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TÜV SÜD - Tire Test 2021

205/55 R16 - MICHELIN PRIMACY 4+

(Excerpt of report no. 713209668-PR-01)

Test Results:

New condition: Wet & dry braking, Aquaplaning straight-line & in curve

Worn* condition: Wet braking

Test Period: May – June 2021

*) Explanation see page 2

TÜV SÜD Product Service GmbH

Report No. 713209668-PR-02(en)

TÜV®

TIRE DETAILS

DIMENSION: 205/55 R16

TIRE BRANDS & PATTERNS IN THE TEST: MICHELIN

NEW CONDITION:



MICHELIN PRIMACY 4+

91V

DOT: HCWC 10VX 1021

WORN* CONDITION:



MICHELIN PRIMACY 4+

91V

DOT: HCWC 10VX 1021

- The above listed test samples of Michelin Primacy 4+ were provided by Michelin.
- From the available lot of tires, TÜV SÜD PS selected the samples for each test randomly.
- Tire buffing had been done by Michelin.

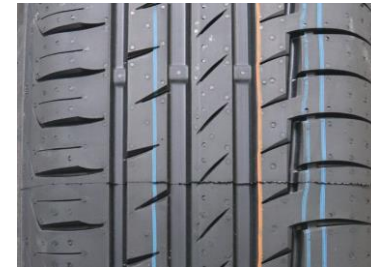
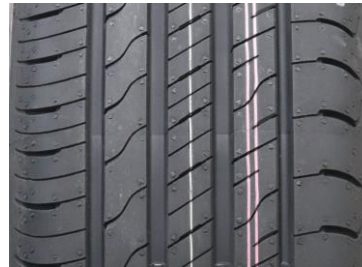
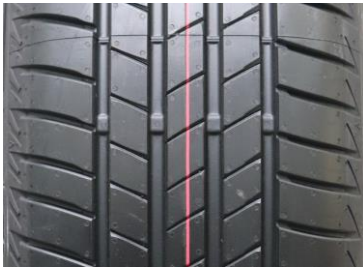
*) to reach the desired worn condition, the tires were buffed on a special machine to the depth range of the tread wear indicator according to UN-ECE regulation R30 Rev3. (1.6mm +0.6/-0.0mm)

TIRE DETAILS

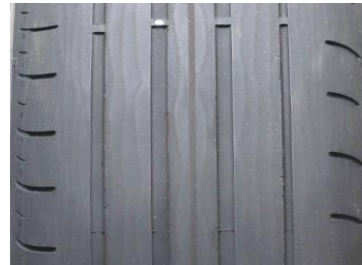
DIMENSION: 205/55 R16

TIRE BRANDS & PATTERNS IN THE TEST: COMPETITORS

NEW CONDITION:



WORN* CONDITION:



**BRIDGESTONE
TURANZA T005**
91V, DOT: VR8K U3L 0321-0421

**GOODYEAR
EFFICIENTGRIP PERFORMANCE 2**
91V, DOT: NE0F WW1R 0321

**CONTINENTAL
PREMIUMCONTACT 6**
91V, DOT: CN0F D8P0 4520-0721

- All competitor test samples were purchased by TÜV SÜD PS on the free market.
- From the available lot of tires, TÜV SÜD PS selected the samples for each test randomly.
- Tire buffing had been done by Michelin.

*) to reach the desired worn condition, the tires were buffed on a special machine to the depth range of the tread wear indicator according to UN-ECE regulation R30 Rev3. (1.6mm +0.6/-0.0mm)



TEST DETAILS

▪ TEST LOCATIONS

- Wet braking “high μ ” (higher friction), dry braking: FAKTmotion, Memmingen (D)
- Wet braking “low μ ” (lower friction): ATP, Papenburg (D)
- Aquaplaning straight-line & in curve: ATP, Papenburg (D)

▪ TEST VEHICLE

- VW Golf VIII 2.0TDI 150hp, VW Golf VII 1.5TSI 130hp

▪ PROCEDURE AND EVALUATION

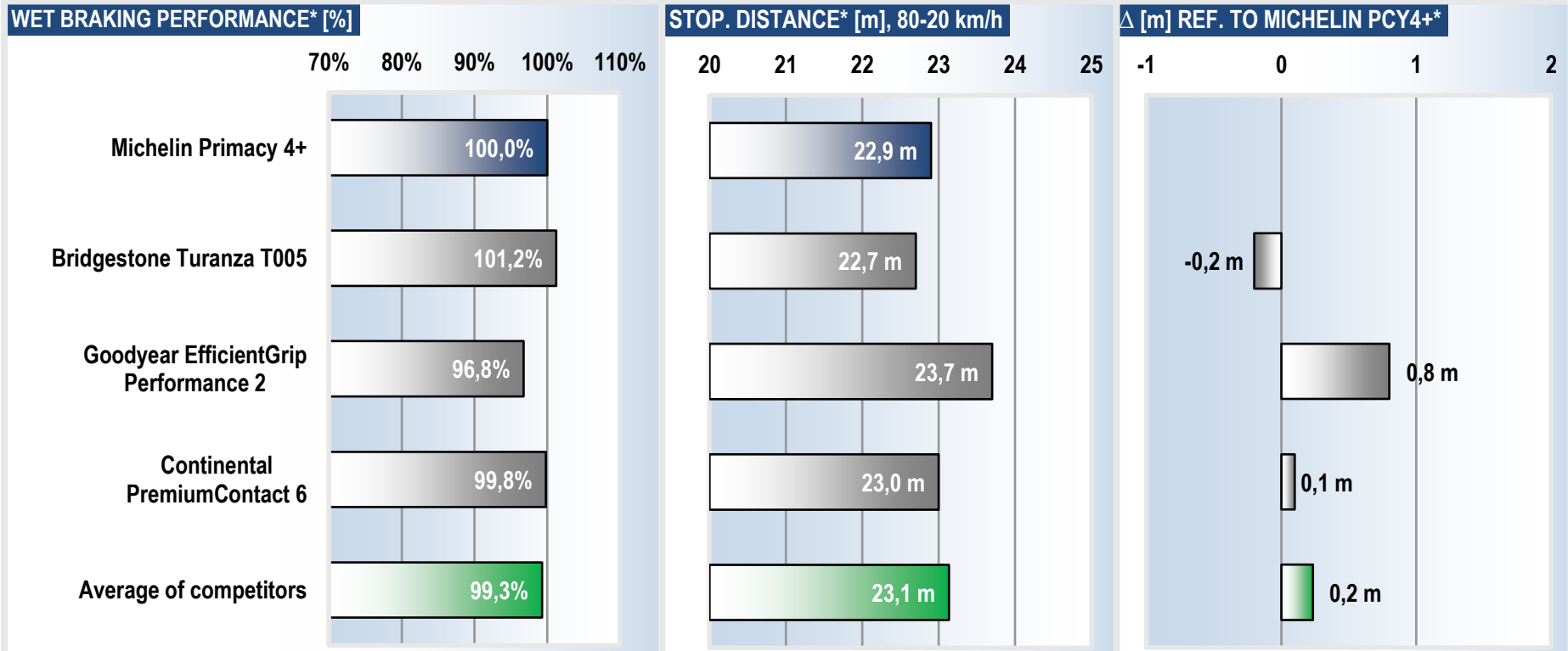
- In all tests, the reference/control tire was tested repeatedly in order to detect and consider possible changes of the ambient test parameters and to adapt the corresponding performance by linear interpolation.
- All tires in the test were evaluated in relation to the performance of the reference/control tire.
- The performance is displayed as a percentage value, calculated on the basis of the measured and corrected test data.
- In the present evaluation the reference tire (new condition: Michelin Primacy 4+, worn condition: Michelin Primacy 4+ (worn)) represents the 100% performance baseline.
- In all evaluations, a percentage $>100\%$ means better and $<100\%$ means worse.



TEST RESULTS

WET BRAKING IN NEW CONDITION

- ABS-emergency stop on wet high and low μ surfaces (within the permitted range of ECE R117):
- $T_{\text{surface}} = 19.0$ to 26.3°C $T_{\text{air}} = 14.6$ to 20.4°C
- Relevant test speed range: 80 to 20 km/h



*) Average of the performance on high and low μ wet surface.



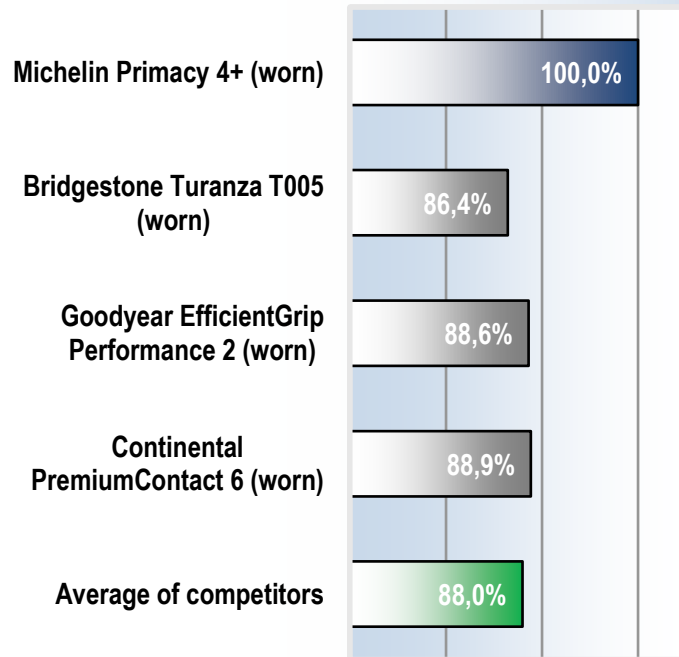
TEST RESULTS

WET BRAKING IN WORN CONDITION

- ABS-emergency stop on wet high and low μ surfaces (within the permitted range of ECE R117):
- $T_{\text{surface}} = 15.6$ to 24.1°C $T_{\text{air}} = 14.4$ to 18.8°C
- Relevant test speed range: 80 to 20 km/h

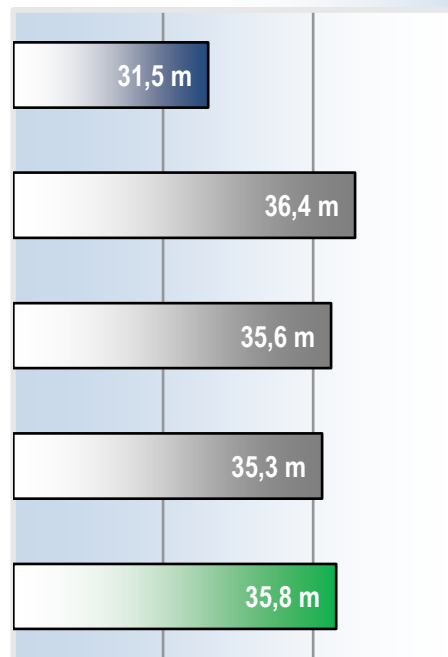
WET BRAKING PERFORMANCE* [%]

70% 80% 90% 100%



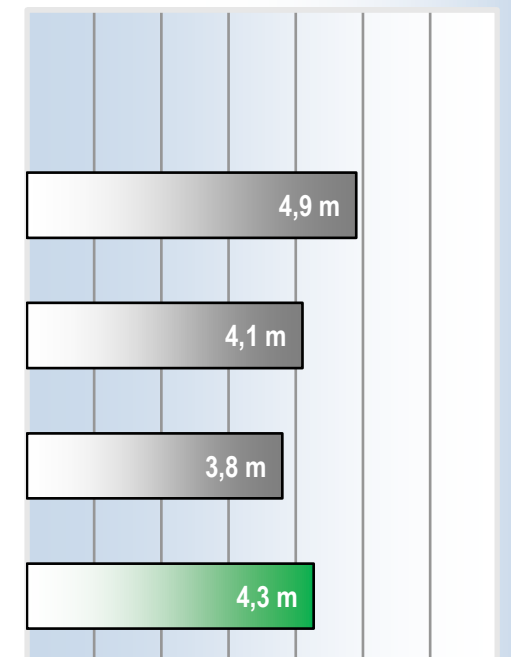
STOP. DISTANCE* [m], 80-20 km/h

25 30 35 40



Δ [m] REF. TO MICHELIN PCY4+*

0 1 2 3 4 5 6 7



*) Average of the performance on high and low μ wet surface.



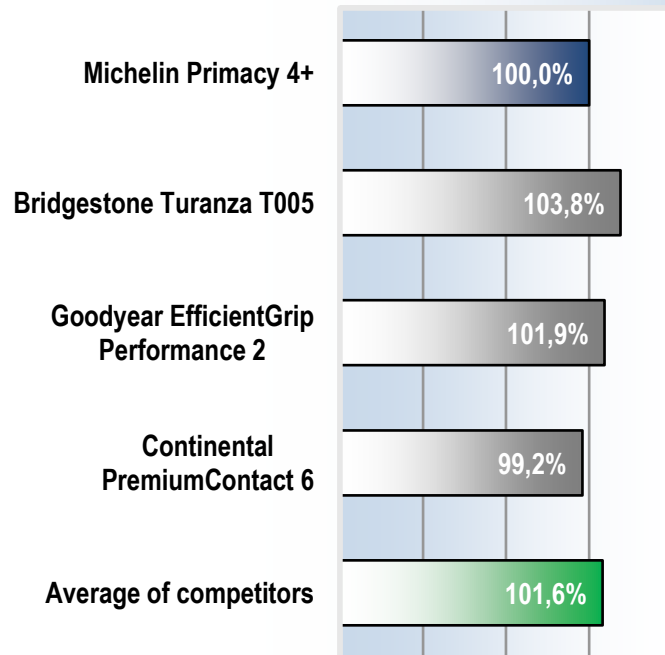
TEST RESULTS

■ DRY BRAKING IN NEW CONDITION

- ABS-emergency stop on dry asphalt surface
- $T_{\text{surface}} = 37.1$ to 41.8°C $T_{\text{air}} = 20.4$ to 22.1°C
- Relevant test speed range: 100 to 0 km/h

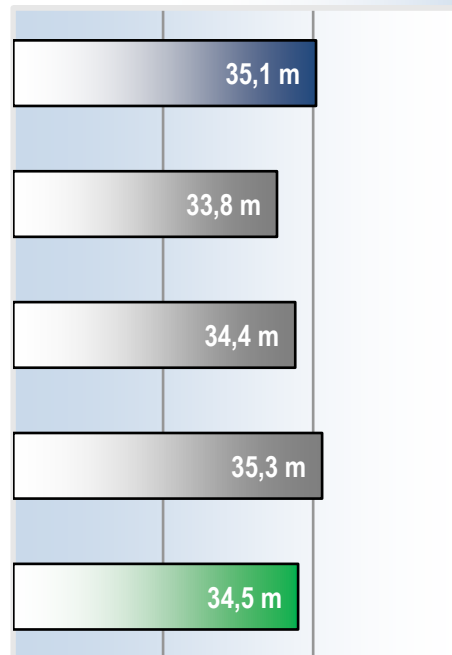
DRY BRAKING PERFORMANCE [%]

70% 80% 90% 100% 110%



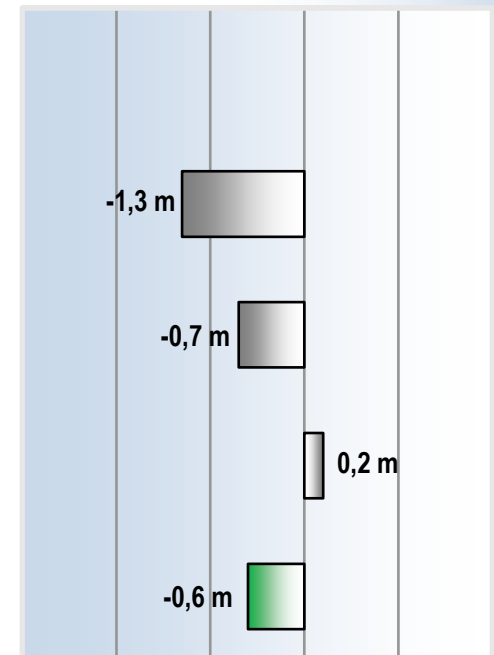
STOP. DISTANCE [m], 100-0 km/h

25 30 35 40



Δ [m] REF. TO MICHELIN PCY4+

-3 -2 -1 0 1 2





TEST RESULTS

■ AQUAPLANING STRAIGHT-LINE

- Aquaplaning test in longitudinal direction in a water basin with asphalt surface; water depth: 9mm
- $T_{\text{surface}} = 19.2 \text{ to } 21.9^\circ\text{C}$ $T_{\text{air}} = 14.3 \text{ to } 15.1^\circ\text{C}$
- Result: maximum speed at a slip ratio of 15%

AQUAPLANING LONGI. PERFORMANCE [%]

85% 90% 95% 100% 105%

Michelin Primacy 4+

100,0%

Bridgestone Turanza T005

97,7%

Goodyear EfficientGrip
Performance 2

97,9%

Continental
PremiumContact 6

98,4%

Average of competitors

98,0%

SPEED [km/h]

70 75 80

80,8 km/h

78,9 km/h

79,1 km/h

79,5 km/h

79,2 km/h

Δ [km/h] REF. TO MICHELIN PCY4+

-2,5 -2,0 -1,5 -1,0 -0,5 0,0

-1,9 km/h

-1,7 km/h

-1,3 km/h

-1,6 km/h



TEST RESULTS

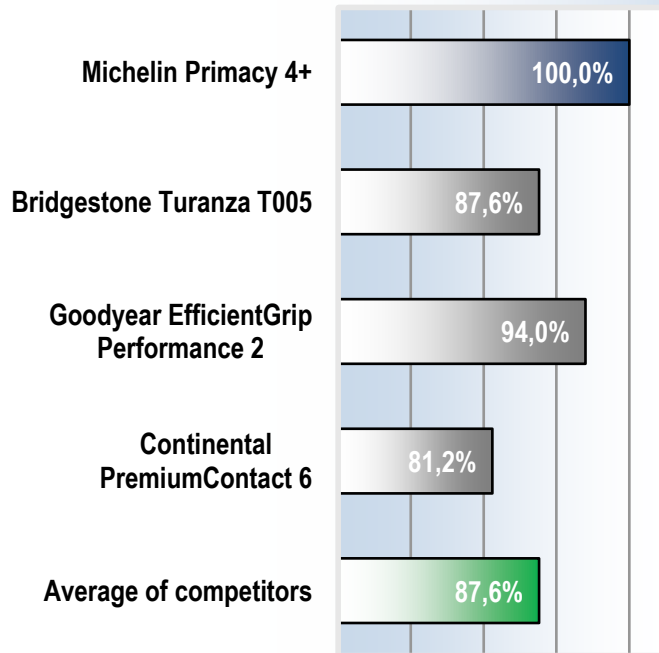
■ AQUAPLANING IN CURVE

- Aquaplaning test in lateral direction in a water basin with asphalt surface; water depth: 8mm; curve radius: 100m
- $T_{\text{surface}} = 15.4 \text{ to } 18.0^\circ\text{C}$ $T_{\text{air}} = 14.2 \text{ to } 16.4^\circ\text{C}$
- Result: Maximum area under the graph → intergal A (lateral acceleration over speed)

$$A = \int_{v=50\text{km/h}}^{v(\text{amax}-60\%)} a * dv$$

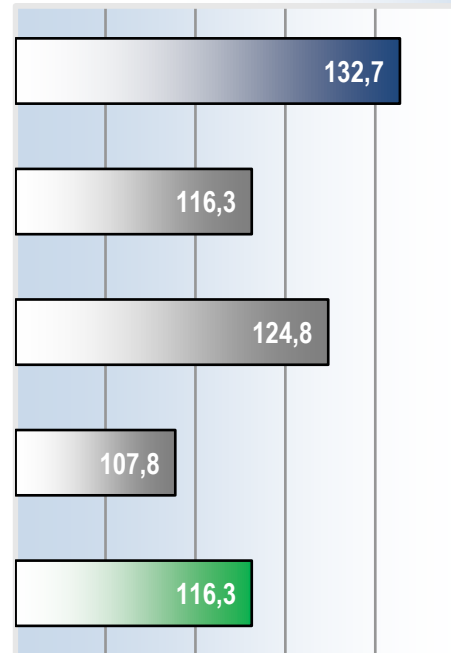
AQUAPLANING IN CURVE PERFORMANCE [%]

60% 70% 80% 90% 100%



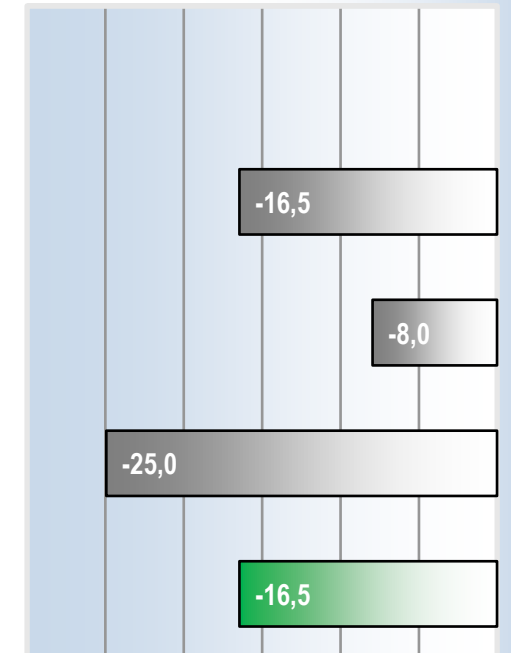
INTEGRAL A [-]

90 100 110 120 130 140



Δ [-] REF. TO MICHELIN PCY4+

-30 -25 -20 -15 -10 -5 0



TEST RESULTS

■ TREAD DEPTH MEASUREMENT

- The tires were buffed to an aim value of 2mm and measured by Michelin.
- TÜV SÜD PS validated the results on the basis of random samples. Tread wear was checked at one tire of each set.

MICHELIN PRIMACY 4+

		Measurement Michelin							Measurement TÜV SÜD PS				
Unit [mm]		Section				Average	Unit [mm]		Section				Average
		1	2	3	4				1	2	3	4	
Measurement point	1	1,95	1,81	1,83	2,12	1,93	Measurement point	1	1,97	1,68	1,75	2,03	1,86
	2	2,16	1,84	2,02	2,35	2,09		2	1,97	1,80	1,81	2,09	1,92
	3	2,25	1,92	2,06	2,31	2,14		3	2,11	1,71	2,04	2,16	2,01
	4	2,29	1,82	2,12	2,43	2,17		4	2,08	1,60	1,90	2,23	1,95
	5	2,20	1,65	1,98	2,39	2,06		5	2,20	1,53	1,88	2,28	1,97
	6	1,93	1,82	1,83	2,39	1,99		6	1,87	1,79	1,66	2,31	1,91
	7	-	-	-	-	-		7	-	-	-	-	-
	8	-	-	-	-	-		8	-	-	-	-	-
Average		2,13	1,81	1,97	2,33		Average		2,03	1,69	1,84	2,18	

Congruence average value Michelin/TÜV (≥ 95%)	93,9%
Max error of single value (≤ 10%)	12,1%

General average tire tread depth [mm]	2,06	✓	General average tire tread depth [mm]	1,94	✓
Max. deviation of measurement points' average [mm]	0,24	✓	Max. deviation of measurement points' average [mm]	0,15	✓
Standard deviation of all measurements [mm]	0,23	✓	Standard deviation of all measurements [mm]	0,22	✓

Target criteria:

General average tire tread depth 2mm ± 0,2mm

Max. deviation of measurement points' average ≤ 0,6mm

Standard deviation of all measurements ≤ 0,35mm



TEST RESULTS

■ TREAD DEPTH MEASUREMENT

- The tires were buffed to an aim value of 2mm and measured by Michelin.
- TÜV SÜD PS validated the results on the basis of random samples. Tread wear was checked at one tire of each set.

BRIDGESTONE TURANZA T005

Measurement Michelin							Measurement TÜV SÜD PS							Congruence average value Michelin/TÜV (≥ 95%)	
Unit [mm]		Section				Average	Unit [mm]		Section				Average	Max error of single value (≤ 10%)	
		1	2	3	4				1	2	3	4			
Measurement point	1	2,16	2,01	1,88	2,06	2,03	Measurement point	1	2,05	1,94	1,80	1,95	1,94	90,4%	19,6%
	2	2,50	2,21	2,07	2,25	2,26		2	2,20	1,96	1,90	1,99	2,01		
	3	2,20	2,06	1,93	2,15	2,09		3	1,94	1,85	1,71	1,87	1,84		
	4	2,08	2,04	1,82	2,05	2,00		4	1,78	1,64	1,50	1,79	1,68		
	5	2,36	2,30	2,14	2,28	2,27		5	2,07	2,10	1,93	2,06	2,04		
	6	2,07	1,92	1,75	1,76	1,88		6	1,77	1,82	1,90	1,72	1,80		
	7	-	-	-	-	-		7	-	-	-	-	-		
	8	-	-	-	-	-		8	-	-	-	-	-		
Average		2,23	2,09	1,93	2,09		Average		1,97	1,89	1,79	1,90			
General average tire tread depth [mm]					2,09	✓	General average tire tread depth [mm]					1,89	✓		
Max. deviation of measurement points' average [mm]					0,40	✓	Max. deviation of measurement points' average [mm]					0,36	✓		
Standard deviation of all measurements [mm]					0,19	✓	Standard deviation of all measurements [mm]					0,16	✓		
Target criteria:															
General average tire tread depth 2mm ± 0,2mm															
Max. deviation of measurement points' average ≤ 0,6mm															
Standard deviation of all measurements ≤ 0,35mm															



TEST RESULTS

■ TREAD DEPTH MEASUREMENT

- The tires were buffed to an aim value of 2mm and measured by Michelin.
- TÜV SÜD PS validated the results on the basis of random samples. Tread wear was checked at one tire of each set.

GOODYEAR EFFICIENTGRIP PERFORMANCE 2

Measurement Michelin							Measurement TÜV SÜD PS							Congruence average value Michelin/TÜV (≥ 95%)	
Unit [mm]		Section				Average	Unit [mm]		Section				Average	Max error of single value (≤ 10%)	
		1	2	3	4				1	2	3	4			
Measurement point	1	2,01	2,03	1,99	1,77	1,95	Measurement point	1	1,99	1,96	1,81	1,72	1,87	91,5%	
	2	1,81	2,13	2,09	1,81	1,96		2	1,55	1,92	1,86	1,57	1,73		
	3	2,05	2,21	2,17	1,96	2,10		3	1,85	2,09	1,99	1,76	1,92		
	4	1,99	2,29	2,19	2,05	2,13		4	1,81	2,14	2,02	1,84	1,95		
	5	1,77	2,02	1,82	1,61	1,81		5	1,49	1,79	1,62	1,44	1,59		
	6	1,87	2,24	2,07	1,79	1,99		6	1,73	2,10	1,95	1,70	1,87		
	7	-	-	-	-	-		7	-	-	-	-	-		
	8	-	-	-	-	-		8	-	-	-	-	-		
Average		1,92	2,15	2,06	1,83		Average		1,74	2,00	1,88	1,67			
General average tire tread depth [mm]					1,99	✓	General average tire tread depth [mm]					1,82	✓		
Max. deviation of measurement points' average [mm]					0,33	✓	Max. deviation of measurement points' average [mm]					0,37	✓		
Standard deviation of all measurements [mm]					0,18	✓	Standard deviation of all measurements [mm]					0,19	✓		
Target criteria:															
General average tire tread depth 2mm ± 0,2mm															
Max. deviation of measurement points' average ≤ 0,6mm															
Standard deviation of all measurements ≤ 0,35mm															



TEST RESULTS

■ TREAD DEPTH MEASUREMENT

- The tires were buffed to an aim value of 2mm and measured by Michelin.
- TÜV SÜD PS validated the results on the basis of random samples. Tread wear was checked at one tire of each set.

CONTINENTAL PREMIUMCONTACT 6

Measurement Michelin						Measurement TÜV SÜD PS						Congruence average value Michelin/TÜV (≥ 95%)		
Unit [mm]	Section				Average	Unit [mm]	Section				Average	Max error of single value (≤ 10%)		
	1	2	3	4			1	2	3	4				
Measurement point	1	2,13	2,21	2,20	2,12	2,17	Measurement point	1	2,04	2,33	2,43	2,23	2,26	94,8%
	2	2,14	1,95	2,05	1,97	2,03		2	1,94	1,74	1,91	1,65	1,81	
	3	2,16	1,97	2,07	1,94	2,04		3	1,95	1,80	1,97	1,74	1,87	18,6%
	4	2,17	2,11	2,18	2,06	2,13		4	2,10	1,95	2,18	1,89	2,03	
	5	2,20	1,96	2,00	2,04	2,05		5	1,79	1,71	1,90	1,76	1,79	
	6	2,03	2,05	2,13	2,01	2,06		6	2,08	2,02	2,28	1,88	2,07	
	7	-	-	-	-	-		7	-	-	-	-	-	
	8	-	-	-	-	-		8	-	-	-	-	-	
Average		2,14	2,04	2,11	2,02		Average		1,98	1,93	2,11	1,86		
General average tire tread depth [mm]					2,08	✓	General average tire tread depth [mm]					1,97	✓	
Max. deviation of measurement points' average [mm]					0,14	✓	Max. deviation of measurement points' average [mm]					0,47	✓	
Standard deviation of all measurements [mm]					0,09	✓	Standard deviation of all measurements [mm]					0,21	✓	
Target criteria:														
General average tire tread depth 2mm ± 0,2mm														
Max. deviation of measurement points' average ≤ 0,6mm														
Standard deviation of all measurements ≤ 0,35mm														

