



Shaping the future of agriculture: high-tech tires for powerful, agricultural machines

As global agriculture modernizes through machines, key equipment such as High Flexion Tires is becoming essential for tractor operations, both to improve efficiency and protect the soil. Together with Trelleborg Tires, we explore the delicate balance that must be achieved for future-proof agriculture.

According to the United Nations, the world population is projected to reach 9.7 billion by 2050, nearly 2 billion more than today. This surge is driving an unprecedented increase in global food demand, to the point that the OECD-FAO Agricultural Outlook for 2023–2032 projects that, over the next decade, we will need to produce an additional 385 million tonnes of food.

These figure, which equates to adding the entire agricultural output of a country like India every year, present a monumental challenge for agriculture: producing enough food to nourish everyone sustainably. Furthermore, this trial comes with several associated objectives, such as increasing yields while reducing the use of fertilizers and pesticides, decreasing water consumption, preserving biodiversity, and improving the quality of life in rural communities.

Consequently, agricultural vehicles and machines are more crucial than ever to agriculture, not only growing in numbers (according to FederUnaComa, the worldwide number of tractors rose from just over 1.9 million in 2015 to nearly 2.5 million in 2022), but also becoming larger and more powerful in the name of efficiency.

In fact, larger machinery typically translates into less time spent in the fields, lower fuel consumption, and fewer vehicle movements. However, such advancements also come with side effects, as explained by Sebastian Barczyk, Product Marketing Manager for Agriculture at Trelleborg Tires: *“Heavy machinery is certainly helpful, but increased power also places higher weight demands on the vehicle, while making the risk of soil compaction significantly higher. This phenomenon can lead to reduced yields or, in severe cases of soil erosion, significant damage to the terrain”*.

Fortunately, as agricultural machinery grows in size, the solution to these challenges lies just beneath the machines themselves: specialized tires that can support higher weights at required speeds while preserving the ground.

Modern tires for modern agricultural problems

As the race for food production intensifies and farmers worldwide become less dependent on labor, adopting larger agricultural machines, the demand for specialized tires is bound to grow.

But which kind of tires can enhance productivity while safeguarding the agricultural environment?



According to Barczyk, tire manufacturers have historically proposed various solutions to achieve this balance, but so far nothing has proven as effective as Very High Flexion (VF) Tires.

These specialized tires can either carry the same load as a standard radial tire with 40% less inflation pressure or carry 40% more load at the same inflation pressure. This capability translates to fewer trips, resulting in reduced fuel consumption, shorter working times, and, most importantly, less soil compaction—ultimately leading to increased crop yields.

Trelleborg Tires, whose commitment to innovation in agricultural tires spans decades, has successfully implemented the VF technological standard in several products. However, as Barczyk emphasizes, *“adopting the VF standard alone isn’t enough to satisfy the growing demands of modern agriculture”*. This recognition has spurred tire manufacturers to develop a comprehensive approach to tire design. Beyond VF technology, they now incorporate a range of advanced features tailored to specific agricultural vehicles and applications.

In Trelleborg Tires’ case, for instance, tells the manager, *“the TM1000 ProgressiveTraction® tire was developed specifically for tractors, boasting a tread devised to increase the transmission power and operating efficiency of the machine while minimizing soil compaction through a ‘wing effect’ on the tire design, meant to maximize the available tread”*.

Furthermore, following the growing professional and extensive use of modern spraying machines, Trelleborg Tires also developed the TM150, designed with the objective to ensure a 5 to 8 % larger footprint compared to standard series tires, resulting in great benefits in terms of crop yields.

Last but not least, with the Trelleborg TM3000, the tire player also responded to the challenge posed by combine harvesters, which are also becoming bigger and are working in more critical environments due to new plants and extreme weather conditions. This tire tread pattern, together with an advanced carcass design, maximizes the tire's load capacity at low inflation pressure, preserving the soil and its organic components while limiting mechanical damage from compaction.

The road ahead: innovation at the service of farmers

In the end, Trelleborg Tires’ case exemplifies how, while the future of humanity depends on agriculture, tire manufacturers have to support this sector with a mission of their own: to seek solutions based on innovation, with the ultimate aim of feeding the population and reducing the environmental impact of agriculture.

The need for specialized tires will in fact grow, and tire manufacturers will play a decisive role in helping farmers meet the challenges of today and tomorrow effectively, empowering them with the right choices for their tire needs.

“Agricultural tires are becoming a crucial component in farming operations and we are fully committed to making a substantial difference in the sector overall performance, efficiency and



sustainability. At this point, we should not focus solely on low soil compaction but also on a broader respect for the planet through our products”, concludes Barczyk.

Trelleborg Tires is a leading global brand delivering advanced solutions for professionals in Agriculture, Material Handling and Construction. Trelleborg anticipates customer needs with a wide range of high-performing tires and complete wheels for off-highway vehicles, improving productivity, efficiency, and environmental sustainability.