LoGiCal®

Ethanol and other related reference materials

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QUARTZ
Forensic Blood Toxicology.
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TOX
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Human blood, serum and urine test material for ethanol determination.

BAPS
Analysis of Lager, Bitter and Dark Ales. Comprehensive range of analytes including alcoholic strength.

DAPS
Analysis of Wine, Spirits and Ready to Drink Beverages.
A wide range of alcoholic beverages and intermediate process test materials for analysis.

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Commitment to quality and efficiency is demonstrated through certification to ISO 9001 for all our activities and accreditations to ISO/EIC 17043 for the operation, management and design of proficiency testing schemes.

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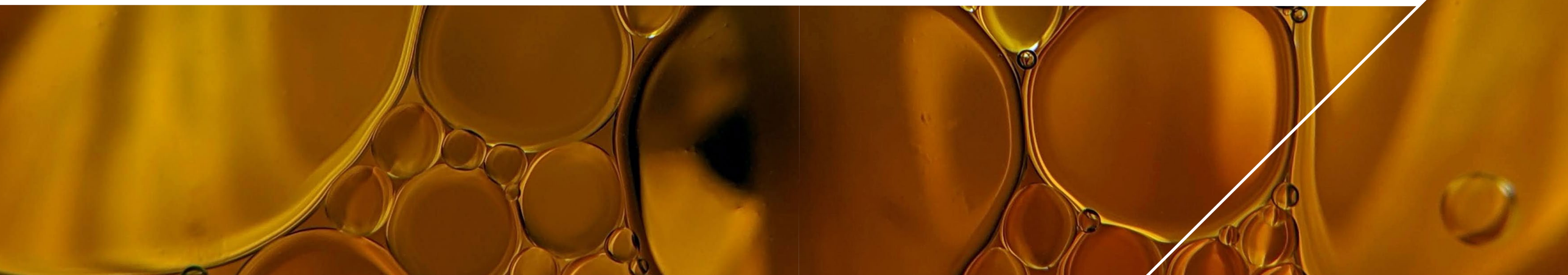

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Introduction

LGC has assembled an unrivalled collection of reference materials for ethanol and related materials. Covering ethanol standards and related materials in both forensic/clinical and industrial relevant concentrations, through to specific biochemical markers of alcohol use, this range of materials will satisfy most of the reference material requirements of analytical laboratories.
To help the end user, the materials have been divided into a number of categories based on their position in the reference material hierarchy, degree of certification, matrix and intended use. This will allow easy selection of the most appropriate reference material for a particular analytical purpose.

Each section is structured in a similar manner. The manufacturer's intended use of a material is listed along with an overview of the quality aspects surrounding the production and certification. Item description and concentrations are listed as per the producer's details.

LGC is very aware that different manufacturers use different concentration units when describing their materials. These local conventions can give rise to confusion. We have therefore included below a table to allow for the easy interconversion of units. We have also colour coded entries throughout the catalogue for easy identification and interconversion.

mg% or mg/100ml or mg/dl	g/dl	g/l
10	0.01	0.1
15	0.015	0.15
20	0.02	0.2
25	0.025	0.25
30	0.03	0.3
50	0.05	0.5
67	0.067	0.67
80	0.08	0.8
100	0.1	1
107	0.107	1.07
110	0.11	1.1
150	0.15	1.5
200	0.2	2
300	0.3	3
400	0.4	4
500	0.5	5

1. Ethanol reference materials from ERM and NIST

Intended use

- **Initial calibration and validation of analytical methodologies**
- **Occasional monitoring of analytical performance**

National Measurement Institutes (NMI's) are responsible for the development and implementation of accurate, robust and traceable measurement systems in their respective countries.
As part of their function, NMI's produce highly characterised and fully traceable reference materials and certified reference materials.

Two of these NMI's, LGC, the United Kingdom's designated NMI for chemical and bioanalytical measurement, and the National Institute for Science and Technology (NIST) currently manufacture highly characterised aqueous ethanol standards at forensic and industrial relevant concentrations.The LGC produced materials are released through the European Reference Material initiative (www.erm-crm.org).

Conceived and designed to be directly traceable to the Système Internationale d'Unités (SI), the primary attribute of these materials is their low underlying uncertainty value. The ERM and NIST products can be regarded as being the ultimate reference materials for the measurement of ethanol.
These higher order reference materials can be divided into three broad categories associated with the industrial production of ethanol, measurement of ethanol in biological fluids, and measurement of ethanol in human breath alcohol underlying uncertainty value.

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1.1 Measurement of ethanol in industrial and other processes

1.1.1 ERM aqueous ethanol reference materials

The primary use of these reference materials is for checking the calibration of automatic density meters commonly used in industry to determine alcoholic strength and for checking analyst and method performance.

Certified values (at 20°C)	Part number	Description	Pack size
5.02% ABV (Alcohol by volume)	LGC5404	Reference Spirit - 5% ABV	25 mL
14.99% ABV	LGC5405	Reference Spirit - 15% ABV	25 mL
40.05% ABV	LGC5406	Reference Spirit - 40% ABV	25 mL
Apparent Alcoholic Strength 37.834 ABV Actual Alcoholic Strength 40.075 ABV	LGC5000	Brandy - 40% ABV	50 mL
4.83% ABV	LGC5005	Lager - 5% ABV	330 mL
1-Propanol 57.0 g/100L 2-Methyl-1-Butanol 21.38 g/100L Butyl Alcohol, n-butanol 0.48 g/100L Isoamyl Alcohol 58.2 g/100L Isobutanol 58.8 g/100L	LGC5100	Whisky - Congeners	10 mL
5.37% ABV	ERM-BA001	Wine - Alcohol (5%)	250 mL
10.12% ABV	ERM-BA002	Wine - Alcohol (10%)	250 mL
14.47% ABV	ERM-BA003	Wine - Alcohol (15%)	250 mL
0.505 % (v/v) ethanol	BCR-651	Beer - Alcohol (low level)	10 mL
0.051 % (v/v) ethanol	BCR-652	Beer - Alcohol (very low level)	10 mL
0.539 % (v/v) ethanol	BCR-653	Wine - Alcohol (low level)	10 mL

1.2 Measurement of ethanol in biological fluids

1.2.1 ERM ethanol reference materials

These materials produced and certified by LGC are intended primarily for use in the calibration of instruments and techniques used for the determination of ethanol in blood and other liquid biological matrices.

Certified values (at 20°C)	Part number	Description	Pack size
20.1 mg/100mL	LGC5409	Aqueous Ethanol - 20mg/ 100mL	50 mL
49.6 mg/100mL	ERM-AC510	Aqueous Ethanol - 50mg/ 100mL	25 mL
66.9 mg/100mL	ERM-AC511	Aqueous Ethanol - 67mg/100mL	25 mL
80.1 mg/100mL	LGC5401	Aqueous ethanol - 80 mg / 100 mL	25 mL
106.9 mg/100mL	LGC5402	Aqueous ethanol - 107 mg / 100mL	25 mL
199.8 mg/100mL	LGC5403	Aqueous ethanol - 200 mg / 100 mL	25 mL

1.2.2 NIST standard reference materials

These materials, produced and certified by NIST, are intended primarily for use in the calibration of instruments and techniques used for the determination of ethanol in blood or in breath

Certified values (at 20°C)	Part number	Description	Pack size
0.01951 % ± 0.00018 %	Ethanol-water solution (nominal 0.02% massfraction)	NIST-2891	5 x 1.2 mL
0.03900 % ± 0.00046 %	Ethanol-water solution (nominal 0.04% massfraction)	NIST-2892	5 x 1.2 mL
0.07663 ± 0.00097	Ethanol-water solution (nominal 0.08% massfraction)	NIST-2893A	5 x 1.2 mL
0.100 84 % ± 0.000 83 %	Ethanol-water solution (nominal 0.1% mass fraction)	NIST-2894	5 x 1.2 mL
0.1701 % ± 0.0014 %	Ethanol-water solution (nominal 0.2% mass fraction)	NIST-2895	5 x 1.2 mL
0.2980 % ± 0.0030 %	Ethanol-water solution (nominal 0.3% mass fraction)	NIST-2896	5 x 1.2 mL
2.001 % ± 0.045 %	Ethanol-water solution (nominal 2% mass fraction)	NIST-2897A	5 x 10 mL
6.01 % ± 0.13 %	Ethanol-water solution (nominal 6% mass fraction)	NIST-2898A	5 x 10 mL
24.95 % ± 0.52 %	Ethanol-water solution (nominal 25% mass fraction)	NIST-2899A	5 x 10 mL
95.6 % ± 1.9 %	Ethanol-water solution (nominal 95.6% mass fraction)	NIST-2900	5 x 10 mL
Multi level calibration kit	Ethanol-water solution (nominal 0.02%,0.04%, 0.08%, 0.10%,0.20%, 0.30% mass fraction)	NIST-1828C	6 x ampoule containing 1.2ml, 1 of each above concentration

2. ISO 17034 ethanol reference materials

Intended use

- **Suitable for the development and validation of new analytical methodologies, for the verification of existing processes and for routine use as either calibration or control materials.**

The ISO Guide 30 series of documents covers the production, certification and appropriate use of reference materials in the modern analytical laboratory. ISO 17034 specifically covers the requirements for the production of robust reference materials. The use of ISO 17034 reference materials is strongly encouraged under ISO/IEC 17025 and equivalent accreditation systems.

These ethanol reference materials, produced under strict ISO 17034 certification processes, have been specifically designed to satisfy these accreditation and other certification requirements. They have been manufactured in varying concentrations and varying pack sizes to meet the differing needs of analytical laboratories. As well as individual concentrations, multi-concentration calibration kits and neat reference materials are available for ease of use.

2.1 Individual aqueous- ethanol standards (two independent ISO 17034 sources by Lipomed and Merck)

Nominal Concentration	Description	Source 1	Source 2	Pack size
10 mg/dL	Ethanol-10	LPM-ETH-010-1ML-10AMP	CERE-040	10x1,2mL
10 mg/dL	Ethanol-10	LPM-ETH-010-1ML-5AMP		5x1,2mL
10 mg/dL	Ethanol-10	LPM-ETH-010-1ML-50AMP		50x1,2mL
15 mg/dL	Ethanol-15	LPM-ETH-015-1ML-10AMP		10x1,2mL
15 mg/dL	Ethanol-15	LPM-ETH-015-1ML-5AMP		5x1,2mL
15 mg/dL	Ethanol-15	LPM-ETH-015-1ML-50AMP		50x1,2mL
20 mg/dL	Ethanol-20	LPM-ETH-020-1ML-10AMP	CERE-056	10x1,2mL
20 mg/dL	Ethanol-20	LPM-ETH-020-1ML-5AMP		5x1,2mL
20 mg/dL	Ethanol-20	LPM-ETH-020-1ML-50AMP		50x1,2mL
25 mg/dL	Ethanol-25	LPM-ETH-025-1ML-10AMP	CERE-035	10x1,2mL
25 mg/dL	Ethanol-25	LPM-ETH-025-1ML-5AMP		5x1,2mL
25 mg/dL	Ethanol-25	LPM-ETH-025-1ML-50AMP		50x1,2mL
40 mg/dL	Ethanol-40	LPM-ETH-040-1ML-10AMP	CERE-045	10x1,2mL
40 mg/dL	Ethanol-40	LPM-ETH-040-1ML-5AMP		5x1,2mL
40 mg/dL	Ethanol-40	LPM-ETH-040-1ML-50AMP		50x1,2mL
50 mg/dL	Ethanol-50	LPM-ETH-050-1ML-10AMP	CERE-029	10x1,2mL
50 mg/dL	Ethanol-50	LPM-ETH-050-1ML-5AMP		5x1,2mL
50 mg/dL	Ethanol-50	LPM-ETH-050-1ML-50AMP		50x1,2mL
70 mg/dL	Ethanol-70	LPM-ETH-070-1ML-10AMP		10x1,2mL
70 mg/dL	Ethanol-70	LPM-ETH-070-1ML-5AMP		5x1,2mL
70 mg/dL	Ethanol-70	LPM-ETH-070-1ML-50AMP		50x1,2mL
80 mg/dL	Ethanol-80	LPM-ETH-080-1ML-10AMP	CERE-030	10x1,2mL
80 mg/dL	Ethanol-80	LPM-ETH-080-1ML-5AMP		5x1,2mL
80 mg/dL	Ethanol-80	LPM-ETH-080-1ML-50AMP		50x1,2mL
90 mg/dL	Ethanol-90	LPM-ETH-090-1ML-10AMP		10x1,2mL
90 mg/dL	Ethanol-90	LPM-ETH-090-1ML-5AMP		5x1,2mL
90 mg/dL	Ethanol-90	LPM-ETH-090-1ML-50AMP		50x1,2mL
100 mg/dL	Ethanol-100	LPM-ETH-100-1ML-10AMP	CERE-031	10x1,2mL
100 mg/dL	Ethanol-100	LPM-ETH-100-1ML-5AMP		5x1,2mL
100 mg/dL	Ethanol-100	LPM-ETH-100-1ML-50AMP		50x1,2mL
125 mg/dL	Ethanol-125	LPM-ETH-125-1ML-10AMP		10x1,2mL
125 mg/dL	Ethanol-125	LPM-ETH-125-1ML-5AMP		5x1,2mL
125 mg/dL	Ethanol-125	LPM-ETH-125-1ML-50AMP		50x1,2mL
150 mg/dL	Ethanol-150	LPM-ETH-150-1ML-10AMP	CERE-041	10x1,2mL
150 mg/dL	Ethanol-150	LPM-ETH-150-1ML-5AMP		5x1,2mL
150 mg/dL	Ethanol-150	LPM-ETH-150-1ML-50AMP		50x1,2mL
160 mg/dL	Ethanol-160	LPM-ETH-160-1ML-10AMP		10x1,2mL
160 mg/dL	Ethanol-160	LPM-ETH-160-1ML-5AMP		5x1,2mL
160 mg/dL	Ethanol-160	LPM-ETH-160-1ML-50AMP		50x1,2mL
170 mg/dL	Ethanol-170	LPM-ETH-170-1ML-10AMP		10x1,2mL
170 mg/dL	Ethanol-170	LPM-ETH-170-1ML-5AMP		5x1,2mL
170 mg/dL	Ethanol-170	LPM-ETH-170-1ML-50AMP		50x1,2mL
200 mg/dL	Ethanol-200	LPM-ETH-200-1ML-10AMP	CERE-032	10x1,2mL
200 mg/dL	Ethanol-200	LPM-ETH-200-1ML-5AMP		5x1,2mL
200 mg/dL	Ethanol-200	LPM-ETH-200-1ML-50AMP		50x1,2mL
250 mg/dL	Ethanol-250	LPM-ETH-250-1ML-10AMP		10x1,2mL
250 mg/dL	Ethanol-250	LPM-ETH-250-1ML-5AMP		5x1,2mL
250 mg/dL	Ethanol-250	LPM-ETH-250-1ML-50AMP		50x1,2mL
300 mg/dL	Ethanol-300	LPM-ETH-300-1ML-10AMP	CERE-033	10x1,2mL
300 mg/dL	Ethanol-300	LPM-ETH-300-1ML-5AMP		5x1,2mL
300 mg/dL	Ethanol-300	LPM-ETH-300-1ML-50AMP		50x1,2mL
400 mg/dL	Ethanol-400	LPM-ETH-400-1ML-10AMP	CERE-036	10x1,2mL
400 mg/dL	Ethanol-400	LPM-ETH-400-1ML-5AMP		5x1,2mL
400 mg/dL	Ethanol-400	LPM-ETH-400-1ML-50AMP		50x1,2mL
500 mg/dL	Ethanol-500	LPM-ETH-500-1ML-10AMP	CERE-053	10x1,2mL
500 mg/dL	Ethanol-500	LPM-ETH-500-1ML-5AMP		5x1,2mL
500 mg/dL	Ethanol-500	LPM-ETH-500-1ML-50AMP		50x1,2mL
600 mg/dL	Ethanol-600	LPM-ETH-600-1ML-10AMP		10x1,2mL
600 mg/dL	Ethanol-600	LPM-ETH-600-1ML-5AMP		5x1,2mL
600 mg/dL	Ethanol-600	LPM-ETH-600-1ML-50AMP		50x1,2mL
700 mg/dL	Ethanol-700	LPM-ETH-700-1ML-10AMP		10x1,2mL
700 mg/dL	Ethanol-700	LPM-ETH-700-1ML-5AMP		5x1,2mL
700 mg/dL	Ethanol-700	LPM-ETH-700-1ML-50AMP		50x1,2mL

2.2 Calibration kits for ethanol

Part number	Concentration	Pack size
CERE-034	Ethanol- 50 mg/dl CERE-029 Ethanol- 80 mg/dl CERE-030 Ethanol-100 mg/dl CERE-031 Ethanol-200 mg/dl CERE-032 Ethanol-300 mg/dl CERE-033	1.2 mL/ampoule, 2 ampoules of each concentration, 10 ampoules/kit

2.3 Neat

Certified values (at 20°C)	Part number	Description	Pack size
99.90% (g/g)	DRE-C13223000	Ethanol	1 mL
99.89% (g/g)	DRE-C13223000-5ML	Ethanol	5 mL
99.9% (g/g)	DRE-C13223000-10ML	Ethanol	10 mL

2.4 Industrial and other processes

Part number	Description	
ALK-ETWA05	Ethanol, 5% ABV (Alcohol by Volume)	25 mL
ALK-ETWA15	Ethanol, 15% ABV (Alcohol by Volume)	25 mL
ALK-ETWA40	Ethanol, 40% ABV (Alcohol by Volume)	25 mL
ALK-PH4-25CF	Certified pH Buffer Solution, pH 4 at 25°C, Coloured (Red), with Fungicide	500 mL
ALK-PH7-20CF	Certified pH Buffer Solution, pH 7 at 20°C, Coloured (Yellow), with Fungicide	500 mL
ALK-PH7-25CF	Certified pH Buffer Solution, pH 7 at 25°C, Coloured (Yellow), with Fungicide	500 mL

3. Ethanol in water reference materials

Intended use

- **Suitable for routine use as either calibration or control materials in combination with an ISO 17034 reference material following appropriate method validation.**
- **Manufactured under ISO 9001 and ISO 13485**

3.1 Aqueous ethanol reference materials by ACQ

These reference materials are ready-to-use liquid aqueous standards that have not been manufactured under ISO 17034 accredited processes. The assigned concentrations have been determined by independent laboratories, each accredited.

CE

Concentration	Description	Part number	Pack size
Ethanol [0.1 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ01-015	10 x 1.5 mL
Ethanol [0.1 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ01-030	10 x 3.0 mL
Ethanol [0.1 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ01-115	100 x 1.5 mL
Ethanol [0.3 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ03-015	10 x 1.5 mL
Ethanol [0.3 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ03-030	10 x 3.0 mL
Ethanol [0.3 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ03-115	100 x 1.5 mL
Ethanol [0.5 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ05-015	10 x 1.5 mL
Ethanol [0.5 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ05-030	10 x 3.0 mL
Ethanol [0.5 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ05-115	100 x 1.5 mL
Ethanol [0.8 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ08-015	10 x 1.5 mL
Ethanol [0.8 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ08-030	10 x 3.0 mL
Ethanol [0.8 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ08-115	100 x 1.5 mL
Ethanol [1.0 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ10-015	10 x 1.5 mL
Ethanol [1.0 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ10-030	10 x 3.0 mL
Ethanol [1.0 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ10-115	100 x 1.5 mL
Ethanol 1.1 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ11-015	10 x 1.5 mL
Ethanol 1.1 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ11-030	10 x 3.0 mL
Ethanol 1.1 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ11-115	100 x 1.5 mL
Ethanol [1.3 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ13-015	10 x 1.5 mL
Ethanol [1.3 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ13-030	10 x 3.0 mL
Ethanol [1.3 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ13-115	100 x 1.5 mL
Ethanol 1.5 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ15-015	10 x 1.5 mL
Ethanol 1.5 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ15-030	10 x 3.0 mL
Ethanol 1.5 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ15-115	100 x 1.5 mL
Ethanol [2.0 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ20-015	10 x 1.5 mL
Ethanol [2.0 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ20-030	10 x 3.0 mL
Ethanol [2.0 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ20-115	100 x 1.5 mL
Ethanol [3.0 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ30-015	10 x 1.5 mL
Ethanol [3.0 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ30-030	10 x 3.0 mL
Ethanol [3.0 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ30-115	100 x 1.5 mL
Ethanol [4.0 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ40-015	10 x 1.5 mL
Ethanol [4.0 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ40-030	10 x 3.0 mL
Ethanol [4.0 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ40-115	100 x 1.5 mL
Ethanol [5.0 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ50-015	10 x 1.5 mL
Ethanol [5.0 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ50-030	10 x 3.0 mL
Ethanol [5.0 g/L]	Ethanol aqueous standards EtOH AQ	AC-AQ50-115	100 x 1.5 mL

3.2 Aqueous ethanol reference materials by Medichem

These reference materials are ready-to-use liquid aqueous standards that have not been manufactured under ISO 17034 accredited processes. The assigned concentrations have been determined by independent laboratories, each accredited.

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Concentration	Description	Part number	Pack size
Ethanol [0.1 g/L]	Ethanol W	ME 20011	100 x 1.2 mL
Ethanol [0.1 g/L]	Ethanol W	ME 20012	10 x 1.5 mL
Ethanol [0.1 g/L]	Ethanol W	ME 20013	10 x 3 mL
Ethanol [0.2 g/L]	Ethanol W	ME 20020	10 x 1.2 mL
Ethanol [0.2 g/L]	Ethanol W	ME 20021	100 x 1.2 mL
Ethanol [0.2 g/L]	Ethanol W	ME 20022	10 x 1.5 mL
Ethanol [0.2 g/L]	Ethanol W	ME 20023	10 x 3 mL
Ethanol [0.3 g/L]	Ethanol W	ME 20030	10 x 1.2 mL
Ethanol [0.3 g/L]	Ethanol W	ME 20031	100 x 1.2 mL
Ethanol [0.3 g/L]	Ethanol W	ME 20032	10 x 1.5 mL
Ethanol [0.3 g/L]	Ethanol W	ME 20033	10 x 3 mL
Ethanol [0.5 g/L]	Ethanol W	ME 20050	10 x 1.2 mL
Ethanol [0.5 g/L]	Ethanol W	ME 20051	100 x 1.2 mL

Concentration	Description	Part number	Pack size
Ethanol [0.5 g/L]	Ethanol W	ME 20052	10 x 1.5 mL
Ethanol [0.5 g/L]	Ethanol W	ME 20053	10 x 3 mL
Ethanol [0.8 g/L]	Ethanol W	ME 20080	10 x 1.2 mL
Ethanol [0.8 g/L]	Ethanol W	ME 20081	100 x 1.2 mL
Ethanol [0.8 g/L]	Ethanol W	ME 20082	10 x 1.5 mL
Ethanol [0.8 g/L]	Ethanol W	ME 20083	10 x 3 mL
Ethanol [1.0 g/L]	Ethanol W	ME 20100	10 x 1.2 mL
Ethanol [1.0 g/L]	Ethanol W	ME 20101	100 x 1.2 mL
Ethanol [1.0 g/L]	Ethanol W	ME 20102	10 x 1.5 mL
Ethanol [1.0 g/L]	Ethanol W	ME 20103	10 x 3 mL
Ethanol 1.1 g/L]	Ethanol W	ME 20110	10 x 1.2 mL
Ethanol 1.1 g/L]	Ethanol W	ME 20111	100 x 1.2 mL
Ethanol 1.1 g/L]	Ethanol W	ME 20112	10 x 1.5 mL
Ethanol 1.1 g/L]	Ethanol W	ME 20113	10 x 3 mL
Ethanol [1.3 g/L]	Ethanol W	ME 20130	10 x 1.2 mL
Ethanol [1.3 g/L]	Ethanol W	ME 20131	100 x 1.2 mL
Ethanol [1.3 g/L]	Ethanol W	ME 20132	10 x 1.5 mL
Ethanol [1.3 g/L]	Ethanol W	ME 20133	10 x 3 mL
Ethanol 1.5 g/L]	Ethanol W	ME 20150	10 x 1.2 mL
Ethanol 1.5 g/L]	Ethanol W	ME 20151	100 x 1.2 mL
Ethanol 1.5 g/L]	Ethanol W	ME 20152	10 x 1.5 mL
Ethanol 1.5 g/L]	Ethanol W	ME 20153	10 x 3 mL
Ethanol [2.0 g/L]	Ethanol W	ME 20200	10 x 1.2 mL
Ethanol [2.0 g/L]	Ethanol W	ME 20201	100 x 1.2 mL
Ethanol [2.0 g/L]	Ethanol W	ME 20202	10 x 1.5 mL
Ethanol [2.0 g/L]	Ethanol W	ME 20203	10 x 3 mL
Ethanol [3.0 g/L]	Ethanol W	ME 20300	10 x 1.2 mL
Ethanol [3.0 g/L]	Ethanol W	ME 20301	100 x 1.2 mL
Ethanol [3.0 g/L]	Ethanol W	ME 20302	10 x 1.5 mL
Ethanol [3.0 g/L]	Ethanol W	ME 20303	10 x 3 mL
Ethanol [4.0 g/L]	Ethanol W	ME 20400	10 x 1.2 mL
Ethanol [4.0 g/L]	Ethanol W	ME 20401	100 x 1.2 mL
Ethanol [4.0 g/L]	Ethanol W	ME 20402	10 x 1.5 mL
Ethanol [4.0 g/L]	Ethanol W	ME 20403	10 x 3 mL
Ethanol [5.0 g/L]	Ethanol W	ME 20500	10 x 1.2 mL
Ethanol [5.0 g/L]	Ethanol W	ME 20501	100 x 1.2 mL
Ethanol [5.0 g/L]	Ethanol W	ME 20502	10 x 1.5 mL
Ethanol [5.0 g/L]	Ethanol W	ME 20503	10 x 3 mL

3.3 Aqueous ethanol reference materials by LGC

These reference materials are ready-to-use liquid aqueous standards that have not been manufactured ISO 170334 accredited processes. Concentrations of solutions have been verified against NIST standard.

Concentration	Description	Part number	Pack size
Ethanol [0.1 g/L]	Ethanol 10mg/100mL in Water	LGCETH-10	1 mL
Ethanol [0.2 g/L]	Ethanol 20mg/100mL in Water	LGCETH-20	1 mL
Ethanol [0.25 g/L]	Ethanol 25mg/100mL in Water	LGCETH-25	1 mL
Ethanol [0.3 g/L]	Ethanol 30mg/100mL in Water	LGCETH-30	1 mL
Ethanol [0.4 g/L]	Ethanol 40mg/100mL in Water	LGCETH-40	1 mL
Ethanol [0.5 g/L]	Ethanol 50mg/100mL in Water	LGCETH-50	1 mL
Ethanol [0.8 g/L]	Ethanol 80mg/100mL in Water	LGCETH-80	1 mL
Ethanol [1.0 g/L]	Ethanol 100mg/100mL in Water	LGCETH-100	1 mL
Ethanol 1.1 g/L]	Ethanol 110mg/100mL in Water	LGCETH-110	1 mL
Ethanol 1.5 g/L]	Ethanol 150mg/100mL in Water	LGCETH-150	1 mL
Ethanol [2.0 g/L]	Ethanol 200mg/100mL in Water	LGCETH-200	1 mL
Ethanol [3.0 g/L]	Ethanol 300mg/100mL in Water	LGCETH-300	1 mL
Ethanol [4.0 g/L]	Ethanol 400mg/100mL in Water	LGCETH-400	1 mL
Ethanol [5.0 g/L]	Ethanol 500mg/100mL in Water	LGCETH-500	1 mL

4. Ethanol in human serum reference materials

Intended use

- **Suitable for routine use as either calibration or control materials in combination with an ISO17034 reference material following appropriate method validation.**
- **Manufactured under ISO 9001 and ISO 13485**

4.1 Serum ethanol reference materials by ACQ

These reference materials are ready-to-use liquid aqueous standards that have not been manufactured under ISO 17034 accredited processes.
The assigned concentrations have been determined by independent laboratories, each accredited.

CE

Concentration	Description	Part number	Pack size
Ethanol [0.2 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE02-015	10 x 1.5 mL
Ethanol [0.2 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE02-030	10 x 3.0 mL
Ethanol [0.2 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE02-115	100 x 1.5 mL
Ethanol [0.3 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE03-015	10 x 1.5 mL
Ethanol [0.3 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE03-030	10 x 3.0 mL
Ethanol [0.3 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE03-115	100 x 1.5 mL
Ethanol [0.5 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE05-015	10 x 1.5 mL
Ethanol [0.5 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE05-030	10 x 3.0 mL
Ethanol [0.5 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE05-115	100 x 1.5 mL
Ethanol [1.0 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE10-015	10 x 1.5 mL
Ethanol [1.0 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE10-030	10 x 3.0 mL
Ethanol [1.0 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE10-115	100 x 1.5 mL

Concentration	Description	Part number	Pack size
Ethanol 1.1 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE11-015	10 x 1.5 mL
Ethanol 1.1 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE11-030	10 x 3.0 mL
Ethanol 1.1 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE11-115	100 x 1.5 mL
Ethanol [1.3 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE13-015	10 x 1.5 mL
Ethanol [1.3 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE13-030	10 x 3.0 mL
Ethanol [1.3 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE13-115	100 x 1.5 mL
Ethanol 1.5 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE15-015	10 x 1.5 mL
Ethanol 1.5 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE15-030	10 x 3.0 mL
Ethanol 1.5 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE15-115	100 x 1.5 mL
Ethanol [3.0 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE30-015	10 x 1.5 mL
Ethanol [3.0 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE30-030	10 x 3.0 mL
Ethanol [3.0 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE30-115	100 x 1.5 mL
Ethanol [4.0 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE40-015	10 x 1.5 mL
Ethanol [4.0 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE40-030	10 x 3.0 mL
Ethanol [4.0 g/L]	Ethanol aqueous in serum EtOH SE	AC-SE40-115	100 x 1.5 mL

4.2 Serum ethanol reference materials by Medichem

These reference materials are ready-to-use liquid aqueous standards that have not been manufactured under ISO 17034 accredited processes.

The assigned concentrations have been determined by independent laboratories, each accredited.

Although concentrations are not accurately defined, ready-to-use precision liquid controls are suitable for monitoring the precision of ethanol in serum measurements.

CE

Concentration	Description	Part number	Pack size
0.2 g/l	Ethanol in human serum with reference values	ME 11021 ME 11020 ME 11022 ME 11023	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
0.3 g/l	Ethanol in human serum with reference values	ME 11031 ME 11030 ME 11032 ME 11033	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
0.5 g/l	Ethanol in human serum with reference values	ME 11051 ME 11050 ME 11052 ME 11053	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
0.8 g/l	Ethanol in human serum with reference values	ME 11081 ME 11080 ME 11082 ME 11083	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
1.0 g/l	Ethanol in human serum with reference values	ME 11101 ME 11100 ME 11102 ME 11102	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
1.1 g/l	Ethanol in human serum with reference values	ME 11111 ME 11110 ME 11112 ME 11113	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
1.3 g/l	Ethanol in human serum with reference values	ME 11131 ME 11130 ME 11132 ME 11133	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL

Concentration	Description	Part number	Pack size
1.5 g/l	Ethanol in human serum with reference values	ME 11151 ME 11150 ME 11152 ME 11153	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
2.0 g/l	Ethanol in human serum with reference values	ME 11201 ME 11200 ME 11202 ME 11203	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
3.0 g/l	Ethanol in human serum with reference values	ME 11301 ME 11300 ME 11302 ME 11303	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
4.0 g/l	Ethanol in human serum with reference values	ME 11401 ME 11400 ME 11402 ME 11403	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
5.0 g/l	Ethanol in human serum with reference values	ME 11501 ME 11500 ME 11502 ME 11503	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
0.5 - 0.6 g/L	Ethanol in human serum, precision control, X1	ME 12012 ME 12013	10 x 1.5 mL 10 x 3.0 mL
0.8 - 1.0 g/L	Ethanol in human serum, precision control, X2	ME 12022 ME 12023	10 x 1.5 mL 10 x 3.0 mL
2.0 - 3.0 g/L	Ethanol in human serum, precision control, X3	ME 12032 ME 12033	10 x 1.5 mL 10 x 3.0 mL

5. Ethanol in human blood reference materials

Intended use

- **Suitable for routine use as either calibration or control materials in combination with an ISO17034 reference material following appropriate method validation.**
- **Manufactured under ISO 9001 and ISO 13485**

5.1 Ethanol human blood reference materials by ACQ

Ready-to-use liquid reference controls for accuracy monitoring of ethanol determinations in whole blood which have not been manufactured under robust ISO 17034 accredited processes.
The assigned concentrations have been determined by independent laboratories, each accredited.

CE

Concentration	Description	Part number	Pack size
Ethanol [0.2 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH02-015	10 x 1.5 ml
Ethanol [0.2 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH02-030	10 x 3.0 ml
Ethanol [0.2 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH02-115	100 x 1.5 ml
Ethanol [0.3 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH03-015	10 x 1.5 ml
Ethanol [0.3 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH03-030	10 x 3.0 ml
Ethanol [0.3 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH03-115	100 x 1.5 ml
Ethanol [0.5 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH05-015	10 x 1.5 ml
Ethanol [0.5 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH05-030	10 x 3.0 ml

Concentration	Description	Part number	Pack size
Ethanol [0.5 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH05-115	100 x 1.5 ml
Ethanol [0.8 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH08-015	10 x 1.5 ml
Ethanol [0.8 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH08-030	10 x 3.0 ml
Ethanol [0.8 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH08-115	100 x 1.5 ml
Ethanol 1.1 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH11-015	10 x 1.5 ml
Ethanol 1.1 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH11-030	10 x 3.0 ml
Ethanol 1.1 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH11-115	100 x 1.5 ml
Ethanol [2.0 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH20-015	10 x 1.5 ml
Ethanol [2.0 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH20-030	10 x 3.0 ml
Ethanol [2.0 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH20-115	100 x 1.5 ml
Ethanol [3.0 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH30-015	10 x 1.5 ml
Ethanol [3.0 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH30-030	10 x 3.0 ml
Ethanol [3.0 g/L]	Ethanol aqueous in whole blood EtOH WH	AC-WH30-115	100 x 1.5 ml

6. ISO 17034 congener and multi component alcohol related reference materials

Intended use

- **Suitable for the development and validation of new analytical methodologies, for the verification of existing processes and for routine use as either calibration or control materials.**

The ISO Guide 30 series of documents covers the production, certification and appropriate use of reference materials in the modern analytical laboratory.
ISO 17034 specifically covers the requirements for the production of robust reference materials.

The use of ISO 17034 reference materials is strongly encouraged under ISO/IEC 17025 and equivalent accreditation systems.

These mixed component ethanol reference materials produced under strict ISO 17034 certification processes have been specifically designed to satisfy these accreditation and other ertification requirements. They have been manufactured in varying concentrations and varying pack sizes to meet the differing needs of analytical laboratories.

Nominal Concentration	Description	Source 1	Source 2	Pack size
100 µg/mL	Multi-component alcohol mix 100 µg/mL containing acetone, isopropanol,ethanol and methanol	LPM-MIX-1808-0.1LH	CERA-076	1 x ampule
200 µg/mL	Multi-component alcohol mix 200 µg/mL containing acetone, isopropanol,ethanol and methanol	LPM-MIX-1808-0.2LH		1 x ampule
300 µg/mL	Multi-component alcohol mix 300 µg/mL containing acetone, isopropanol,ethanol and methanol	LPM-MIX-1808-0.3LH		1 x ampule
400 µg/mL	Multi-component alcohol mix 400 µg/mL containing acetone, isopropanol,ethanol and methanol	LPM-MIX-1808-0.4LH		1 x ampule
500 µg/mL	Multi-component alcohol mix 500 µg/mL containing acetone, isopropanol,ethanol and methanol	LPM-MIX-1808-0.5LH	CERA-057	1 x ampule
1000 µg/mL	Multi-component alcohol mix 1000 µg/mL containing acetone, isopropanol,ethanol and methanol	LPM-MIX-1808-1LH	CERA-056	1 x ampule
2000 µg/mL	Multi-component alcohol mix 2000 µg/mL containing acetone, isopropanol,ethanol and methanol	LPM-MIX-1808-2LH		1 x ampule
4000 µg/mL	Multi-component alcohol mix 4000 µg/mL containing acetone, isopropanol,ethanol and methanol	LPM-MIX-1808-4LH	CERA-061	1 x ampule
5000 µg / mL	Multi-component alcohol mix 5000 µg/mL containing acetone, isopropanol,ethanol and methanol	LPM-MIX-1808-5LH		1 x ampule
Multi level calibration kit	Multi-component alcohol mix at three levels (500, 1000 and 4000 µg/ mL) containing acetone, isopropanol, ethanol and methanol (1 ampoule of each material)		CERA-054	3 x 1.2 mL

7. Congener and multi component alcohol related reference materials

Intended use

- **Suitable for routine use as either calibration or control materials in combination with an ISO17034 reference material following appropriate method validation.**

7.1 Aqueous congener and multi component alcohol reference materials by Medichem

These reference materials are ready-to-use liquid aqueous standards that have not been manufactured under robust ISO 17034 accredited processes. The indicated target values have been determined by independent laboratories, each accredited.

CE

Description	Component	Concentration	Part No.	Pack size
Aqueous congener alcohols control Level 1	Acetone 1-Butanol 2-Butanol 2-Butanone Ethanol Isobutanol Methanol 2-Methyl-1-butanol 3-Methyl-1-butanol 1-Propanol 2-Propanol	0.5 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 1500 mg/L 0.1 mg/L 1.0 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L 0.1 mg/L	ME 91311	10 x 1.2 mL
Aqueous congener alcohols control Level 2	Acetone 1-Butanol 2-Butanol 2-Butanone Ethanol Isobutanol Methanol 2-Methyl-1-butanol 3-Methyl-1-butanol 1-Propanol 2-Propanol	1.0 mg/L 0.2 mg/L 0.2 mg/L 0.2 mg/L 1500 mg/L 0.2 mg/L 2.0 mg/L 0.2 mg/L 0.2 mg/L 0.2 mg/L 0.2 mg/L	ME 91321	10 x 1.2 mL
Aqueous congener alcohols control Level 3	Acetone 1-Butanol 2-Butanol 2-Butanone Ethanol Isobutanol Methanol 2-Methyl-1-butanol 3-Methyl-1-butanol 1-Propanol 2-Propanol	1.5 mg/L 0.3 mg/L 0.3 mg/L 0.3 mg/L 1500 mg/L 0.3 mg/L 3.0 mg/L 0.3 mg/L 0.3 mg/L 0.3 mg/L 0.3 mg/L	ME 91331	10 x 1.2 mL
Aqueous congener alcohols control Level 4	Acetone 1-Butanol 2-Butanol 2-Butanone Ethanol Isobutanol Methanol 2-Methyl-1-butanol 3-Methyl-1-butanol 1-Propanol 2-Propanol	2.0 mg/L 0.4 mg/L 0.4 mg/L 0.4 mg/L 1500 mg/L 0.4 mg/L 4.0 mg/L 0.4 mg/L 0.4 mg/L 0.4 mg/L 0.4 mg/L	ME 91341	10 x 1.2 mL

Description	Component	Concentration	Part No.	Pack size
Aqueous congener alcohols control Level 5	Acetone 1-Butanol 2-Butanol 2-Butanone Ethanol Isobutanol Methanol 2-Methyl-1-butanol 3-Methyl-1-butanol 1-Propanol 2-Propanol	2.5 mg/L 0.5 mg/L 0.5 mg/L 0.5 mg/L 1200 mg/L 0.5 mg/L 5.0 mg/L 0.5 mg/L 0.5 mg/L 0.5 mg/L 0.5 mg/L	ME 91351	10 x 1.2 mL
Aqueous congener alcohols control Level 6	Acetone 1-Butanol 2-Butanol 2-Butanone Ethanol Isobutanol Methanol 2-Methyl-1-butanol 3-Methyl-1-butanol 1-Propanol 2-Propanol	5.0 mg/L 1.0 mg/L 1.0 mg/L 1.0 mg/L 1500 mg/L 1.0 mg/L 10.0 mg/L 1.0 mg/L 1.0 mg/L 1.0 mg/L 1.0 mg/L	ME 91361	10 x 1.2 mL
Aqueous congener alcohols control Level 7	Acetone 1-Butanol 2-Butanol 2-Butanone Ethanol Isobutanol Methanol 2-Methyl-1-butanol 3-Methyl-1-butanol 1-Propanol 2-Propanol	10.0 mg/L 2.0 mg/L 2.0 mg/L 2.0 mg/L 1200 mg/L 2.0 mg/L 20.0 mg/L 2.0 mg/L 2.0 mg/L 2.0 mg/L 2.0 mg/L	ME 91371	10 x 1.2 mL
Aqueous congener alcohols control Level 8	Acetone 1-Butanol 2-Butanol 2-Butanone Ethanol Isobutanol Methanol 2-Methyl-1-butanol 3-Methyl-1-butanol 1-Propanol 2-Propanol	100.0 mg/L 20.0 mg/L 20.0 mg/L 20.0 mg/L 12000 mg/L 20.0 mg/L 200.0 mg/L 20.0 mg/L 20.0 mg/L 20.0 mg/L 20.0 mg/L	ME 91381	10 x 1.2 mL

7.2 Whole blood congener and multi component alcohol reference materials by Medichem

These reference materials are ready-to-use liquid whole blood standards that have not been manufactured under robust ISO 17034 accredited processes. The indicated target values have been determined by independent laboratories, each accredited.

CE

Description	Component	Concentration	Part No.	Pack size
Ethanol and alcohols in whole blood 000	2-Propanol Acetone Ethanol Methanol	< LOD < LOD < LOD < LOD	ME 11V 000BF ME 11V 000DF ME 11V 000EF ME 11V 000HF	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
Ethanol and alcohols in whole blood 030	2-Propanol Acetone Ethanol Methanol	10 mg/mL 10 mg/mL 300 mg/mL 50 mg/mL	x ME 11V 030DF ME 11V 030EF x	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
Ethanol and alcohols in whole blood 050	2-Propanol Acetone Ethanol Methanol	25 mg/mL 25 mg/mL 500 mg/mL 100 mg/mL	ME 11V 050BF ME 11V 050DF ME 11V 050EF ME 11V 050HF	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
Ethanol and alcohols in whole blood 080	2-Propanol Acetone Ethanol Methanol	50 mg/mL 50 mg/mL 800 mg/mL 200 mg/mL	ME 11V 080BF ME 11V 080DF ME 11V 080EF ME 11V 080HF	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
Ethanol and alcohols in whole blood 100	2-Propanol Acetone Ethanol Methanol	75 mg/mL 75 mg/mL 1000 mg/mL 250 mg/mL	x ME 11V 100DF ME 11V 100EF ME 11V 100HF	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
Ethanol and alcohols in whole blood 110	2-Propanol Acetone Ethanol Methanol	100 mg/mL 100 mg/mL 1100 mg/mL 300 mg/mL	ME 11V 110BF ME 11V 110DF ME 11V 110EF ME 11V 110HF	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
Ethanol and alcohols in whole blood 150	2-Propanol Acetone Ethanol Methanol	200 mg/mL 200 mg/mL 1500 mg/mL 400 mg/mL	x ME 11V 150DF ME 11V 150EF x	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
Ethanol and alcohols in whole blood 200	2-Propanol Acetone Ethanol Methanol	300 mg/mL 300 mg/mL 2000 mg/mL 500 mg/mL	ME 11V 200BF ME 11V 200DF ME 11V 200EF ME 11V 200HF	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
Ethanol and alcohols in whole blood 300	2-Propanol Acetone Ethanol Methanol	500 mg/mL 500 mg/mL 3000 mg/mL 750 mg/mL	ME 11V 300BF ME 11V 300DF ME 11V 300EF ME 11V 300HF	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL
Ethanol and alcohols in whole blood 400	2-Propanol Acetone Ethanol Methanol	1000 mg/mL 1000 mg/mL 4000 mg/mL 1000 mg/mL	ME 11V 400BF ME 11V 400DF ME 11V 400EF ME 11V 400HF	10 x 0.6 mL 10 x 1.2 mL 10 x 1.5 mL 10 x 3 mL

8. Markers for identification of ethanol use

Intended use

Along with the established Carbohydrate Deficient Transferrin (CDT) and phosphatidylethanol (PEth) markers, there are a number of metabolites of ethanol that are of interest to analytical laboratories. These include ethyl glucuronide, ethyl sulphate, the ethyl esters of some fatty acids.

The analysis of these compounds in hair, urine and other matrices can help elucidate an individual's drinking pattern. The Society of Hair Testing (SoHT, http://www.soht.org/) provide clear guidelines to the interpretation of such tests, in hair.

8.1 ISO 17034 reference materials

The ISO Guide 30 series of documents covers the production, certification and appropriate use of reference materials in the modern analytical laboratory. ISO 17034 specifically covers the requirements for the production of robust reference materials. The use of ISO 17034 reference materials is strongly encouraged under ISO/IEC 17025 and equivalent accreditation systems.

These markers of ethanol use reference materials are produced under strict ISO 17034 certification processes and have been specifically designed to satisfy these accreditation and other certification requirements. They have been manufactured in varying concentrations and varying pack sizes to meet the differing needs of analytical laboratories.

Part number	Description	Pack size	
CERP-114-1ML	PEth 16:0/18:1, 1.0 mg/mL (as free phosphate)	1 mL	Peth
CERP-115-1ML	PEth 16:0/18:2, 1.0 mg/mL ((as free phosphate)	1 mL	
CERP-151-1ML	PEth 16:0/18:1-D5, 100 µg/mL (as free phosphate)	1 mL	
CERP-164-1ML	Phosphatidylethanol 16:0/18:1-D5 (PEth 16:0/18:1-D5), 100 µg/mL (as free phosphate)	1 mL	
LPM-EGL-332-1LM	Ethyl-Beta-D-glucuronide, 1mg/mL in Methanol	1 mL	EtG
CERE-015	Ethyl-beta-D-glucuronide (1.0 mg/mL) in Methanol	1 mL	
CERE-016	Ethyl beta-D-glucuronide (0.1 mg/mL) in Methanol	1 mL	
LPM-EGL-780-1LM	Ethyl-Beta-D-glucuronide-D5, 1mg/mL in Methanol	1 mL	
CERE-063	Ethyl-Beta-D-glucuronide-D5 (1.0 mg/ml) in Methanol	1 mL	
LPM-EGL-780-0.1LM	Ethyl-Beta-D-glucuronide-D5, 0.1mg/mL in Methanol	1 mL	
CERE-048	Ethyl-Beta-D-glucuronide-D5 (0.1 mg/mL) in Methanol	1 mL	
LPM-EGL-780-1LM-5	Ethyl-Beta-D-glucuronide-D5, 5 mg/5 mL in Methanol	1 mL	
LPM-ETS-972-NA-1LM	Ethylsulfate sodium salt, 1mg/ml in Methanol	1 mL	EtS
CERE-064	Ethyl sulfate sodium salt (1.0 mg/ml)(as ethyl sulfate) in Methanol	1 mL	
CERE-116-1ML	Ethyl sulfate sodium salt (10 mg/mL) in in Methanol:Water (1:1)	1 mL	
LPM-ETS-979-NA-1LM	Ethylsulfate-D5 sodium salt, 1mg/ml in Methanol	1 mL	
CERE-066	Ethyl-D5 sulfate sodium salt (1.0 mg/mL) (as ethyl sulfate) in Methanol	1 mL	
LPM-ETS-979-NA-0.1LM	Ethylsulfate-D5 sodium salt, 0.1mg/ml in Methanol	1 mL	
LPM-ETS-979-NA-1LM	Ethylsulfate-D5 sodium salt, 1mg/ml in Methanol	1 mL	
LPM-ETS-979-NA-1LM-5	Ethylsulfate-D5 sodium salt, 5 mg/5 ml in Methanol	1 mL	
LPM-FAE-1451-1LA	Ethyl palmitate, 1mg/ml in Acetonitrile	1 mL	FAEE
LPM-FAE-1695-1LA	Ethyl palmitate-D5, 1mg/ml in Acetonitrile	1 mL	
LPM-FAE-1454-1LA	Ethyl stearate, 1mg/ml in Acetonitrile	1 mL	
LPM-FAE-1698-1LA	Ethyl stearate-D5, 1mg/ml in Acetonitrile	1 mL	

8.2 Neat reference materials

The following materials are neat materials for use in the preparation of solutions, to act as calibrators/controls or internal standards. These materials have not been manufactured under ISO 17034 accredited processes.

Part number	Description	Pack size	
LPM-EGL-332-10	Ethyl-Beta-D-glucuronide	10 mg	EtG
LPM-EGL-332-50	Ethyl-Beta-D-glucuronide	50 mg	
LPM-EGL-332-100	Ethyl-Beta-D-glucuronide	100 mg	
ME 70002	Ethyl-beta-D-6-glucuronide	2 mg	
ME 70010	Ethyl-beta-D-6-glucuronide	10 mg	
LPM-EGL-780-10	Ethyl-Beta-D-glucuronide-D5	10 mg	
LPM-EGL-780-50	Ethyl-Beta-D-glucuronide-D5	50 mg	
LPM-EGL-780-100	Ethyl-Beta-D-glucuronide-D5	100 mg	
ME 70502	Ethyl-beta-D-6-glucuronide-D5	2 mg	
ME 70510	Ethyl-beta-D-6-glucuronide-D5	10 mg	
LPM-ETS-972-NA-10	Ethylsulfate sodium salt	10 mg	EtS
LGCFOR0397.04	Ethyl Sulfate Sodium Salt	10 mg	
LPM-ETS-972-NA-50	Ethylsulfate sodium salt	50 mg	
LPM-ETS-972-NA-100	Ethylsulfate sodium salt	100 mg	
LPM-ETS-979-NA-10	Ethylsulfate-D5 sodium salt	10 mg	
LPM-ETS-979-NA-50	Ethylsulfate-D5 sodium salt	50 mg	
LPM-ETS-979-NA-100	Ethylsulfate-D5 sodium salt	100 mg	
TRC-E925180-1G	Ethyl Myristate	1 g	FAEE
TRC-E925182-10MG	Ethyl Myristate-d5	10 mg	
TRC-E925325-1G	Ethyl Oleate	1 g	
TRC-E925327-10MG	Ethyl Oleate-d5	10 mg	
TRC-E925480-1G	Ethyl Palmitate	1 g	
TRC-E925482-25MG	Ethyl Palmitate-d5	25 mg	
TRC-E925950-1G	Ethyl Stearate	1 g	
TRC-E925952-5MG	Ethyl Stearate-d5	5 mg	

8.3 Whole blood reference materials

Phosphatidylethanol

These reference materials are whole blood controls that have not been manufactured under robust ISO 17034 accredited processes. The indicated target values have been determined by independent laboratories, each accredited.

CE

Concentration	Description	Part number	Pack size
PEth 16:0 / 18:1 - 52.8 ng/mL PEth 16:0 / 18:2 - 22.6 ng/mL	PEth A 323 WH (authentic)	AC-49WHA323	10 x 0.25 mL
PEth 16:0 / 18:1 - 33.4 ng/mL PEth 16:0 / 18:2 - x	PEth A 40 ng/ml WH (authentic)	AC-49WHA040-005	5 x 0.5 mL
PEth 16:0 / 18:1 - 308 ng/mL PEth 16:0 / 18:2 - x	PEth S 300 ng/ml WH (spiked)	AC-49WHS300-005	5 x 0.5 mL

8.4 Serum reference materials

8.4.1 Ethylglucuronide and Ethylsulfate by Medichem

These reference materials are serum controls that have not been manufactured under robust ISO 17034 accredited processes. The indicated target values have been determined by independent laboratories, each accredited.

Concentration	Description	Part number	Pack size
Ethylglucuronide 0.10 mg/L Ethylsulfate 0.035 mg/L	Alcohol consumption markers in human serum Level 1	ME 15SL01GC ME 15SL01GF	5 x 2.5 mL 10 x 2.5mL
Ethylglucuronide 1.0 mg/L Ethylsulfate 0.35 mg/L	Alcohol consumption markers in human serum Level 2	ME 15SL02GC ME 15SL02GF	5 x 2.5 mL 10 x 2.5mL
Ethylglucuronide 5.0 mg/L Ethylsulfate 1.70 mg/L	Alcohol consumption markers in human serum Level 3	ME 15SL03GC ME 15SL03GF	5 x 2.5 mL 10 x 2.5mL
SET	Alcohol consumption markers in human serum Level 1-3	ME 15SS01GD	SET 3 x 2 x 2.5 mL

8.4.2 Ethylglucuronide and Ethylsulfate by Recipe

These reference materials are serum controls or calibrators that have not been manufactured under robust ISO 17034 accredited processes. The mean values have been established at RECIPE, according to the Guideline of the German Medical Association on Quality Assurance (Rili-BAEK), with statistical methods.

Concentration	Description	Part number	Pack size
Ethylglucuronide 188 µg/L Ethylsulfate 83.3 µg/L	ClinChek® Serum Control, lyophil., for Ethylglucuronide and Ethylsulfate, Level I	REC-MS8180	10 x 1 mL
Ethylglucuronide 933 µg/L Ethylsulfate 416 µg/L	ClinChek® Serum Control, lyophil., for Ethylglucuronide and Ethylsulfate, Level II	REC-MS8181	10 x 1 mL
SET	ClinChek® Serum Control, lyophil., for Ethylglucuronide and Ethylsulfate, Level I, II	REC-MS8182	SET 2 x 5 x 1 mL
Ethylglucuronide 74.2 µg/L Ethylsulfate 35.6 µg/L	ClinCal® Serum Calibrator Set, lyophil., for Ethylglucuronide and Ethylsulfate (Level 0 – 3)	REC-MS8113	SET 4 x 1 x 1 ml
Ethylglucuronide 557 µg/L Ethylsulfate 266 µg/L			
Ethylglucuronide 4562 µg/L Ethylsulfate 2154 µg/L			

8.4.3 Carbohydrate Deficient Transferrin (CDT) by Recipe

These reference materials are serum controls or calibrators that have not been manufactured under robust ISO 17034 accredited processes. The mean values have been established at RECIPE, according to the Guideline of the German Medical Association on Quality Assurance (Rili-BAEK), with statistical methods.

Concentration	Part number	Pack size
ClinChek® Serum Control, lyophil., for CDT, Level I	REC-21080	10 x 1 mL
ClinChek® Serum Control, lyophil., for CDT, Level I	REC-21081	10 x 1 mL
REC-21082	SET	2 x 5 x 1 mL
REC-21013	SET	2 x 1 x 1 mL

8.5 Urine reference materials

8.5.1 Ethylglucuronide and Ethylsulfate by Medichem

These reference materials are urine controls that have not been manufactured under robust ISO 17034 accredited processes. The indicated target values have been determined by independent laboratories, each accredited.

Concentration	Description	Part number	Pack size
Ethylglucuronide 0.10 mg/L Ethylsulfate 0.035 mg/L	Alcohol consumption markers in human urine Level 1	ME 15UL01GC ME 15UL01GF	5 x 2.5 mL 10 x 2.5mL
Ethylglucuronide 0.5 mg/L Ethylsulfate 0.175 mg/L	Alcohol consumption markers in human urine Level 2	ME 15UL02GC ME 15UL02GF	5 x 2.5 mL 10 x 2.5mL
Ethylglucuronide 1.0 mg/L Ethylsulfate 0.35 mg/L	Alcohol consumption markers in human urine Level 3	ME 15UL03GC ME 15UL03GF	5 x 2.5 mL 10 x 2.5mL
Ethylglucuronide 5.0 mg/L Ethylsulfate 1.70 mg/L	Alcohol consumption markers in human urine Level 4	ME 15UL04GC ME 15UL04GF	5 x 2.5 mL 10 x 2.5mL
SET	Alcohol consumption markers in human urine Level 1-4	ME 15US01GJ	SET 4 x 2 x 2.5 mL

8.5.2 Ethylglucuronide and Ethylsulfate by Recipe

These reference materials are urine controls or calibrators that have not been manufactured under robust ISO 17034 accredited processes. The mean values have been established at RECIPE, according to the Guideline of the German Medical Association on Quality Assurance (Rili-BAEK), with statistical methods..

Concentration	Description	Part number	Pack size
Ethylglucuronide 96.4 µg/L Ethylsulfate 31.6 µg/L	ClinChek® Urine Control, lyophil., for Ethylglucuronide and Ethylsulfate, Level I	REC-MS8080	10 x 1 mL
Ethylglucuronide 495 µg/L Ethylsulfate 184 µg/L	ClinChek® Urine Control, lyophil., for Ethylglucuronide and Ethylsulfate, Level I	REC-MS8081	10 x 1 mL
Ethylglucuronide 1978 µg/L Ethylsulfate 748 µg/L	ClinChek® Urine Control, lyophil., for Ethylglucuronide and Ethylsulfate, Level III	REC-MS8082	10 x 1 mL

Concentration	Description	Part number	Pack size
SET	ClinChek® Urine Control, lyophil., for Ethylglucuronide and Ethylsulfate, Level I, II, III	REC-MS8083	SET 3 x 3 x 1 mL
Ethylglucuronide 77.8 µg/L Ethylsulfate 25.6 µg/L	ClinCal® Urine Calibrator Set, lyophil., for Ethylglucuronide and Ethylsulfate (Level 0 – 3)	REC-MS8413	SET 4 x 1 x 1 ml
Ethylglucuronide 590 µg/L Ethylsulfate 244 µg/L			
Ethylglucuronide 4771 µg/L Ethylsulfate 1893 µg/L			
Ethylglucuronide 80.3 µg/L Ethylsulfate 26.6 µg/L	ClinCal® Urine Calibrator Set, lyophil., for Ethylglucuronide and Ethylsulfate (Level 0 – 6)	REC-MS8713	SET 7 x 1 x 1 ml
Ethylglucuronide 194 µg/L Ethylsulfate 78.5 µg/L			
Ethylglucuronide 597 µg/L Ethylsulfate 262 µg/L			
Ethylglucuronide 1486 µg/L Ethylsulfate 641 µg/L			
Ethylglucuronide 4897 µg/L Ethylsulfate 2144 µg/L			
Ethylglucuronide 9840 µg/L Ethylsulfate 5289 µg/L			

8.6 Hair reference materials

8.6.1 FAEE and Ethylglucuronide by Medichem

Authentic cut reference material for determination of alcohol consumption markers in hair, manufactured from hair of European alcoholic beverage consumers. The target values have been established within the bounds of the proficiency tests by the Society of Hair Testing SoHT in cooperation with the Federal Institute for Materials Research and Testing (BAM) and MEDICHEM.

CE

Concentration	Description	Part number	Pack size
Ethylglucuronide 27 pg/mg Ethyl myristate 250 pg/ mg Ethyl oleate 1348 pg/mg Ethyl palmitate 483 pg / mg Ethyl stearate 74 pg / mg	Alcohol consumption markers in hair	ME 15HR01VA ME 15HR01VA	1 x 100 mg 1 x 300 mg
Ethylglucuronide 22.9 pg/mg Ethyl myristate 69 pg/ mg Ethyl oleate 867 pg/mg Ethyl palmitate 274 pg / mg Ethyl stearate 132 pg / mg	Alcohol consumption markers in hair	ME 15HR02VA ME 15HR02VA	1 x 100 mg 1 x 300 mg
Ethylglucuronide 50.6 pg/mg Ethyl myristate 394 pg/ mg Ethyl oleate 1718 pg/mg Ethyl palmitate 875 pg / mg Ethyl stearate 231 pg / mg	Alcohol consumption markers in hair	ME 15HR03VA ME 15HR03VA	1 x 100 mg 1 x 300 mg
Ethylglucuronide 82.5 pg/mg Ethyl myristate 54 pg/ mg Ethyl oleate 233 pg/mg Ethyl palmitate 181 pg / mg Ethyl stearate 30 pg / mg	Alcohol consumption markers in hair	ME 15HR04VA ME 15HR04VA	1 x 100 mg 1 x 300 mg
Ethylglucuronide 8.5 pg/mg Ethyl myristate 25 pg/ mg Ethyl oleate 171 pg/mg Ethyl palmitate 108 pg / mg Ethyl stearate 54 pg / mg	Alcohol consumption markers in hair	ME 15HR10VA ME 15HR10VA	1 x 100 mg 1 x 300 mg
Ethylglucuronide 28.8 pg/mg Ethyl myristate 363 pg/ mg Ethyl oleate 1046 pg/mg Ethyl palmitate 571 pg / mg Ethyl stearate 100 pg / mg	Alcohol consumption markers in hair	ME 15HR11VA ME 15HR11VA	1 x 100 mg 1 x 300 mg

8.6.2 Ethylglucuronide by Medichem

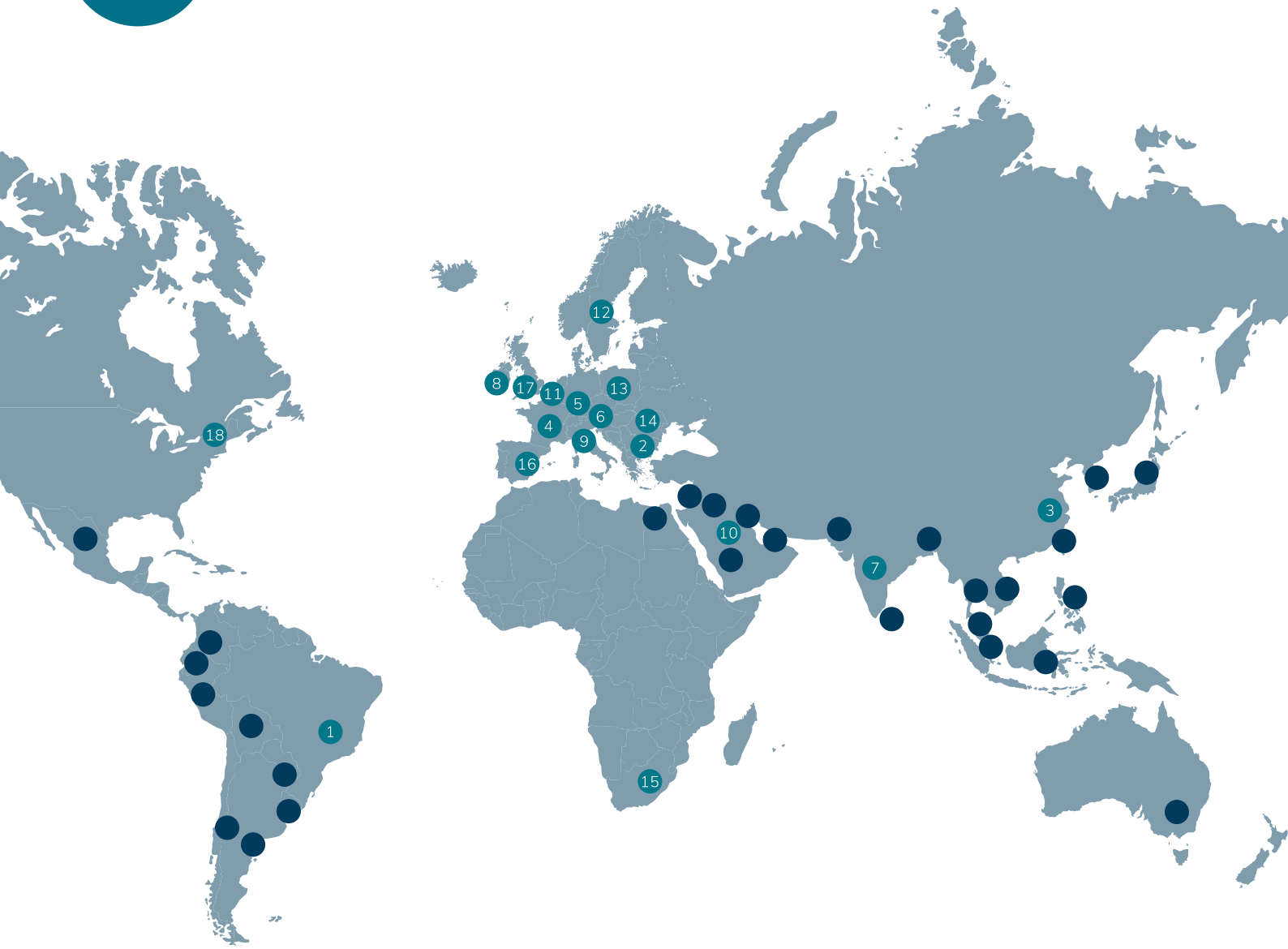
Gravimetrically spiked cut reference material in 11 levels for determination of ethyl glucuronide in hair, prepared from hair of European donors. The reference material is suitable for internal quality control of the determination of ethyl glucuronide in hair.

The gravimetric value has been verified by the BAM Federal Institute for Materials Research and Testing performing multiple determinations. Homogeneity of the samples is controlled under repetitive conditions.

CE

Concentration	Description	Part number	Pack size
Ethylglucuronide 4 pg/mg	Ethylglucuronide in human hair	ME 15HL02VA ME 15HL02VF	1 x 100 mg 10 x 100 mg
Ethylglucuronide 5 pg/mg	Ethylglucuronide in human hair	ME 15HL03VA ME 15HL03VF	1 x 100 mg 10 x 100 mg
Ethylglucuronide 7 pg/mg	Ethylglucuronide in human hair	ME 15HL04VA ME 15HL04VF	1 x 100 mg 10 x 100 mg
Ethylglucuronide 20 pg/mg	Ethylglucuronide in human hair	ME 15HL06VA ME 15HL06VF	1 x 100 mg 10 x 100 mg
Ethylglucuronide 25 pg/mg	Ethylglucuronide in human hair	ME 15HL07VA ME 15HL07VF	1 x 100 mg 10 x 100 mg
Ethylglucuronide 30 pg/mg	Ethylglucuronide in human hair	ME 15HL08VA ME 15HL08VF	1 x 100 mg 10 x 100 mg
Ethylglucuronide 40 pg/mg	Ethylglucuronide in human hair	ME 15HL09VA ME 15HL09VF	1 x 100 mg 10 x 100 mg
Ethylglucuronide 50 pg/mg	Ethylglucuronide in human hair	ME 15HL10VA ME 15HL10VF	1 x 100 mg 10 x 100 mg
Ethylglucuronide 100 pg/mg	Ethylglucuronide in human hair	ME 15HL11VA ME 15HL11VF	1 x 100 mg 10 x 100 mg
Ethylglucuronide 200 pg/mg	Ethylglucuronide in human hair	ME 15HL12VA ME 15HL12VF	1 x 100 mg 10 x 100 mg

Worldwide



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