

GRB/GRRF Joint Informal Working Group on Special Tyre Definitions

Agenda item 4. Further discussion on snow tyre thresholds

Submitted by the experts from Norway

Background (IG STD 31. August 2009)

ETRTO presented some results from snow braking tests at the last IG STD meeting. In our view this was too little information to conclude on a definition for snow tyres, and we hereby give documentation available at the moment and propose further work on the issue.

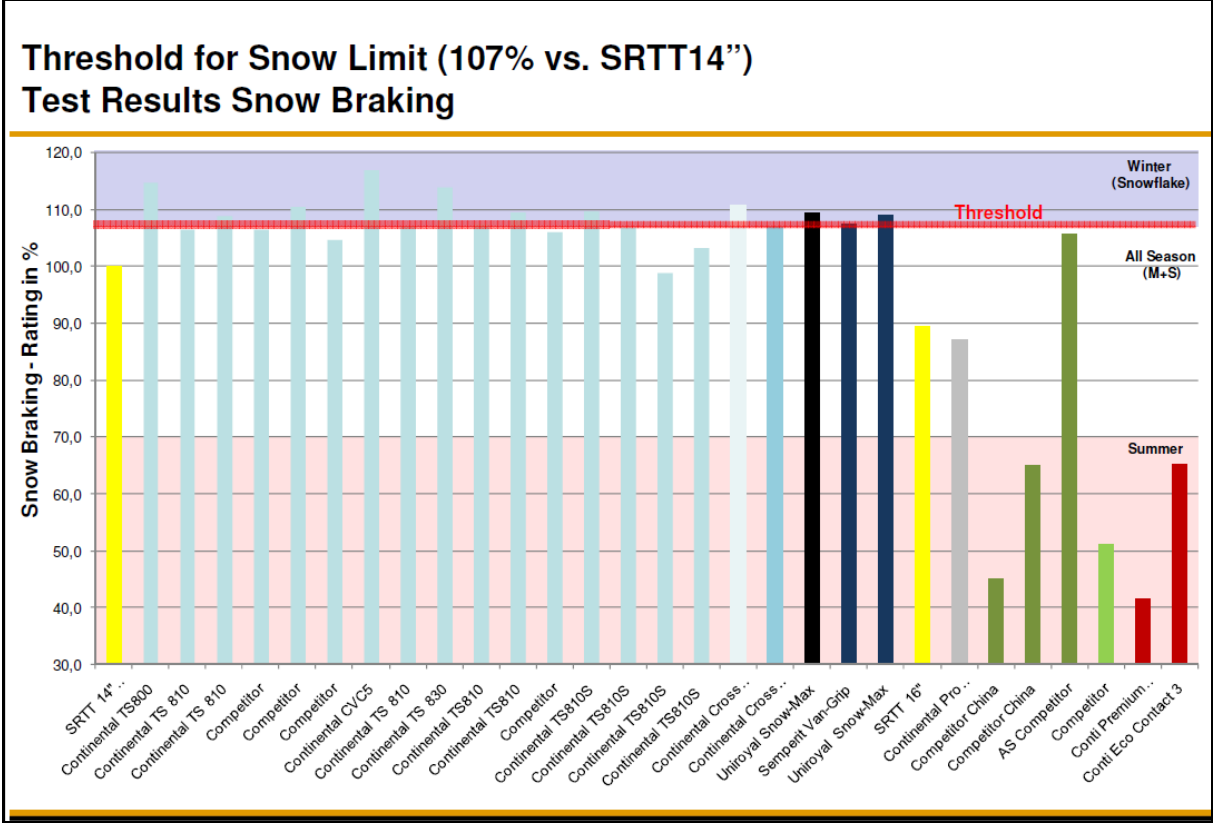


Figure 1. ETRTO results presented on the meeting in August.

Does the year of production have an influence?

We have put the same data as ETRTO, except for the summer tyres and most of the all season tyres (dark red), into a diagram, and did the sorting after the year of production. As the diagram illustrates, only tyres from 2005 and 2006 fail the 107% threshold, and all the tyres from 2007 and the 2008 (only one!) passes.

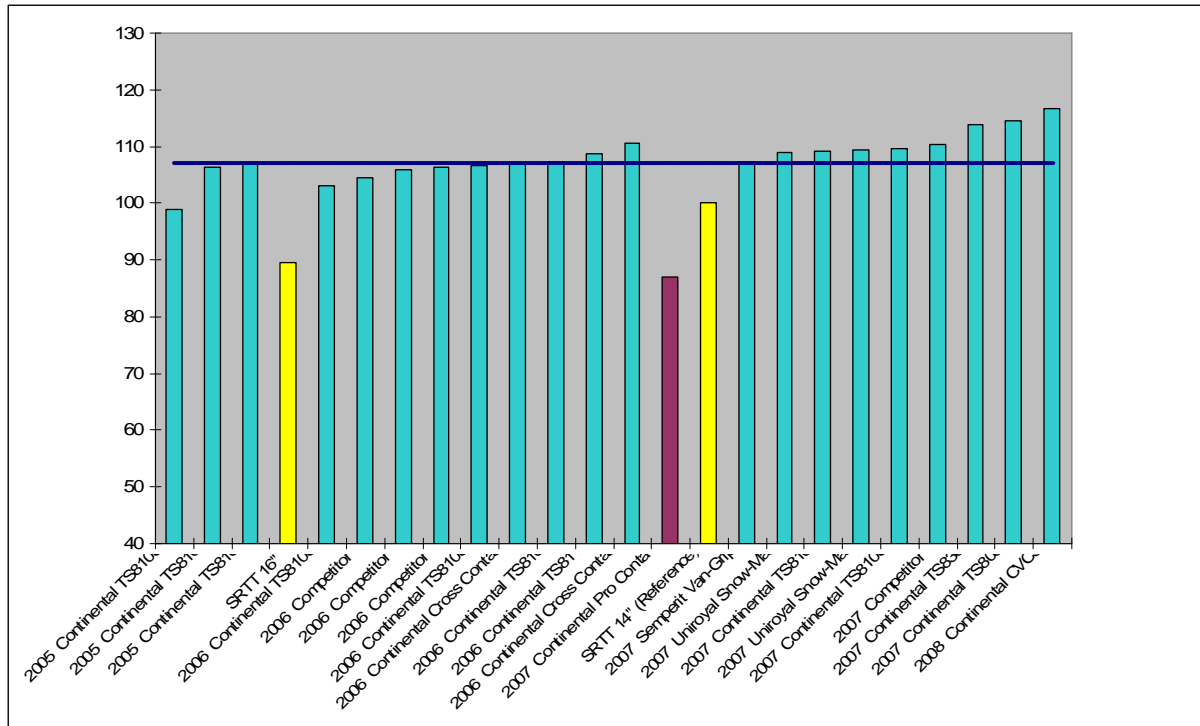


Figure 2. ETRTO data sorted by year of production

Correlation between winter qualities on tyres

Swedish, Finnish, Russian and Norwegian motor sport magazines run tests on winter tyre qualities before each winter season. We have gathered data from the two previous years (2008 and 2009) and put them up in two different graphs visualizing correlations

- between **ice and snow** qualities

Braking distance on ice surface versus braking distance on snow surface

Correlation: 0,63

- between **ice and wet grip**

Braking distance on ice surface versus braking distance on wet asphalt surfaces

Correlation: - 0,56

The two data series from 2008 and 2009 are treated separately, but put in the same diagram. Some tyres are presented twice because they were included in both 2008 and 2009. Data is not recalculated/manipulated, but used directly “as is”. The tests are performed by Test World in Finland and the tyres are mainly “Nordic” winter tyres (speed lower than H=210 km/t). The two tyres furthest to the right are by the magazines referred to as Mid-European winter tyres. .

Axis

- The Y-axis is braking distance in meters
- The X-axis is different tyres ordered by braking distance on one out of the two parameters

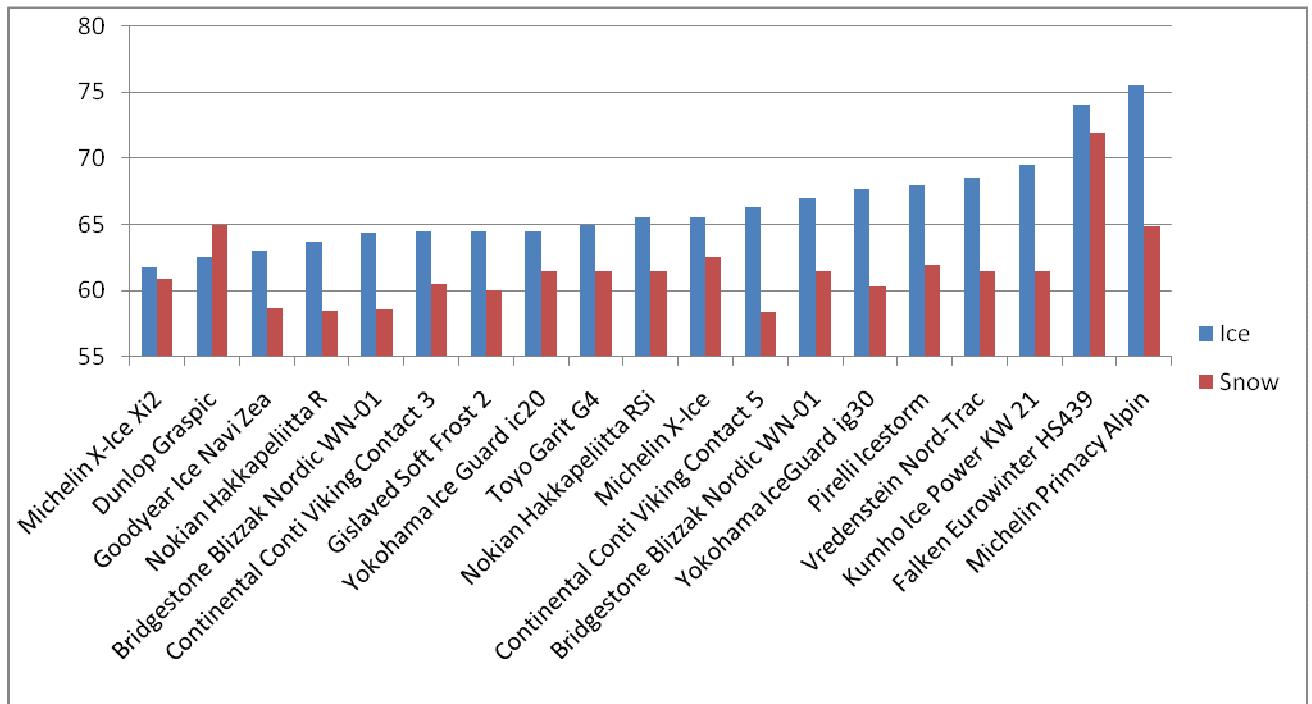


Figure 3. Correlation between braking distance on ice surface versus braking distance on snow surface

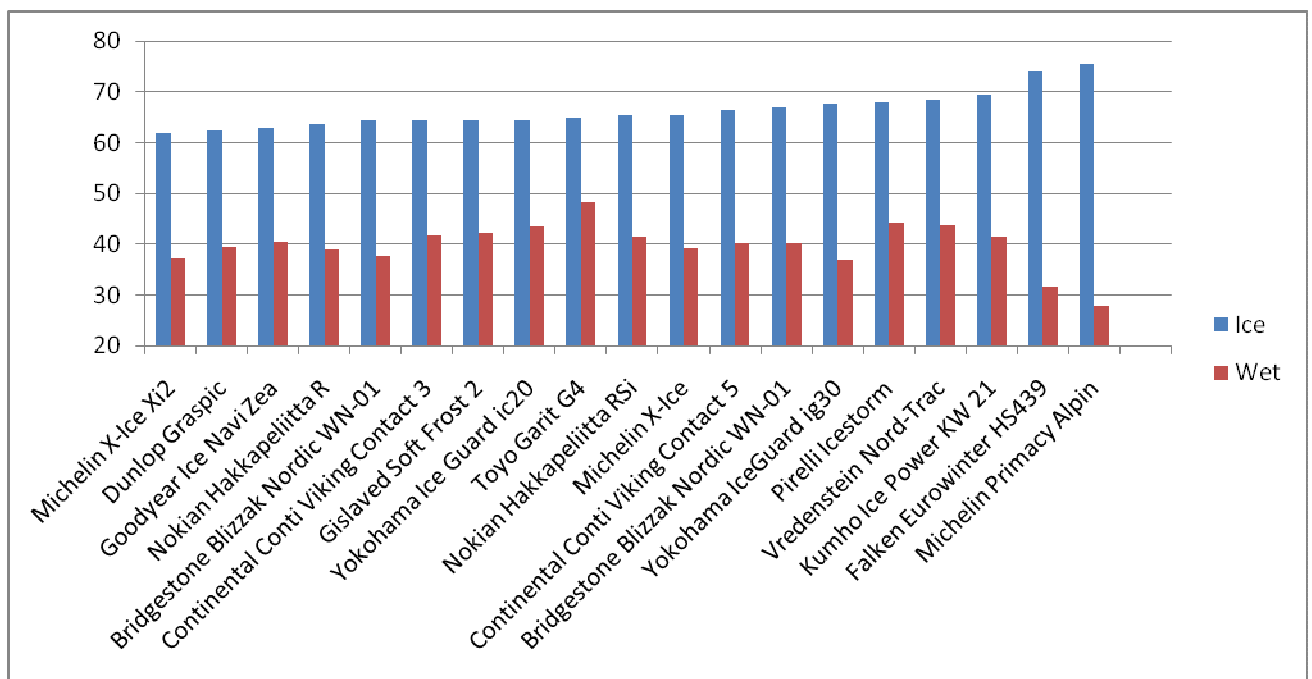


Figure 4. Correlation between braking distance on ice surface versus braking distance on wet asphalt surface.

Recommendations for functional requirements – grip on ice, snow and wet asphalt

A bad braking grip on ice can be crucial. Since there seems to be a poor correlation between braking distance on snow versus braking distance on ice, we think it is necessary to include both as function demands for a snow tyre. Especially since braking on ice is considered a more critical parameter than braking distance on snow for the Nordic consumer (according to the motor magazines).

What our sources have told us, and what also seems to be confirmed by figure 3, is that braking distance on ice is negatively correlated with braking distance on wet pavement. The tests are done in relatively cold weather, not as required for a standard wet grip test. Because wet grip also is a very important property for a winter tyre, we think wet grip in cold temperatures (i.e. 1-8°C) also have to be a functional requirement for winter tyres. Our sources have also stressed the fact that if only snow grip and ice grip are included, the focus will be less on the wet grip (since wet grip and ice grip seems to be adversative qualities) and this could affect the traffic safety when driving on wet pavements which also occur in winter time.

New tyre tests

The results given in figure 2 and 3 are from tests for motor sport magazines. These tests are relative between the tyres on the market, and don't include reference test tyres SRTT. We have now ordered new tests at test facilities in Finland. These tests will be performed with some of the tyres from the above mentioned tests, and also include mid-European winter tyres and reference tyres.

The objectives of the project are

- To find out the performance level of different tyre segments on ice and snow against the standard reference tyres (SRTT 14" and 16")
- To analyze the test methods on snow and ice, the repeatability and results in different temperatures
- To draw conclusions about the target result levels and test methods

In total 10 tyres will be tested, 4 Nordic Winter tyres (non-studded), 4 Mid-European winter tyres and 2 reference tyres. From the results in the motor magazine tests, both tyres in the best, the middle and the worst performing classes will be chosen.

The ETRTO method for braking efficiency under winter conditions will be applied. We will also apply extended test criteria to get better knowledge of the temperature influence.

Extended test criteria for both ice and snow:

- Temperature range -1 .. -4 °C
- Temperature range -6 .. -9 °C
- Temperature range -12 .. -15 °C

We will also perform wet grip tests for the same tyres.

Our preliminary recommendations for "snow tyre":

- Ice is a more frequent surface in the Nordic countries than in more southern European countries, and the need for consideration to ice grip qualities is important for safety reasons
- include requirements for both braking tests on snow, ice and wet surface (wet grip at 0-7 degrees Celsius)
- wait for the new tyre tests before deciding the limits.