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TÜV SÜD - Tire Test 2020/2021

(Excerpt of report no. 713202755-CC16-01)

205/55 R16 - MICHELIN CROSSCLIMATE 2

Test Results:

New condition: Wet & dry braking, snow braking & acceleration, rolling resistance

Worn* condition: Wet & dry braking, snow braking & acceleration

Test Period: December 2020 – April 2021

*) Explanation see page 2

TÜV SÜD Product Service GmbH

Report No. 713202755-CC16-02(en)

TÜV®

TIRE DETAILS

DIMENSION: 205/55 R16

TIRE BRANDS & PATTERNS IN THE TEST: MICHELIN

NEW CONDITION:



MICHELIN

CROSSCLIMATE 2

94V

DOT: HC WC 0MRX 39/4020

WORN* CONDITION:



NEW CONDITION :



MICHELIN

CROSSCLIMATE+

94V

DOT: H1 WC 0JYX 3620

WORN* CONDITION :



- The above listed test samples of Michelin CrossClimate 2 were provided by Michelin.
- The test samples of Michelin CrossClimate+ 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.

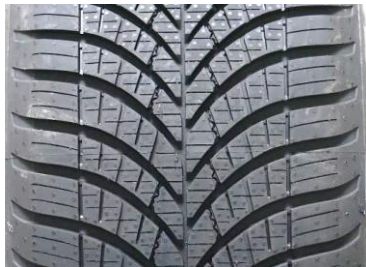
*) to reach the desired worn condition, the tires were buffed on a special machine to the depth range of the tread wear indicator according to UN-ECE regulation R30 Rev3. (1.6mm +0.6/-0.0mm)

TIRE DETAILS

DIMENSION: 205/55 R16

TIRE BRANDS & PATTERNS IN THE TEST: COMPETITORS

NEW CONDITION:



WORN* CONDITION:



GOODYEAR

VECTOR 4SEASONS GEN-3
94V, DOT: A50F YF1R 3420

CONTINENTAL

ALLSEASONSCONTACT
94V, DOT: HW0F D4H6 35-3620

BRIDGESTONE

WEATHER CONTROL A005 Evo
94V, DOT: VR8K V4J 35-3820

PIRELLI

CINTURATO ALL SEASON PLUS
94V, DOT: XH BK 893A 08-4220

- 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)
- Snow braking & acceleration: Arctic Falls Plantskolan, Vidsel (S)
- Rolling resistance: TÜV SÜD tire lab, Garching (D)

■ TEST VEHICLE

- VW Golf VIII 2.0TDI 150hp, VW Golf VII 1.6TDI 115hp, VW Golf VII 1.0TSI 110hp

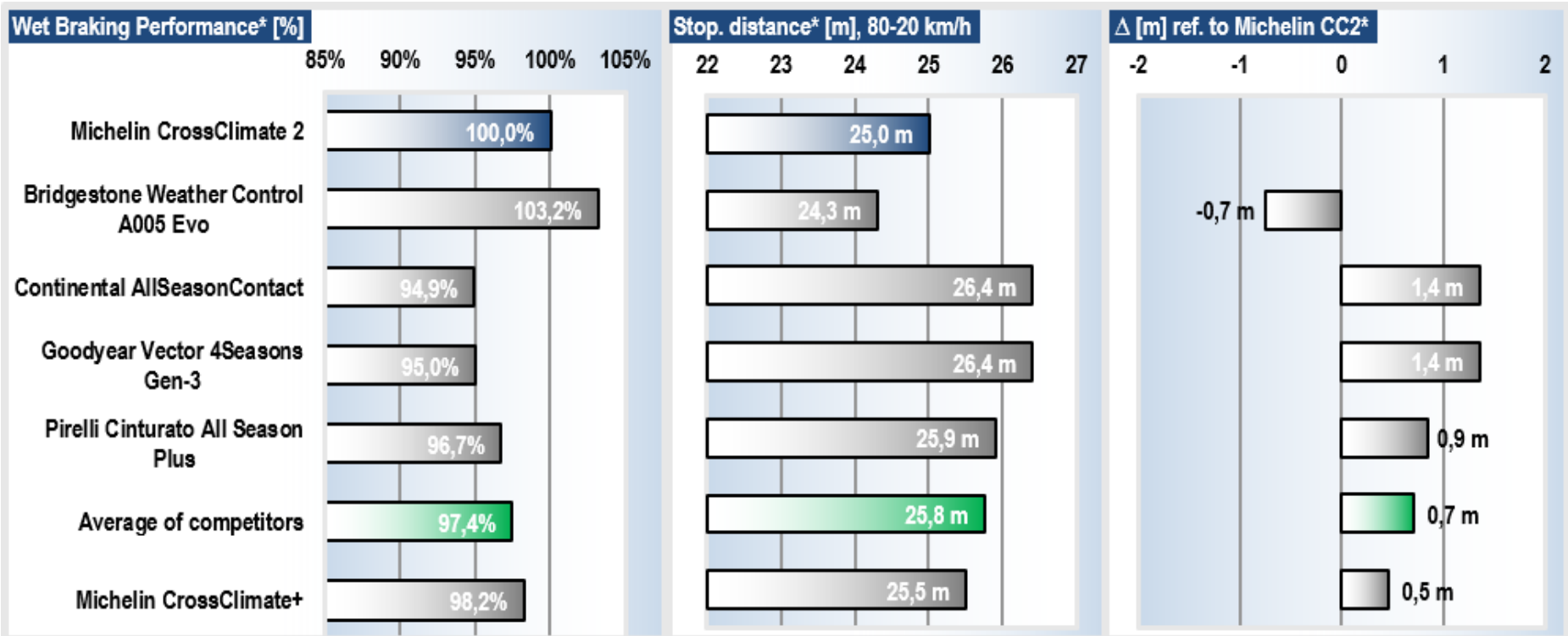
■ PROCEDURE AND EVALUATION

- 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 CrossClimate 2, worn condition: Michelin CrossClimate 2 (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 high and low μ surfaces (within the permitted range of ECE R117) at 2 different test temperature ranges:
- $T_{\text{surface, low}} = 5.2$ to 6.8°C at $T_{\text{air, low}} = 1.3$ to 4.2°C ; $T_{\text{surface, high}} = 19.1$ to 25.3°C at $T_{\text{air, high}} = 14.3$ to 24.0°C
- Relevant test speed range: 80 to 20 km/h

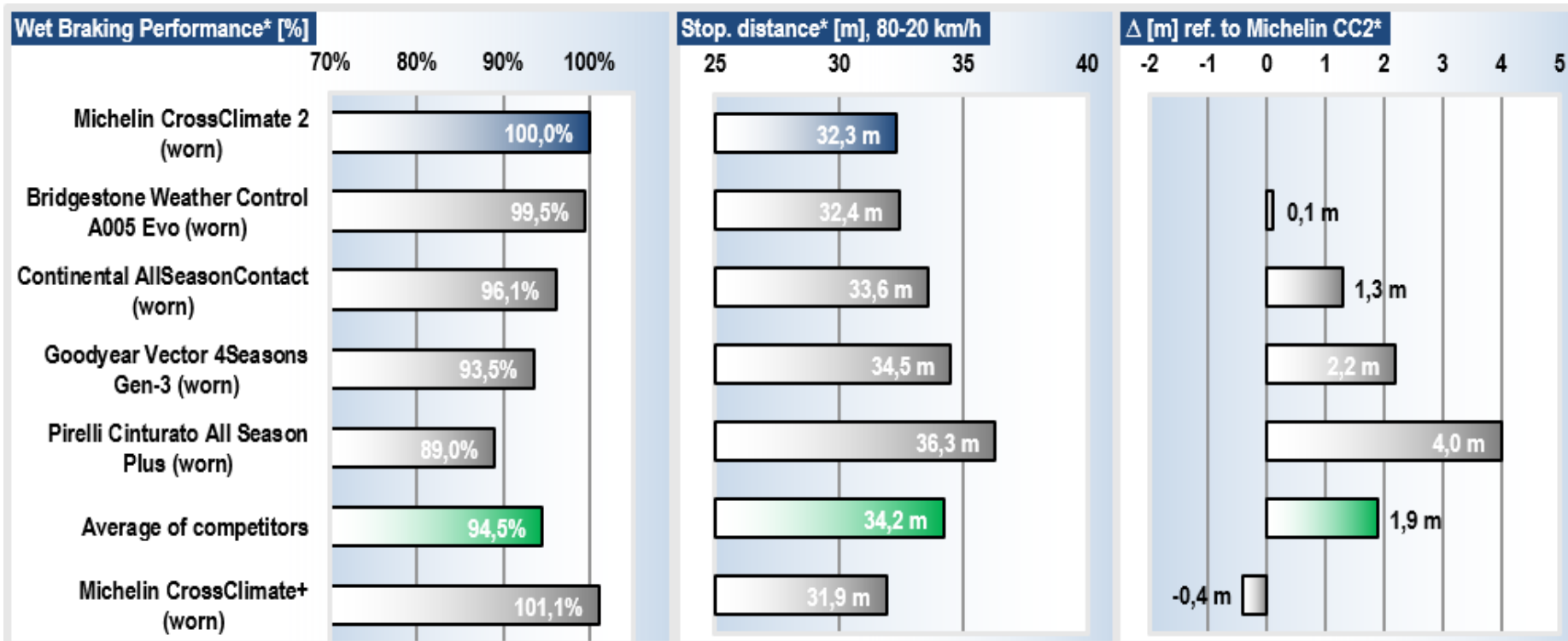


*) Average of the performance on high and low μ wet surface with two different temperature ranges each.

TEST RESULTS

WET BRAKING IN WORN CONDITION

- ABS-emergency stop on high and low μ surfaces (within the permitted range of ECE R117) at 2 different test temperature ranges:
- $T_{\text{surface, low}} = 0.4$ to 6.1°C at $T_{\text{air, low}} = 0.6$ to 4.3°C ; $T_{\text{surface, high}} = 15.6$ to 25.5°C at $T_{\text{air, high}} = 10.0$ to 23.7°C
- Relevant test speed range: 80 to 20 km/h



*) Average of the performance on high and low μ wet surface with two different temperature ranges each.

TEST RESULTS

■ DRY BRAKING IN NEW CONDITION

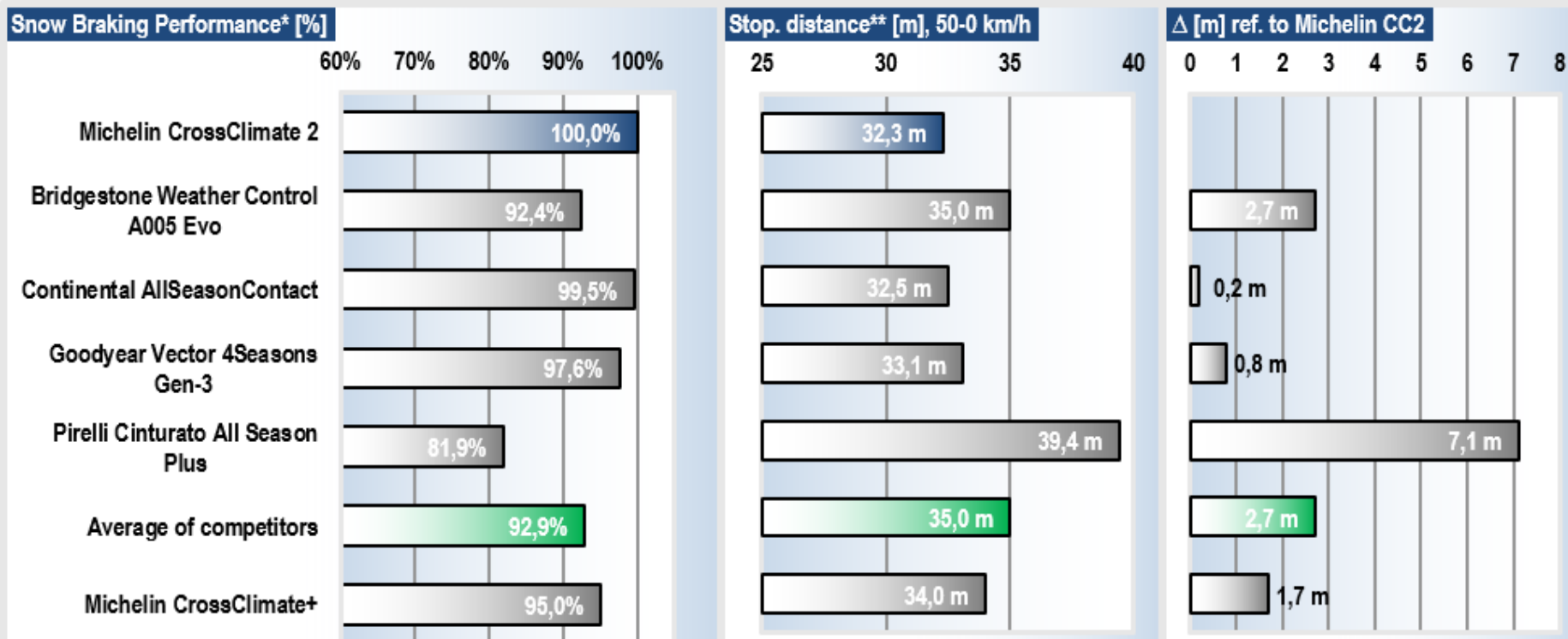
- ABS-emergency stop on dry asphalt surface at a temperature range of $T_{\text{surface}} = 4.4$ to 6.7°C at $T_{\text{air}} = 4.1$ to 6.2°C
- Relevant test speed range: 100 to 0 km/h



TEST RESULTS

■ SNOW BRAKING IN NEW CONDITION

- ABS-emergency stop on compressed snow at a $\varnothing$ temperature range of $T_{\text{Surface}} = -13.6$ to -8.0°C at $T_{\text{Air}} = -15.4$ to -9.7°C
- Triple test execution (test and re-tests on three different days)
- Relevant Test speed range: 30 to 10 km/h



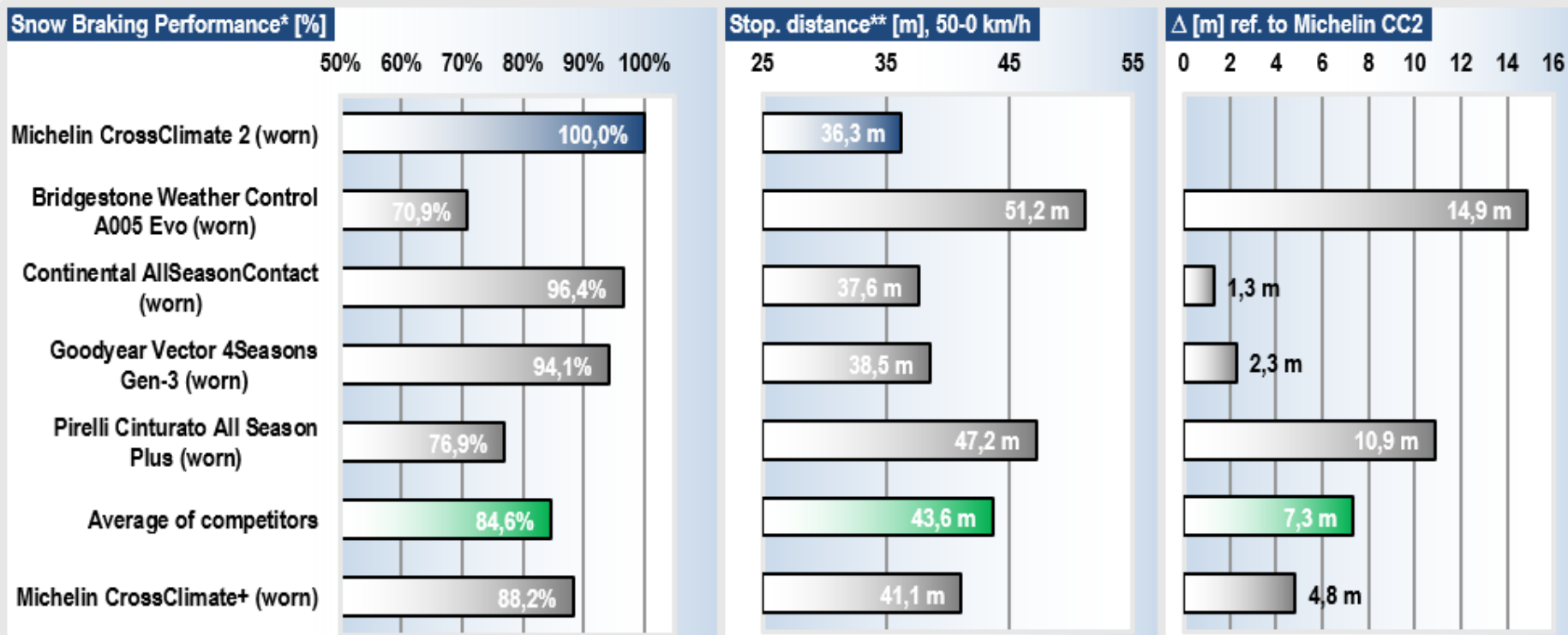
*) Calculations based on the mean decelerations resulting from the measured stopping distances from 30–10 km/h.

**) Extrapolation from 30-10 km/h to 50-0 km/h is based on the mean decelerations resulting from the measured braking distances achieved in the actual tests.

TEST RESULTS

■ SNOW BRAKING IN WORN CONDITION

- ABS-emergency stop on compressed snow at a $\varnothing$ temperature range of $T_{\text{Surface}} = -13.6$ to -8.5°C at $T_{\text{Air}} = -12.6$ to -10.6°C
- Triple test execution (test and re-tests on three different days)
- Relevant Test speed range: 30 to 10 km/h



*) Calculations based on the mean decelerations resulting from the measured stopping distances from 30–10 km/h.

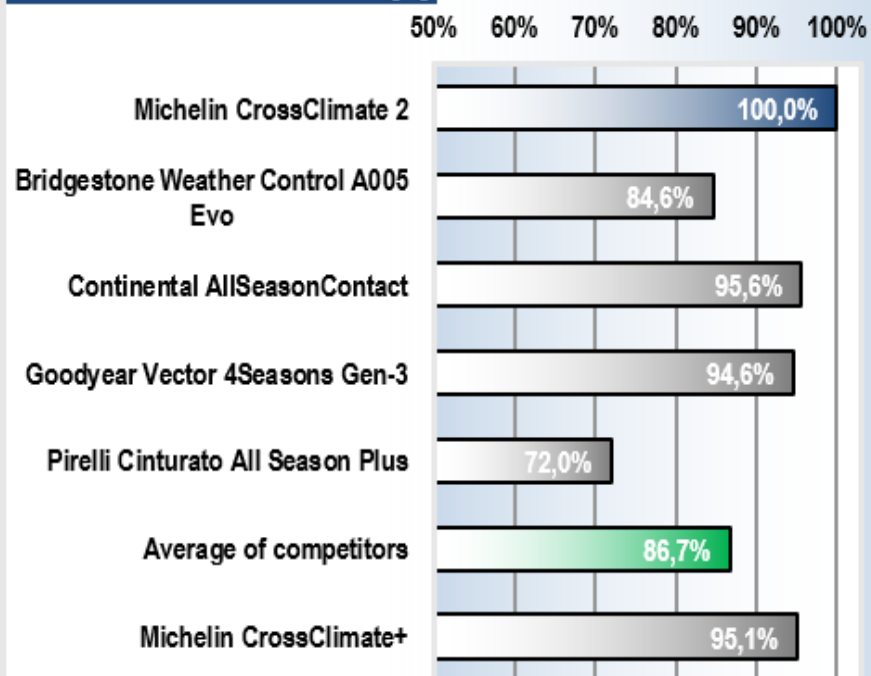
**) Extrapolation from 30-10 km/h to 50-0 km/h is based on the mean decelerations resulting from the measured braking distances achieved in the actual tests.

TEST RESULTS

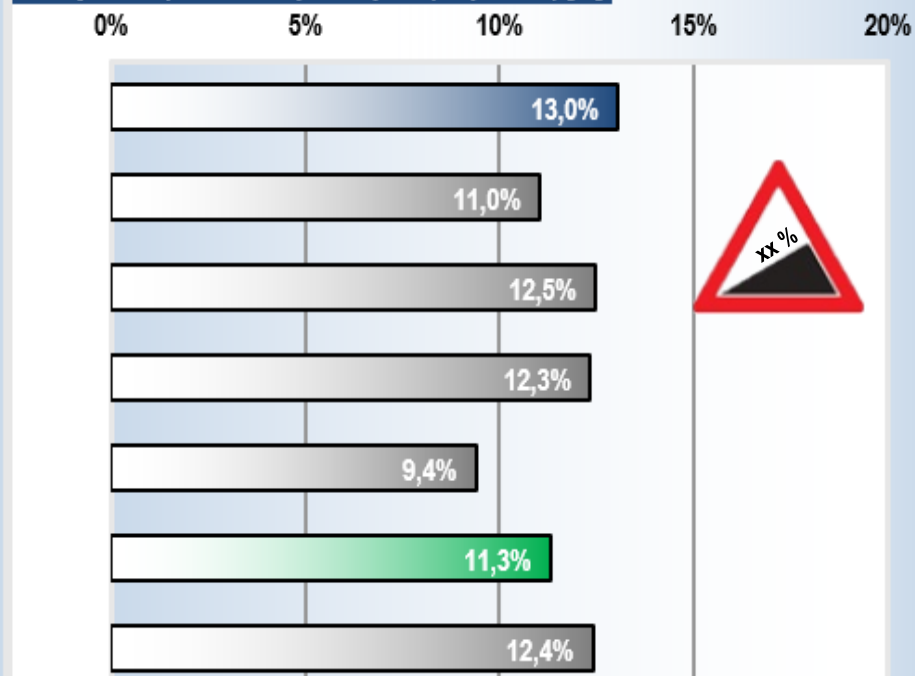
■ SNOW ACCELERATION IN NEW CONDITION

- Maximum acceleration on compressed snow at a temperature range of $\varnothing T_{\text{Surface}} = -13.6$ to -8.0°C at $T_{\text{Air}} = -15.4$ bis -9.7°C
- Triple test execution (test and re-tests on three different days) with active electronic traction control
- Relevant test speed range: 5 to 30 km/h

Snow Acceleration Performance* [%]



Ability to keep a const. speed uphill (slope incl.) [%]



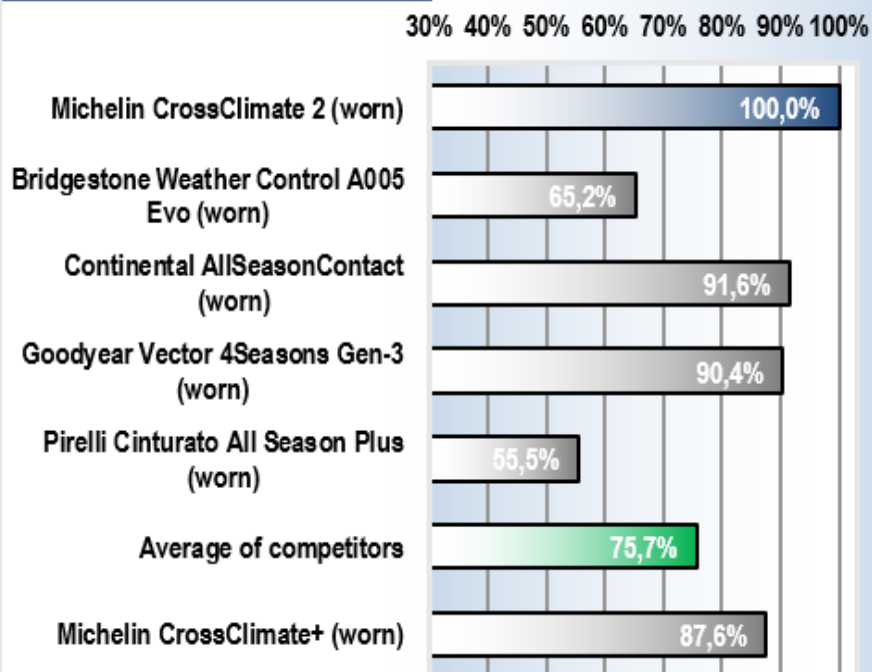
*) Calculations based on the mean accelerations resulting from the measured acceleration times from 5–30 km/h achieved in the actual tests.

TEST RESULTS

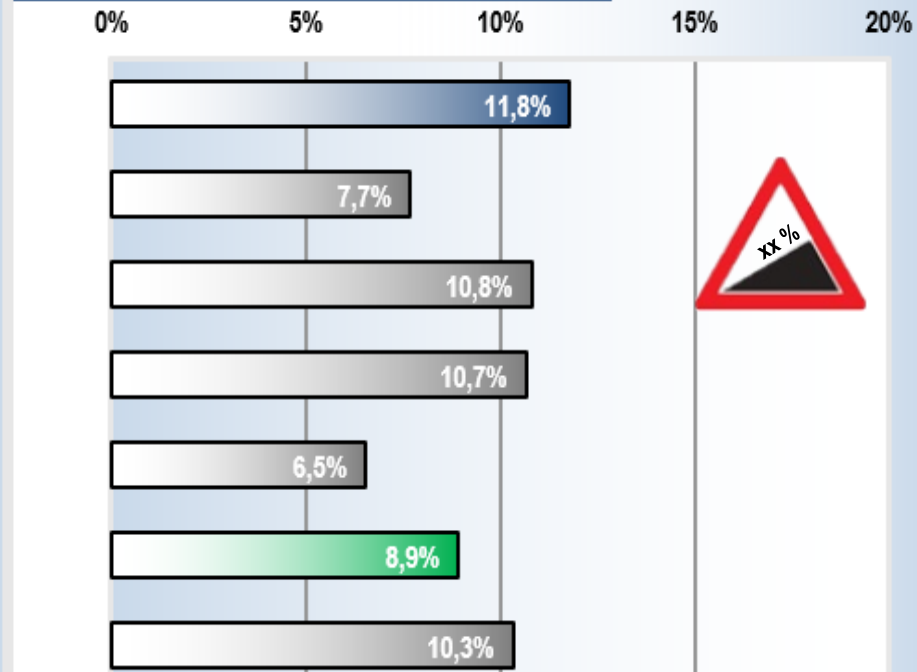
■ SNOW ACCELERATION IN WORN CONDITION

- Maximum acceleration on compressed snow at a temperature range of $\varnothing T_{\text{Surface}} = -13.6$ to -8.5°C at $T_{\text{Air}} = -12.6$ to -10.6°C
- Triple test execution (test and re-tests on three different days) with active electronic traction control
- Relevant test speed range: 5 to 30 km/h

Snow Acceleration Performance* [%]



Ability to keep a const. speed uphill (slope incl.) [%]

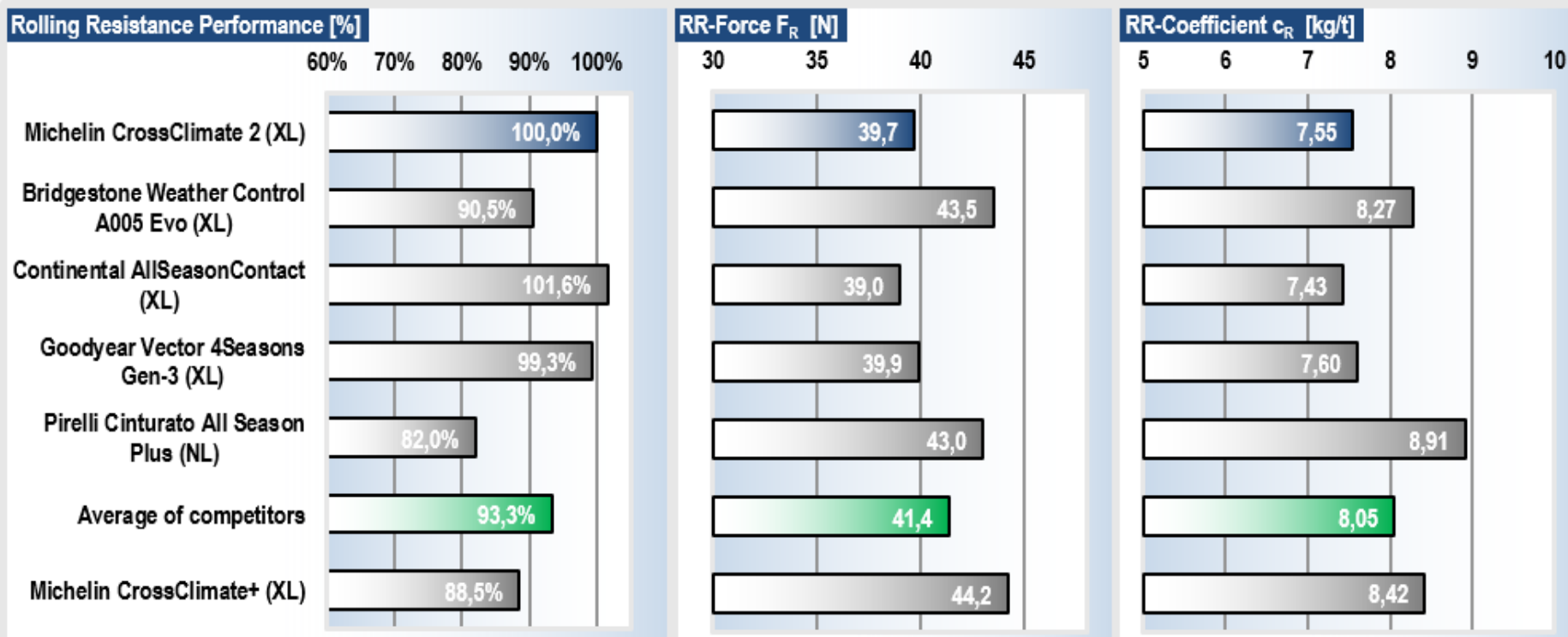


*) Calculations based on the mean accelerations resulting from the measured acceleration times from 5–30 km/h achieved in the actual tests.

TEST RESULTS

■ ROLLING RESISTANCE IN NEW CONDITION

- Electrical power method according to ISO 28580
- Load / inflation: 536 kg / 2.5 bar (XL) & 492kg / 2.1 bar (NL)
- Result Michelin CrossClimate 2: Rolling Resistance-Force $F_R = 39,7$ N; Rolling Resistance-Coefficient $c_R = 7,55$ kg/t ($\triangleq$ EC Label Value = 7,3)



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 CROSSCLIMATE 2

Average of four tires						
Tread depth measurement [mm]		Section				Average
		1	2	3	4	
Measurement point	1	2,18	2,16	2,12	2,31	2,19
	2	2,00	1,97	1,95	2,23	2,04
	3	2,11	2,06	2,03	2,26	2,11
	4	2,10	2,10	2,06	2,17	2,11
	5	1,93	2,05	1,99	2,08	2,01
	6	1,94	2,08	2,02	2,03	2,02
	7	1,89	2,07	2,00	2,02	1,99
	8	2,11	2,13	2,17	2,24	2,16
Average		2,03	2,07	2,04	2,17	

Measurement Michelin						
Unit [mm]		Section				Average
		1	2	3	4	
Measurement point	1	2,22	2,31	2,36	2,19	2,27
	2	1,94	2,16	1,85	1,93	1,97
	3	2,09	2,30	1,98	1,89	2,07
	4	2,06	2,39	1,94	1,79	2,05
	5	1,99	2,42	1,99	1,76	2,04
	6	2,21	2,46	2,05	1,77	2,12
	7	2,20	2,55	2,23	1,83	2,20
	8	2,36	2,71	2,40	2,16	2,41
Average		2,13	2,41	2,10	1,92	

Measurement TÜV SÜD PS						
Unit [mm]		Section				Average
		1	2	3	4	
Measurement point	1	2,13	2,27	2,26	2,13	2,20
	2	1,84	2,12	1,80	1,85	1,90
	3	2,00	2,22	1,94	1,81	1,99
	4	2,10	2,34	1,94	1,76	2,04
	5	1,95	2,38	1,94	1,68	1,99
	6	2,12	2,36	2,01	1,76	2,06
	7	2,13	2,36	2,21	1,78	2,12
	8	2,37	2,71	2,35	2,11	2,39
Average		2,08	2,35	2,06	1,86	

General average tire tread depth [mm]	2,08	✓
Max. deviation of measurement points' average [mm]	0,20	✓
Standard deviation of all measurements [mm]	0,10	✓

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

Congruence average value Michelin/TÜV

≥ 95%

97,4%

Max error of single value

≤ 10%

8,1%

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 VECTOR 4SEASONS GEN-3

Average of four tires						
Tread depth measurement [mm]		Section				Average
		1	2	3	4	
Measurement point	1	2,17	2,13	2,12	2,05	2,12
	2	1,95	1,93	1,90	1,85	1,91
	3	1,86	1,79	1,77	1,73	1,79
	4	1,95	1,95	1,88	1,88	1,92
	5	2,06	2,09	1,98	1,96	2,02
	6	1,89	1,98	1,89	1,80	1,89
	7	1,87	1,96	1,85	1,81	1,87
	8	2,20	2,24	2,07	2,12	2,16
Average		1,99	2,01	1,93	1,90	

Measurement Michelin						
Unit [mm]		Section				Average
		1	2	3	4	
Measurement point	1	2,18	2,00	2,07	2,11	2,09
	2	1,86	1,76	1,67	1,80	1,77
	3	1,80	1,51	1,48	1,67	1,62
	4	1,62	1,49	1,44	1,62	1,54
	5	1,84	1,78	1,72	1,81	1,79
	6	1,75	1,82	1,85	1,83	1,81
	7	1,59	1,80	1,87	1,83	1,77
	8	2,08	2,15	2,10	2,02	2,09
Average		1,84	1,79	1,78	1,84	

Measurement TÜV SÜD PS						
Unit [mm]		Section				Average
		1	2	3	4	
Measurement point	1	2,00	1,93	1,94	2,00	1,97
	2	1,79	1,64	1,55	1,65	1,66
	3	1,73	1,42	1,43	1,59	1,54
	4	1,53	1,43	1,35	1,56	1,47
	5	1,77	1,69	1,60	1,75	1,70
	6	1,67	1,73	1,75	1,68	1,71
	7	1,52	1,78	1,78	1,78	1,72
	8	2,02	2,05	2,06	1,99	2,03
Average		1,75	1,71	1,68	1,75	

General average tire tread depth [mm]	1,96	✓
Max. deviation of measurement points' average [mm]	0,37	✓
Standard deviation of all measurements [mm]	0,13	✓

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

Congruence average value Michelin/TÜV

≥ 95%

95,2%

Max error of single value

≤ 10%

9,1%

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 ALLSEASONCONTACT

Average of four tires						
Tread depth measurement [mm]		Section				Average
		1	2	3	4	
Measurement point	1	2,06	2,19	2,17	2,14	2,14
	2	1,88	2,02	2,11	1,95	1,99
	3	1,98	2,11	2,24	2,07	2,10
	4	2,05	2,20	2,30	2,11	2,16
	5	2,14	2,28	2,31	2,22	2,24
	6	2,15	2,20	2,28	2,18	2,20
	7	2,00	2,07	2,08	2,02	2,04
	8	2,12	2,23	2,20	2,04	2,15
Average		2,04	2,16	2,21	2,09	

Measurement Michelin						
Unit [mm]		Section				Average
		1	2	3	4	
Measurement point	1	2,16	2,26	2,24	2,08	2,19
	2	1,94	2,23	2,24	1,81	2,06
	3	1,94	2,27	2,29	1,80	2,08
	4	2,01	2,31	2,25	1,80	2,09
	5	2,05	2,32	2,30	1,98	2,16
	6	2,04	2,28	2,32	1,89	2,13
	7	1,95	2,17	2,07	1,76	1,99
	8	2,12	2,24	2,17	1,72	2,06
Average		2,03	2,26	2,24	1,86	

Measurement TÜV SÜD PS						
Unit [mm]		Section				Average
		1	2	3	4	
Measurement point	1	2,13	2,22	2,17	1,97	2,12
	2	1,85	2,16	2,15	1,72	1,97
	3	1,89	2,23	2,19	1,77	2,02
	4	1,95	2,24	2,19	1,74	2,03
	5	1,97	2,24	2,21	1,89	2,08
	6	1,98	2,24	2,23	1,77	2,06
	7	1,87	2,10	2,02	1,70	1,92
	8	2,03	2,12	2,04	1,65	1,96
Average		1,96	2,19	2,15	1,78	

General average tire tread depth [mm]	2,13	✓
Max. deviation of measurement points' average [mm]	0,25	✓
Standard deviation of all measurements [mm]	0,11	✓

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

Congruence average value Michelin/TÜV

≥ 95%

96,4%

Max error of single value

≤ 10%

6,8%

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 WEATHER CONTROL A005 Evo

Average of four tires						
Tread depth measurement [mm]		Section				Average
		1	2	3	4	
Measurement point	1	2,16	2,14	2,24	2,20	2,18
	2	2,16	2,07	2,20	2,08	2,13
	3	2,17	2,14	2,33	2,20	2,21
	4	2,28	2,33	2,42	2,35	2,35
	5	2,10	2,03	2,11	2,05	2,07
	6	1,94	1,84	2,02	2,05	1,96
	7	2,10	2,02	2,15	2,19	2,11
	8	2,13	2,11	2,24	2,24	2,18
Average		2,13	2,08	2,21	2,17	

Measurement Michelin						
Unit [mm]		Section				Average
		1	2	3	4	
Measurement point	1	2,20	1,91	2,13	2,39	2,16
	2	1,99	1,68	2,07	2,13	1,97
	3	2,04	1,78	2,26	2,24	2,08
	4	2,30	2,02	2,44	2,46	2,31
	5	2,28	1,78	2,07	2,26	2,10
	6	2,01	1,52	2,14	2,27	1,99
	7	2,12	1,66	2,09	2,38	2,06
	8	2,08	1,91	2,22	2,41	2,16
Average		2,13	1,78	2,18	2,32	

Measurement TÜV SÜD PS						
Unit [mm]		Section				Average
		1	2	3	4	
Measurement point	1	2,20	1,96	2,13	2,44	2,18
	2	2,01	1,67	2,09	2,13	1,98
	3	1,99	1,76	2,21	2,21	2,04
	4	2,24	1,97	2,40	2,42	2,26
	5	2,31	1,79	2,08	2,20	2,10
	6	1,98	1,51	2,10	2,24	1,96
	7	2,11	1,70	2,12	2,38	2,08
	8	2,13	1,97	2,23	2,39	2,18
Average		2,12	1,79	2,17	2,30	

General average tire tread depth [mm]	2,15	✓
Max. deviation of measurement points' average [mm]	0,39	✓
Standard deviation of all measurements [mm]	0,12	✓

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

Congruence average value Michelin/TÜV

≥ 95%

99,7%

Max error of single value

≤ 10%

3,1%

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.

PIRELLI CINTURATO ALL SEASON PLUS

Average of four tires						
Tread depth measurement [mm]		Section				Average
		1	2	3	4	
Measurement point	1	1,94	2,16	2,15	2,08	2,08
	2	1,93	2,07	2,10	2,03	2,03
	3	1,69	1,80	1,82	1,85	1,79
	4	1,92	1,98	2,10	2,06	2,01
	5	2,01	2,04	2,20	2,18	2,11
	6	2,08	2,23	2,34	2,31	2,24
	7	2,07	2,25	2,36	2,35	2,25
	8	1,77	1,94	2,08	2,13	1,98
Average		1,93	2,05	2,14	2,12	

Measurement Michelin						
Unit [mm]		Section				Average
		1	2	3	4	
Measurement point	1	1,96	2,36	2,27	2,28	2,22
	2	2,11	2,38	2,18	2,20	2,22
	3	1,81	1,97	1,88	1,84	1,88
	4	1,78	1,97	1,98	1,90	1,91
	5	1,95	2,01	2,15	2,05	2,04
	6	2,18	2,37	2,47	2,51	2,38
	7	2,20	2,36	2,49	2,61	2,42
	8	1,78	2,03	2,07	2,28	2,04
Average		1,97	2,18	2,19	2,21	

Measurement TÜV SÜD PS						
Unit [mm]		Section				Average
		1	2	3	4	
Measurement point	1	1,91	2,32	2,18	2,25	2,17
	2	2,06	2,31	2,14	2,20	2,18
	3	1,77	1,87	1,81	1,74	1,80
	4	1,67	1,91	1,91	1,85	1,84
	5	1,86	1,99	2,10	1,99	1,99
	6	2,03	2,33	2,45	2,54	2,34
	7	2,22	2,52	2,49	2,68	2,48
	8	1,75	2,06	2,25	2,31	2,09
Average		1,91	2,16	2,17	2,20	

General average tire tread depth [mm]	2,06	✓
Max. deviation of measurement points' average [mm]	0,47	✓
Standard deviation of all measurements [mm]	0,17	✓

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

Congruence average value Michelin/TÜV

≥ 95%

98,7%

Max error of single value

≤ 10%

8,7%