

ISO 6145-1:2019 (E)

Gas analysis — Preparation of calibration gas mixtures using dynamic methods — Part 1: General aspects

Contents

	Foreword
	Introduction
1	Scope
2	Normative references
3	Terms and definitions
4	Symbols
5	Principle
5.1	General
5.2	Suitability of the method to the application
5.3	Piston pumps
5.4	Continuous (syringe) injection
5.5	Capillary
5.6	Critical flow orifices
5.7	Thermal mass flow controller
5.8	Diffusion
5.9	Saturation
5.10	Permeation method
5.11	Electrochemical generation
5.12	Summary
6	Recommendations for handling the dynamic system
6.1	Safety considerations
6.1.1	Reactions between mixture components
6.1.2	Reactions with dynamic system materials
6.2	Quality considerations
6.2.1	Purity of parent gas standards or "zero" gas
6.2.2	Gas handling
7	Calibration methods of a dynamic system
7.1	Generalities on the calibration
7.2	Calibration of each element
7.2.1	General
7.2.2	Calibration devices for flow rate: Principle and uncertainty
7.2.2.1	General
7.2.2.2	Balance and chronometer
7.2.2.3	Piston prover
7.2.2.4	Thermal mass flowmeter (MFM)
7.2.2.5	Laminar flow element (LFE)
7.2.2.6	Flow calibration measurement designs
7.3	Single point calibration of a dynamic system by comparison with reference gas mixtures
7.4	Calibration certificate
8	Calculation of the composition and its uncertainty
8.1	General
8.2	Calculations for volumetric methods
8.2.1	General

8.2.2	Formulae
8.2.2.1	Example for 2 gases
8.3	Calculations for gravimetric methods
8.3.1	General
8.3.2	Formula
9	Sources of uncertainty and uncertainty of the final mixture
10	Verification
10.1	Principle
10.2	Verification criteria
10.3	Recalibration criteria
Annex A	(normative) Calculation details
A.1	Volumetric methods
A.1.1	Volume fractions and associated uncertainty
A.1.2	Amount-of-substance fractions and associated uncertainty
A.2	Gravimetric methods
A.2.1	Amount-of-substance fractions and associated uncertainty
A.2.2	Mass fractions and associated uncertainty
Annex B	(informative) Atomic weights and molar masses
B.1	General
B.2	Standard atomic weights
B.3	Molar masses

Page count: 23