

INVESTIGATION ON PARAMETERS INFLUENCING THE ESTABLISHMENT OF EQUILIBRIUM IN A DYNAMIC BREATH ALCOHOL CALIBRATION GAS GENERATOR

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Abstract

The aim of this article is to present some important parameters influencing the establishment of equilibrium in a dynamic breath alcohol calibration gas generator, used as a national measurement standard. In Albania the owner of these standard is General Directorate of Metrology (DPM), responsible for calibration and verification. According to OIML recommendation R 126, a calibration gas generator can be realized as a so-called „bubble-train“, where air flows through three washing flasks which are connected in series. Each washing flask contains a ethanol/water solution with well-known concentration. All flasks are located in a thermal bath to realize a defined temperature of 34 °C. Usually the following parameters are varied to obtain different ethanol concentrations in the gas stream: temperature of the bath, concentration of ethanol in the ethanol/water solution, gas flow of the gas (usually between 1 liter/minute and 20 liters/minute, kind of gas flowing through the apparatus (air or nitrogen), pressure at the outlet of the bubble-train. Due to the dynamic principle usually the temperature of the liquid solution in the last of the flasks is measured and taken as the equilibrium temperature to calculate the equilibrium concentration according to Dubowski's formula. This equation is very temperature sensitive and therefore the question is, which „equilibrium“ temperature really can be found in the last flask (in the liquid solution and in the gas phase as well). This temperature will be a function of several influencing factors as has been mentioned above.

Keywords: *Breath alcohol calibration gas generator; temperature of the bath; concentration of ethanol; gas flow; pressure.*