

Proposal for amendments to UN Regulation No. 140 (Electronic Stability Control - ESC)

I. Proposal

Paragraph 9.9.4., amend to read:

- “9.9.4. The steering amplitude of the final run in each series is the greater of 6.5 A or 270 degrees, provided the calculated magnitude of 6.5 A is less than or equal to 300 degrees. If any 0.5 A increment, up to 6.5 A, is greater than 300 degrees, the steering amplitude of the final run shall be 300 degrees.
If the above calculated steering amplitude of the final run is greater than the maximum operable steering wheel angle determined by design of the steering system, the final angle amplitude for the series test shall be greater than 98 per cent of the maximum operable angle.
If the execution of the steering maneuver needs a steering robot mechanical power of more than 1200 W, the first amplitude above 1200 W of steering robot mechanical power may be used as the final steering amplitude.”

II. Justification

1. Reaching a certain given steering wheel angular speed needs much more torque with direct (low) steering gear ratio systems than with high steering gear ratio systems, due to the given 0.7 Hz sine frequency.
2. There might appear in the future some vehicles equipped with significantly low steering gear ratio (i.e. quick steering characteristics) that may need too much steering wheel torque to achieve the **270** degrees required by the regulation - a torque not reachable by conventional ESC robots. This then can jeopardize the easy certification of future beneficial steering equipment e.g. “steer-by-wire” systems.
3. The mechanical power threshold of 1200 W (product of instantaneous steering wheel torque (Nm) and steering wheel angular speed (rad/s)) has been chosen to represent a reasonable specification for a conventional steering robot. This value of 1200 W seems reasonable since, with the steering robot technical specifications recommended in paragraph 8.3.5 (40 to 60 Nm, 1200 °/s i.e. 20.94 rad/s), it is theoretically possible to reach 838 to 1257 W.
4. Explanatory note: "A" is the steering wheel angle in degrees that produces a steady state lateral acceleration [...] of 0.3g for the test vehicle. [...] (paragraph 9.6.1.)