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World Forum for Harmonization of Vehicle Regulations

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Item 4.7.6 of the provisional agenda

1958 Agreement:

Consideration of draft amendments to existing

UN Regulations submitted by GRVA

Proposal for Supplement 8 to the 02 series of amendments to UN Regulation No. 90 (Replacement brake parts)

Submitted by the Working Party on Automated/Autonomous and Connected Vehicles *

The text reproduced below was adopted by the Working Party on Automated/Autonomous and Connected Vehicles (GRVA) at its eleventh session (see ECE/TRANS/WP.29/GRVA/11, para. 101. It is based on ECE/TRANS/WP.29/GRVA/2021/28. It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Administrative Committee (AC.1) for consideration at their March 2022 sessions.

* In accordance with the programme of work of the Inland Transport Committee for 2022 as outlined in proposed programme budget for 2022 (A/76/6 (part V sect. 20) para 20.76), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.



Annex 14,

Table A14/2.2.5, amend to read:

”

Disc Diameter [mm]	Disc Thickness [mm]	Tangential force <i>F</i> [kN] min
≥ 150 < 250	≤ 3	≥ 8
	> 3 ≤ 4	≥ 10
	> 4	≥ 12
≥ 250 < 350	≤ 4	≥ 8
	> 4 ≤ 5	≥ 11
	> 5	≥ 14

”

Annex 15,

Insert a new paragraph 1.5., to read:

“1.5. Definition of bell mounting face

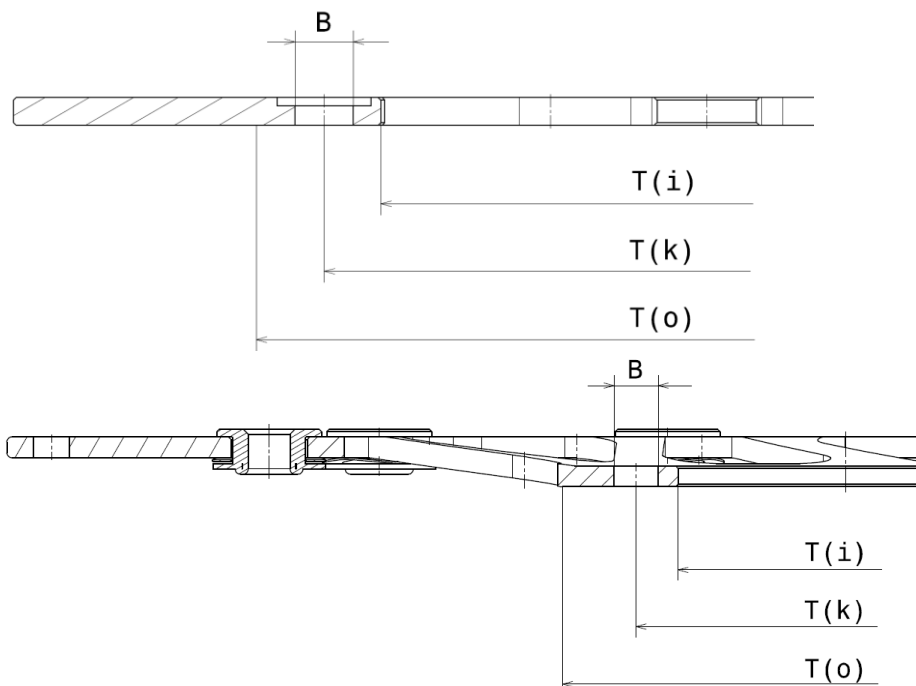
“*Bell mounting face*” means the surface of a brake disc that goes in contact with wheel hub.

The mounting surface is calculated between the disc inner diameter $T(i)$ and a diameter $T(o)$ defined as the max diameter of area subjected to flatness restrictions as indicated on disc drawing (see figure 1).

In case indications on the drawing are missing, $T(o)$ is defined as follows:

$$T(o) = T(k) + B + 10\text{mm}$$

Figure 1



”

Insert a new paragraph 1.6., to read:

- "1.6. Definition of reference disc
 Within each discs group, the *reference disc* is the one which has the highest ratio of kinetic energy (considering all the replacement applications foreseen) and its mass, as described in paragraph 5.3.6."

Paragraph 2.3., amend to read:

- "2.3. Braking surface lightening: any solution is allowed (holes, slots, wave, etc.) provided that the ratio between the vehicle kinetic energy to the mass of the disc braking surface, must be same or higher than the reference disc (with tolerance of – 20 per cent maximum).

Example:

Outer diameter 300 mm,

radial width of the braking surface 36.5 mm \geq total area A = 302 cm²

Lightening on the braking surface: 64 holes diameter 7 mm \geq total area

B = 24.6 cm²

δ = Braking surface material specific weigh

Braking Surface Mass (BSM)= (A-B) * Th * δ

Vehicle kinetic energy K.E.= $\frac{1}{2} m V^2$ (as defined in para. 5.3.6)

Braking Surface Lightening (BSL) *ratio* = $K.E. / BSM$ "

Paragraph 2.6., amend to read:

- "2.6. Spokes of the bell with full/empty ratio – measured on the average circumference between end of the mounting face and max. diameter of the bell same or higher than the reference disc (with a tolerance of -20 per cent max.), thickness same or higher than the reference disc (with a tolerance of -15 per cent max) and same mechanical properties, as specified in the international standard for materials, with respect to the reference disc."

Paragraph 2.9., amend to read:

- "2.9. Outer diameter included in the range of 100 mm, according to Table 2.9.:

Range [mm]	One piece	Composite fixed	Floating discs
$\geq 150 < 250$	X	X	X
$\geq 250 < 350$	X	X	X

"
