International Standard 6711

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Gas analysis — Checking of calibration gas mixtures by a comparison method

Analyse des gaz — Vérification des mélanges de gaz pour étalonnage par une méthode de comparaison

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 6711 was developed by Technical Committee ISO/TC 158, *Analysis of gases*, and was circulated to the member bodies in February 1980.

It has been approved by the member bodies of the following countries :

Australia	India	South Africa, Rep. of
Belgium	Ireland	Spain
Bulgaria	Italy	United Kingdom
Czechoslovakia	Mexico	USSR
France	Netherlands	
Germany, F.R.	Poland	

No member body expressed disapproval of the document.

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Gas analysis — Checking of calibration gas mixtures by a comparison method

1 Scope and field of application

This International Standard describes a method for checking calibration gas mixtures using a comparison method.

It is applicable for all calibration gas mixtures stored in cylinders and permits the checking, at any time, of the stated concentrations of the gaseous calibration constituents.

2 References

ISO 6143, *Gas analysis — Determination of composition of calibration gas mixtures — Comparison methods.*[1)]

ISO 6144, *Gas analysis — Preparation of calibration gas mixtures — Static volumetric methods.*[1)]

3 Principle

The method is based on a series of measurements by repeated preparation of mixtures having the concentration being checked, followed by a repeatability study of the analytical results at the last stage of the repetition.

The method of checking is based on

a) a sufficiently fast method (method A) of preparing calibration gas mixtures E :

— the concentration of which, C, can be adjusted to closer than 0,5 % relative to the value X of the concentration to be checked,

— with a known degree of uncertainty $\frac{\Delta C}{C}$ (in the sense of conventional calculation of errors),

— the principle of which does not allow causes of systematic errors;

NOTE — Methods of this type are the static volumetric methods described in ISO 6144.

b) a method of analysis (method B) of the constituent in question, known as the comparison method (see ISO 6143). This is used to compare the response of a suitable analyser to the constituent in the mixture M to be checked and from calibration gas mixtures E obtained using method A. The analyser response shall not be subject to any interference from other gases, including the complementary gases, in mixtures M and E.

A comparison of the responses R_M and R_E using the two methods gives

$$\frac{R_M}{R_E} = \frac{X}{C} = k$$

4 Procedure

This method comprises three stages:

a) The mixture M to be checked is compared, by means of the analytical method B, with a mixture E_1 having a concentration C_1 close to the stated value of X. A first approximation of the concentration X_1 is thus obtained.

b) A mixture E_2 having a concentration $C_2 \approx X_1$ is then prepared.

This mixture E_2 is compared with the mixture M to be checked. From this, a second approximation X_2 of the concentration X in mixture M is obtained. Generally, $X_2 \approx X_1$ with an accuracy of better than 0,5 % as a relative value. If this is not the case, a mixture E_3 having a concentration $C_3 \approx X_2$ is prepared, and a new analytical comparison is carried out giving $X_3 \approx X_2$ with an accuracy of better than 0,5 % as a relative value. Usually, two comparisons are sufficient.

The mixtures E_p shall be used immediately after preparation to rule out the effect of variations with time of the concentration C of the calibration gas mixture.

c) The repeatability of the analytical method is evaluated.

1) At present at the stage of draft.