



Expert Interview

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OptiGrip – tire technology innovation that delivers excellent performance over a lifetime

Goodyear's new OptiGrip tire with SmartWear Technology is the culmination of several years of research into the design, engineering and physics of tire tread and compound technologies. Bringing to market an innovative new tire such as the OptiGrip necessitated a close continued collaboration between Goodyear's Research, Development and Testing teams: more than 50 research engineers and scientists, as well as a testing team of over 80



Joseph Lambert, Manager Tire Evaluation at Goodyear

people, collaborated on the development of Goodyear's latest tire innovation. Over the course of the past eighteen months, the OptiGrip was put through an extensive test repertoire, even by the industry's exemplary testing standards, including about 150 simulation tests as well as over 2.000 driving tests on test tracks in Germany, Spain, France and Goodyear's own proving grounds in Luxembourg and Southern France. Apart from Goodyear's own testing programs the independent testing organization TÜV SÜD Automotive also put the tire through a rigorous test program.

An interview with Joseph Lambert, Head of Tire Testing and Evaluation at Goodyear's Technical Center Luxembourg

Behind the scenes: developing & testing an innovative new tire

1. ***What does testing an innovative new tire such as OptiGrip entail?***
During the product development phase, our tires are put through rigorous tests, both on drums in the lab as well as on the track. Before our products are brought to market, we literally drive millions of kilometers with them. By testing our products' performance both under controlled conditions in the lab as well as on our proving grounds in Luxembourg and France we make sure that all their performance parameters have been extensively tested and evaluated.



2. ***Are the tests to which the OptiGrip was submitted any different than the tests usually performed on tires?***

First and foremost the OptiGrip was subjected to the rigorous testing program all our new tires are required to pass before being brought to market. This includes amongst others, tests that measure braking on dry and wet surfaces, straight and curved aquaplaning tests and noise tests, as well as high-speed tests and rolling resistance tests.

Developing a tire with focus on performance over a lifetime and which continues to deliver excellent performance even after many thousands of kilometers required additional testing. The OptiGrip had to withstand the scrutiny of tests that measured its performance when new, and after 10.000, 20.000 and 30.000 kilometers.

3. ***What product and performance characteristics did you pay attention to during the testing of the OptiGrip proto-type tires?***

The key for us during the development of the OptiGrip was certainly its performance on wet roads, the most important safety parameter. While it is relatively easy to develop a tire with certain characteristics, say high mileage or low rolling resistance, it is much more challenging to develop a balanced tire that adheres to several key safety parameters even after having rolled many thousands of kilometers, without compromising on mileage and rolling resistance. Good wet braking capacities, or good wet handling and aquaplaning resistance – those are key performance indicators of worn tires, and those are the areas in which we wanted to excel with the OptiGrip.

4. ***OptiGrip has proven to deliver exemplary performance over a lifetime, at 10,000 – 20,000 and 30,000 km. How did you recreate ‘worn’ tires with these specific kilometer totals?***

In order to evaluate the effect of say 20.000 kilometers on the tread of a tire, we performed two kinds of tests: we buffed down the tires to the same profile radius, mounted them on drums and performed various tests in the lab. Other OptiGrip tires we put on numerous cars and drove them under strictly predefined conditions: for a defined number of kilometers and on specific types of roads – 50 percent on highways, 50 percent on secondary roads. This way we saw what the tires really looked like and performed after thousands of kilometers on the road.

On the road – retaining excellent performance over time with OptiGrip

5. ***What makes a worn tire perform less well?***

Worn tires have less tread depth than new tires. This has two main consequences: less tread depth means fewer grooves and channels to absorb and evacuate water on wet roads. Worn tires are less resistant to aquaplaning than new tires. It also has a negative effect on the tire's braking performance on wet. Tires with less mileage have more grip and shorter braking distances.



6. ***What are the biggest concerns that drivers face when driving with worn tires?***

One of the most critical performance aspects related to tires with higher mileage levels remains handling and braking on wet road surfaces. While many tires on the market today focus on high mileage or good rolling resistance, it is much less common to find a tire that in particular delivers outstanding braking performance and aquaplaning resistance after 30,000 kilometers.

7. ***What was most impressive about the OptiGrip's performance during the driving tests?***

When we tested the OptiGrip at our proving grounds, we were amazed at the tire's wet handling and braking abilities. But of course these tests are Goodyear-initiated, and don't carry as much weight within the industry as tests performed by independent industry authorities. That's why we were very pleased to have TÜV SÜD Automotive confirming that the OptiGrip delivered a 20% shorter braking distance on wet after 30.000km than the competitors it was tested against. It also retained twice as much control on wet as its competitors after 30.000km.

8. ***What specific tests were performed to test the OptiGrip's braking and stopping capacities?***

TÜV SÜD Automotive tested the OptiGrip at facilities in Mireval, France using a VW Golf 2.0 FSI with 225/45 R17 tires and measured the performance of the tire on both dry and wet surfaces with a braking test between 80kmh and 20km/h.

The test vehicles were decelerated from an entrance speed to standstill by full pedal pressure and by means of the equipped 4-wheel ABS. The actual braking distance was measured only between the initial speed and the end speed. In doing so, sufficient time for build-up of brake pressure was provided; likewise, possible falsifying influence of pitching motions of the vehicle when reaching standstill and insufficient ABS control in the very-low speed range was avoided. From the initial and the end speed and the recorded braking distance, the mean deceleration was calculated.

9. ***How do tire experts measure 'aquaplaning resistance'?***

To measure the aquaplaning resistance of the OptiGrip, we equip the test car with special wheel rotating sensors and a GPS-based device to measure the speed. In order to test the aquaplaning behavior in longitudinal direction, the vehicle is driven with one side in a flooded basin with a water depth of about 9 mm. The wheel rotation speed of the right and the left front wheel is measured while the vehicle accelerates. At a certain speed, the front wheel running in the water basin begins to spin, which results in a difference of rotation speed of the front wheels.

To test the tires' aquaplaning behavior in curves, the vehicle is driven on a dry asphalt circle. An approximately 20m long segment of the circle is flooded with water. At a certain speed the car loses grip when reaching the flooded segment, which shows the testers the tires' curved aquaplaning performance.



The TÜV test results showed that after 30.000 km the Goodyear OptiGrip provided a 6% better resistance to aquaplaning in longitudinal direction than its leading competitors.

Goodyear EMEA tire testing in numbers:

- Approximate number of people in team: over 200
- Approximate number of nationalities: 12
- Approximate number of tire kilometers driven annually for tire testing: over 100 million km
- Approximate number of tires tested each year: over 70 000
- Approximate number of vehicles used to test tires: over 500
- Number of Goodyear test tracks world wide: 7

About Goodyear

Goodyear is one of the world's largest tire companies. Goodyear employs about 70,000 people and manufactures its products in more than 60 facilities in 26 countries around the world.

Goodyear's innovations have set automotive standards for more than 100 years. Goodyear has been the pioneer of the innovative safety technology known as RunOnFlat, which allows a driver to continue on a journey with a punctured tire. Goodyear is the world's leading manufacturer of RunOnFlat tires, with applications on various BMWs, the award winning Mini, Mercedes-Benz high performance cars, Opel and other brands. Additional Goodyear RunOnFlat fitments are on the horizon, as the company's designers are working with multiple automobile manufacturers on more than 150 RunOnFlat projects. In 2007 Goodyear supplied more than two million RunOnFlat tires.

For more information on Goodyear and its products, visit www.goodyear.com.