

PROPOSAL FOR A DRAFT CORRIGENDUM TO REGULATION No. 101

Note: The text reproduced below was prepared by the experts from Switzerland in order to correct the reference density used for NG in paragraph 5.2.4.(1) of Regulation No. 101. In fact the correct value for NG should be at 0.699 kg/m^3 instead of the actually used value of 0.654 kg/m^3 .

A. PROPOSAL

Paragraph 5.2.4.(1), correct to read:

"(1) density: measured on the test fuel according to ISO 3675 or an equivalent method. For petrol and diesel fuel the density measured at $15 \text{ }^\circ\text{C}$ will be used; for LPG and natural gas a reference density will be used, as follows:

0.538 kg/litre for LPG
 0.699 kg/m^3 for NG 3/"

B. JUSTIFICATION

Ad paragraph 5.2.4.(1):

According to footnote 3/ of paragraph 5.2.4.(1) the definition of the reference density for NG is based on the mean value of G20 and G23 reference fuels at $15 \text{ }^\circ\text{C}$.

Using the standard sea level conditions of $P = 101325 \text{ Pa}$ and $T = 15 \text{ }^\circ\text{C}$ and the gas constant for dry air $R = 287.05$ the air density D may be calculated as:

$$D = 101325 / (287.05 * (15 + 273.15)) = 1.225 \text{ kg/m}^3.$$

G20 contains of 100% CH_4 (see Reg. No. 85 Annex 8). According to standard CEN EN437:1993+A1:1997+A2:1999¹ the relative density for G20 i.e. the ratio of masses of equal volumina of gas and dry air is at 0.555. The density at $15 \text{ }^\circ\text{C}$ for G20 may be calculated as:

$$0.555 * 1.225 = \mathbf{0.680 \text{ kg/m}^3}.$$

G23 contains of 92.5% CH_4 and of 7.5% N_2 . The density for G23 at $15 \text{ }^\circ\text{C}$ is therefore at $0.586 * 1.225 = \mathbf{0.718 \text{ kg/m}^3}$, based on standard CEN EN437:1993+A1:1997+A2:1999.

The **reference density for NG** is the mean value of the two gases G20 and G23 at $15 \text{ }^\circ\text{C}$ (50% to 50%) and should be therefore at $\mathbf{0.699 \text{ kg/m}^3}$.

¹ CEN EN437:1993 "Test gases, Test pressures, Appliance categories", in addition Amendment 1:1997, in addition Amendment 2:1999. This standard has been superseded by CEN EN437:2003.