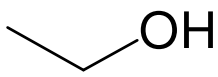
Certificate of Analysis

Reference Material - Secondary Standard

Product Name: Aqueous Ethanol 30 mg/100 ml

Catalogue Number: LGCETH-30
Lot Number: 46048

CAS Number: 64-17-5
Molecular Formula: C_2H_6O
Molecular Weight: 46.07
Solvent: Water
Volume per Ampoule: Not less than 1 ml [1]



Long-term Storage: 2 to 8 °C, dark

Expiry Date: February-2016
Intended Use: The primary aim of this material is for identification, calibration and quantification.

Component	Concentration ("as is")	Uncertainty
see product name	30.00 mg/100 ml [2]	U = 0.13 mg/100 ml [3]
Uncertainty of the concentration is expressed as an expanded uncertainty in accordance with ISO 17025 and Guide 34 at the about 95 % level of confidence using a coverage factor of k = 2 and has been calculated by statistical analysis of our production system and incorporates uncertainty of the purity, material density and balance and weighing technique. Concentration based on material weighings and material purity factor (assay of the neat material).		

The solution's concentration and homogeneity are verified by independent method.

LGC certifies that this standard meets the specification stated in this certificate and warrants this product to meet the stated acceptance criteria through the retest date when stored unopened as recommended. Product should be used shortly after opening to avoid concentration changes due to evaporation. Warranty does not apply to ampoules stored after opening.

Release Date:
Luckenwalde, July 2015

Signed:

Dr. Sabine Schröder
Unit for Reference Materials

[1] Ampoules are overfilled to ensure a minimum 1 ml volume fill. We advise laboratories to use measured volumes of this standard solution before diluting to the desired concentration.
[2] The value is based on the results of analytical techniques, which calibration and verification was carried out with standards traceable to SI-units. The value is expressed on an "as is" basis.
The concentration with its uncertainty is valid in the range between 19 °C and 25 °C.
The identity is verified by data from international scientific literature.
Gravimetrically prepared using qualified balances calibrated annually by accredited calibration service. Calibration verification performed daily prior to use utilizing weights traceable to SI via other mass standards.
[3] The uncertainty "U" is the expanded uncertainty estimated in accordance with the Guide to the Expression of Uncertainty in Measurement (GUM). It is corresponding to a level of confidence of about 95 %. Standard uncertainties are indicated with "u".

Verification of Concentration and Homogeneity				
Lot Number	Verified Concentration (mg/100 ml) *Result*	*Acceptance Criteria*	% RSD - Homogeneity *Result*	*Acceptance Criteria*
46048	29.91	± 3 %	0.58	≤ 3 %
Results compared to NIST and ERM				
Standard	Verified Concentration (mg/100 ml) *Result*	*Acceptance Criteria*	% RSD - Homogeneity *Result*	*Acceptance Criteria*
NIST Lot SRM 2893 (80 mg/100ml)	29.93	± 3 %	0.42	≤ 3 %
ERM Lot ERM-AC510a (50 mg/100ml)	29.72	± 3 %	1.58	≤ 3 %
Concentration verified by GC/MS2				

Solution Standard Assay Parameters				**External Calibration (100 % amount)**	
Analysis Method	GC/MS2				
Column:	DB-624, 60 m x 0.53 mm x 3 µm			Number of Measurements:	6
Injector:	180 °C				
Flow:	0.8 ml/min				
Oven Program:	Rate	°C	Time		
		35	4 min		
	12 °C/min	220	0 min (run time 19.43 min)		
Detector:	EI, 70eV, ion source temperature: 220 °C				

Neat Material Data			
Product Name:	Ethanol		
CAS Number:	64-17-5		
Molecular Formula:	C_2H_6O		
Molecular Weight:	46.07		
Compound Lot:	26530		
Test		**Method**	**Result**
^{1}H-NMR Spectrum*		SOP 06-053	conform / complies to structure
Assay by quantitative NMR ("as is")*		**Quant. NMR**	**100.01 %**
The expanded uncertainty according to the assay is U = 0.44 % (about 95 % level of confidence using a coverage factor of k = 2).			

*: Validated method performed by ISO/IEC 17025 accredited testing lab

The assay of the neat material is verified by titration.

I. Stability and Homogeneity

Accelerated stability studies indicate no significant instability. The given validity period is based on this data. This is backed up by historical data over the range of several years for the neat substance. Homogeneity assured by validated process of preparation (incl. ampoulation), verified by homogeneity testing (GC/MS2).

II. Further Information

General

For laboratory use only. Not suitable for human or animal consumption.

This material conforms to the characteristics of a secondary standard as described within ISO Guide 30 (Terms and definitions used in connection with reference materials).
The certified values quoted in this certificate are LGC's best estimate of the true values within the stated uncertainties and based on the techniques described in this certificate.

Handling of the RM

Before usage of the RM, it should be allowed to warm to room temperature. The concentration with its uncertainty is guaranteed in the range between 19 °C and 25 °C. The uncertainty accounts for the temperature-dependent density in this range.

Quality Control Assessment

The product quality is controlled by regularly performed quality control tests (retests).