

## **EVs See Greater Battery Life and Range with Smart Tires**

Tires play a pivotal role in the life of an electric vehicles battery, and can mean the difference of making it to your destination with extra charge, or having to make an emergency stop to avoid an unpleasant call to roadside assistance. Given the important impact tires have on the life of an EV battery, it's no surprise that many researchers and companies are working on technologies that make tires smarter to reduce their impact on these green vehicles.

### **Better Tire Maintenance through Intelligent Tire Technology**

Tire pressure is a huge drain for electric vehicle batteries. The same is true for fuel-based vehicles where underinflated tires can reduce fuel economy by 2.5 to 3.3 percent.<sup>i</sup> Knowing whether your tires are properly inflated at all times so that adjustments can be made as necessary is a key solution for EV owners looking for longer battery life.

To combat the problem of underinflated tires, Goodyear has developed their Air Maintenance Technology (AMT). This system enables a vehicle's computer to inform the driver when air and pressure levels are ideal and when they need to be changed in order to improve vehicle performance and to reduce the risk of tire problems. Since partially inflated tires can vastly lower battery life and fuel efficiency, a system like this would go a long way to helping drivers save money. Additionally, by reducing tire wear, such smart technology would reduce the number of tire replacements, further lowering tire-related vehicle costs.



According to Goodyear Chief Technical Officer, Jean-Claude Kihn, "We believe the Air Maintenance Technology application for commercial vehicle tires will not only enhance the performance of the tire, but will also provide cost savings to fleet

owners and operators through the extension of tire tread life and increased fuel economy." This technology recently garnered the company a Popular Mechanics' Breakthrough Award.<sup>ii</sup>

Goodyear also recently debuted their Self-Inflating Technology for Commercial Tires. Noting that 50 percent of all truck and trailer breakdowns for commercial vehicle fleet operators are related to tires in some way or another, the company demonstrated how this self-inflating technology can vastly reduce costs. This intelligent tire design works in tandem with their AMT system. When the tire pressure drops below optimum, a small pumping tube opens up to allow air in from the outside. The air is pushed through an inlet valve into the tire cavity via the deformation in the tire as it rolls. All of this is accomplished without the use of external pumps or driver intervention.<sup>iii</sup>

Schrader Electronics and Pirelli have developed a similar fleet-level tire monitoring system called the Cyber Fleet. This remote system is based on an electronic sensor that allows tires to talk to the driver and a fleet manager in real time. It works through an electronic sensor known as the Tyre Mounted Sensor (TMS) which is mounted inside the tire to collect and transmit data. The data can be transmitted to a handheld receiver.

It can indicate current tire pressure and temperature, making it easy for both to determine whether the tires need maintenance in order to increase or decrease pressure for reduced rolling resistance. It also makes it very simple for driver and fleet manager to know current tire wear and to estimate when the next replacement will be required. It is said to offer fuel savings up to 1000 Euros annually per vehicle and has been tested in 13 heavy goods vehicles covering more than 20,000 km.<sup>iv</sup>

The weight of your electric vehicle also has a big impact on its battery life and range. As such, maintaining an optimal weight for lower battery consumption is one of the ways drivers can extend their



Continental Contact Patch Sensor

range. Tire manufacturers are responding to this opportunity with intelligent tire designs that build smarts into their systems for better weight management.

Continental already sells tires with built-in monitors that keep track of air pressure to let you know when it's too low. But this same company is looking to expand their technology to include sensors that calculate and report the weight of your vehicle to ensure you never go over the suggested capacity. They'll do this by installing tiny sensors that measure the contact patch of your tires – the surface area touching the ground. This surface area increases as the load of your vehicle increases, squishing and flattening the tires against the ground.

The information about your vehicle's weight will be accessible through your smartphone. The app will not only display information about payload, it will also notify the driver about the need to increase tire pressure to achieve better efficiency. The app will even help the driver calculate the correct tire pressure with the Filling Assistant, which also informs the driver when the tire is sufficiently filled during the process. By protecting you from overloading your vehicle with too much weight, such sensors could ensure you don't ruin your suspension or your tires on a long drive.<sup>v</sup>

### **Innovations in Tire Technologies for Electric Vehicles and Beyond**

Battery life is of utmost importance for electric vehicles, and as such, the tires created for these vehicles will need to be increasingly efficient. In particular, the tires needed for new electric vehicles will need to have reduced friction since this aspect accounts for 15 percent of a passenger vehicles' fuel consumption.<sup>vi</sup> As such, tire companies are working on a number of ways to reduce the rolling resistance of tires used for EVs and HEVs in order to increase range and protect battery life.



[Conti.eContact Tires for Electric Vehicles](#)

The new Conti.eContact tires, for instance, have been developed specifically for electric vehicles. These tires are based on the concept that a larger outer diameter (195/55R20 instead of the traditional 205/55R16) will significantly reduce rolling resistance. They have other features that make them excellent at wet braking, including circumferential grooves, optimized tread depth, smooth off-shoulder design, and flat contour. What's more, these tires are designed with a more flexible sidewall in order to result in less energy loss when deflecting or rebounding.

Having the right tires for the right weather is important for safety. But having the wrong tires for current weather conditions can reduce the efficiency of the tires. As a result, intelligent tires for EVs are those that put an end to the need for seasonal tire changes, a relief for those living in regions where snowy weather requires a swap to winter tires every fall. Thanks to German scientists from Detlef Riemer at the University of Applied Sciences in Leipzig who are working on an intelligent all-weather tire design, drivers can put save storage space and money with tires that automatically adapt to prevailing weather conditions.

These adaptive tires use electronic sensors that recognize different types of weather (whether there's rain, snow, or it's dry), as well as various road conditions (un-tarmacked roads, motorways, etc). The best part is that these tires will adapt on the fly while you're driving, adjusting their profile automatically to a raise or widened shape depending on the need.<sup>vii</sup> Not only will these new tires be safer, they'll also reduce battery drain or fuel consumption by allowing for a more efficient ride. Of course, they'll also be quieter.

### **Tires that Think for Themselves**

Clearly smart tires are going to play a big role in lowering the costs of electric vehicles, as well as the costs of conventional vehicles. The smart versions of these tires will minimize tire replacements, improve battery and fuel efficiency, and make ongoing vehicle maintenance that much simpler than it has been historically. These changes will be welcome news to drivers of EVs, diesel and gas-powered vehicles, and fleet managers alike.

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