

**PROPOSAL TO AMEND REGULATION No. 111**

Transmitted by the expert from the United Kingdom

Note: The text reproduced below is based on TRANS/WP.29/GRRF/2003/14Rev.1.

The intention of this proposal is to clarify the proposals contained in TRANS/WP.29/GRRF/2003/14Rev.1 and suggest some further amendments. The proposed paragraph 11.5 should be amended as ESP does not include steering or suspension devices that enhance stability. The present wording of 7.2 implies testing at 100% fill mandatory but we feel that the manufacturer should be given the option of accepting that the vehicle has failed when partially filled and carrying out modifications. The new paragraph 5(c) proposed for Annex 3 would be better as paragraph 7.3 and believe that ballasting is unnecessary and complicated. The same calculation could be applied as in 7.2 or the manufacturer could have the option of testing with the intended fluid. The proposal always uses "water" but this may raise objections due to tank contamination – "substitute fluid" may be more appropriate.

Insert a new paragraph 11.5 to read:

11.5 Stability enhancement system engaged: .....Yes/No/Not applicable 2/

Annex 3

Paragraph 5b, keep existing requirement and place the burden on the manufacturer to provide the calculation.

Paragraph 5c, delete and transfer to new paragraph 7.3 with amended provisions.

Insert new paragraph 7.2 to read:

7.2 Without prejudice to paragraph 5. In the case where the vehicle is tested with a partially filled tank and where it fails to reach the rollover threshold level inclination angle required by this Regulation, the manufacturer may, if he wishes, have the vehicle re-tested in the fully filled condition whilst accepting that this may result in exceeding the maximum permissible mass of the vehicle or any of its axles. In this overloaded condition there shall be sufficient reserve suspension travel not to influence the results of the test. Alternatively the manufacturer with the agreement of the Type Approval authority may choose to provide facilities for the vehicle to be tested using the fluid which it is intended to carry, taking into account any incurred safety risks. If, during testing of a vehicle, which tank in case of full load (with respect to its mass) is not filled completely (with respect to its volume), the tilt table inclination angle  $\beta$  is less than value of  $\beta_e$  or/and roll angle  $\phi$  when  $\beta = \beta_e$  is more than value of  $\phi_e$ , the test shall be repeated with the fully filled (with respect to its volume) tank. 1/

In the case where the vehicle is tested in the fully filled condition, the The recorded values of the recorded at the test tilt table inclination angle  $\beta_w$  and roll angle  $\phi_w$  (when  $\beta_p = \beta_e$ ) shall be corrected by using the following formulae:

$$\tan \beta_p = \tan \beta_w \cdot \frac{A_T \cdot H_w}{A_w \cdot H_g} + \frac{T_T}{2 H_g} \left( 1 - \frac{A_T}{A_w} \right)$$

The value of  $\beta_p$  shall be higher than, or equal to, the minimum rollover threshold inclination angle required by this Regulation ( $\beta_c$ ), and the value of  $\phi_w$  shall be lower than the corresponding critical values  $\beta_e$  ( $\beta_p \geq \beta_e$ )  $\phi_p \leq \phi_e$ . [Note by the secretariat: The text and the formulas are contradictory]

In the formulas formulae:

$A_T$  = vehicle mass in case of loading by normal fluid;

$A_w$  = vehicle mass in case of loading by ~~water~~ a substitute fluid.

$$A_w = A_T + V_l \cdot (\rho_w - \rho_T)$$

$H_g, H_w$  = height of the vehicle centre of gravity in case of loading by ~~normal fluid and water~~ a substitute fluid, respectively;

$$H_w = H_g - V_l \cdot (\rho_w - \rho_T) / C_{ST}$$

$T_T$  = theoretical wheel track at the vehicle cross section at the centre-of-gravity point;

$\beta_p$  = corrected tilt table inclination angle for the fluid which the vehicle is intended to carry;

$\beta_w$  = the recorded tilt table inclination angle achieved using the substitute fluid;

$V_t$  = effective tank volume;

$$C_{ST} = \frac{A_g}{H_g - H_l}$$

$C_{ST}$  = vertical stiffness of suspension at the centre of gravity point;

$A_g$  = mass of payload;

$\rho_T$  = density of normal fluid;

$\rho_w$  = density of ~~water~~ the substitute fluid;

$H_l$  = height of the centre of gravity of the vehicle in running order.

~~**1/ If a vehicle manufacturer disagrees with the full loading of a tank by water, and the fluid designated for carriage is unsafe, the test can be repeated with a tank filled with the fluid designated for carriage at the facilities of a vehicle manufacturer, who shall provide necessary safety measures."**~~

Insert a new paragraph 7.3, to read:

7.3 ~~if~~ if, in the case of filling a tank by with water, or any other non-dangerous substitute fluid, the total vehicle mass ~~and/or axle/bogie load~~ is less than maximum authorized permissible mass of a vehicle and the vehicle is intended to carry a fluid having a higher density than that of the test fluid, ~~then the total mass of a test vehicle shall be increased by ballasting until it reaches the maximum authorized mass~~ the recorded value of the rollover threshold inclination angle may be corrected using the formula given in paragraph 7.2 of the Annex. Alternatively the manufacturer may arrange to provide facilities for the vehicle to be tested using the fluid which it is intended to carry, taking into account any incurred safety risks. ~~If the vehicle is ballasted, the ballast shall be attached to the sprung part of a test the vehicle in such a way, so the that the centre of mass of the ballast is coincided coincident with the centre of volume of a the tank."~~