Deutscher Verkehrssicherheitsrat

Tyres

Resolution of the Executive Board of 29.10.2013 based on the recommendation of the Committee of Vehicle Engineering of 29.08.2013

Explanatory Note

Tyres are in principle the physical connection of a motor vehicle with the road surface via a wheel-load specific tyre-to-road contact patch (tyre footprint), which enables therefore the transmission of all acceleration, braking and cornering forces from the vehicle to the road surface. This should permit the driver to handle the vehicle as safely and predictably as possible under all weather and road conditions.

In addition, tyres should be compliant with suspension properties, be durable, produce minimum noise emissions, and have a very low rolling resistance,

This afore mentioned broad variety of desired tasks is in part physically contrary and demanding to each other, as for instance reduction in rolling resistance in conjunction with minimum braking distance.

However, the criteria as mentioned in the first paragraph are vital in the focus of road safety. In order to prevent accidents or mitigate their consequences, the optimal transmission of tyre-to-road braking- and steering-forces is of key importance. All safety related systems that are developed in order to enhance vehicle dynamics, such as the Electronic Stability Programme (ESP), Antilock Braking System (ABS), Emergency Braking Systems (EBS) or other chassis functions, are based on tyres with the highest possible road holding abilities. Therefore, the tyre safety criteria are of particular importance.

This significance is also emphasized by the European legislator. Therefore, the Tyre Labelling Regulation (Tyre Label) No. 1222/2009 of the European Parliament and of the European Council, including Commission Regulation (EU) No. 1235/2011, contains, in addition to the criteria regarding rolling resistance and noise emission, also a wet grip index which provides the customer with information on the braking performance of tyres on wet roads.

According to observations by the German Road Safety Council (DVR), the introduction of the tyre label has motivated tyre manufacturers to pay particular attention to braking on wet surfaces as a safety criterion in the development of new tyres, so that today the braking performance of many new tyres is much better than it has been a few years ago.

Minimum requirements for passenger car tyres

While the tyre label aims to provide the consumer with criteria for evaluating the tyre performance in certain classes, the minimum requirements for tyres are regulated, among others, in Regulations Nos. 30 and 117 of the United Nations Economic Commission for Europe (UN/ECE). These define rules applicable to tyre dimensions, load and speed performance tests as well as wear indicators.

Functional requirements for C1 tyres related to adhesion on wet surfaces are regulated in Regulation (EC) No 661/2009 of the European Parliament and of the Council of 13 July 2009 concerning “type-approval requirements for the general safety of motor vehicles, their trailers and systems, components and separate technical units intended therefore”. This regulation refers to UN/ECE Regulation No. 117 and establishes, for the first time, a specific minimum wet grip index “G” for ordinary road-type tyres or, respectively, winter tyres of the category C1 (tyres for passenger cars) as the minimum level. For normal C1 road tyres, i.e. summer tyres, this level was set as $G \geq 1.1$.

The DVR considers this limit to be too low.

To achieve speed reduction of a road vehicle by means of braking is a key element to prevent accidents or reduce their severity. The minimum wet grip index of 1.1 corresponds to class E of the tyre labelling regulation. For the categorization of passenger car tyres regarding wet grip performance, this results in a difference of a braking distance of approximately 13 meters when braking from 80 km/h on a wet road when comparing class A and class E tyres. This means that a vehicle fitted with class E tyres is still moving with a remaining speed of approximately 40 km/h, whereas a vehicle fitted with class A tyres is already at rest. With higher initial speed, the remaining vehicle impact velocity will also be correspondingly higher.

At least for the category of summer tyres, i.e. those tyres which are not marked with the snowflake symbol (Three Peak Mountain Symbol) according to ECE Regulation No. 117.02, limit values for wet grip performance should be introduced, which exclude the wet grip class E according to the label. This means that ECE Regulation 117 and Regulation No 661/2009 of the European Parliament and of the Council concerning type-approval of motor vehicles ought to be amended, and that for normal C1 road tyres the minimum wet grip index should be set at least at $G \geq 1.25$, which corresponds to the wet grip class C.

DVR considers this a demand that could be implemented since a great number of the C1 summer tyres on the market, which are provided with a label, already meet the requirements of the wet grip classes A to C.

Minimum requirements for commercial vehicle tyres

So far, no minimum wet grip indices are defined by ECE regulation for the type approval of tyres for light commercial vehicles (C2 tyres) and heavy commercial vehicles and buses (C3 tyres) (see Note 1).

Passenger cars, light and heavy commercial vehicles and buses are sharing the roads simultaneously. Particularly in emergency situations it is vital, that the braking performance of all vehicles involved in such case does not differ significantly from each other in order to avoid rear-end collisions, specifically impacts of heavy commercial vehicles or buses into cars ahead. The minimum wet grip indices, which are of significance for the braking distance, should therefore not differ too much between vehicle categories.

For Class C2 tyres, the minimum wet grip index G should be set at least at G ≥1.1.

For Class C3 tyres, this value should be set at least at G ≥ 0.95.

Over 90% of the C2 and C3 tyres currently on the market meet these limits. Therefore, these minimum requirements can be implemented without major effort.

An exception to this rule may be allowed for commercial vehicle tyres for special vehicles used for instance in the mining sector or for crane trucks.

Winter Tyres

Winter tyres are marked with the Three Peak Mountain Symbol. Basically their function is to provide good traction in typical wintery conditions with ice, snow, slush, wet surfaces or black ice on the roads. Because of these required properties, the wet grip levels of typical winter tyres are usually poorer than those of summer tyres.

Therefore, compliance with the criteria for the minimum wet grip index for C1, C2 and C3 summer tyres cannot be applied to these winter tyres.

The following limits should be set for each of the following classes of winter tyres: C1: G ≥ 1.15; C2: G ≥ 1.0;C3: G ≥ 0.85.

Special winter tyres for Scandinavian countries should be exempted from this regulation.

Market Surveillance

The European Tyre Labelling Regulation regulates in particular the classification of tyres in terms of rolling resistance, noise emission and wet grip. Information about the wet grip classes is used by customers for their individual buying decision.

It is, however, necessary to ensure that these measurements are performed according to the given technical specifications and that the classifications derived from these are correct. Unfortunately, recent tyre tests have shown that not all information on the labels is true.

To protect the consumers and to enable them to assess the tyre characteristics properly, in particularly the safety features of tyres, effective market surveillance is to be carried out.

Recommendations

Given the outstanding significance of tyres for braking ability and lateral control, resulting in the safe operation and accident prevention of motor vehicles, DVR recommends:

1. The regulation No. 661/2009 of the European Parliament and the Council for Type Approval of vehicles as well as the Regulation No. 117.02 of the Economic Commission of the United Nations for Europe (UN/ECE) should be amended in such a way that for normal passenger car C1 tyres (summer tyres) the minimum wet grip index G is set at ≥1.25.

2. All C2 tyres (light commercial vehicles) should at least meet the minimum wet grip index of G ≥ 1.1.

3. All C3 tyres (heavy commercial vehicles and busses) should at least meet the minimum wet grip index of G ≥ 0.95.

4. All C1 winter tyres should at least meet the minimum wet grip index G of 1.15. Accordingly, the minimum wet grip index G for C2 winter tyres should be set at 1.0 and for C3 winter tyres at 0.85.

5. Special tyres for passenger cars, so-called “Scandinavian winter tyres” (e.g. spikes tyres), should be exempted from this regulation.

6. An exception to these regulations may be considered for C2 and C3 tyres for commercial vehicle tyres for special operations. .

7. The official document “ECE/TRANS/WP.29/GRRF/2013/9, Proposal for Amendments to Regulation No. 117”, dated 7th December 2012 and discussed in the 74th Session of GRRF 19-22 February 2013 should be amended in accordance with the above noted minimum wet grip values G for C1, C2 and C3 tyres, which are recommended by DVR.

8. The German Road Safety Council welcomes the new European Tyre Labelling Regulation. The market surveillance of the Federal States should include a monitoring of the compliance with the Labelling Regulation as one of their focal points.

9. The above mentioned safety-related minimum values for the wet grip index are to be reviewed and adapted at regular intervals with regard to technical progress. Relevant studies to allow the categorization of tyres with regard to wet grip properties should be carried out as soon as possible.

For the board:

signed

Dr. Walter Eichendorf
Präsident

Note 1:

In the Working Party on Brakes and Running Gear (GRRF74th Session of GRRF 19-22 February 2013, see ECE / TRANS/WP.29/GRRF/201) the minimum wet grip value proposed for C2 tyres (Traction Tyres) was 0.85, and for C3 tyres it was 0.65.

Considering all three tyre classes C1, C2 and C3 with regard to the calculation specifications for the wet grip value of the test tyre G(T) according to ECE R 117.02, Addendum 116: Revision 2 - Amendment 1, which is legally in force since 18 November 2012, and in view of its relation to the braking force coefficient BFC between tyre and road when braking on wet roads, one arrives at the following values:

The braking force coefficient BFC(T) of the test tyre obtained for C1 tyres was about 0.76, based on a test tyre minimum wet grip value of G(T) = 1.25 and a coefficient BFC(R_0)=0.68 of the reference tyre according to ECE R 117. BFC(T)=0.76 would be the necessary coefficient of adhesion between tyre and road given the required minimum conditions for C1 tyres.

The braking force coefficient BFC(T) of the test tyre obtained for C2 tyres was about 0.60, based on a minimum wet grip value of G(T) = 1.1 and performed on the same conditions of BFC(R_0)=0.68 of the reference tyre according to ECE R 117.
BFC(T)=0.60 would be the necessary coefficient of adhesion between tyre and road given the required minimum conditions for C2 tyres.

The braking force coefficient BFC(T) of the test tyre obtained for C3 tyres was about 0.52, based on a minimum wet grip value of G(T)=0.95 and performed on the same conditions of BFC(R_0)=0.68 of the reference tyre according to ECE R 117.
BFC(T)=0.52 would be the necessary coefficient of adhesion between tyre and road given the required minimum conditions for C3 tyres.
Remark: For C3 tyres a physical coefficient of adhesion of BFC(T) = 0.5 is required to homologate a motor vehicle on dry road surfaces on German and European roads based on the minimum braking performance required by law.