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# TÜV SÜD AUTOMOTIVE SUMMER TIRE TEST 2007

205/55 R16 91 H

COMMISSIONED BY CONTINENTAL

REPORT NO. 76225118

TESTED CRITERION:

- § BRAKING ON WET ASPHALT
  - § DRY BRAKING
- (FRICITION COEFFICIENT ACC. TO EUROPEAN STANDARDS)

## 1 OBJECTIVE

A comparison test with passenger car summer tires was carried out in order to determine the braking performance of 7 different tire models (one Continental tire and six competitor tires) on wet and dry surface.

## 2 TEST SCOPE

The following properties on wet and dry road surface were tested within the scope of this test:

### Wet surface:

§ Braking on wet asphalt (80 – 20 kph)

### Dry surface:

§ Braking on dry asphalt (100 – 10 kph)

## 3 TEST TIRES

The test tire population consisted of tires listed below:

BRAND (MANUFACTURER)	COMMERCIAL NAME	CODE/VERSION	TIRE SIZE
Bridgestone	Turanza ER 300	D1 / W1	205/55 R16 91H
Continental	Premium Contact2	D2 W2-1 / W2-2 WR1 / DR1	205/55 R16 91H
Goodyear	Excellence	D3 / W3	205/55 R16 91H
Kleber	Dynaxer HP2	D4 / W4	205/55 R16 91H
Michelin	Pilot Primacy	D5 / W5	205/55 R16 91H
Pirelli	P7	D6 / W6	205/55 R16 91H
Triangle	Talon GLS TR 928	D7 / W7	205/55 R16 91H

Two additional sets of Continental PremiumContact2 (WR1 for wet-/ and DR1 for dry surface) were chosen to serve as reference tires that form the baseline of 100% to which the results of all other tires in the test refer to. Moreover, the reference tires were repeatedly measured in order to detect changes of the ambient conditions and to correct the results accordingly (if required).

All test tires were purchased by TÜV SÜD Automotive on the free market.

More information about the tires can be found in the annex of this report (tire identification table).

## 4 TEST DETAILS

### 4.1 TEST TIRE PREPARATION

Before tests got started, all tires were conditioned (run-in) on dry road over a distance of 100 km at moderate speed, in order to remove production residues and mold agents from the tire surface.

The tire inflation pressure for the tests was set in compliance with the vehicle manufacturer's recommendation for the relevant tire size:

Front axle: 2.4 bar                      Rear axle 2.2 bar


The inflation pressure was checked regularly before each test (and adjusted if required).

The tires were mounted on steel rims, size 6.5J x 16 H2, offset 50.

## 4.2 TEST VEHICLE

All tests were carried with the following vehicle (standard production car):

VOLKSWAGEN GOLF V 2.0 TDI	
BODY:	5-door saloon
ENGINE:	2.0 l Turbo, diesel-direct injection
MAX. ENGINE POWER [kW]:	104
TOPSPEED [km/h]:	205
GEARBOX:	6-gear manual
AXLE LOADS [kg]:	FA 930 / RA 545
PERM. TOTALWEIGHT [kg]:	1910
Tyre Pressure Front Axle [bar]	2.4
Tyre Pressure Rear Axle [bar]	2.2



picture exemplarily

## 4.3 TEST LOCATION

All road tests were carried out on the BOSCH proving ground in Boxberg located near Bad Mergentheim (Germany).

The proving ground is exclusively used for tire tests and provides all required test tracks in good condition.

The friction coefficients of the different tracks have been: (information BOSCH)

- § Wetted asphalt:  $\mu$  about 0,8
- § Dry asphalt :  $\mu$  about 1,0

## 4.4 TEST AND EVALUATION PROCEDURES

In each test several runs are made with each test tire set in order to be able to calculate a mean value which forms the result. For both braking tests, the reference tire is repeatedly measured in order to be able to detect changes of the ambient conditions and to adjust results accordingly.

The number of test runs with each tire as well as the number of re-runs of the reference tire depends on the varying parameters and was kept as equal for all candidates as possible:

- § Expected and actual variation of the results; the target is to reach a sufficiently low coefficient of variation (different in dependence on the test and the test surface) in order to get a high level of significance and reliable results.
- § Expected and actual changes of ambient conditions throughout one test
- § Grade of influence of the ambient conditions on the results
- § Stability of test track conditions
- § Stress to the tires in the relevant test (important for subsequent tests)

Where required, the actually measured results are converted in a way that a high value represents a good performance and a low value represents a bad value (e.g. braking distance [m] is converted into deceleration [ $m/s^2$ ]).

At the end of each test, these values are referred to the performance of the reference tire; which results in a performance index for each test tire expressed as a percentage compared to the reference tire. Logically, the reference tire always lies on the 100% baseline; the other tires are either lying below (worse) or above (better) the reference tire. Additionally each tire performance is related to average performance out of all tires.

The datasheets in the annex of this report contain the valid results of all runs in each test which allow the reader to follow all conversions and calculations in detail.

#### 4.4.1 BRAKING

For braking tests, the vehicles are equipped with a GPS device for measuring the vehicle speed and a data recording and storage device.

The test vehicle is decelerated from the entrance speed down to standstill by full pedal pressure and with the vehicle's anti-lock brake system (ABS) activated.

The braking distance is measured from an initial speed down to a speed of 20 kph / 10 kph ( wet -/ dry asphalt) only (not to 0 kph!) in order to exclude falsifying influence by insufficient ABS control in the speed range below 10 kph and the pitching motions of the vehicle when reaching the standstill.

For the result, the braking distance of each tire is considered; the mean deceleration is calculated thereof.

In dependence on road surface and test track layout, different parameters for the initial speed apply for the braking tests. In the present test, the parameters were as follows:

Dry asphalt: 100 – 10 kph; wet asphalt: 80 – 20 kph

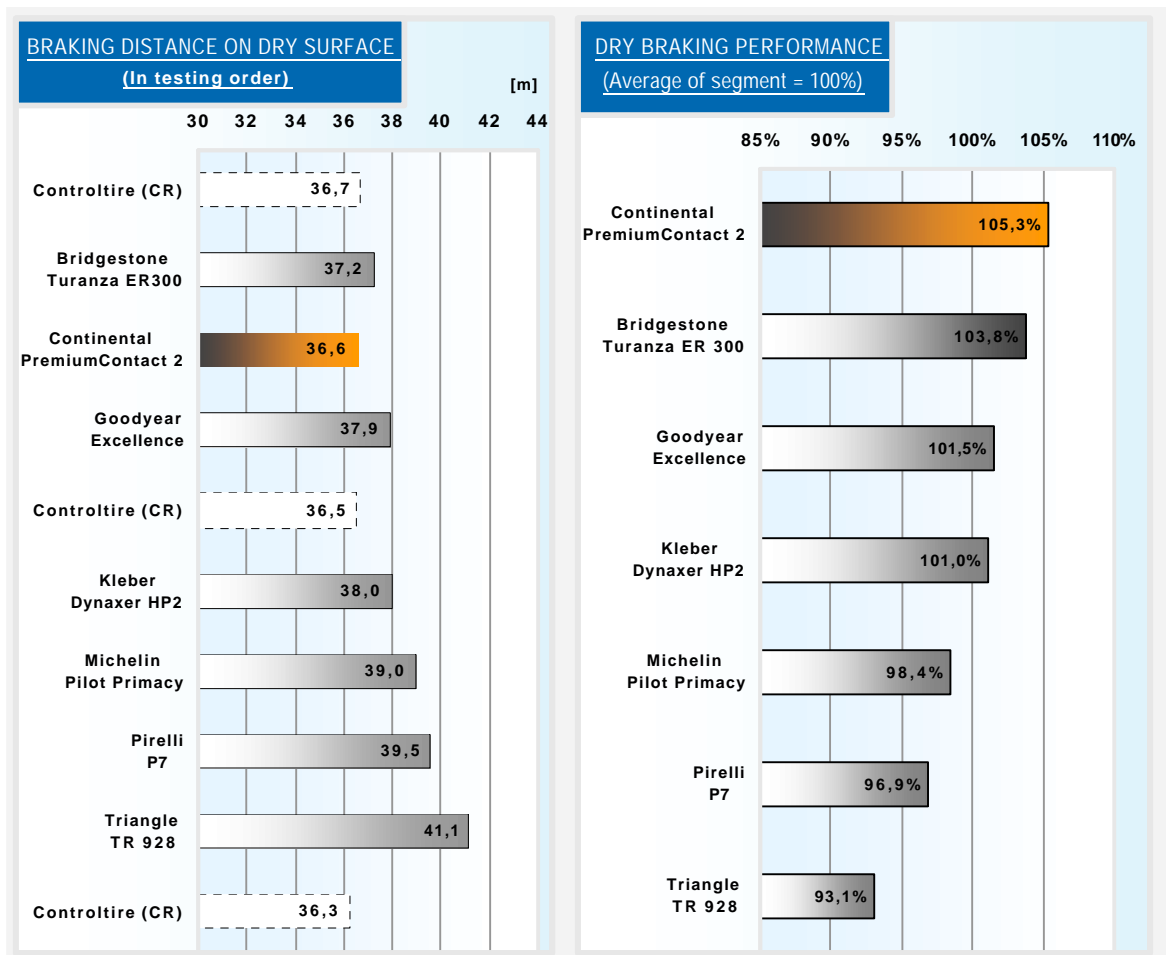
The entrance speed into the braking track is always ~5 kph higher than the initial speed in order to ensure sufficient build-up time for the braking pressure.

## 5 TEST RESULTS

Detailed data sheets and diagrams can be found in annex of this test report.

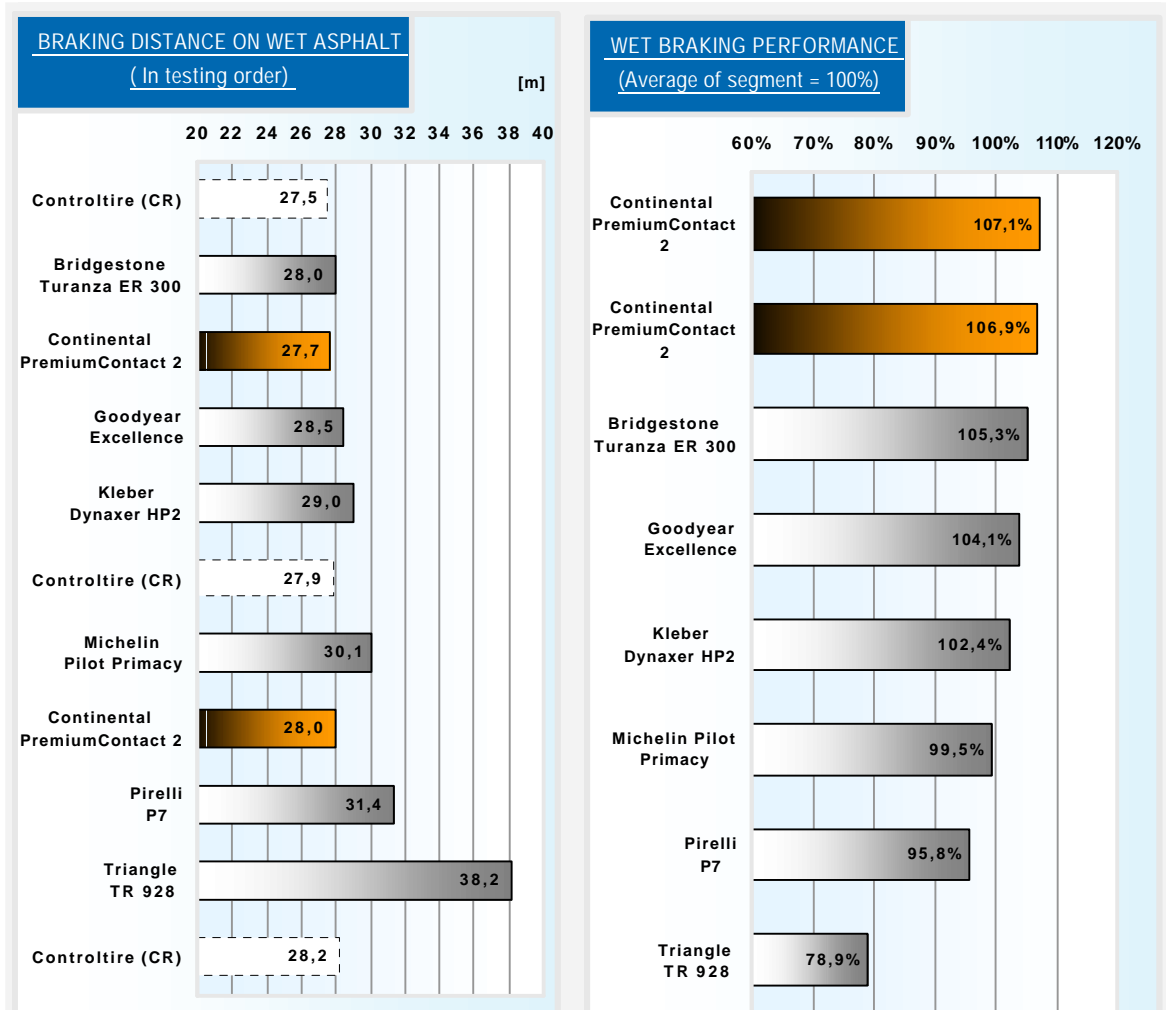
The charts and tables below demonstrate the results of the test.

### 5.1 TEST RESULTS BRAKING ON DRY ASPHALT



TIRES (RANKED)	DISTANCE BRAKING [M]	BRAKING PERFORMANMCE	DIFFERENCE TO AVG. OF SEGMENT
Continental PremiumContact2	36.6	105.3 %	+5.3 %
Bridgestone Turanza ER 300	37.2	103.8 %	+3.8 %
Goodyear Excellence	37.9	101.5 %	+1.5 %
Kleber Dynaxer HP2	38.0	101.0 %	+1.0 %
Michelin Pilot Primacy	39.0	98.4 %	-1.6 %
Pirelli P7	39.5	96.9 %	-3.1 %
Triangle TR 928	41.1	93.1 %	-6.9 %

5.2 TEST RESULTS BRAKING ON WET ASPHALT



TIRES (RANKED)	DISTANCE BRAKING [M ]	BRAKING PERFORMANNC E	DIFFERENCE TO AVG. OF SEGMENT
Continental PremiumContact2	27.7 – 28.0	106.9 % -107.1 %	+6.9 % - +7.1 %
Bridgestone Turanza ER 300	28.0	105.3 %	+5.3 %
Goodyear Excellence	28.5	104.1 %	+4.1 %
Kleber Dynaxer HP2	29.0	102.4 %	+2.4 %
Michelin Pilot Primacy	30.1	99.5 %	-0.5 %
Pirelli P7	31.4	95.8 %	-4.2 %
Triangle TR 928	38.2	78.9 %	-21.1 %

This test report consists of 6 pages and 7 pages of annex.

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*M. Stamm*  
 Dipl.-Ing. (FH) Michael Stamm  
 TÜV SÜD Automotive GmbH