Tyre Temperature/Aging Effect on UN Reg. 51.03
Temperature Effect on UN Reg. 51.03

Tyre/Road Noise for C1 summer tyres

Example: tyre/road noise summer tyre measured at different temperatures.

<table>
<thead>
<tr>
<th>Speed Condition</th>
<th>Noise Dependency</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 km/h constant speed</td>
<td>-0.07 dB(A)/°C</td>
</tr>
<tr>
<td>2 m/s² accelerated at 50 km/h</td>
<td>+0.04 dB(A)/°C</td>
</tr>
</tbody>
</table>

- A linear relationship can be used to approximate the temperature dependency of the constant speed noise at 50 km/h ($R^2 \sim 0.84$). Based on data from multiple C1 summer tyre designs and sizes an average value of -0.07 dB(A)/°C surface temp. is found for 50 km/h constant speed.

- A linear relationship can be used to approximate the temperature dependency of the noise increase as a result of the acceleration ($R^2 \sim 0.86$). Based on data from multiple C1 summer tyre designs and sizes an average value of +0.04 dB(A)/°C surface temp. is found for the noise increase due to acceleration (2 m/s² accelerated at 50 km/h).

- Based on data from multiple C1 summer tyre designs and sizes it is found that a linear relationship is not appropriate ($R^2 \sim 0.44$) to describe the temp. dependency of the noise under acceleration (2 m/s²). The noise generation phenomena linked to constant speed rolling and a driving torque show an opposite temperature dependency. Therefore, the noise under acceleration cannot longer be approximated by a linear relationship.
Tyre aging effect on UN Reg. 51.03/ Reg.117

Same tyre periodically tested in the Lab over a period of 3.5 years

Reg.117
Reference speed 80 km/h

Reg.51
Reference speed 50 km/h (Constant speed)

Averaged aging effect (multiple tyres on smooth/rough surface) = 0.2 dB(A)/year both for Reg.117 (80 km/h) and Reg.51 (km/h) cruise.