake function-based analyses for particular products or solutions over their whole lifecycle, rather than just comparing the raw materials required for their manufacture.

Count the difference

At Teijin Aramid, we’re confident our aramid solutions help deliver more energy-efficient road transport, but we also want to quantify these improvements by measuring a product’s sustainability value. To this end, we developed a unique Customer Benefit Model (CBM) for tire applications, based on industry standards DIN 22 101 and ISO 14040/4. This model quantifies both the economic and environmental impact for tire manufacturers for different tire designs. The CBM compares Twaron®-based tire solutions with existing (standard) polyester- and rayon-reinforced tires. Specifically, these different tires are compared for levels of rolling resistance, CO₂ emissions and cost durability. Quantifiable improvements? Check!

Here, there, everywhere

Our aramids are not only used to add value to tire applications. From brakes and transmission systems to automotive hoses, belts, composites and beyond, our materials add strength, reduce weight and deliver reliability throughout the automotive industry. Even a little aramid will go a long way: small percentages of aramids in product mixes will deliver lower carbon footprints, extra safety and higher durability. That’s why, in an industry that is changing faster than ever and the line between failure and success has never been finer, Teijin Aramid will go with you the full distance.

Environmental impact in the value chain

In the complete life of a tire, the largest impact* is in the use phase, which is where Twaron® aramid can make a real difference.

* The environmental impact is determined by cumulative energy demand, eutrophication potential, (CO₂) respiratory inorganics and acidification potential.
At Teijin Aramid, everything we do is guided by our ambition to shape a better future for generations to come. Day after day, we move forward, continuously improving our processes, our technology and ourselves. As market leaders, we drive progress through collaboration and set new standards for high performance. We connect with our customers at every level, wherever they are in the world. Because we believe that, together, we can be something bigger. Together, we can challenge conformity.

From automotive and oil & gas, to civil engineering, ballistic protection and beyond, our products are empowering excellence in diverse markets and applications around the globe. By enabling lighter, stronger and more resistant materials. And by taking durability, protection and efficiency to new levels. Whether you choose Twaron®, Teijinconex®, Technora® or Endumax®, our high-performance materials are an enduring guarantee of reliability. You can be sure of that.