

PROPOSAL FOR DRAFT AMENDMENTS TO REGULATION No. 110

This document has been prepared in order to insert a new paragraph containing the endurance test for pressure regulator and vaporizer. It is based on the proposal presented by India. (see document ECE/TRANS/WP29/GRPE/2006/11).

PROPOSAL

Annex 4D

Insert a new paragraph 2.4, to read:

"2.4. Durability test (Continued operation) of pressure regulator:

The regulator shall be able to withstand 50.000 cycles without any failure when tested according to the following procedure. Where the stages of pressure regulation are separate, the service pressure in a) to f) is considered to be the working pressure of the upstream stage.

- a) Recycle the regulator for 95% of the total number of cycles at room temperature and at the service pressure. Each cycle shall consist of flow until stable outlet pressure has been obtained, after which the gas flow shall be shut off by a downstream valve within 1 s, until the downstream lock-up pressure has stabilized. Stabilized outlet pressures are defined as set pressure $\pm 15\%$ for at least 5 s.
- b) Cycle the inlet pressure of the regulator for 1% of the total number of cycles at room temperature from 100% to 50% of the service pressure. The duration of each cycle shall be no less than 10 s.
- c) Repeat the cycling procedure of a) at 120°C at the service pressure for 1 % of the total number of cycles.
- d) Repeat the cycling procedure of b) at 120°C at the service pressure for 1 % of the total number of cycles.
- e) Repeat the cycling procedure of a) at - 40°C or -20°C as applicable and 50% of service pressure for 1% of the total number of cycles.
- f) Repeat the cycling procedure of b) at - 40°C or -20°C as applicable and 50% of service pressure for 1 % of the total number of cycles.
- g) At the completion of all tests indicated in the par. a), b), c), d), e) and f) the regulator shall be leak proof (see Annex 5B) at the temperatures of - 40°C or - 20°C, as applicable, and at the room temperature and at the temperature of + 120°C."

JUSTIFICATION

With reference to document ECE/TRANS/WP.29/GRPE/2006/11 presented by Indian delegation, regarding durability test cycles number for pressure regulator from 6.000 to 50.000, it has been noted that R.110, Annex 5L – Durability test (continued operation) contains a test procedure that is different from the one specified in ISO 15500-9 Para 6.4, which requires 50.000 cycles. In addition, a more appropriate durability test procedure is proposed. The 50.000 cycles takes into account the effective stress of internal components due to not only to switch-on/off but also the continuous vibration (dither) of the fuel flow request by the engine.