



Automotive

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# Influence Of Mileage On Tire Performances Test Results Of Summer Tires 225/45 R17 94W

## Abstract of Test Report No. 76230122



## Project Description

### Objective

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**The objective of this project was to benchmark 225/45 R17 94W passenger car summer tires of different makes against each other during their mileage with special regards to:**

**Durability**

**Safety on wet and  
dry roads**

**Some of the properties above were examined on used tires as well.**



## Scope

## Durability

### Tire tread wear test

**Convoy driving over a distance of 30,000 km (three runs over a 10,000 km distance on public roads with identical vehicles fitted with the benchmark tire makes)**

**NOTE: these “new” tires served as “used” tires in subsequent tests.**

## Scope

### Safety on wet roads

<b>Braking</b>	<p>Measurement of braking distance from 80-20 kph (ABS braking) on:</p> <ul style="list-style-type: none"> <li>- wetted asphalt (<u>after 0, 10000, 20000 &amp; 30000 km</u>)</li> <li>- wetted concrete (<u>after 0 and 30000 km</u>)</li> </ul>
<b>Handling</b>	<p>Subjective assessment of ride and handling criteria and timed laps on a wetted handling circuit (<u>after 0, 10000, 20000 &amp; 30000 km</u>)</p>
<b>Aquaplaning in corners</b>	<p>Measurement of the transmittable lateral forces when cornering through a water basin (<u>after 0 and 30000 km</u>)</p>
<b>Aquaplaning longitudinal</b>	<p>Measurement of the aquaplaning speed at 15% slip in a water basin of 9 mm water depth (<u>after 0, 10000, 20000 &amp; 30000 km</u>)</p>





## Scope

### Safety on dry roads



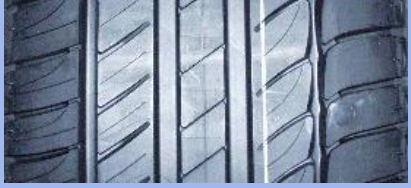
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#### Braking

**Measurement of braking distance from 100-5 kph  
(ABS braking) on dry asphalt (after 0 and 30000 km)**

## Test Population

### Summer tires 225/45R17 94W

Manufacturer	Commercial name	Tread design
Goodyear	OptiGrip	
Continental	Sport Contact 3	
Michelin	Primacy HP	
Control tire: new Goodyear OptiGrip		

## Test Vehicles

### VOLKSWAGEN GOLF Mk V 2.0 FSI

Specifications of test vehicle used for tests on wet and dry surface:



<b>Body</b>	5-door saloon
<b>Max. Engine power</b>	110 kW / 6000 min-1
<b>Engine type</b>	4 cyl. 2.0l petrol engine
<b>Max. Speed</b>	206 km/h
<b>Drive concept</b>	front
<b>Max. Engine torque</b>	200 Nm / 3500 min-1
<b>Gearbox</b>	6-speed manual transmission
<b>Max. Permissible weight</b>	1890 kg

### VOLKSWAGEN GOLF Mk V 1.9 TDI

The wear test was performed with three test vehicles specified as follows:



<b>Body</b>	5-door saloon
<b>Max. Engine power</b>	77 kW / 4000 min-1
<b>Engine type</b>	4 cyl. 1.9l turbo diesel engine, direct injection
<b>Max. Speed</b>	185 km/h
<b>Drive concept</b>	front
<b>Max. Engine torque</b>	250 Nm / 1900 min-1
<b>Gearbox</b>	5-speed manual transmission
<b>Max. Permissible weight</b>	1910 kg

## Test Details Wear

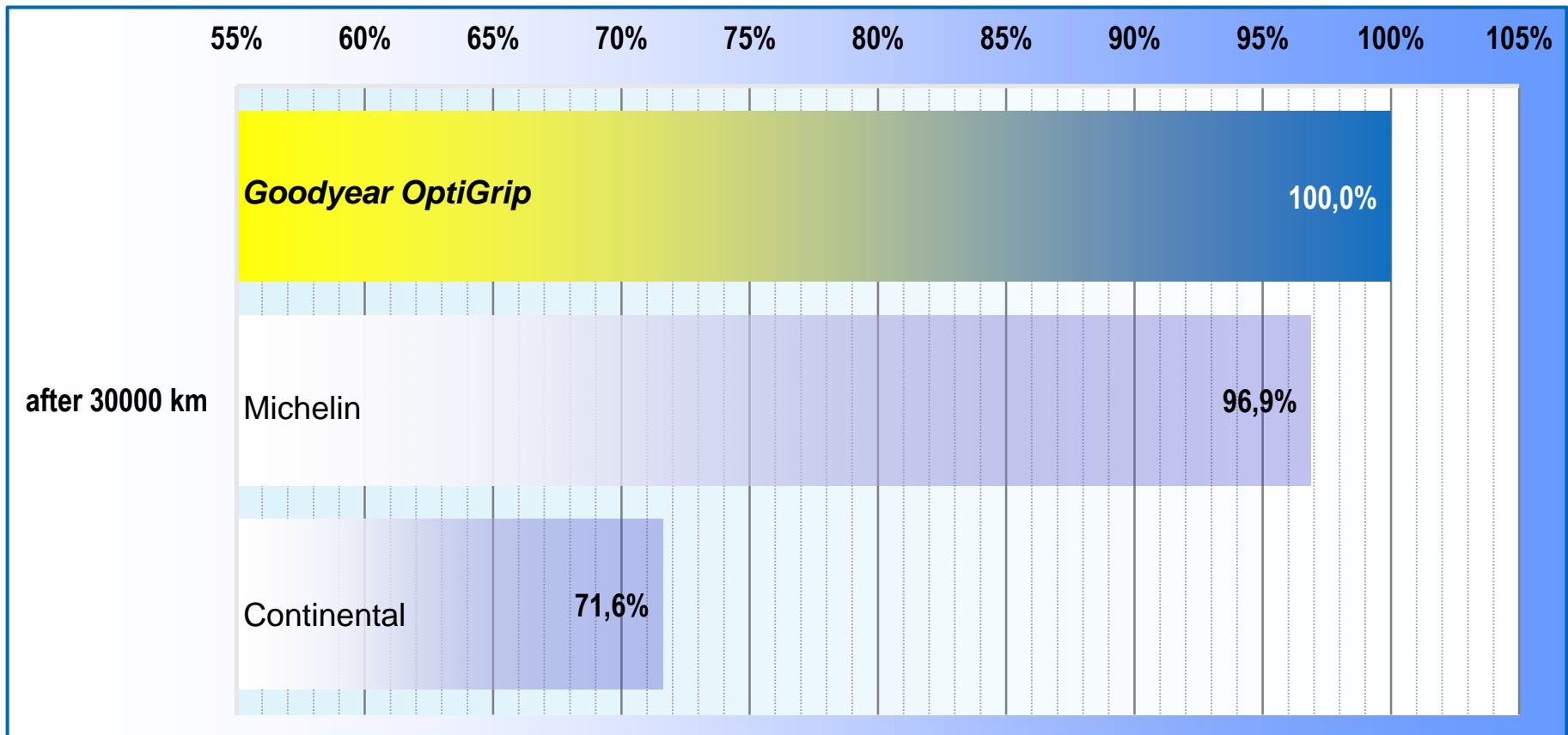
### Key Points

**Tires fitted to five identical vehicles driven in convoy over a total distance of 10,000 km :**

- Chassis alignment check & adjustments as needed
- Driver / vehicle rotation every 125 km; tire / vehicle rotation every 500 km ⇒ to ensure same conditions
- Tread wear measured by digital gauge (1/10 mm accuracy)
- Measurement intervals: every 3,350 km; 6 or 7 (Goodyear) spots in the tire's 4 main grooves and on each shoulder measured 5 x on each tire (every 72°)
- Tire inflation pressure checked at each tire / vehicle rotation (every 500 km) – no air loss noted on any of the test tires throughout the test

## Test Results Wear

### Expected Lifetime (Average of most worn axle)





## General Key Points

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- **Results show both absolute values measured and % evaluation in comparison to the average performance of all tires in the test.**
- **Results of tread wear test (exp. Lifetime) are subject to linear extrapolation (based on wear between 0 and 30,000 km in the most worn groove of the average of axle of each brand)**
- **Relative performance:**
  - performance compared to average performance of all tires in the test**
  - value above 100 % = better**
  - value below 100 % = worse**



## Test Details Wet Braking

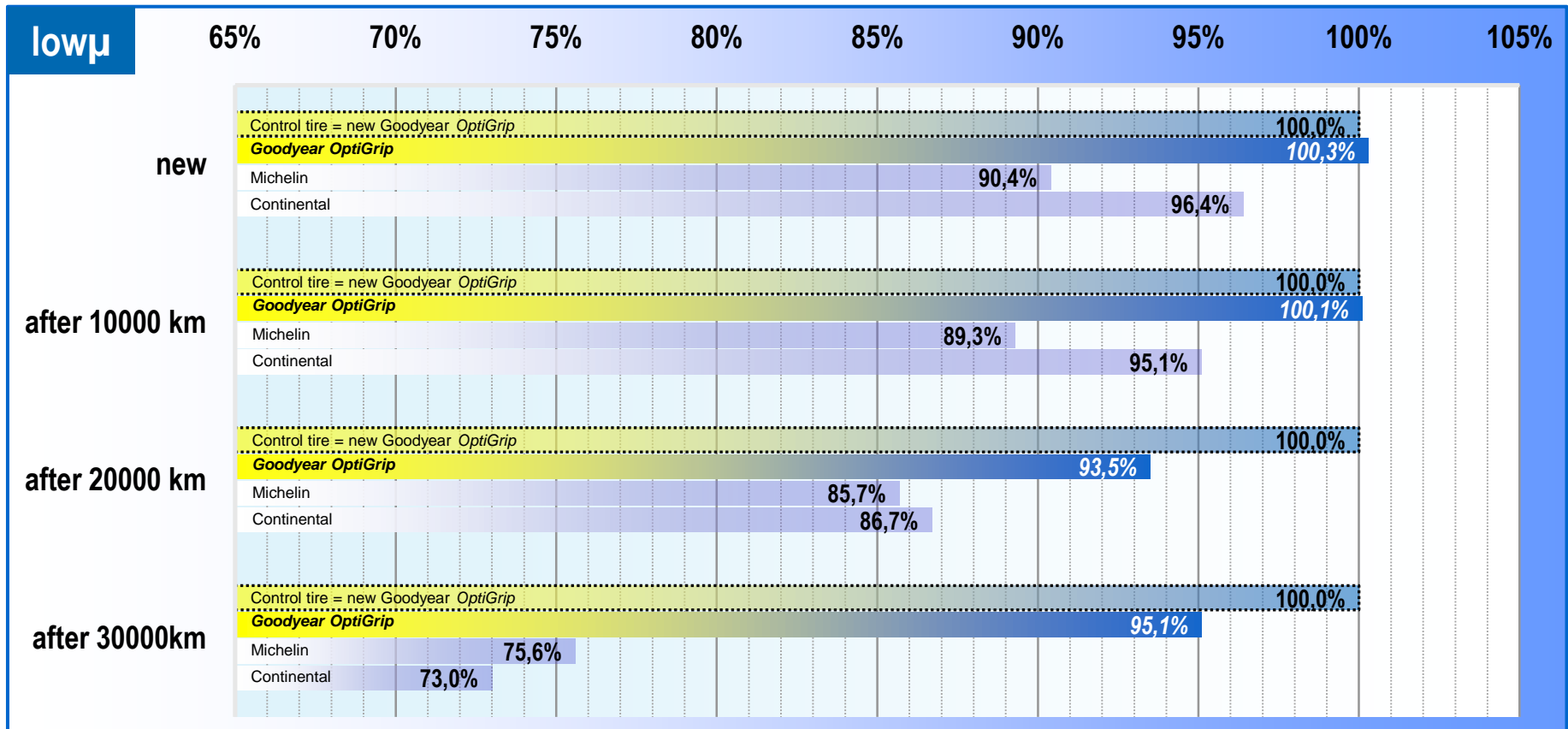
### Key Points

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- **Test vehicle equipped with vehicle speed measurement equipment**
- **One tire make selected as control tire / re-tested at end of each complete sequence ⇒ to consider potential changes of test conditions (e.g. temperature)**
- **Deceleration on artificially wetted asphalt and concrete**
- **Relevant factor for result: stopping distance**
- **Minimum of 8 validated runs for each tire**
- **Mean deceleration calculated based on 8 values**

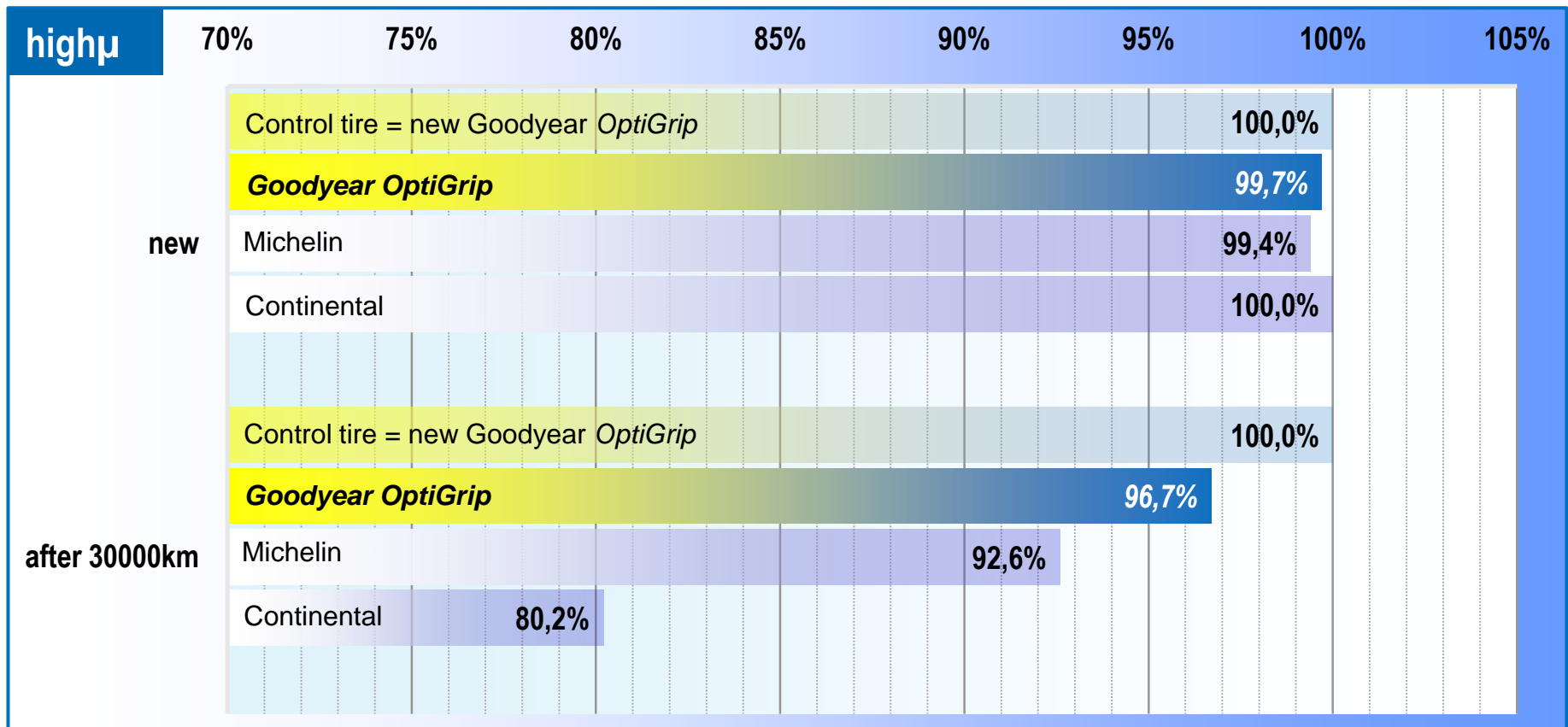
## Results On Wet Surface

### Braking performance on wet surface, new / used tires (low $\mu$ )



## Results On Wet Surface

### Braking performance on wet surface, new / used tires (high $\mu$ )





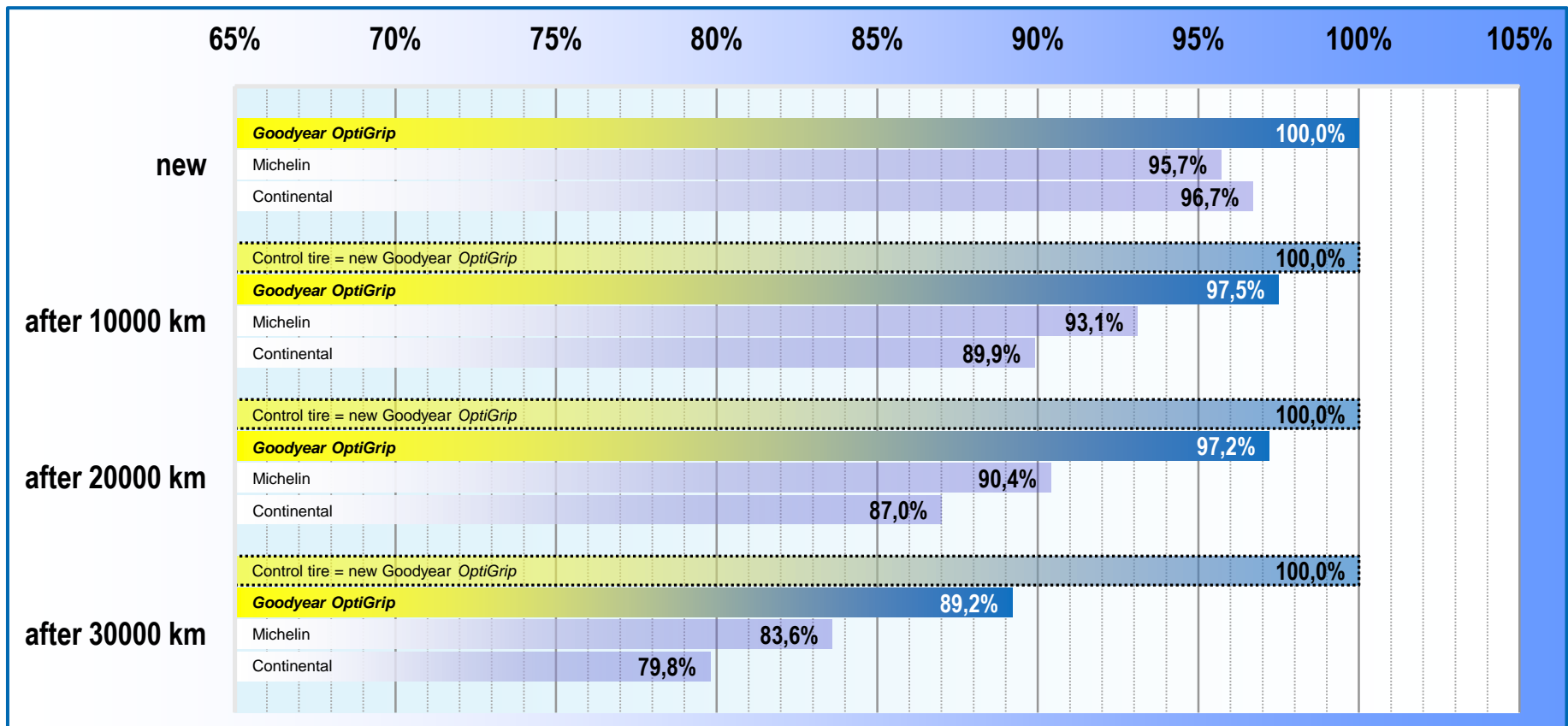
## Key Points

**Test vehicle equipped with vehicle speed measuring system and rotation wheel spin sensors on both front wheels**

- **Driving:** The vehicle is driven with constant speed into a flooded water basin with an approximate water depth of 9 mm. One side of the vehicle is running on dry asphalt the other side runs through the flooded segment.
- **Test:** Acceleration with full throttle when entering the water basin. Speed and wheel spin are recorded. The corresponding vehicle speed to a wheel spin difference of 15% represents the aquaplaning speed.
- **Aquaplaning longitudinal:** Characterized by maximally reached aquaplaning speed. Four valid runs in same gear.

## Results On Wet Surface

### Aquaplaning longitudinal ability, new / used tires





## Test Details Aquaplaning Corn.

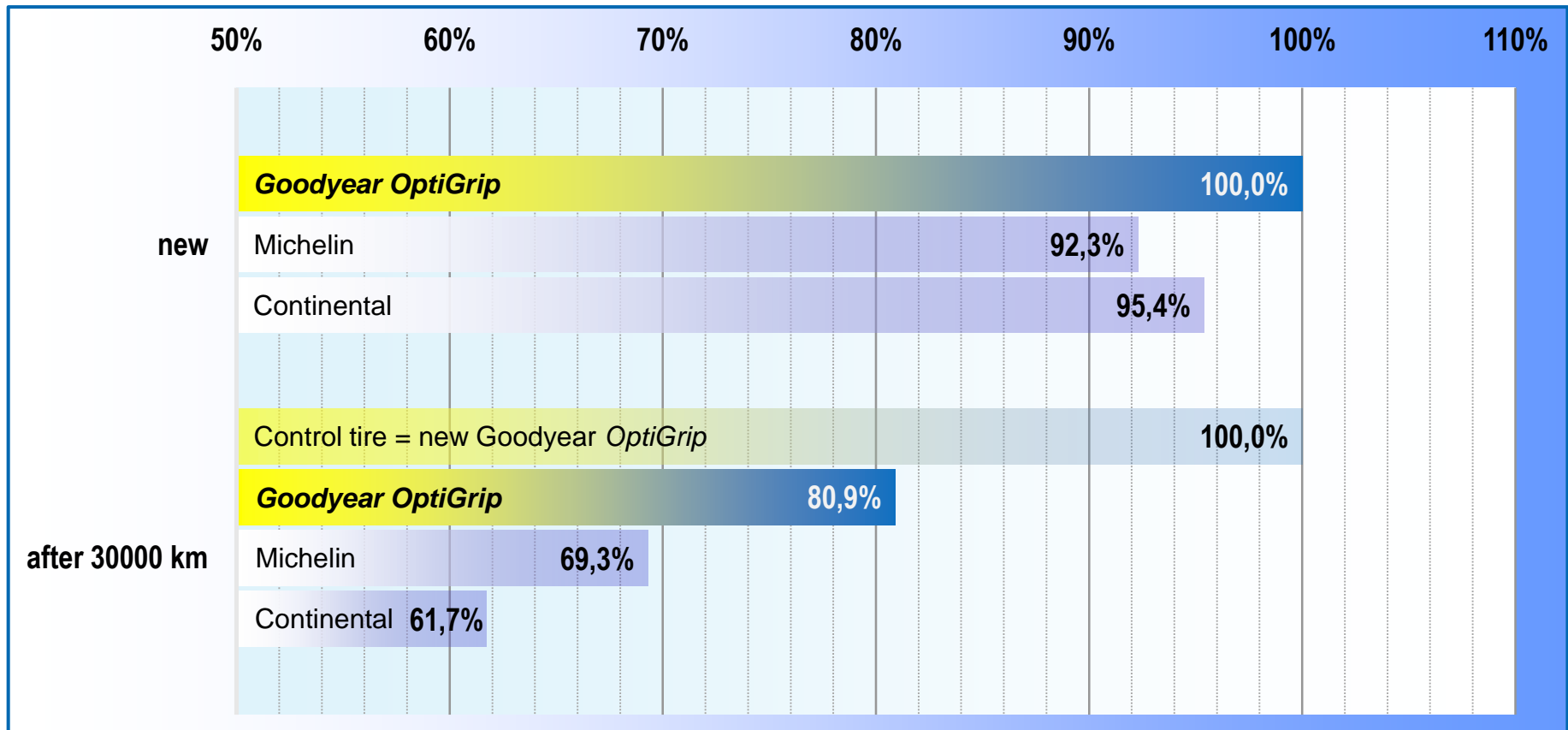
### Key Points

**Test vehicle equipped with vehicle speed measuring equipment and lateral acceleration sensor**

- **Driving: Constant speed & steering angle on dry asphalt (circle with app. 20 m segment flooded water)**
- **Test: Lateral acceleration and speed recorded when vehicle enters flooded segment (light barrier); vehicle speed is increased run by run until clear decrease of lateral acceleration occurs**
- **Aquaplaning in corners: Characterized by maximally transmittable lateral acceleration as well as drop after reaching max (the flatter the gradient the easier to control)**

## Results On Wet Surface

### Aquaplaning in corners ability, new / used tires





## Key Points

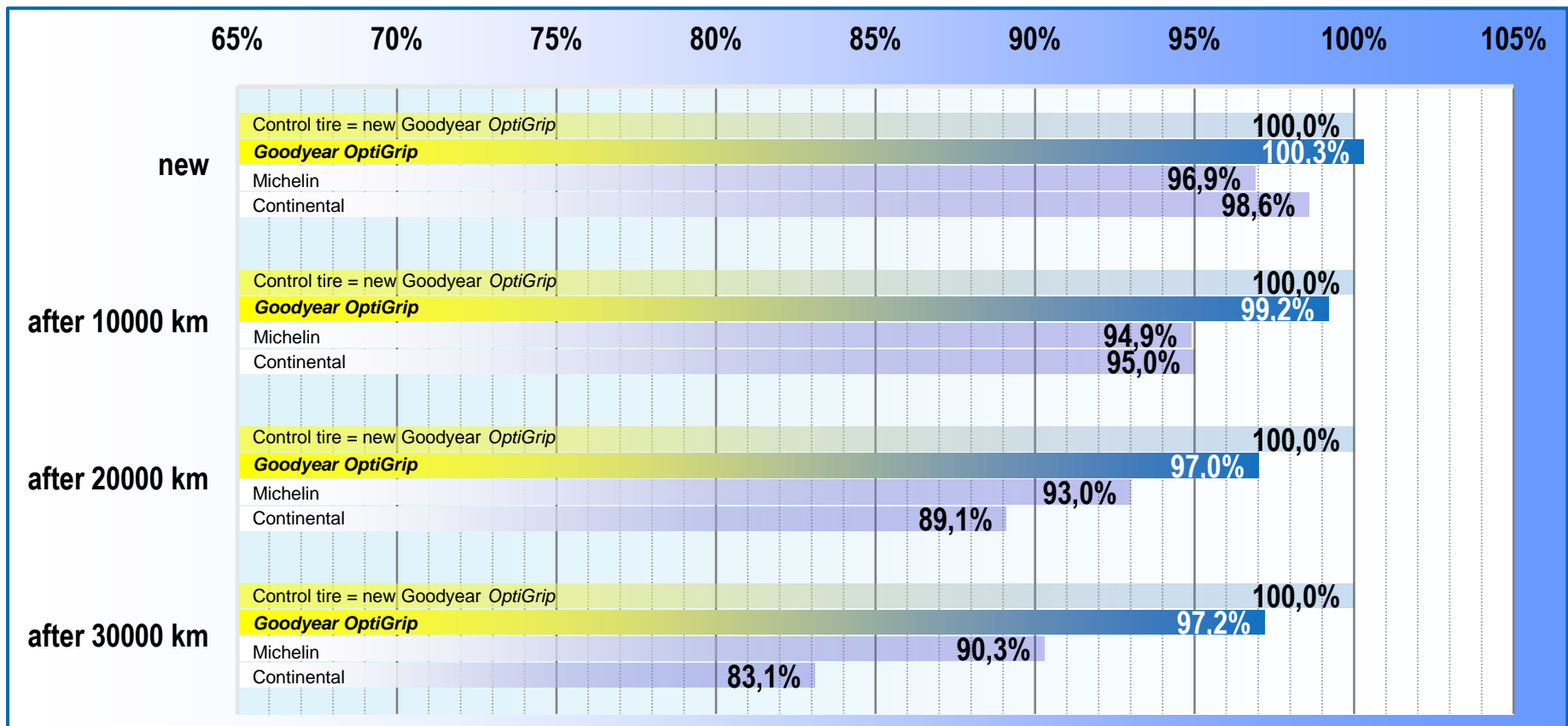
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**Subjective assessment of handling & ride by experienced test drivers on special, artificially wetted handling circuit (asphalt):**

- **Driving at and beyond vehicle's stability limit (ESP off / ABS on)**
- **Avoidance of excessive under- / oversteer while driving at stability limit (striving for maximum reproducibility)**
- **Lap times recorded and average speed calculated from lap time and track length**
- **Use of 10-point scale for different performance criteria  
⇒ one overall evaluation score**

## Results On Wet Surface

### Handling ability on wet surface, new / used tires





## Test Details Dry Braking

### Key Points

- **Test vehicle equipped with vehicle speed measurement equipment**
- **One tire make selected as control tire / re-tested at end of each complete sequence ⇒ to consider potential changes of test conditions (e.g. temperature)**
- **Deceleration on dry asphalt**
- **Relevant factor for result: stopping distance**
- **Minimum of 8 validated runs for each tire**
- **Mean deceleration, calculated based on 8 values**

## Results On Dry Surface

### Braking performance on dry surface, new / used tires

