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TÜV SÜD - Tire Test 2021

(Excerpt of report no. 713208251-CC-01)

205/55 R16 94V – MICHELIN CROSSCLIMATE 2

Test results:

New condition: Wet & dry braking, snow braking & acceleration
Worn* condition: Wet braking, snow braking & acceleration
Test period: March 2021 – April 2021

*) Explanation see page 2

Report No. 713208251-CC-01(en)

TÜV SÜD Product Service GmbH

TIRE DETAILS

DIMENSION: 205/55 R16

TIRE BRANDS & PATTERNS IN THE TEST:

MICHELIN
CROSSCLIMATE 2
94V
DOT: HCWC 0MRX 0421

NEW CONDITION:

WORN* CONDITION:

PIRELLI
CINTURATO ALL SEASON SF2
94V
DOT: 1XH BK104L 5120-5220

NEW CONDITION :

WORN* CONDITION :

- The test samples of Michelin CrossClimate 2 were provided by Michelin.
- The test samples of Pirelli Cinturato All Season SF2 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 was 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): FAKT-motion, Memmingen (D)
- Dry braking: FAKT-motion, Memmingen (D)
- Wet braking “low μ” (lower friction): ATP, Papenburg (D)
- Snow braking & acceleration: Arctic Falls, Vidsel (S)

Test vehicle

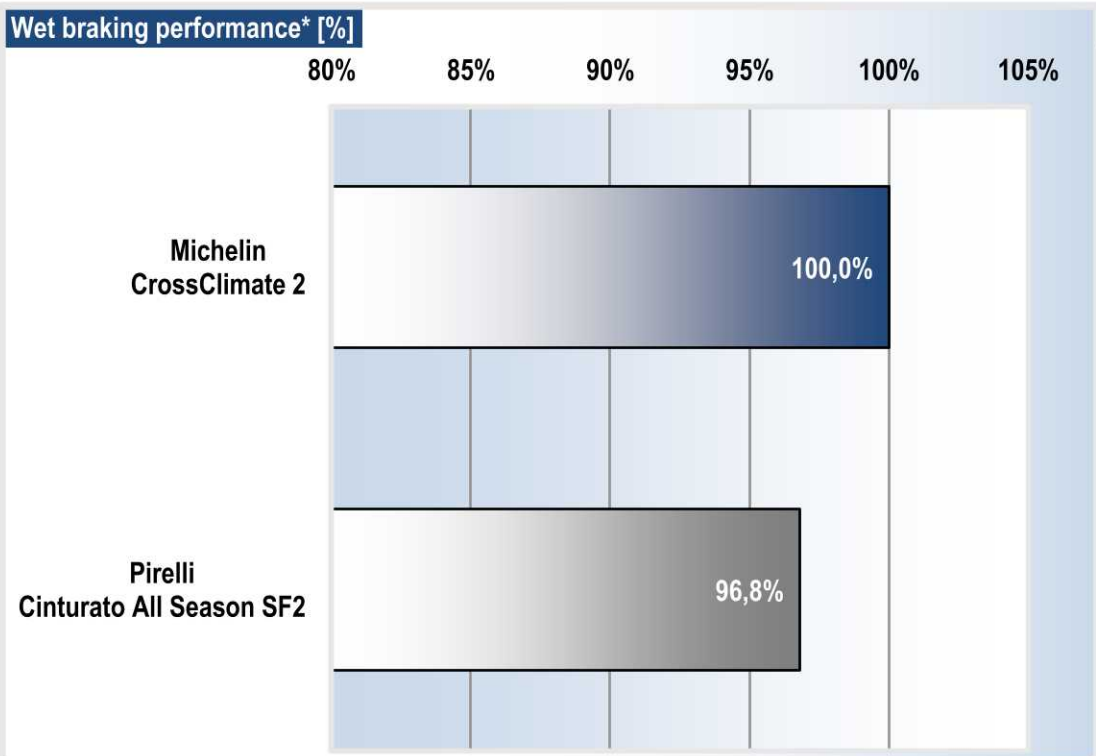
- VW Golf VIII 2.0TDI 150hp, VW Golf VIII 1.6TDI 115hp

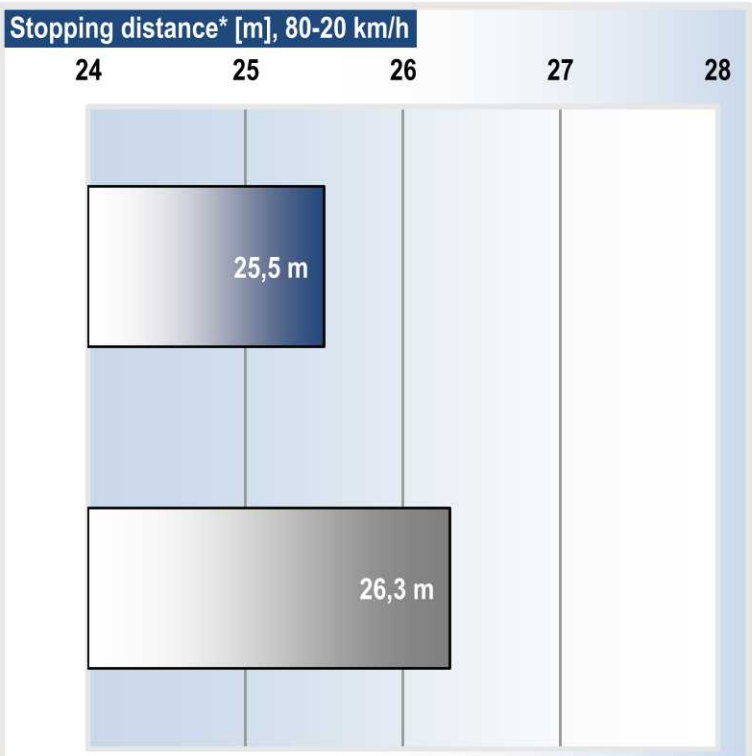
Procedure and evaluation

- 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: $T_{Surface, low}$= 4.1 to 7.8°C at $T_{Air, low}$= 0.5 to 6.7°C; $T_{Surface, high}$= 19.7 to 23.7°C at $T_{Air, high}$= 14.3 to 17.4°C
  - Relevant test speed range: 80 to 20 km/h

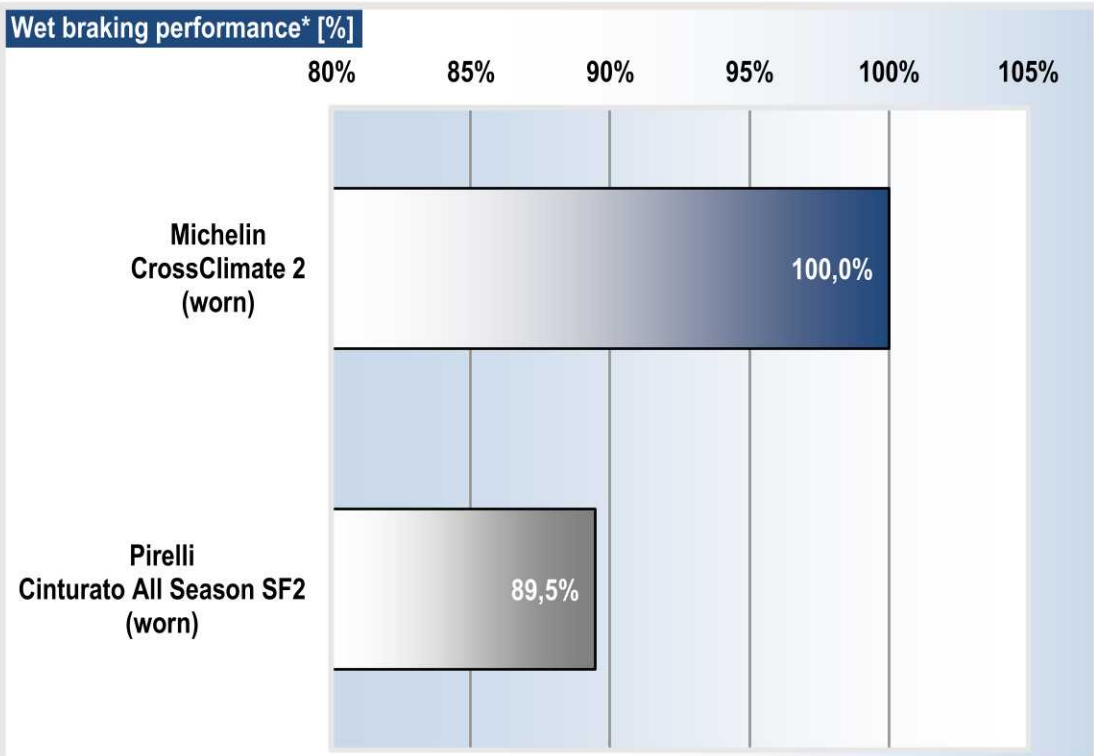


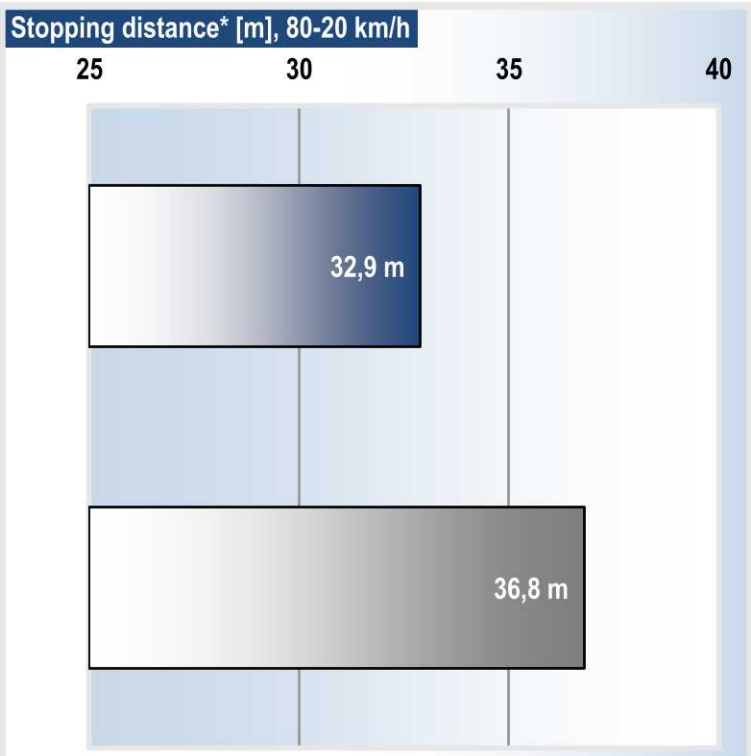


*) Average of the performance on high and low µ wet surface with two different temperature ranges each.

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: $T_{Surface, low}$= 5.5 to 7.9°C at $T_{Air, low}$= 1.7 to 6.8°C; $T_{Surface, high}$= 15.6 to 21.5°C at $T_{Air, high}$= 10.0 to 20.7°C
  - Relevant test speed range: 80 to 20 km/h

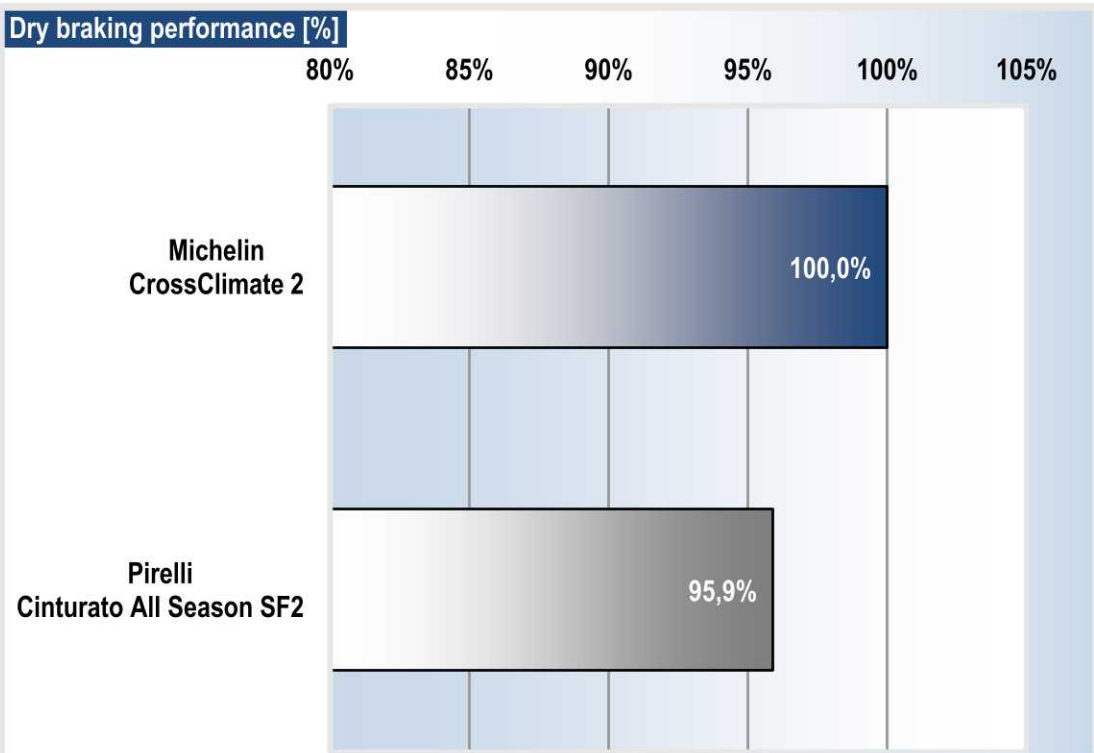


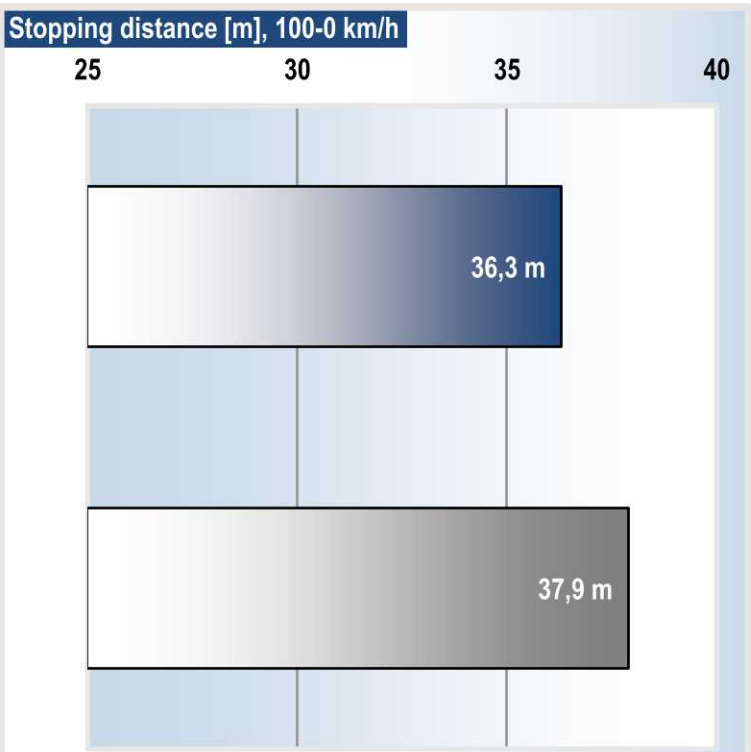


*) Average of the performance on high and low µ wet surface with two different temperature ranges each.

TEST RESULTS

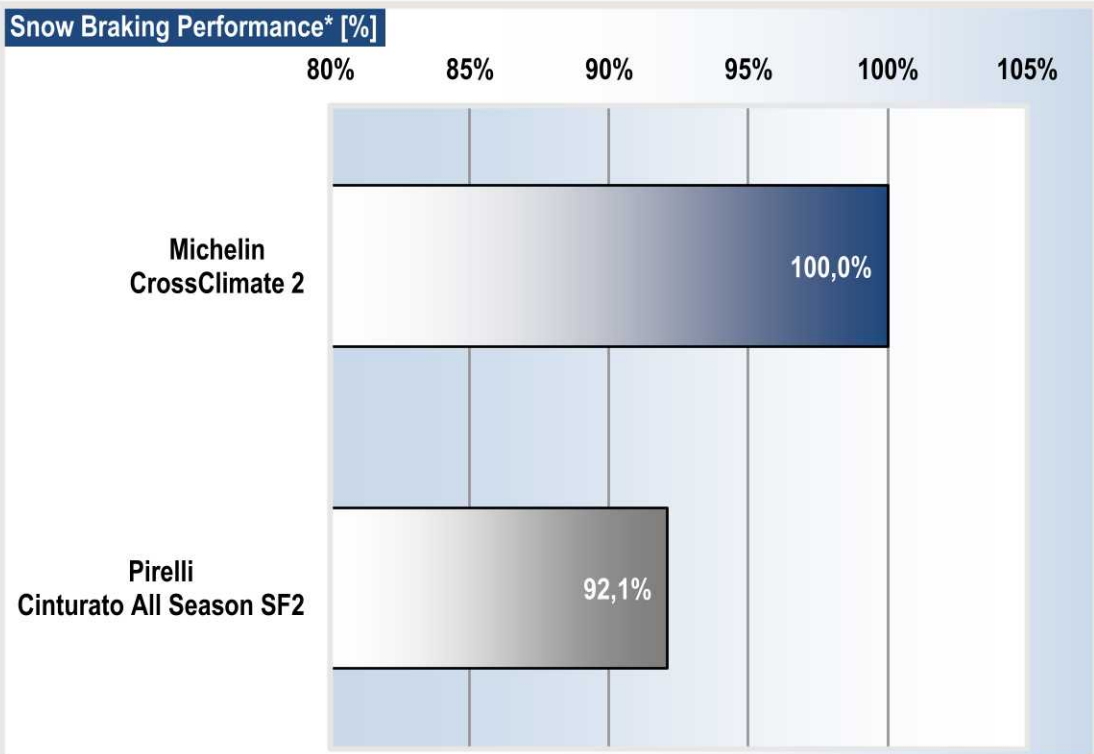
- **DRY BRAKING IN NEW CONDITION**
  - ABS-emergency stop on dry asphalt surface at a temperature range of $T_{Surface}$= 20.3 to 29.8°C at T_{Air}= 13.5 to 15.1°C
  - Relevant test speed range: 100 to 0 km/h





TEST RESULTS

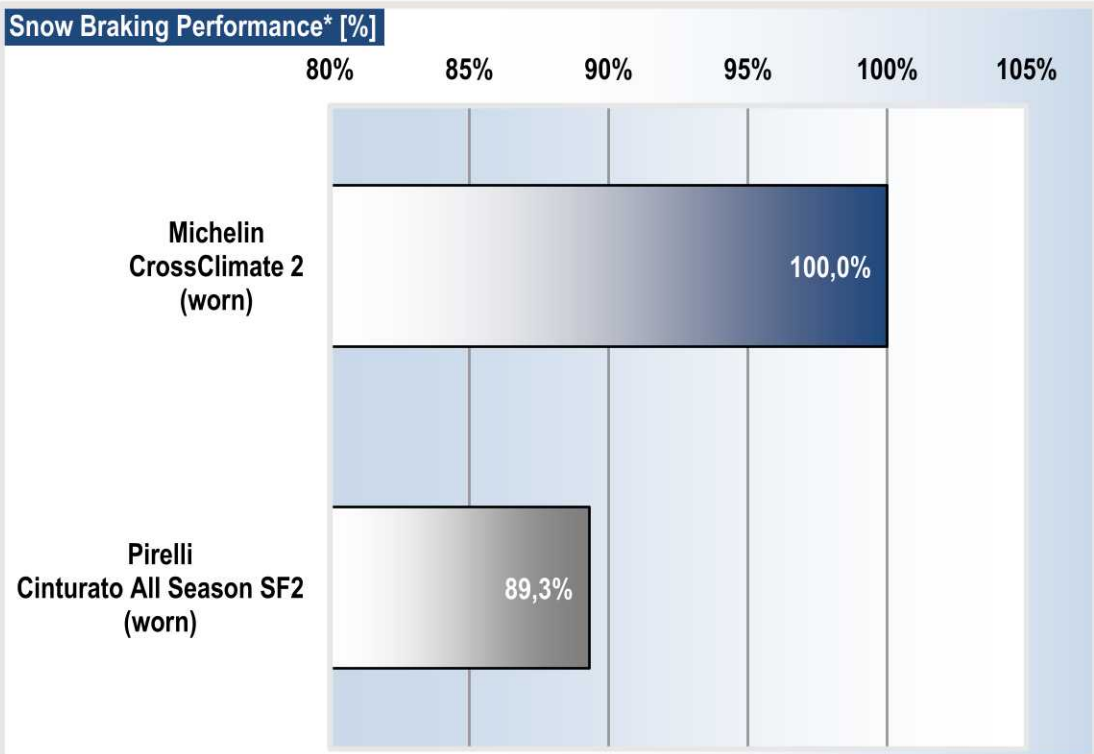
- **SNOW BRAKING IN NEW CONDITION**
  - ABS-emergency stop on compressed snow at a temperature range of $T_{Surface}$= -8.3 to -6.3°C at T_{Air}= -8.7 to -3.2°C
  - Double test execution (test and re-test on two different days)
  - Relevant test speed range: 30 to 10 km/h



*) 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

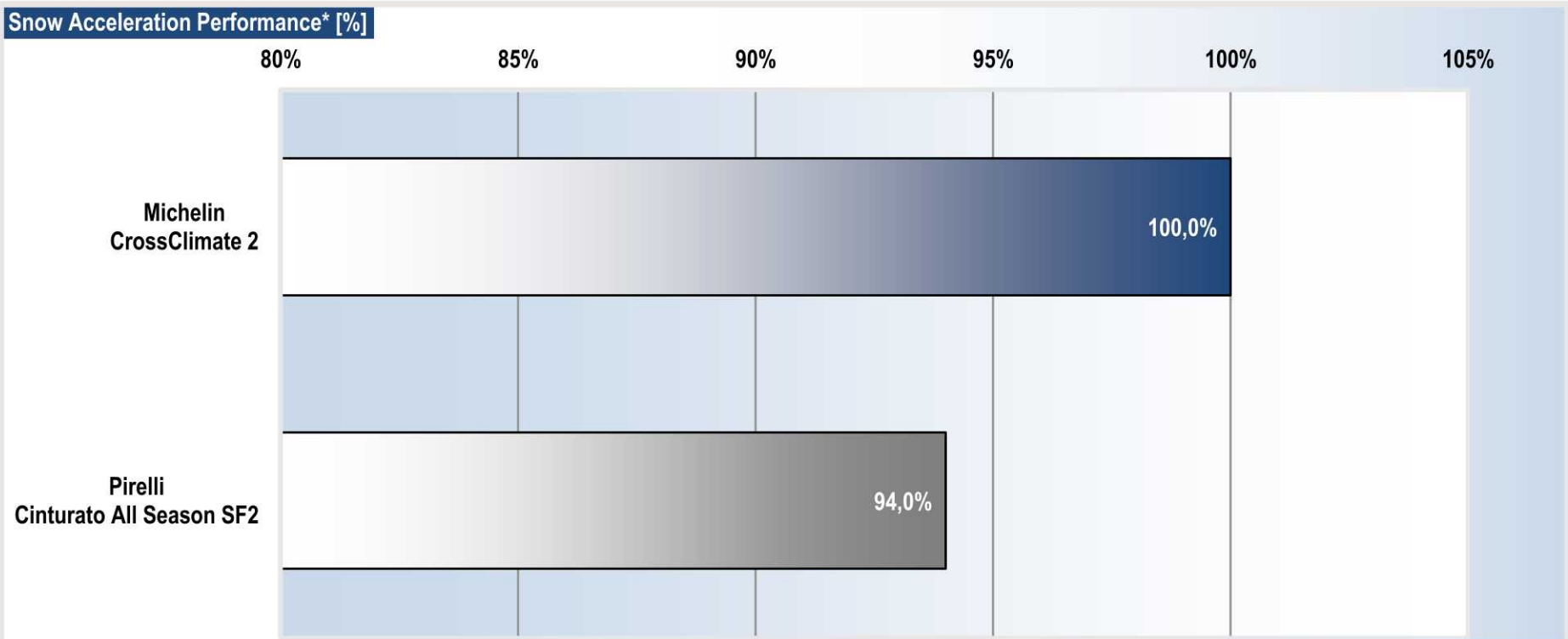
- **SNOW BRAKING IN WORN CONDITION**
  - ABS-emergency stop on compressed snow at a temperature range of $T_{Surface}$= -7.1 to -6.2°C at T_{Air}= -4.3 to -3.4°C
  - Double test execution (test and re-test on two different days)
  - Relevant test speed range: 30 to 10 km/h



*) 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

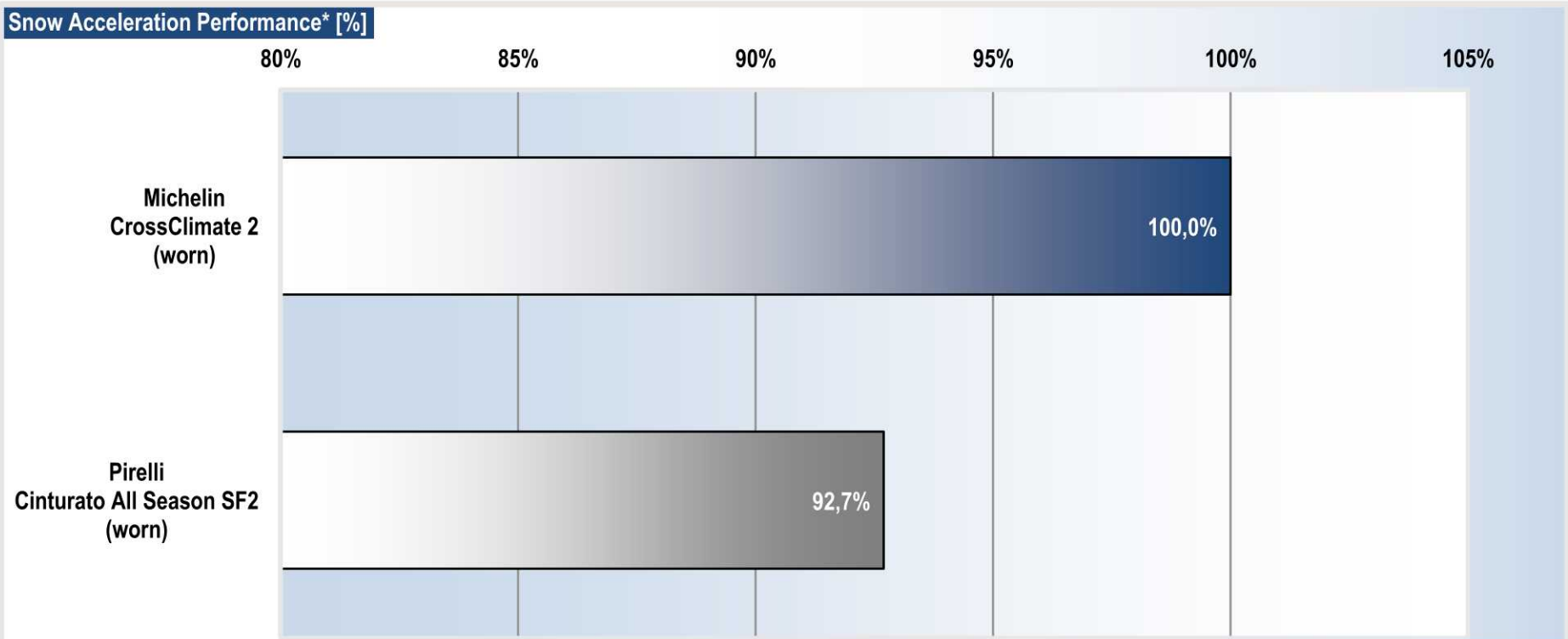
- **SNOW ACCELERATION IN NEW CONDITION**
  - Maximum acceleration on compressed snow at a temperature range of $T_{Surface}$= -8.3 to -6.3°C at T_{Air}= -8.7 to -3.2°C
  - Double test execution (test and re-test on two different days) with active electronic traction control
  - Relevant test speed range: 5 to 30 km/h



*) 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 $T_{Surface}$= -7.1 to -6.2°C at T_{Air}= -4.3 to -3.4°C
  - Double test execution (test and re-test on two different days) with active electronic traction control
  - Relevant test speed range: 5 to 30 km/h



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

TEST RESULTS

Tread depth measurement

- The tires were buffed to an aim tread depth 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 tire line.

Michelin CrossClimate 2

Measurement Michelin

Unit [mm]		Section 1	2	3	4	Average
Measurement point	1	2,05	2,06	2,04	2,46	**2,15**
	2	1,76	1,80	1,79	2,34	**1,92**
	3	2,05	1,93	1,92	2,51	**2,10**
	4	1,88	1,90	1,75	2,40	**1,98**
	5	1,81	1,93	1,97	2,50	**2,05**
	6	1,94	2,05	1,98	2,66	**2,16**
	7	1,73	1,80	1,87	2,51	**1,98**
	8	1,98	1,85	1,98	2,52	**2,08**
Average		**1,90**	**1,92**	**1,91**	**2,49**	

General average tire tread depth [mm]	**2,05**	✓
Max. deviation of measurement points' average [mm]	**0,24**	✓
Standard deviation of all measurements [mm]	**0,27**	✓

Measurement TÜV SÜD PS

Unit [mm]		Section 1	2	3	4	Average
Measurement point	1	2,04	2,05	2,02	2,43	**2,14**
	2	1,74	1,77	1,76	2,39	**1,92**
	3	2,03	1,96	1,87	2,55	**2,10**
	4	1,81	1,83	1,77	2,34	**1,94**
	5	1,79	1,89	1,93	2,44	**2,01**
	6	1,92	1,99	1,89	2,56	**2,09**
	7	1,72	1,78	1,83	2,46	**1,95**
	8	1,98	1,89	2,00	2,47	**2,09**
Average		**1,88**	**1,90**	**1,88**	**2,46**	

General average tire tread depth [mm]	**2,03**	✓
Max. deviation of measurement points' average [mm]	**0,22**	✓
Standard deviation of all measurements [mm]	**0,27**	✓

Congruence average value Michelin/TÜV (≥ 95%)
98,8%

Max error of single value (≤ 10%)
4,5%

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 tread depth 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 tire line.

Pirelli Cinturato All Season SF2

Measurement Michelin

Unit [mm]		Section 1	2	3	4	Average
Measurement point	1	2,04	2,13	2,28	2,16	**2,15**
	2	2,02	2,17	2,28	2,00	**2,12**
	3	2,07	2,03	2,18	1,94	**2,06**
	4	1,93	1,89	2,13	1,88	**1,96**
	5	1,91	1,86	2,23	2,00	**2,00**
	6	2,00	2,06	2,28	2,10	**2,11**
	7	2,00	2,01	2,13	2,06	**2,05**
	8	2,08	2,07	2,36	2,20	**2,18**
Average		**2,01**	**2,03**	**2,23**	**2,04**	

General average tire tread depth [mm]	**2,08**	✓
Max. deviation of measurement points' average [mm]	**0,22**	✓
Standard deviation of all measurements [mm]	**0,13**	✓

Measurement TÜV SÜD PS

Unit [mm]		Section 1	2	3	4	Average
Measurement point	1	2,05	2,11	2,28	2,15	**2,15**
	2	2,00	2,10	2,25	1,95	**2,08**
	3	1,98	2,00	2,13	1,89	**2,00**
	4	1,82	1,80	2,00	1,84	**1,87**
	5	1,81	1,79	2,18	1,93	**1,93**
	6	1,98	2,01	2,24	2,02	**2,06**
	7	1,95	2,00	2,12	2,04	**2,03**
	8	2,06	2,07	2,34	2,18	**2,16**
Average		**1,96**	**1,99**	**2,19**	**2,00**	

General average tire tread depth [mm]	**2,03**	✓
Max. deviation of measurement points' average [mm]	**0,30**	✓
Standard deviation of all measurements [mm]	**0,14**	✓

Congruence average value Michelin/TÜV (≥ 95%)
97,9%

Max error of single value (≤ 10%)
6,1%

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