Current European laws concerning tyres and wheels are not sufficient for today and the future.

In the Vehicle, Chassis and Chassis control, big changes are going on. These changes include tyres and tyre performance.

In the future tyres will be actively controlled!

New technologies are now ready for series production. New laws don‘t exist for these advances.

The goal of the following German proposal is; As long as we don‘t have a clear view of what we
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from Germany

need in the future – there should be (technical) restrictions allowed in the given tyre directives 92/23/EEC and 70/156/EEC.
Development of HP Tyres for HP Cars

Future Major Developments and Trends

- Commitment for CO₂ reduction will put more emphasis on tyre weight and lower rolling resistance without any deterioration in other tyre performance criterias.

- US Zero Evap regulations might change the chemical composition of today's tyres, since virtually no HC-evaporations can be allowed for.

- General drive to reduce tyre noise is a major challenge for the tyre industry if other performance criterias may not be affected.

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Rolling Resistance Index

Summer and A/S Tyres
(Range of different brands on A and B series)

Test Conditions

- Drum Diameter: 2 m
- Tyre load (R1/R2): 360 kg, 490 kg
- Tyre Pressure: 2.2 bar, 2.4 bar
- Rim: 6J x 15, 7 ½ J x 16
- Ambient Temperature: 25 - 28 °C
- RR - Index: Average for worst test value at 40, 70 and 100 km/h (based on 5 Tyres)
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Noise Reduction Potential in Traffic

"Who“ can do "what“?

Share of Tyre/Road Noise as Part of Total Noise Level

<table>
<thead>
<tr>
<th>Total Level in dB (A)</th>
<th>Tyre A</th>
<th>Tyre B</th>
<th>Tyre C</th>
</tr>
</thead>
<tbody>
<tr>
<td>77</td>
<td>32%</td>
<td>20%</td>
<td>15%</td>
</tr>
<tr>
<td>73</td>
<td>79%</td>
<td>50%</td>
<td>32%</td>
</tr>
</tbody>
</table>

Potential : Tyre/Road Noise Spectrum of Driving Noise (Road Influence)

<table>
<thead>
<tr>
<th>Road Surfaces</th>
<th>Drum</th>
<th>Asphalt</th>
<th>ISO-Asphalt</th>
<th>All Road Surfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurements: TUV Bevera</td>
<td>Vehicle: BMW 525</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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The problem of (too) big tolerances
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Max. allowed tolerances, new tyre 225/40 R 19 + 8.0 J * 19
summer and winter tyre
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“TC-2000“ (Tyre Concept 2000)

Tolerances

Double Marking (DM) should be possible, if the new tolerances are inside the existing tolerances; DM was possible from “HR“ to “R...H“!
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Runflat- or Extented Mobility
Tyre / Wheel System
Transponder-Technology in Passenger Car Tyres
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Sidewall Torsion Sensor
How it Works in a Car