Clinical applications

Blank matrix materials

Code	Product	Unit
ME 40161	Human whole blood control Native human lyophilised whole blood control (Medidrug Basis-line VB) can be used for base line determination in different applications, as negative control or as dilution medium of concentrated blood from patients.	10 x 2.5 mL
DTI-600-1	OraFlx negative - synthetic saliva	10 mL
DTI-600-2	OraFlx negative - synthetic saliva	1 L
ME 40151	Human serum control Native human lyophilised serum control (Medidrug Basis-line S) can be used for base line determination in different applications, as negative control or as dilution medium of concentrated serum from patients.	10 x 2.5 mL
ME 40201	Human urine control Native human lyophilised urine control (Medidrug Basis-line U) can be used for base line determination in different applications, as negative control or as dilution medium of concentrated urine from patients.	9 x 5 mL
DTI-710	Surine E - synthetic urine for trace metals	1L
DTI-766	Surine negative for blind quality controls	60 mL
CER-720-1	Synthetic urine (Surine TM - negative urine control)	1 L
CER-720-2	Synthetic urine (Surine TM - negative urine control)	50 mL
CER-720-3	Synthetic urine (Surine TM - negative urine control)	5 mL

Coagulation factors

ERM-AD148	Thromboplastin, bovine (OBT/79) The sample is the lyophilised form of an 2.2 g aliquot of bovine brain thromboplastin combined and is intended for prothrombin time determination on blood plasma. It is kept under vacuum in sealed glass ampoules. Parameters of the calibration line Prothrombin time slope..... 1.011 ± 0.015 Prothrombin time intercept..... - 0.321 ± 0.025	amp.
ERM-AD149	Thromboplastin, rabbit The sample is the lyophilised form of an 0.5 mL aliquot of the extract of rabbit brain tissue, without calcium ion added and it is intended for the determination of the prothrombin time in human blood plasma in accordance with the described methodology. It is kept under nitrogen in sealed glass ampoules. Parameters of the regression line Prothrombin time slope..... 1.257 ± 0.013 Prothrombin time intercept..... - 0.242 ±0.019	amp.

Drugs

ERM-AC200	Digoxin This is a pure material which is primarily intended for use as a calibration standard in methods of analysis for digoxin in serum. Digoxin is used clinically to alleviate some of the symptoms of heart failure and to help control heart rate and abnormal heart rhythms. The material was characterised for purity using liquid chromatography with UV detection (LC-UV), and its structural identity confirmed using nuclear magnetic resonance spectroscopy (NMR). Certified for purity > 98%	vial
ERM-AC803	Theophylline This is a pure material which is primarily intended for use as a calibration standard in methods of analysis for theophylline in clinical samples. Theophylline is a bronchodilator used as a treatment for respiratory diseases such as asthma and chronic obstructive pulmonary disease (COPD). The material has been certified by liquid chromatography with diode-array detection (LC-DAD) and differential scanning calorimetry (DSC). LC was carried out on a C18 column with a 94 % water / 6 % acetonitrile mobile phase and detection at 273 nm. DSC was carried out with a heating rate of 1.3 °C/minute. The moisture content was determined by oven-coulometric Karl Fischer titration. Certified for purity > 99%	vial

Drugs in serum

NIST-1599	Anticonvulsant drug level assay standard This material is certified for mass concentrations of two anticonvulsant drugs (valproic acid and carbamazepine) in processed human serum base. It is intended for use in the calibration and standardisation of procedures employed in clinical laboratories for the determination of these drugs in serum. It can also be used for critical evaluation of working or secondary reference solutions prepared either in-house or supplied commercially. This material is supplied as a set of four different freeze-dried preparations, three different mass concentrations and a blank. Analytes — low µg/mL — medium µg/mL — high µg/mL Valproic acid ..... 14.5 ..... 69.1 ..... 142.5 Carbamazepine..... 2.8 ..... 8.8 ..... 19.4	set (4 x 5 mL)
NIST-900	Antiepilepsy drug level assay standard This material is certified for mass concentrations of four antiepilepsy drugs (phenytoin, ethosuximide, phenobarbital and primidone) in a processed human serum base. It is intended for use in the calibration and standardisation of procedures employed in clinical laboratories for the determination of these drugs in serum, and for the critical evaluation of working or secondary reference solutions prepared either in-house or supplied commercially. One set contains four bottles with freeze-dried human serum, including a blank and three different concentration levels. Analytes — toxic µg/mL — therapeutic µg/mL — sub-therapeutic µg/mL Phenytonin ..... 60.7 ..... 16.7 ..... 4.2 Ethosuximide ..... 174.7 ..... 75.9 ..... 11.8 Phenobarbital ..... 103.6 ..... 21.6 ..... 5.3 Primidone ..... 18.6 ..... 8.1 ..... 3.6	set (4 x 5 mL)

Code	Product	Unit
ERM-DA200	Digoxin in human serum These reference materials are intended for use in the validation of new methods, and monitoring the performance of methods commonly used in clinical laboratories to determine the digoxin content of human serum samples. They can also be used in the training and evaluation of staff. They are clinically relevant since they closely match the upper and lower decision levels for digoxin monitoring. Digoxin is used clinically in the treatment of heart problems, and has a very narrow range for therapeutic efficacy. The materials are being certified using isotope-dilution liquid chromatography-tandem mass spectrometry (ID-LC/MS-MS). The method uses exact matching isotope dilution LC-MS, in which the serum is spiked with d3-digoxin and then extracted with tert-butyl methyl ether. Liquid chromatography is conducted using a C18 column and a mobile phase of ethanol / water + 0.1% formic acid. An electrospray interface is utilised and is operated in positive ion mode. Availability – estimated autumn 2008	vial
ERM-DA201	Digoxin in human serum These reference materials are intended for use in the validation of new methods, and monitoring the performance of methods commonly used in clinical laboratories to determine the digoxin content of human serum samples. They can also be used in the training and evaluation of staff. They are clinically relevant since they closely match the upper and lower decision levels for digoxin monitoring. Digoxin is used clinically in the treatment of heart problems, and has a very narrow range for therapeutic efficacy. The materials are being certified using isotope-dilution liquid chromatography-tandem mass spectrometry (ID-LC/MS-MS). The method uses exact matching isotope dilution LC-MS, in which the serum is spiked with d3-digoxin and then extracted with tert-butyl methyl ether. Liquid chromatography is conducted using a C18 column and a mobile phase of ethanol / water + 0.1% formic acid. An electrospray interface is utilised and is operated in positive ion mode. Availability – estimated autumn 2008	vial
Electrolytes		
NIST-915b	Calcium carbonate, clinical This material is intended for use as an analytical standard of known purity. It is intended primarily for use in the calibration and standardization of procedures for calcium (Ca) determinations employed in clinical analysis and for routine critical evaluation of the daily working standards used in these procedures. The certified values for this material are expressed as % mass fractions. Certified value $CaCO_3$ ..... 99.907 ± 0.021 % Ca ..... 40.0104 ± 0.0083 % CO_3 ..... 59.923 ± 0.012 %	20 g
NIST-924A	Lithium carbonate (clinical) This material is intended primarily for use in the calibrations and standardisation of procedures. It is supplied in crystalline form. Certified purity (mass fraction) ..... 99.867 ± 0.017 %	30 g
NIST-929a	Magnesium gluconate dihydrate This material is intended for use as an assay standard for magnesium. The material is highly purified magnesium gluconate dihydrate [$Mg(C_6H_{11}O_7)_2 \cdot 2H_2O$] Certified value (mass fraction) Magnesium ..... 5.362 ± 0.027 %	5 g
NIST-918B	Potassium chloride This material is intended for use as an analytical standard of known purity. It is intended primarily for use in the calibration and standardization of procedures for potassium (K) and chloride (Cl) determinations employed in clinical analysis and for routine critical evaluation of the daily working standards used in these procedures. The certified values for this material are expressed as % mass fractions Certified value KCl ..... 99.927 ± 0.014 % K ..... 52.4121 ± 0.0086 % Cl ..... 47.5284 ± 0.0049 %	30 g
NIST-919B	Sodium chloride This material is intended for the production of saline solutions of accurately known concentration and the calibration of instrumentation and standardization of procedures used in the determination of sodium and chloride ions in clinical analysis. A unit consists of a single glass bottle containing 30 g of the material. The certified values are expressed as % mass fractions. Certified value NaCl ..... 99.835 % ± 0.020 % Cl ..... 60.564 % ± 0.014 % Na ..... 39.2747% ± 0.0075%	30 g
Electrolytes in serum		
BCR-304	Calcium (II), Magnesium (II) and Lithium (I) in human serum Each sample is in lyophilised form equivalent to about 5.3 mL of human serum kept under vacuum in rubber stoppered vials. Amount-of-substance concentration in the reconstituted material Analytes mmol/L Ca ..... 2.201 ± 0.019 Mg ..... 1.85 ± 0.03 Li ..... 0.985 ± 0.029	vial
HEC JCCRM111	Chloride in human serum This material is prepared following NCCLS C29A2 standardization of sodium and potassium ion-selective electrode systems to the flame photometric reference method. Certified values (amount-of-substance concentration) in the range 6.7 to 120.1 mmol/l with corresponding uncertainties of 0.9 to 1.2 mmol/l.	unit

Code	Product	Unit

NIST-956B — Electrolytes in frozen human serum — set (6)

This material is primarily intended for use in the calibration and validation of procedures and methods employed in clinical analysis for the determination of electrolytes in either diluted or undiluted human serum or plasma. It can be used for calibrating direct-reading ion-selective electrode analyzers [1] and for validating secondary reference materials. A unit consists of six sealed ampoules of frozen human serum, two ampoules each of three different concentration levels. Each ampoule contains approximately 2.0 mL of human serum. Certified values for elements at three levels.

Analytes	level 1 mmol/L	level 2 mmol/L	level 3 mmol/L
Ca	2.949	2.456	1.974
Li	1.920	1.207	0.486
Mg	1.522	0.994	0.458
K	5.973	3.983	1.987
Na	120.1	141.0	160.7

NIST-909B — Human serum — set (6x10 mL)

This material is primarily intended for use in evaluating the accuracy of clinical procedures for determination of specified constituents in human serum. It can also be used to validate working or secondary reference materials. A unit consists of six bottles of lyophilised human serum, three bottles each of two different analyte concentration levels and six bottles of deionised, autoclaved water for reconstitution. Certified values for trace metals and other clinical analytes; cholesterol, urea etc. are given in both mmol/L and mmol/L/g.

Analytes	Level 1 mmol/L	Level 2 mmol/L
Calcium	2.218	3.532
Chloride	89.11	119.43
Cholesterol	3.787	6.084
Creatinine	0.05618	0.4674
Lithium	0.6145	2.600
Magnesium	0.7634	1.918
Potassium	3.424	6.278
Sodium	120.76	141.0
Total glycerides	0.949	1.529
Triglycerides	0.804	1.271
Urea	5.51	30.75
Uric acid	0.2809	0.7579
Uncertified (information) values		
ALP	86	410 U/L
LDH	145	480 U/L
ALT	49	150 U/L
AST	43	200 U/L
CK	92	300 U/L
pH	7.9 at 22.6 °C	7.8 at 22.9 °C

Enzymes

BCR-647 — Adenosine deaminase (ADA 1), human — 1 mL

The intended use of the material is to validate, to calibrate or to assess the performance of adenosine deaminase catalytic concentration measurement procedures. The user must confirm that the transfer procedure is satisfactory.
Each sample is in lyophilised form and equivalent to about 1 mL of solution of purified adenosine deaminase (ADA 1) from human erythrocytes. The preparation has been stabilised by incorporation in a matrix of 50 mmol/L Tris/HCl buffer pH = 7.4 and human serum albumin 30 g/L.
No contamination, as assessed by measurement of their catalytic activity, has been detected for the following enzymes : acid phosphatase, acetylcholinesterase, glutamate dehydrogenase, glucose-6-phosphate dehydrogenase and adenosine deaminase isoenzyme2. L-lactate dehydrogenase, alanine aminotransferase and aspartate aminotransferase were found in trace amounts 0.39 %, 0.01 % and 0.09 %, respectively (% of total adenosine deaminase catalytic activity).

Catalytic concentration ... 2.55 ± 0.09 µkat/L

ERM-AD454 — Alanine aminotransferase — amp.

Each sample is in lyophilised form and equivalent to about 1 mL of a solution of purified alanine aminotransferase from pig heart. The material is kept under dry nitrogen in sealed glass ampoules. Catalytic concentration of alanine aminotransferase in reconstituted material as determined by the IFCC method at 37 °C

U/L ... 186 ± 4
µkat/L ... 3.09 ± 0.07

BCR-371 — Alkaline phosphatase — amp.

from pig kidney

Catalytic concentration (IFCC recommended method at 30 °C) of alkaline phosphatase in reconstituted material

U/L ... 254 ± 6
µkat/L ... 4.23 ± 0.10

Each sample is in lyophilised form and equivalent to about 1 mL of a solution of partially purified enzyme, stabilised by incorporation in a matrix of bovine serum albumin. The material is kept under nitrogen gas in sealed glass ampoules.

IRMM/IFCC 456 — alpha-Amylase — amp.

Each sample is in lyophilised form and equivalent to about 1 mL of a solution of a partially purified human pancreatic α-amylase. The material is kept under nitrogen gas in sealed glass ampoules. Catalytic concentration of α-amylase in reconstituted material as determined by the IFCC method at 37 °C

U/L ... 546 ± 19
µkat/L ... 9.1± 0.3

BCR-299 — Creatine kinase (CK-BB Isoenzyme) — amp.

from human placenta

Catalytic concentration (IFCC recommended method) of creatine kinase in reconstituted material

U/l ... 325 ± 10
µkat/l ... 5.42 ± 0.17

Each sample is in lyophilised form and equivalent to about 1 mL of solution of partially purified creatine kinase (CK-BB) from human placenta. The preparation has been stabilised by incorporation in a matrix of bovine serum albumin. The material is kept under nitrogen gas in rubber stoppered vials.

Code	Product	Unit
ERM-AD455	Creatine kinase (CK-MB Isoenzyme) Each sample is in lyophilised form and equivalent to about 1 mL of a solution of purified creatine kinase from human heart. Material is kept under dry nitrogen gas in sealed glass ampoules. Catalytic concentration of creatine kinase-2 (CK-MB) in reconstituted material as determined by the IFCC method at 37 °C U/L ..... 101± 4 µkat/L ..... 1.68 ± 0.07	vial
ERM-AD452	gamma-Glutamyltransferase Each sample is in lyophilised form and equivalent to about 1 mL of a solution of a partially purified pig kidney γ-glutamyltransferase. The material is kept under nitrogen gas in sealed glass ampoules. Catalytic concentration of γ-glutamyltransferase in reconstituted material as determined by the IFCC method at 37 °C U/L ..... 114.1 ± 2.4 µkat/L ..... 1.90 ± 0.04	amp.
ERM-AD453	Lactate dehydrogenase isoenzyme 1 Each sample is in lyophilised form and equivalent to about 1 mL of a solution of purified lactate dehydrogenase from human erythrocytes. The material is kept under dry nitrogen in sealed glass ampoules. Catalytic concentration of lactate dehydrogenase isoenzyme 1 in reconstituted material as determined by the IFCC method at 37 °C U/L ..... 502 ± 7 µkat/L ..... 8.37 ± 0.12	amp.
BCR-693	Lipase (human pancreatic lipase from pancreatic juice) Each sample is in lyophilised form and equivalent to about 1 mL of solution of purified human pancreatic lipase from human pancreatic juice. The preparation has been stabilised by incorporation in a matrix of Tris 20 mmol/L, pH = 7.6 and BSA 40 g/L. No contamination, as assessed by measurement of their catalytic activity, has been detected for the following enzymes: ALP, ALT, α-Amylase, AST, esterase, GGT and LDH. The material is kept under dry nitrogen in neutral clear glass ampoules. Catalytic concentration..... 28.9 ± 1.2 µkat /L	amp.
BCR-694	Lipase (human recombinant pancreatic lipase) Each sample is in lyophilised form and equivalent to about 1 ml of solution of purified recombinant pancreatic lipase from V79-rHPL cell line. The preparation has been stabilised by incorporation in a matrix of Tris 20 mmol/L, pH = 7.6 and BSA 40 g/L. No contamination, as assessed by measurement of their catalytic activity, has been detected for the following enzymes: ALP, ALT, α-Amylase, AST, esterase, GGT and LDH. The material is kept under dry nitrogen in neutral clear glass ampoules. Certified value Catalytic concentration.....17.4 ± 1.0 µkat/L	amp.
BCR-410	Prostatic acid phosphatase from human prostate Each sample is in lyophilised form and equivalent to about 1 mL of a solution of enzyme, stabilised by incorporation in a matrix of human serum albumin. Material is kept under dry nitrogen in sealed glass ampoules. Catalytic concentration of prostatic acid phosphatase in reconstituted material U/L ..... 28 ± 0.7 nkat/L.....0.466 ± 0.012	amp.
Enzymes in serum		
HEC JCERM20327	Lactate dehydrogenase (LDH) in bovine serum albumine Lot No. 003 certified value (catalytic concentration) 398 ± 5 U/l	unit
Metabolites and substrates		
NIST-927D	Bovine serum albumin (7% solution) This material is intended primarily for use in the standardization of procedures employed in clinical analyses for total serum protein, for critical evaluation of daily working standards used in these procedures, and as a reference standard for assays of total protein by colorimetric methods. It is a solution (mass fraction 7 %) of known protein concentration and purity. The protein content of this material was determined using the biuret reference method that is recommended for use in standardizing laboratory-prepared protein solutions and "normal" serum pools. In addition to the measurement using the biuret method, NIST made measurements of the bovine serum albumine (BSA) concentration using amino acid analysis. A unit consists of 10 ampoules each containing 2.1 mL of solution. Certified bovine serum albumine concentration by amino acid analysis BSA concentration ..... 65.41 g/L ± 0.82 g/L Reference total protein concentration by the biuret method Protein concentration ..... 70.10 g/L ± 0.74 g/L	(10 x 2.1mL)
NIST-2389	Amino acids mixture This material is a solution of 17 amino acids in a 0.1 mol/L aqueous solution of hydrochloric acid. It is intended primarily for the use in calibration of chromatographic instrumentation for the determination of amino acids. A unit of consists of five 2 mL ampoules each containing approximately 1.2 mL of the solution. Alanine ..... 2.51 ± 0.09 Arginine ..... 2.94 ± 0.14 Aspartic acid ..... 2.50 ± 0.09 Cystine ..... 1.16 ± 0.04 Glutamic acid ..... 2.47 ± 0.08 Glycine ..... 2.45 ± 0.08 Histidine ..... 2.83 ± 0.11 Isoleucine ..... 2.39 ± 0.07 Leucine ..... 2.48 ± 0.09 Lysine ..... 2.47 ± 0.10 Methionine ..... 2.43 ± 0.09 Phenylalanine ..... 2.44 ± 0.08 Proline ..... 2.44 ± 0.09 Serine ..... 2.43 ± 0.09 Threonine ..... 2.39 ± 0.08 Tyrosine ..... 2.47 ± 0.09 Valine ..... 2.44 ± 0.08	set (5 x 2 mL)
NIST-916A	Bilirubin This material consists of a sample of unconjugated bilirubin primarily intended for the use in determination of bilirubin. Bilirubin ..... 98.3 ± 0.3 %	100 mg
NIST-911C	Cholesterol This material is intended primarily for use in the calibration and standardization of procedures for the determination of cholesterol in clinical samples and for routine evaluations of daily working standards used in these procedures. A unit consists of 2 g of material. Certified purity (mass fraction) ..... 99.2 ± 0.4 %	2 g

Code	Product	Unit
NCS ZC76020B	Cholesterol Certified purity..... 99.7 ± 0.1 %	300 mg
NMIJ CRM6001-9	Cholesterol This material is intended for the use in calibration of analytical instruments and validation of analytical techniques and instruments. Each unit contains 1 g of high purity cholesterol filled in amber borosilicate glass vials and an aluminized bag with argon gas. Certified purity (mass fraction)..... 99.9 ± 0.1 %	1 g
NIST-RM 8444	Cotinine in human urine This standard is intended primarily for use in validating methods for the determination of Cotinine in human urine. One set consists of four vials, each containing Cotinine in 5 ml human urine, which has been freeze dried. Two vials are "blank" concentration levels, typical for non-smokers without exposure to cigarette smoke; one vial is a "low" concentration level corresponding to non-smokers with passive exposure to side-stream smoke; and one vial is a "high" level, typical of smokers. Analyte — blank ng/mL — low ng/mL — high ng/mL Cotinine..... 0.8 ..... 54 488	4 x 5 mL
NIST-914A	Creatinine This material is intended primarily for use in the calibration and standardisation of procedures used for determination of creatinine. Creatinine..... 99.7 ± 0.3 %	10 g
ME 70002	Ethyl-ß-D-6-glucuronide	2 mg
ME 70010	Ethyl-ß-D-6-glucuronide	10 mg
ME 70502	Ethyl-ß-D-6-glucuronide-D5	2 mg
ME 70510	Ethyl-ß-D-6-glucuronide-D5	10 mg
NIST-917B	D-Glucose (dextrose, clinical) This material is intended primarily for use in the calibration and standardisation of procedures for glucose determinations. Certified purity (mass fraction)..... 99.7 ± 0.2 % α-D-Glucopyranose (mass fraction)..... 96.7 ± 0.2 % β-D- Glucopyranose (mass fraction)..... 3.0 ± 0.2 %	50 g
CEN DMR-190	Glucose in powder This material is used for analytical calibration as well as method validation in high performance liquid chromatography with refraction index detector and electrochemical detector employed in glucose measurements. Each unit contains 15 g of glucose in crystals in a transparent glass bottle as a calibrant for quantified glucose. Purity..... 99.40 %	15 g
NIST-925	4-Hydroxy-3-methoxy-DL-mandelic acid (VMA), clinical Certified purity..... 99.4 %	1 g
NIST-1595	Tripalmitin This material is intended primarily for use in the calibration and standardisation of procedures for the chemical analysis of serum for triglycerides, and for the critical evaluation of routine working or secondary reference materials used in these procedures. Certified purity (mass fraction)..... 99.5 ± 0.2 %	2 g
NIST-912A	Urea This material is intended primarily for calibrating apparatus and validating methods. Certified purity (mass fraction)..... 99.9 ± 0.1 wt% Moisture ..... 0.02 ± 0.003 wt% Biuret..... 0.02 ± 0.02 wt% Ash..... 0.001 ± 0.0007 wt% Insoluble matter ..... 0.0001 ± 0.00005 wt%	25 g
NCS ZC76009	Urea Certified purity..... 99.9 ± 0.2 %	6 g
NIST-913A	Uric acid This material is intended primarily for uric acid determinations. Certified purity (mass fraction)..... 99.6 ± 0.1%	10 g
NCS ZC76010	Uric acid Purity..... 99.8 %	400 mg

Metabolites and substrates in serum

NIST-1952A	Cholesterol in human serum This material is intended for use in evaluating the accuracy of clinical procedures for the determination of cholesterol in serum, in calibrating instruments and equipment used in these procedures and in validating working or secondary standards. It consists of six vials of freeze-dried serum, two each of three different cholesterol levels. Concentrations are also given in mg/dL/g. Analyte — low — medium — high Cholesterol (mmol·L^{-1}·g^{-1}) ..... 13.89 ..... 21.29 ..... 28.91	set (6)
HEC JCCRM211	Cholesterol in human serum Certified values (amount-of-substance concentration) in the range 5.307 to 6.786 mmol/l with corresponding uncertainties of 0.023 to 0.031 mmol/l.	unit

Code	Product	Unit
NIST-968C	Fat soluble cholesterol and vitamins in human serum This material is intended for use in validating methods for determining fat-soluble vitamins, carotenoids, and cholesterol in human serum and plasma. It can also be used for quality assurance when assigning values to in-house control material for these constituents. A unit consists of two vials of lyophilised human serum, one vial at each of two different concentration levels. Analytes: level I µg/mL; level II µg/mL *trans*-retinol: 0.841; 0.484 δ-Tocopherol: 0.131; 0.527 γ-Tocopherol: 3.90; 1.56 α-Tocopherol: 7.47; 16.79 *trans*-β-carotene: 0.157; 0.391 Total β-carotene: 0.171; 0.436 Cholesterol: 1335; 1669	set (2)
NIST-967	Creatinine in frozen in human serum This material is intended primarily for use in evaluating the accuracy of procedures for the determination of creatinine in human serum and also for use in validating working or secondary reference materials. A unit consists of four stoppered ampoules of frozen human serum, two ampoules each at two different creatinine concentration levels. One level corresponds to the normal range of serum creatinine levels, and the second level is intended to correspond to levels found in chronic kidney desease. Each ampoule contains 1.0 mL of human serum. Concentrations: mmol/L Level I: 0.0665 ± 0.0019 Level II: 0.3462 ± 0.0073	set (4)
ERM-DA252	Creatinine in frozen human serum (low level) The material is intended for use in the validation and ongoing monitoring of methods of analysis for the determination of creatinine in human blood samples. Each units consists of 1 ml of human serum in a screw-cap plastic vial. Constituent: certified value Creatinine: 3.1 ± 0.2 mg/kg (Available in autumn 2008)	vial
ERM-DA253	Creatinine in frozen human serum (high level) The material is intended for use in the validation and ongoing monitoring of methods of analysis for the determination of creatinine in human blood samples. Each units consists of 1 ml of human serum in a screw-cap plastic vial. Constituent: certified value Creatinine: 50 ± 1.4 mg/kg (Available in autumn 2008)	vial
BCR-573	Creatinine in human serum (low) Each sample is the lyophilised form of approximately 1 mL portion of serum, with no additives. The mass of the lyophilised material contained in the ampoule is about 0.09 g. Amount-of-substance concentration (µmol/L): 68.7 ± 1.4	0.9 g
BCR-574	Creatinine in human serum (medium) Each sample is the lyophilised form of approximately 1 mL portion of serum, spiked with no further additives. The mass of the lyophilised material contained in the ampoule is about 0.09 g. Amount-of-substance concentration (µmol/L): 105.0 ± 1.3	0.9 g
BCR-575	Creatinine in human serum (high) Each sample is the lyophilised form of approximately 1 mL portion of serum spiked with exogenous creatine, with no further additives. The mass of the lyophilised material contained in the ampoule is about 0.09 g. Amount-of-substance concentration: 404.1 ± 7.1µmol/L	0.9 g
BCR-573I	Set of creatinine interfering substances The set consists of three vials with lyophilised solutions. - 0.025 mg calcium dobesilate / 1.2 cefoxitin - 0.044 mg sodium pyruvate - 0.108 mg bilirubin ditaurate	3 vials
ME 41055	Ethylglucuronide in human serum (Medidrug ETG 1/05-A S-plus) Lyophilised serum control prepared from human serum for accuracy and precision monitoring of ethylglucuronide determinations in serum. The reference value ranges were established by institutions of forensic medicine within the bounds of external proficiency testing by the GTFCh (Association of Toxicological and Forensic Chemistry) reference value Ethylglucuronide: 1.7 mg/L	10 x 2.5 mL
ME 41056	Ethylglucuronide in human serum (Medidrug ETG 2/05-A S-plus) Lyophilised serum control prepared from human serum for accuracy and precision monitoring of ethylglucuronide determinations in serum. The reference value ranges were established by institutions of forensic medicine within the bounds of external proficiency testing by the GTFCh (Association of Toxicological and Forensic Chemistry) reference value Ethylglucuronide: 0.91 mg/L	10 x 2.5 mL
NIST-965A	Glucose in frozen human serum This material is intended primarily for use in evaluating the accuracy of procedures for the determination of glucose in human serum and for use in validating working or secondary reference materials. A unit consists of eight flame sealed ampoules of frozen human serum, two ampoules at each of three different glucose concentration levels. level 1; level 2; level 3 Glucose: 5.680; 11.097; 16.355 mmol/L	unit

Code	Product	Unit
HEC JCCRM521	Glucose in human serum Certified values (mass concentration) in the range 73.9 to 239 mg/l with corresponding uncertainties of 0.5 to 1.7 mg/l.	unit
NIST-1955	Homocysteine and folate in frozen human serum This material is intended primarily for use in evaluating the accuracy of clinical procedures for the determination of homocysteine and folate (in various forms) in human serum. It is also intended for use in validating working or secondary reference materials. A unit consists of three bottles of frozen human serum, each of three concentration levels. Each bottle contains 1 mL of human serum. Certified values (amount-of-substance concentration and mass concentration): Concentration levels for Homocysteine µmol/L — µg/mL Level I ... 3.98 ± 0.18 ... 0.538 ± 0.024 Level II ... 8.85 ± 0.60 ... 1.196 ± 0.082 Level III ... 17.7 ± 1.1 ... 2.39 ± 0.15 Concentration levels for 5-Methyltetrahydrofolic acid nmol/L — ng/mL Level I ... 4.26 ± 0.25 ... 1.96 ± 0.12 Level II ... 9.73 ± 0.24 ... 4.47 ± 0.11 Level III ... 37.1 ± 1.4 ... 17.03 ± 0.64 a	unit (3)
NIST-1951B	Lipids in frozen human serum This material is intended primarily for use in evaluating the accuracy of clinical procedures for the determination of total cholesterol, HDL-cholesterol, LDL-cholesterol, and triglycerides (both total glyceride species and triglycerides only) in human serum. It is also intended for use in validating working or secondary reference materials. A unit consists of four bottles of frozen human serum, two bottles each of two different analyte concentration levels. Each bottle contains 1 mL of human serum. Concentrations are also given in mg/dL. Analyte — level I — level II Total Cholesterol ... 4.804 ± 0.014 ... 6.895 ± 0.022 mmol/L Total Glycerides ... 1.370 ± 0.015 ... 2.988 ± 0.036 mmol/L Triglycerides only ... 1.208 ± 0.013 ... 2.700 ± 0.027mmol/L	unit (4 x 1mL)
CEN DMR-263A	Metabolites and substrates in frozen human serum (creatinine, cholesterol, glucose, urea, uric acid) This material is intended for the calibration and validation of clinical procedures, and for preparation of secondary reference materials. It can also be used in calibration and validation of glucose procedures based on high performance liquid chromatography with refraction index and electrochemical detection. Each unit consists of one cryogenic vial of 1 mL serum. Certified values: Analytes Glucose ... 82,9 mg/dL Cholesterol ... 159,73 mg/dL Creatinine ... 0,7512 mg/dL Uric acid ... 5,21 mg/dL Urea ... 27,07 mg/dL	unit
SERO100205	Seronorm Lipid (serum control for clinical chemistry) Animal assayed serum for the accuray control of lipid analyses. It is a stable freeze-dried all animal control serum providing analytical data for major lipid components. Each batch is supplied with a data key providing reference and analytical values for each component. The component levels are on the borderline between normal and pathological range. The analytical data are elaborated in collaboration with independent laboratories using reference or well accepted methods. The components are: - Bile acids - Cholesterol, total - HDL-cholesterol - LDL-cholesterol - Phospholipids - Triglycerides - Fatty acid composition of phospholipids and total lipids (palmitic acid, palmitoleic acid, stearic acid, oleic acid, linoleic acid, linolenic acid, dihomogammalinol acid, arachidonic acid, timnodonic acid, docosapentaenoic acid, docosahexaenoic acid, phytanic acid).	12 x 3mL
HEC JCCRM223	Triglycerides in human serum Certified values (amount-of-substance concentration) in the range 1.04 mmol/l to 2.64 mmol/l with corresponding uncertainties of 0.03 to 0.07 mmol/l.	unit
HEC JCCLS021	Uric acid in fresh human serum This set of three materials are primarily intended for use in evaluating reference methods for determining uric acid in human serum, and in validation of secondary reference materials. It is certified for uric acid at three concentration levels. The higher levels were prepared by adding high purity creatinine, uric acid and glucose into the low level fresh pooled human serum. Certified values: Medium concentration — High concentraion — Abnormally high concentration 4.342 ± 0.010 mg/dl ... 7.496 ± 0.017 mg/dl ... 10.71 ± 0.03 mg/dl 0.2583 ± 0.0006 mmol/l ... 0.4460 ± 0.0010 mmol/l ... 0.6374 ± 0.0014 mmol/l	unit

Molecular biology products

NIST-2372	Human DNA quantitation standard This material is intended primarily for use in the value assignment of human genomic deoxyribonucleic acid (DNA) forensic quantitation materials. NIST-2372 consists of three well-characterized human genomic DNA materials solubilized in 10 mmol/L Tris HCl and 0.1 mmol/L disodium EDTA) using deionized water adjusted to pH 8.0 (TE-4, pH 8.0 buffer). The three component genomic DNA materials, labeled A, B, and C, are respectively derived from a single male donor, multiple female donors, and multiple male and female donors. Each unit of NIST-2372 consists of one sterile 2-mL vial of each component, each vial containing approximately 110 ¼L of DNA solution. Certified values for decadic attenuance (D10) are provided for the three components at five wavelengths. Information values for the conventional DNA mass concentrations are also provided. Certfied value Wavelength (nm) — Component A — Component B — Component C 230 ... 0.458 ± 0.024 ... 0.445 ± 0.024 ... 0.446 ± 0.025 260 ... 1.049 ± 0.017 ... 1.073 ± 0.031 ... 1.086 ± 0.018 270 ... 0.859 ± 0.016 ... 0.875 ± 0.021 ... 0.893 ± 0.016 280 ... 0.562 ± 0.014 ... 0.571 ± 0.016 ... 0.585 ± 0.015 330 ... 0.005 + 0.006 - 0.005 ... 0.005 ± 0.005 ... 0.005 + 0.009 - 0.005	set (3 x 1 each)

Code	Product	Unit
NIST-2390	DNA profiling standard This material is intended for (1) standardization of forensic and paternity quality assurance procedures for Restriction Fragment Length Polymorphisms (RFLP) testing using HaeIII restriction enzymes, and (2) instructional law enforcement or nonclinical research purposes. It is not intended for any human/animal clinical diagnostic use. This new certificate of the material updates the band size values of the original SRM 2390 certification to reflect the evolution of forensic practice from 1991 to 1998. Each unit consists of 20 components. Quantitative allelic band sizes are provided for human DNA from two sources: (1) the female cell line K562, and (2) the male source "TAW." Three different forms of material from the two sources are provided: (1) cell pellet, (2) extracted genomic DNA, and (3) a HaeIII restriction digest "pre-cut" DNA. The remaining components are well-characterized consumable materials required for qualitative evaluation of the HaeIII RFLP measurement process. These components include standards for quantifying extracted DNA by use of yield gels, a DNA ladder for band size determination, materials for labeling the DNA size ladder, a viral DNA marker for assessment of electrophoretic separation, and agarose that is compatible with all DNA components.	set
NIST-2391B	PCR based DNA profiling This material is intended primarily for use in the standardization of forensic and paternity quality assurance procedures for Polymerase Chain Reaction (PCR)-based genetic testing and for instructional law enforcement or non-clinical research purposes. This material can also be used for quality assurance when assigning values to in-house control materials. It is not intended for any human or animal clinical diagnostic use. Note that NIST-2391b is slightly modified from NIST-2391, in that there is more emphasis on Short Tandem Repeats (STRs) and less emphasis on D1S80 [1,2] reflecting the growing interest and utility of STRs. It is composed of well-characterized human deoxyribonucleic acid (DNA) in two forms: genomic DNA and DNA to be extracted from cells spotted onto filter paper. Each unit is composed of 12 frozen components packaged in one box.	set (12)
NIST-2392	Mitochondrial DNA sequencing This material is intended to provide quality control when performing the polymerase chain reaction (PCR) and sequencing of human mitochondrial DNA (mtDNA) for forensic identifications, medical diagnosis, or mutation detection. It may also be used as a control when amplifying (PCR) and sequencing any DNA. It can also be used for quality assurance when assigning values to in-house control materials. It is certified for the sequences of the entire human mtDNA (16 569 base pairs) from two lymphoblastoid cell culture lines (CHR and GM09947A) from apparently normal individuals, plus the cloned HV1 region of CHR containing a C-stretch which is difficult to sequence. The SRM is packaged in a single box containing three components: (1) extracted DNA from cell culture line CHR (tube contains 60 µL of DNA at a concentration of 1 ng/µL); (2) extracted DNA from cell culture line GM09947A (tube contains 60 µL of DNA at a concentration of 1 ng/µL); and (3) cloned DNA from the CHR HV1 region containing the C-stretch (tube contains 10 µL of DNA at a concentration of 100 ng/µL).	box (3)
NIST-2392-I	Mitochondrial DNA sequencing (Human HL-60 DNA) This material is intended to provide quality control when performing the polymerase chain reaction (PCR) and sequencing of human mitochondrial DNA (mtDNA) for forensic identification, medical diagnosis, or mutation detection. It may also serve as a control when amplifying (PCR) and sequencing any DNA. it can also be used for quality assurance when assigning values to in-house control materials. It is certified for the sequences of the entire human mtDNA (16 569 base pairs) from a promyelocytic cell line (HL-60) prepared from the peripheral blood leukocytes from an individual with acute promyelocytic leukemia. Each unit consists of 65 µL of extracted DNA from cell culture line HL-60 at a nominal concentration of 1.4 ng/µL, which is contained in a vial packaged in a protective plastic box. For details please ask for the data sheet.	box
NIST-2394	Heteroplasmic Mitochondrial DNA Mutation Detection Standard (set of 10 tubes) This material is composed of human mitochondrial DNA mixtures which simulate different levels of heteroplasmy and is intended to provide quality control benchmarks for forensic, medical, and DNA scientists to assess the detection sensitivity of low-frequency mutations, single nucleotide polymorphisms (SNPs) in either mitochondrial DNA (mtDNA) or in pooled nuclear DNA samples, or heteroplasmic sites in mtDNA. The product is packaged in a single protective plastic box containing ten tubes: one tube containing the 100 % (by mass) polymorphic DNA, one tube containing the 100 % (by mass) CRS DNA, and eight tubes containing different mass percentages of the polymorphic/CRS mtDNA mixtures (mass % polymorphic levels are 1 %, 2.5 %, 5 %, 10 %, 20 %, 30 %, 40 % and 50 %). Each vial contains 25 µL of DNA at a concentration of 8 ng/µL in 10 mM Tris-HCl, pH 8.5.	set (10)
NIST-2395	Human Y-Chromosome DNA Profiling Standard This material is intended primarily for use in the standardization of forensic and paternity quality assurance procedures for Polymerase Chain Reaction (PCR)-based genetic testing and for instructional law enforcement or non-clinical research purposes that involve the human Y-chromosome. It can also be used for quality assurance when assigning values to in-house control materials. It is not intended for any human or animal clinical diagnostic use. It is composed of well-characterized human genomic deoxyribonucleic acid (DNA) in liquid form. Each unit is composed of 6 frozen components packaged in one box, five male samples and one female sample.	box (6)
NIST-2396	Oxidative DNA Damage Mass Spectrometry Standard (set of 12 vials) This material is intended for use in the measurement of oxidative DNA damage by gas chromatography/mass spectrometry (GC/MS), and liquid chromatography/mass spectrometry (LC/MS), using the isotope-dilution technique for quantification in both cases. Each unit is a set of twelve stable isotope-labeled components (ten analogues of oxidatively modified DNA bases, one analog of an oxidatively modified nucleoside and one analog of a normal DNA nucleoside) contained in a protective plastic box. Each vial of contains 0.2 mL of a designated component at a specified concentration.	set (12)
NIST-2399	Fragile X Human DNA Triplet Repeat Standard This material is intended to provide quality control by serving as a positive control to clinical laboratories that test human samples for Fragile X and who need to determine the number of CGG trinucleotide repeats present in samples. It is composed of human deoxyribonucleic acid (DNA) from fragile X cell lines or patient samples that have been amplified using polymerase chain reaction (PCR) techniques. Each unit consists of a single box containing 9 vials, designated A through I. Each vial contains 20 µL of a frozen PCR product with a different number of CGG repeats suspended in a buffer (10 mM Tris-Cl pH 8.5). The American College of Medical Genetics Guidelines requires a positive control for all genetic testing. In addition to medical diagnoses, the ability to detect the correct number of triplet repeats will help in genetic counseling and genetic research in the area of triplet repeats.NIST-2399 will also help to ensure the accuracy and comparability of results from different laboratories.	set (9)
IRMM/IFCC-490	PLASMID DNA for prothrombin wildtype (homozygous) This material is intended to be used as a negative control material (wildtype sequence) in PCR reactions for the identification of the Factor II (prothrombin) G20210A mutation by diagnostic PCR-derived methods. Each polypropylene vial contains approximately 1 ng plasmid DNA (pIRMM-0001) in a volume of 50 µL of a Tris/EDTA solution (10 mmol/L Tris, 1 mmol/L EDTA, pH 8.0). This solution was obtained after dilution of the stock of 1390 ± 29 µg/mL (concentration ± standard deviation) in Tris/EDTA buffer. The plasmid pIRMM-0001 is a pUC18 vector containing a 609-bp fragment of the human prothrombin gene from nucleotide 26302 to nucleotide 26910 (wildtype sequence) in the GeneBank database (accession number M17262). Certified property: $p < 3 \times 10^{-6}$	vial

Code	Product	Unit
IRMM/IFCC-491	PLASMID DNA for prothrombin mutation (homozygous) Each polypropylene vial contains approximately 1 ng plasmid DNA (pIRMM-0002) in a volume of 50 µL of a Tris/EDTA solution (10 mmol/L Tris, 1 mmol/L EDTA, pH 8.0). This solution was obtained after dilution of the stock of 1823 ± 29 µg/mL (concentration ± standard deviation) in Tris/EDTA buffer. The plasmid pIRMM-0002 is a pUC18 vector containing a 609-bp fragment of the human prothrombin gene from nucleotide 26302 to nucleotide 26910 (G->A point mutation at position 26784 in the GeneBank database (accession number M17262)). Another point mutation (A->G) is present at position 26628, but does not influence the genotyping. Certified property: $p < 3 \times 10^{-5}$	vial
IRMM/IFCC-492	PLASMID DNA for prothrombin mutation (homozygous) Each polypropylene vial contains approximately 1 ng plasmid DNA (pIRMM-0001 and pIRMM-0002) in a volume of 50 µL of a Tris/EDTA solution (10 mmol/L Tris, 1 mmol/L EDTA, pH 8.0). This solution was obtained after dilution of the stocks (concentration ± standard deviation) of IRMM/IFCC-490 of 1390 ± 29 µg/mL and IRMM/IFCC-491 of 1823 ± 29 µg/mL in Tris/EDTA buffer. The plasmids pIRMM-0001 and pIRMM-0002 are pUC18 vectors containing a 609-bp fragment of the human prothrombin gene from nucleotide 26302 to nucleotide 26910 in the GeneBank database (accession number M17262). They were mixed in equal volumes of identical mass concentrations (wildtype and G20210A point mutation sequences) to mimic a heterozygous control. Certified property: $p < 3 \times 10^{-5}$	vial

Non-electrolyte metals

NIST-937	Iron metal (clinical) This material is intended for use as an assay standard for iron. It is provided in the form of chips sized between 0.5 mm and 1.8 mm mesh. Certified purity (mass fraction) ..... 99.90 ± 0.02 %	50 g
NIST-928	Lead nitrate (clinical) This material is certified for use as an assay standard for lead. Certified purity (mass fraction) ..... 100.00 ± 0.03 %	30 g

Non-electrolyte metals in blood

NIST-955C	Lead in caprine blood This material is intended primarily for use in evaluating the accuracy of lead concentration determinations in blood and for use in validating working or secondary reference materials for lead in blood analysis. A unit consists of four vials of frozen caprine blood at four concentration levels: a base level and three progressively elevated levels that contain endogenous lead and spiked inorganic arsenic, cadmium, inorganic mercury, methylmercury, and ethylmercury. Certified values are provided for lead. Each vial contains approximately 2 mL of whole blood. Certified concentration — Lead (µg/dL) — Lead (µmol/L) Level 1 ..... 0.424 ± 0.011 ..... 0.02047 ± 0.00053 Level 2 ..... 13.950 ± 0.080 ..... 0.6733 ± 0.0038 Level 3 ..... 27.76 ± 0.16 ..... 1.3400 ± 0.0076 Level 4 ..... 45.53 ± 0.27 ..... 2.198 ± 0.013	set (4 x 2 mL)
ERM-CE194	Lead and cadmium in bovine blood, low level Each sample is in lyophilised form equivalent to about 5.75 mL of bovine blood with additives, kept under nitrogen in rubber stoppered vials. Mass concentration in the reconstituted material Analytes Pb ..... 126 ± 4 µg/L Cd ..... 0.20 ± 0.05 µg/L	amp.
ERM-CE195	Lead and cadmium in bovine blood, medium level Each sample is in lyophilised form equivalent to about 5.75 mL of bovine blood with additives, kept under nitrogen in rubber stoppered vials. Mass concentration in the reconstituted material Analytes Pb ..... 416 ± 9 µg/L Cd ..... 5.06 ± 0.15 µg/L	amp.
ERM-CE196	Lead and cadmium in bovine blood, high level Each sample is in lyophilised form equivalent to about 5.75 mL of bovine blood with additives, kept under nitrogen in rubber stoppered vials. Mass concentration in the reconstituted material Analytes Pb ..... 772 ± 11 µg/L Cd ..... 12.33 ± 0.20 µg/L	amp.
BCR-634	Lead and cadmium in reconstituted human blood (low) The material is supplied in lyophilised form in brown glass vials. Sodium-EDTA was used as anticoagulant. No other preservatives were added. The content of a vial is approximately 0.6 g dry matter with residual moisture content less than 2 % and equivalent to 3.0 mL of fresh whole blood. This material was produced from blood from healthy Danish blood donors. Each portion of blood was tested negative for Anti-HIV-1&2, Anti-HCV and Anti-HTLV-I&II. However, as all biological material of human origin the blood should be treated as contagious material. Analytes — mass concentration Cd ..... 1.4 µg/L Pb ..... 46 µg/L	vial
BCR-635	Lead and cadmium in reconstituted human blood (medium) The material is supplied in lyophilised form in brown glass vials. Sodium-EDTA was used as anticoagulant. No other preservatives were added. The content of a vial is approximately 0.6 g dry matter with residual moisture content less than 2 % and equivalent to 3.0 mL of fresh whole blood. This material was produced from blood from healthy Danish blood donors. Each portion of blood was tested negative for Anti-HIV-1&2, Anti-HCV and Anti-HTLV-I&II. However, as all biological material of human origin the blood should be treated as contagious material. Analytes — mass concentration Cd ..... 6.6 µg/L Pb ..... 210 µg/L	vial

Code	Product	Unit
BCR-636	Lead and cadmium in reconstituted human blood (high) The material is supplied in lyophilised form in brown glass vials. Sodium-EDTA was used as anticoagulant. No other preservatives were added. The content of a vial is approximately 0.6 g dry matter with residual moisture content less than 2 % and equivalent to 3.0 mL of fresh whole blood. This material was produced from blood from healthy Danish blood donors. Each portion of blood was tested negative for Anti-HIV-1&2, Anti-HCV and Anti-HTLV-I&II. However, as all biological material of human origin the blood should be treated as contagious material. Analytes — mass concentration Cd — 11.6 µg/L Pb — $0.52 \cdot 10^3$ µg/L	vial
NIST-966	Toxic metals in blood This material is intended for use in evaluating the accuracy of lead, cadmium and total mercury concentration determinations in whole blood. It can also be used for validating analytical methods and for providing traceability to working or secondary blood reference materials containing these constituents. It contains frozen whole bovine blood with below mentioned components at two concentration levels. Analytes — level 1 — level 2 Pb — 1.56 — 25.27 µg/dL Cd — 0.032 — 5.22 µg/L Hg (total) — 0.0445 — 31.4 µg/L	unit

Non-electrolyte metals in urine

NIST-2672A	Mercury in urine This material is intended primarily for use as an analytical standard for the determination of mercury in urine. It consists of four bottles of freeze-dried urine containing mercury, two bottles each at low and elevated levels. Certified values after reconstitution low level — elevated level Hg — (0.002) — 0.105 mg/L	set (4)
NIST-2670A	Toxic elements in freeze dried urine This material is primarily intended for use in evaluating the accuracy of clinical methods and for the calibration of apparatus used to determine the concentration of toxic metals and other elements in human urine or similar matrices. It can also be used to validate working or secondary reference materials. It consists of four bottles of freeze-dried urine, two bottles each at the low and high levels. The low level urine was prepared from human urine that was lyophilised after pooling and centrifugation. The high level urine was prepared by spiking an aliquot of the pooled and homogenized low-level urine with selected metals, followed by lyophilisation. Due to the centrifugation (which improved sample homogeneity), neither level represents a fresh urine pool from a normal human population. Analytes — low — elevated level Antimony — 0.971 — 0.824 µg/L Cadmium — 0.0591 — 4.862 µg/L Cesium — 1.075 — 1.085 µg/L Cobalt — 0.166 — 51.2 µg/L Iodine — 88.2 — 88.2 µg/L Lead — 0.49 — 233.2 µg/L Mercury — 0.0663 — 95.1 µg/L Manganese — — 99 µg/L Molybdenum — — 114.1 µg/L Platinum — — 51.5 µg/L Selenium — — 229.5 µg/L Thallium — 0.0162 — 5.417 µg/L Thorium — 0.0053 — 0.01606 µg/L Uranium — 0.1020 — 4.997 µg/L	set (4 x 20 mL)

Non-peptide hormones

NIST-921	Cortisol (hydrocortisone) This material is intended primarily for use in the calibration and standardisation of procedures for cortisol determinations employed in clinical analysis and for routine evaluation of the daily working standards used in these procedures. Analyte Cortisol (hydrocortisone) — 98.9 ± 0.2 %	1 g
IRMM-468	Thyroxine (T4) The material can be used as a calibrant by manufacturers and laboratories, e.g. for the preparation of lower order reference materials and for validation studies. The material consists of an off-white cristalline powder in an amber glass vial sealed under N_2 atmosphere. Each vial contains about 100 mg of the powder. Certified value (mass fraction) — 98.6 ± 0.7 %	vial
IRMM-469	3,3',5 Triiodothyronine (T3) The material can be used as a calibrant by manufacturers and laboratories, e.g. for the preparation of lower order reference materials and for validation studies. The material consists of an off-white cristalline powder in an amber glass vial sealed under N_2 atmosphere. Each vial contains about 100 mg of the powder. Certified value (mass fraction) — 91.1 ± 0.7 %	vial

Non-peptide hormones in serum

ERM-DA192	Cortisol in human serum (unspiked) Each sample is the lyophilised form of a 1.25 mL portion of serum without additives kept under nitrogen in sealed glass ampoules. Cortisol concentration in the reconstituted material µg/L — 98.8 ± 2.0 nmol/L — 273 ± 6	amp.
ERM-DA193	Cortisol in human serum (spiked) Each sample is the lyophilised form of a 1.25 mL portion of serum without additives kept under nitrogen in sealed glass ampoules. Cortisol concentration in the reconstituted material µg/L — 277 ± 5 nmol/L — 763 ± 14	amp.

Code	Product	Unit
ERM-DA451	Cortisol reference serum panel of fresh frozen human sera The panel is primarily intended for use in evaluation/verification of in vitro test systems for serum cortisol by method comparison with the ID-GC/MS method (for an appropriate measurement protocol, see full report). The results shall be described by linear regression/bias plot and interpreted in terms of sensitivity, specificity and metrologically correct measurement (trueness). The method comparison will also be used to investigate the suitability of the panel for recalibration of a test system. IRMM/IFCC-451 is a reference serum panel consisting of 34 vials originating from native single-donations that does not contain any additives. It is available in the form of screw capped cryo-vials (34 x 1 mL serum). Detailed information is given in the certificate of analysis.	34 vials
BCR-576	Estradiol-17-beta in human serum (low level) Each sample is the lyophilised form of a 5 mL portion of serum without additives kept under nitrogen in sealed glass ampoules. Amount-of-substance concentration in the reconstituted material 0.114 ± 0.005 nmol/L	amp.
BCR-577	Estradiol-17-beta in human serum (medium level) Each sample is the lyophilised form of a 1 mL portion of serum without additives kept under nitrogen in sealed glass ampoules. Amount-of-substance concentration in the reconstituted material 0.689 ± 0.032 nmol/L	amp.
BCR-578	Estradiol-17-beta in human serum (high level) Each sample is the lyophilised form of a 1 mL portion of serum without additives kept under nitrogen in sealed glass ampoules. Amount-of-substance concentration in the reconstituted material 1.34 ± 0.07 nmol/L	amp.
ERM-DA347	Progesterone in human serum (low) Each sample is the lyophilised form of a 1 mL portion of serum, containing endogenous progesterone, without additives kept under nitrogen gas in sealed glass ampoules. Progesterone concentration in the reconstituted material ng/L ..... 3.19 ± 0.07 nmol/L ..... 10.13 ± 0.21	amp.
BCR-348R	Progesterone in human serum (high) BCR-348R is intended to be used for trueness assessment and quality control of progesterone measurement procedures using ID-GC-MS and to verify the comparability of results from different laboratories using that technique. The material can also be used for calibration or quality control of in vitro diagnostic devices if commutability of this material has been demonstrated using ID-GC-MS reference method for comparison. The material consists of 1 mL of human serum lyophilised in an ampoule which is sealed under N2 atmosphere. Each ampoule contains about 80 mg of the lyophilised powder. Concentration: ..... 5 ± 0.4 µg/L	amp.
ERM-DA346A	Testosterone in human serum This material is intended for method validation and for monitoring the performance of methods commonly used in medical laboratories. ERM-DA346A was prepared from a single native female human serum pool. The material was sterile filtered and sub-sampled into plastic screw-cap 3 mL vials. Each vial contains a minimum of 0.8 mL. The certified value (mass fraction) is based on isotope dilution mass spectrometry. Certified value ..... 0.25 ± 0.04 µg/kg	vial
ERM-DA345A	Testosterone in human serum This material is intended for method validation and for monitoring the performance of methods commonly used in medical laboratories. ERM-DA345A was prepared from a single native female human serum pool, part of which was spiked with testosterone in methanol to produce a material with a level of testosterone within the normal male range. The material was sterile filtered and sub-sampled into plastic screw-cap 3 mL vials. Each vial contains a minimum of 0.8 mL. The certified value (mass fraction) is based on isotope dilution mass spectrometry. Certified value ..... 5.58 ± 0.20 µg/kg	vial

Occupational health and hygiene materials in blood

BCR-634	Lead and cadmium in reconstituted human blood (low) The material is supplied in lyophilised form in brown glass vials. Sodium-EDTA was used as anticoagulant. No other preservatives were added. The content of a vial is approximately 0.6 g dry matter with residual moisture content less than 2 % and equivalent to 3.0 mL of fresh whole blood. This material was produced from blood from healthy Danish blood donors. Each portion of blood was tested negative for Anti-HIV-1&2, Anti-HCV and Anti-HTLV-I&II. However, as all biological material of human origin the blood should be treated as contagious material. Analytes mass concentration Cd ..... 1.4 µg/L Pb ..... 46 µg/L	vial
BCR-635	Lead and cadmium in reconstituted human blood (medium) The material is supplied in lyophilised form in brown glass vials. Sodium-EDTA was used as anticoagulant. No other preservatives were added. The content of a vial is approximately 0.6 g dry matter with residual moisture content less than 2 % and equivalent to 3.0 mL of fresh whole blood. This material was produced from blood from healthy Danish blood donors. Each portion of blood was tested negative for Anti-HIV-1&2, Anti-HCV and Anti-HTLV-I&II. However, as all biological material of human origin the blood should be treated as contagious material. Analytes mass concentration Cd ..... 6.6 µg/L Pb ..... 210 µg/L	vial
BCR-636	Lead and cadmium in reconstituted human blood (high) The material is supplied in lyophilised form in brown glass vials. Sodium-EDTA was used as anticoagulant. No other preservatives were added. The content of a vial is approximately 0.6 g dry matter with residual moisture content less than 2 % and equivalent to 3.0 mL of fresh whole blood. This material was produced from blood from healthy Danish blood donors. Each portion of blood was tested negative for Anti-HIV-1&2, Anti-HCV and Anti-HTLV-I&II. However, as all biological material of human origin the blood should be treated as contagious material. Analytes mass concentration Cd ..... 11.6 µg/L Pb ..... $0.52 \cdot 10^3$ µg/L	vial

Code	Product	Unit

NIST-966 — Toxic metals in blood — unit

This material is intended for use in evaluating the accuracy of lead, cadmium and total mercury concentration determinations in whole blood. It can also be used for validating analytical methods and for providing traceability to working or secondary blood reference materials containing these constituents. It contains frozen whole bovine blood with below mentioned components at two concentration levels.

Analytes	level 1	level 2
Pb	1.56	25.27 µg/dL
Cd	0.032	5.22 µg/L
Hg (total)	0.0445	31.4 µg/L

SERO201505 — Trace elements in whole blood, level 1 — 10 x 5 mL

This reference material is produced from blood collected from thoroughly controlled voluntary blood donors of a Scandinavian blood bank. Each unit is separately controlled and found negative for HBS antigen and HIV I, II and hepatitis C antibodies. No preservatives are added to the samples. It contains all normal constituents which ensures the control and test samples to be analysed under the same conditions.

Certified values after reconstitution

Al 17.1 µg/L	I 12.0 µg/L	Sc 15 ng/L
Sb 1.6 µg/L	Ir < 0.5 ng/L	Se 79.8 µg/L
As 1.8 µg/L	Fe 432 mg/L	Si 0.52 mg/L
Ba 52.6 µg/L	La 0.04 µg/L	Ag 0.13 µg/L
Be < 0.01 µg/L	Pb 27.6 µg/L	Na 1313 mg/L
Bi < 0.01 µg/L	Li 4.9 µg/L	Sr 27.8 µg/L
B 26.3 µg/L	Lu 0.8 ng/L	S 1223 mg/L
Br 1.1 mg/L	Mg 19.6 mg/L	Ta 18 ng/L
Cd 0.74 µg/L	Mn 10.6 µg/L	Te 0.03 µg/L
Ca 14.2 mg/L	Hg 2.2 µg/L	Tb 1.2 ng/L
Ce 0.05 µg/L	Mo 0.5 µg/L	Tl < 0.01 µg/L
Cs 2.3 µg/L	Nd 0.04 µg/L	Th < 0.01 µg/L
Co 0.15 µg/L	Ni 1.6 µg/L	Tm 1.0 ng/L
Cr 0.6 µg/L	Nb 0.05 µg/L	Sn 0.34 µg/L
Cu 564 µg/L	Pd < 10 ng/L	Ti 2.3 µg/L
Dy 4.8 ng/L	P 239 mg/L	W 0.06 µg/L
Er 2.9 ng/L	Pt < 1 ng/L	U 0.17 µg/L
Eu 2.7 ng/L	K 1101 mg/L	V 0.32 µg/L
Gd 50 ng/L	Pr < 0.01 µg/L	Yb 2.3 ng/L
Ga 46 ng/L	Re 1.7 ng/L	Y 0.05 µg/L
Ge < 0.1µg/L	Rh < 0.01 µg/L	Zn 5.5 mg/L
Au < 0.01 µg/L	Rb 1278 mg/L	Zr 0.28 µg/L
Hf 4.0 ng/L	Ru < 0.02 µg/L	
Ho 1.1 ng/L	Sm < 0.01 µg/L	

SERO201605 — Trace elements in whole blood, level 2 — 10 x 5 mL

This reference material is produced from blood collected from thoroughly controlled voluntary blood donors of a Scandinavian blood bank. Each unit is separately controlled and found negative for HBS antigen and HIV I, II and hepatitis C antibodies. No preservatives are added to the samples. It contains all normal constituents which ensures the control and test samples to be analysed under the same conditions.

Certified values after reconstitution

Al 58.9 µg/L	Ho 1.9 ng/L	Sm 10 ng/L
Sb 29.1 µg/L	I 27 µg/L	Sc 49 ng/L
As 13.2 µg/L	Ir < 0.5 ng/L	Se 123 µg/L
Ba 64.5 µg/L	Fe 433 mg/L	Si 655 µg/L
Be 5.9 µg/L	La 61 ng/L	Ag 134 ng/L
Bi 5.1 µg/L	Pb 393 µg/L	Na 1329 mg/L
B 91 µg/L	Li 1.9 µg/L	Sr 31.4 µg/L
Br 574 mg/L	Lu 1.1 ng/L	S 1213 mg/L
Cd 5.1 µg/L	Mg 20.1 mg/L	Ta 6.4 ng/L
Ca 16.7 mg/L	Mn 13.3 µg/L	Te 30 ng/L
Ce 56 µg/L	Hg 7.8 µg/L	Tb 0.8 ng/L
Cs 2.1 µg/L	Mo 6.2 µg/L	Tl 5.2 µg/L
Co 6.1µg/L	Nd 42 ng/L	Th 8 ng/L
Cr 6.3 µg/L	Ni 5.3 µg/L	Tm 0.6 ng/L
Cu 666 µg/L	Nb 19 ng/L	Sn 0.35 µg/
Dy 7 ng/L	Pd < 20 ng/L	Ti 1.7 µg/L
Er 3.8 ng/L	P 243 mg/L	W 95 ng/L
Eu 2.6 ng/L	Pt 1.4 ng/L	U 180 ng/L
F (*) 100 µg/l	K 1060 mg/L	V 4.3 µg/L
Gd 36 ng/L	Pr 12 ng/L	Yb 3.0 ng/L
Ga 28 ng/L	Re 1.5 ng/L	Y 40 ng/L
Ge --	Rh < 1 ng/L	Zn 5038 µg/L
Au 22 µg/L	Rb 1282 mg/L	Zr 136 ng/L
Hf 2.3 ng/L	Ru < 15 ng/L	(*) added amount, not analyzed

SERO102405 — Trace elements in whole blood, level 3 — 10 x 5 mL

These reference materials are produced from blood collected from thoroughly controlled voluntary blood donors of a Scandinavian blood bank. Each unit is separately controlled and found negative for HBS antigen and HIV I, II and hepatitis C antibodies. No preservatives are added to the samples. It contains all normal constituents which ensures the control and test samples to be analysed under the same conditions.

Certified values after reconstitution

Al 93.6 µg/L	Ho 3.8 ng/L	Sm 15 ng/L
Sb 82.7 µg/L	I 119 µg/L	Sc 75 ng/L
As 25 µg/L	Ir < 0.2 ng/L	Se 146 µg/L
Ba 2371 µg/L	Fe 471 mg/L	Si 1.6 mg/L
Be 10.6 µg/L	La 95 ng/L	Ag 45 ng/L
Bi 10.2 µg/L	Pb 503 µg/L	Na 4157 mg/L
B 254 µg/L	Li 4.1 µg/L	Sr 214 µg/L
Br 9820 mg/L	Lu 0.9 ng/L	S 1368 mg/L
Cd 10.8 µg/L	Mg 21.9 mg/L	Ta 10 ng/L
Ca 72 mg/L	Mn 20.9 µg/L	Te 0.08 µg/L
Ce 59 ng/L	Hg 17.9 µg/L	Tb 15 ng/L
Cs 2.5 µg/L	Mo 21.5 µg/L	Tl 10.1 µg/L
Co 11 µg/L	Nd 48 ng/L	Th 5 ng/L
Cr 10.8 µg/L	Ni 10.1 µg/L	Tm 1 ng/L
Cu 1740 µg/L	Nb 44 ng/L	Sn 10.6 µg/L
Dy 7 ng/L	Pd < 10 ng/L	Ti 13 µg/L
Er 4.3 ng/L	P 214 mg/L	W 0.14 µg/L
Eu 17 ng/L	Pt 4.1 ng/L	U 51 ng/L
F (*) 200 µg/L	K 451 mg/L	V 7.4 µg/L
Gd 13 ng/L	Pr 15 ng/L	Yb 3.2 ng/L
Ga 62 ng/L	Re 4.2 ng/L	Y 101 ng/L
Ge --	Rh < 50 ng/L	Zn 8157 µg/L
Au 10 ng/L	Rb 0.71 mg/L	Zr 84 ng/L
Hf 1.3 ng/L	Ru < 200 ng/L	(*) added amount, not analyzed

Code	Product	Unit
NIST-955C	**Lead in caprine blood** This material is intended primarily for use in evaluating the accuracy of lead concentration determinations in blood and for use in validating working or secondary reference materials for lead in blood analysis. A unit consists of four vials of frozen caprine blood at four concentration levels: a base level and three progressively elevated levels that contain endogenous lead and spiked inorganic arsenic, cadmium, inorganic mercury, methylmercury, and ethylmercury. Certified values are provided for lead. Each vial contains approximately 2 mL of whole blood. Certified concentration — Lead (µg/dL) — Lead (µmol/L) Level 1 — 0.424 ± 0.011 — 0.02047 ± 0.00053 Level 2 — 13.950 ± 0.080 — 0.6733 ± 0.0038 Level 3 — 27.76 ± 0.16 — 1.3400 ± 0.0076 Level 4 — 45.53 ± 0.27 — 2.198 ± 0.013	set (4 x 2 mL)
ERM-CE194	**Lead and cadmium in bovine blood, low level** Each sample is in lyophilised form equivalent to about 5.75 mL of bovine blood with additives, kept under nitrogen in rubber stoppered vials. Mass concentration in the reconstituted material Analytes Pb — 126 ± 4 µg/L Cd — 0.20 ± 0.05 µg/L	amp.
ERM-CE195	**Lead and cadmium in bovine blood, medium level** Each sample is in lyophilised form equivalent to about 5.75 mL of bovine blood with additives, kept under nitrogen in rubber stoppered vials. Mass concentration in the reconstituted material Analytes Pb — 416 ± 9 µg/L Cd — 5.06 ± 0.15 µg/L	amp.
ERM-CE196	**Lead and cadmium in bovine blood, high level** Each sample is in lyophilised form equivalent to about 5.75 mL of bovine blood with additives, kept under nitrogen in rubber stoppered vials. Mass concentration in the reconstituted material Analytes Pb — 772 ± 11 µg/L Cd — 12.33 ± 0.20 µg/L	amp.

Occupational health and hygiene materials in serum

ME 28341	**Metals in human serum level 1 (low)** Lyophilised human serum control (Medisafe® Metals S) in two different concentrations for quality control and calibration of trace element determinations from serum. The real assay values have been determined by independent laboratories of forensic medicine. Analytes Al — 24 µg/L; As — 100 µg/L; Ba — 16 µg/L; Cd — 8 µg/L; Cr — 14 µg/L; Co — 5.5 µg/L Cu — 1000 µg/L; F — 200 µg/L; Fe — 1690 µg/L; Hg — 13 µg/L; Mn — 20 µg/L; Ni — 51 µg/L Pb — 180 µg/L; Pd — 6 µg/L; Se — 50 µg/L; Sn — 5 µg/L; Zn — 520 µg/L	6 x 5 mL
ME 28342	**Metals in human serum, level 2 (high)** Lyophilised human serum control (Medisafe® Metals S) in two different concentrations for quality control and calibration of trace element determinations from serum. The real assay values have been determined by independent laboratories of forensic medicine. Analytes Al — 40 µg/L; As — 250 µg/L; Ba — 44 µg/L; Cd — 17 µg/L; Cr — 14 µg/L; Co — 12 µg/L Cu — 1500 µg/L; F — 400 µg/L; Fe — 1690 µg/L; Hg — 50 µg/L; Mn — 20 µg/L; Ni — 51 µg/L Pb — 293 µg/L; Pd — 55 µg/L; Se — 90 µg/L; Sn — 50 µg/L; Zn — 520 µg/L	6 x 5 mL
NIST-1589A	**PCBs, pesticides and dioxins/furans in human serum** This standard is intended for use in evaluating analytical methods for the determination of selected polychlorinated biphenyl (PCB) congeners, chlorinated pesticides and total cholesterol in human serum and similar matrices. Reference values are also provided for selected polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs). All of the constituents for which certified and reference values are provided are naturally present in the freeze-dried human serum. A unit consists of five bottles of freeze-dried human serum. Analyte — ng/kg PCB 99 — 121 ± 10; PCB 101 — 34 ± 9; PCB 105 — 29 ± 4; PCB 118 — 119 ± 9; PCB 138 — 483 ± 39; PCB 163 — --; PCB 164 — --; PCB 149 — 56 ± 8 PCB 151 — 28 ± 4; PCB 153 — 672 ± 35; PCB 156 — 66 ± 4; PCB 180 — 483 ± 29; PCB 183 — 65 ± 5; PCB 187 — 172 ± 25; PCB 182 — --; PCB 194 — 98 ± 14 PCB 195 — 22 ± 4; PCB 206 — 40 ± 6; PCB 209 — 25 ± 4; beta-HCH — 56 ± 13; trans-Nonachlor — 169 ± 29; Heptachlor epoxide — 75 ± 9; Oxychlordane — 157 ± 14; 4,4'-DDE — 6600 ± 1000	set
BCR-637	**Trace elements in human serum (Al, Se, Zn)** The CRM is supplied in frozen form in white plastic vials. The serum was sterile filtered prior to filling and no preservatives were added. The content of a vial is approximately 4.5 mL serum.This serum material was produced from blood from healthy Danish blood donors. Each portion of blood was tested negative for Anti-HIV-1&2, Anti-HCV and Anti-HTLV-I&II. Element — mass concentration Al — 12.5 µg/L Se — 81 µg/L Zn — 1.11 mg/L	vial
BCR-638	**Trace elements in human serum (Al, Se, Zn)** The CRM is supplied in frozen form in white plastic vials. The serum was sterile filtered prior to filling and no preservatives were added. The content of a vial is approximately 4.5 mL serum. This serum material was produced from blood from healthy Danish blood donors. Each portion of blood was tested negative for Anti-HIV-1&2, Anti-HCV and Anti-HTLV-I&II. Element — mass concentration Al — 55 µg/L Se — 104 µg/L Zn — 1.43 mg/L	vial

Code	Product	Unit

BCR-639 — Trace elements in human serum (Al, Se, Zn) — vial

The CRM is supplied in frozen form in white plastic vials. The serum was sterile filtered prior to filling and no preservatives were added. The content of a vial is approximately 4.5 mL serum.This serum material was produced from blood from healthy Danish blood donors. Each portion of blood was tested negative for Anti-HIV-1&2, Anti-HCV and Anti-HTLV-I&II.

Element	mass concentration
Al	194 µg/L
Se	133 µg/L
Zn	2.36 mg/L

SERO201405 — Trace elements in serum, level 1 — 6 x 3 mL

This reference material is produced from serum collected from thoroughly controlled voluntary blood donors of a Scandinavian blood bank. Each unit is separately controlled and found negative for HBS antigen and HIV I, II and hepatitis C antibodies. No preservatives are added to the samples. Contains all normal constituents which ensure the control and test samples to be analysed under the same conditions.

Certified values after reconstitution

Al	7.6 µg/L	Hf	10 ng/L	Ru	< 100 ng/L
Ar	0.39 µg/L	Hg	1.1 µg/L	S	1043 mg/L
As	1.3 µg/L	Ho	7 ng//	Sb	51.6 µg/l
Au	526 µg/L	I	61.2 µg/L	Sc	27 ng/L
B	38 µg/L	Ir	< 10 ng/L	Se	59.2 µg/L
Ba	124 µg/L	K	112 mg/L	Si	465 µg/L
Be	< 0.02 µg/L	La	0.15 µg/L	Sm	62 ng/L
Bi	14 ng	Li	5.20 mg/L	Sn	1.24 µg/L
Br	456 µg/L	Mn	8.9 µg/L	Sr	25.4 µg/L
Ca	93.9 mg/L	Mg	18.3 mg/L	Ta	9 ng/L
Cd	0.50 µg/L	Mo	0.52 µg/L	Te	505 ng/L
Ce	0.13 µg/L	Na	3040 mg/L	Tb	9 ng/L
Cr	0.54 µg/L	Nb	78 ng/L	Th	25 ng/L
Cs	39 ng/L	Nd	126 ng/L	Ti	1.4 µg/L
Co	0.23 µg/L	Ni	4 µg/L	Tl	29 ng/L
Cu	1.17 mg/L	Os	< 20 ng/L	Tm	4.4 ng/L
Dy	24 ng/L	Pa	< 100 ng/L	U	0.21 µg/L
Er	29 ng/L	P	59 mg/L	Va	0.71 µg/L
Eu	19 ng/L	Pb	2.9 µg/L	W	0.15 µg/L
F	75 µg/L	Pr	33 ng/L	Y	0.19 µg/L
Fe	1.2 mg/L	Pt	12 ng/L	Yb	21 ng/L
Ga	19 ng/L	Rb	3.3 µg/L	Zn	1.22 mg/L
Gd	18 ng/L	Re	4.7 ng/L	Zr	0.47 µg/L
Ge	< 0.5 µg/L	Rh	<100 ng/L		

SERO203105 — Trace elements in serum, level 2 — 6 x 3 mL

This reference material is produced from serum collected from thoroughly controlled voluntary blood donors of a Scandinavian blood bank. Each unit is separately controlled and found negative for HBS antigen and HIV I, II and hepatitis C antibodies. No preservatives are added to the samples. Contains all normal constituents which ensure the control and test samples to be analysed under the same conditions.

Certified values after reconstitution

Al	111 µg/L	Hg	1.86 µg/L	Ru	< 15 ng/L
Ar	343 ng/L	Ho	9 ng//	S	1330 mg/L
As	< 1 µg/L	I	54 µg/L	Sb	21 µg/l
Au	1956 µg/L	Ir	1.2 ng/L	Sc	57 ng/L
B	41 µg/L	K	236 mg/L	Se	136 µg/L
Ba	271 µg/L	La	315 ng/L	Si	2.1 mg/L
Be	18 ng/L	Li	10.6 mg/L	Sm	46 ng/L
Bi	21 ng	Lu	3.4 ng/L	Sn	2.86 µg/L
Br	656 µg/L	Mn	19.1 µg/L	Sr	130 µg/L
Ca	117 mg/L	Mg	28.9 mg/L	Ta	3.2 ng/L
Cd	317 ng/L	Mo	1.31 µg/L	Te	19 ng/L
Ce	285 ng/L	Na	3783 mg/L	Tb	5.4 ng/L
Cr	5.2 µg/L	Nb	42 ng/L	Th	45 ng/L
Cs	22 ng/L	Nd	249 ng/L	Ti	3 µg/L
Co	3.2 µg/L	Ni	10.7 µg/L	Tl	34 ng/L
Cu	2.6 mg/L	Os	< 20 ng/L	Tm	3.1 ng/L
Dy	30 ng/L	Pa	< 100 ng/L	U	0.98 µg/L
Er	20 ng/L	P	42 mg/L	Va	1.12 µg/L
Eu	12 ng/L	Pb	3 µg/L	W	84 ng/L
F (added amount)	200 µg/L	Pd	< 10 ng/L	Y	243 ng/L
Fe	1.91 mg/L	Pr	69 ng/L	Yb	21 ng/L
Ga	41 ng/L	Pt	17 ng/L	Zn	0.92 mg/L
Gd	18 ng/L	Rb	7.2 µg/L	Zr	2.4 µg/L
Ge	< 400 ng/L	Re	6.3 ng/L		
Hf	33 ng/L	Rh	<100 ng/L		

Occupational health and hygiene materials in urine

NIST-RM 8444 — Cotinine in human urine — 4 x 5 mL

This standard is intended primarily for use in validating methods for the determination of Cotinine in human urine. One set consists of four vials, each containing Cotinine in 5 ml human urine, which has been freeze dried. Two vials are "blank" concentration levels, typical for non-smokers without exposure to cigarette smoke; one vial is a "low" concentration level corresponding to non-smokers with passive exposure to side-stream smoke; and one vial is a "high" level, typical of smokers.

Analyte	blank ng/mL	low ng/mL	high ng/mL
Cotinine	0.8	54	488

NIST-2672A — Mercury in urine — set (4)

This material is intended primarily for use as an analytical standard for the determination of mercury in urine. It consists of four bottles of freeze-dried urine containing mercury, two bottles each at low and elevated levels.

Certified values after reconstitution

	low level	elevated level
Hg	(0.002)	0.105 mg/L

Code	Product	Unit
ME 28351	**Metals in human urine, level 1 (low)** Lyophilised human urine control in two different concentrations for quality control and calibration of trace element determinations from urine. The real assay values have been determined by independent laboratories of forensic medicine. Analyte level 1 Al 80 µg/L; As 50 µg/L; Ba 21 µg/L; Cd 13 µg/L; Cr 10 µg/L; Co 3 µg/L; Cu 50 µg/L; F 10 mg/L; Fe 700 µg/L; Hg 50 µg/L; Mn 25 µg/L; Ni 25 µg/L; Pb 130 µg/L; Pd 5 µg/L; Se 20 µg/L; Sn 5 µg/L; Zn 1.7 mg/L	6 x 5 mL
ME 28352	**Metals in human urine, level 2 (high)** Lyophilised human urine control in two different concentrations for quality control and calibration of trace element determinations from urine. The real assay values have been determined by independent laboratories of forensic medicine. Analyte level 2 Al 400 µg/L; As 250 µg/L; Ba 50 µg/L; Cd 8 µg/L; Cr 2 µg/L; Co 18 µg/L; Cu 250 µg/L; F 6 mg/L; Fe 200 µg/L; Hg 10 µg/L; Mn 15 µg/L; Ni 15 µg/L; Pb 80 µg/L; Pd 50 µg/L; Se 200 µg/L; Sn 50 µg/L; Zn 0.8 mg/L	6 x 5 mL
BCR-640	**Trace elements (As, Cr) and 1-Hydroxypyrene in lyophilised human urine** The CRM is supplied in lyophilised form in white plastic vials. No other preservatives are added. The content of a vial is approximately 0.3 g dry matter with residual moisture content less than 3 % and equivalent to 10.0 mL of fresh urine. This urine material was collected from healthy British donors. Based on the available information and knowledge, any infection danger resulting from an exposure to the material can be excluded, because of the treatment process applied. Compound concentration Arsenic 23 µg/L Chromium 1.5 µg/L 1-Hydroxypyrene 0.62 nmol/L This product is currently under recertification - not available at the moment	vial
BCR-641	**Trace elements (As, Cd, Cr, Co) and 1-Hydroxypyrene in lyophilised human urine** The CRM is supplied in lyophilised form in white plastic vials. No other preservatives are added. The content of a vial is approximately 0.3 g dry matter with residual moisture content less than 3 % and equivalent to 10.0 mL of fresh urine. This urine material was collected from healthy British donors. Based on the available information and knowledge, any infection danger resulting from an exposure to the material can be excluded, because of the treatment process applied. Compound concentration Arsenic 76 µg/L Cadmium 5.2 µg/L Chromium 6.4 µg/L Cobalt 10.4 µg/L 1-Hydroxypyrene 5.8 nmol/L This product is currently under recertification - not available at the moment	vial
BCR-642	**Trace elements (As, Cd, Cr, Co) and 1-Hydroxypyrene in lyophilised human urine** The CRM is supplied in lyophilised form in white plastic vials. No other preservatives are added. The content of a vial is approximately 0.3 g dry matter with residual moisture content less than 3 % and equivalent to 10.0 mL of fresh urine. This urine material was collected from healthy British donors. Based on the available information and knowledge, any infection danger resulting from an exposure to the material can be excluded, because of the treatment process applied. Compound concentration Arsenic 157 µg/L Cadmium 10.1 µg/L Chromium 21.0 µg/L Cobalt 61 µg/L 1-Hydroxypyrene 21 nmol/L This product is currently under recertification - not available at the moment	vial
NIST-2670A	**Toxic elements in freeze dried urine** This material is primarily intended for use in evaluating the accuracy of clinical methods and for the calibration of apparatus used to determine the concentration of toxic metals and other elements in human urine or similar matrices. It can also be used to validate working or secondary reference materials. It consists of four bottles of freeze-dried urine, two bottles each at the low and high levels. The low level urine was prepared from human urine that was lyophilised after pooling and centrifugation. The high level urine was prepared by spiking an aliquot of the pooled and homogenized low-level urine with selected metals, followed by lyophilisation. Due to the centrifugation (which improved sample homogeneity), neither level represents a fresh urine pool from a normal human population. Analytes low elevated level Antimony 0.971 0.824 µg/L Cadmium 0.0591 4.862 µg/L Cesium 1.075 1.085 µg/L Cobalt 0.166 51.2 µg/L Iodine 88.2 88.2 µg/L Lead 0.49 233.2 µg/L Mercury 0.0663 95.1 µg/L Manganese 99 µg/L Molybdenum 114.1 µg/L Platinum 51.5 µg/L Selenium 229.5 µg/L Thallium 0.0162 5.417 µg/L Thorium 0.0053 0.01606 µg/L Uranium 0.1020 4.997 µg/L	set (4 x 20 mL)

Code	Product	Unit

SERO201305 — Trace elements in urine, level 1 — 10 x 5 mL

This reference material is produced from human urine from thoroughly controlled voluntary Norwegian donors. Each unit is controlled by official authorities and found negative for presence of HBS antigen and HIV I, II and hepatitis C antibodies. No preservatives are added to the samples. It contains all normal constituents which ensure the control and test samples to be analysed under the same conditions.

Certified values after reconstitution

Analyte					
Ag	10 ng/L	Fe	8.3 µg/L	S	706 mg/L
Al	5.1 µg/L	Hf	1.6 ng/L	Sb	19.4 µg/L
As	85 µg/L	Hg	0.22 µg/L	Se	21.7 µg/L
Au	38 ng/L	I	139 µg/L	Si	3.11 mg/L
B	1294 µg/L	Ir	0.3 ng/L	Sn	3.2 µg/L
Ba	17.5 µg/L	K	2349 mg/L	Sr	122 µg/L
Be	< 0.005 µg/L	La	14.5 ng/L	Ta	11 ng/L
Bi	2.0 ng/L	Li	15.8 µg/L	Te	0.38 µg/L
Br	3.2 mg/L	Mg	89 mg/L	Th	1.4 ng/L
Ca	116 mg/L	Mn	1.2 µg/L	Ti	4.6 µg/L
Cd	0.31 µg/L	Mo	61.4 µg/L	Tl	0.21 µg/L
Ce	28 ng/L	Na	2487 mg/L	U	37 ng/L
Cl	4396 mg/L	Ni	2.4 µg/L	V	0.53 µg/L
Co	0.28 µg/L	P	872 mg/L	W	0.14 µg/L
Cu	18.6 µg/L	Pb	0.75 µg/L	Zn	393 µg/L
Cr	0.56 µg/L	Pt	2.4 ng/L	Zr	53 ng/L
Cs	7.8 µg/L	Rb	1.8 mg/L		
F	--	Re	94 ng/L		

SERO201205 — Trace elements in urine, level 2 — 10 x 5 mL

This reference material is produced from human urine from thoroughly controlled voluntary Norwegian donors. Each unit is controlled by official authorities and found negative for presence of HBS antigen and HIV I, II and hepatitis C antibodies. No preservatives are added to the samples. It contains all normal constituents which ensure the control and test samples to be analysed under the same conditions.

Certified values after reconstitution

Analyte					
Ag	26 ng/L	I	304 µg/L	Sm	4.3 ng/L
Al	100 µg/L	Ir	0.16 ng/L	Sn	54.6 µg/L
As	142 µg/L	K	1903 mg/L	Sr	110 µg/L
Au	24 ng/L	La	31 ng/L	Ta	9 ng/L
B	869 µg/L	Li	10.2 µg/L	Tb	1.2 ng/L
Ba	51 µg/L	Lu	0.9 ng/L	Te	25.3 µg/L
Be	4.9 µg/L	Mg	71 mg/L	Th	2.5 ng/L
Bi	20.1 µg/L	Mn	12.3 µg/L	Ti	17.8 µg/L
Br	2 mg/L	Mo	49.3 µg/L	Tl	9.26 µg/L
Ca	107 mg/L	Na	2307 mg/L	Tm	0.3 ng/L
Cd	4.6 µg/L	Nb	57 ng/L	U	65.5 ng/L
Ce	77 ng/L	Nd	16.2 ng/L	V	25.2 µg/L
Cl	127 mmol/L	Ni	50.4 µg/L	W	0.17 µg/L
Co	10 µg/L	P	702 mg/L	Y	15 ng/L
Cu	72 µg/L	Pb	40.3 µg/L	Yb	1.1 ng/L
Cr	19.7 µg/L	Pd	<10 ng/L	Zn	1168 µg/L
Cs	6.79 µg/L	Pr	9.5 ng/L	Zr	81 ng/L
Dy	1.9 ng/L	Pt	8.1 ng/L	Creatinine	8863 µmol/L
Er	2.2 ng/L	Rb	1.17 mg/L	1-Hydroxypyrene	55 µg/L*
Eu	1.9 ng/L	Re	78 ng/L	Formic acid	10.8 mg/L*
F	4 mg/L*	Rh	<50 ng/L	Phenol	300 mg/L*
Fe	12.3 µg/L	Ru	<200 ng/L	Mandelic acid	490 µg/L*
Ga	37 ng/L	S	543 mg/L	Tetrachloroethylene	1000 µg/L*
Gd	4.5 ng/L	Sb	99.9 µg/L	TCA	350 µmol/L*
Hf	1 ng/L	Sc	103 ng/L	(*) added amount, not analyzed	
Hg	40.7 µg/L	Se	58.6 µg/L		
Ho	4.6 ng/L	Si	5.2 mg/L		

Occupational health and hygiene materials in other matrices

NIST-1400 — Trace elements in bone ash — 50 g

This standard is intended primarily for use in evaluating analytical methods for the determination of selected major, minor and trace elements in bone and in material of a similar matrix. It consists of bone ash that was blended to high degree of homogeneity.

Certified values

Ca	38.18 ± 0.13 %	Mg	0.684 ± 0.013 %	Sr	249 ± 7 µg/g
Fe	660 ± 27 µg/g	P	17.91 ± 0.19 %	Zn	181 ± 3 µg/g
K	186 ± 8 µg/g	Pb	9.07 ± 0.12 µg/g		

NIST-1486 — Trace elements in bone meal — 50 g

This standard is intended primarily for use in evaluating analytical methods for the determination of selected major, minor and trace elements in bone and in material of similar matrix. It consists of steamed bone meal that was sieved and blended to a high degree of homogeneity.

Certified values

Ca	26.58 ± 0.24 wt%	Fe	99 ± 8 µg/g	Sr	264 ± 7 µg/g
Mg	0.466 ± 0.017 wt%	K	412 ± 4 µg/g	Zn	147 ± 16 µg/g
P	12.30 ± 0.19 wt%	Pb	1.335 ± 0.014 µg/g		

BCR-665 — Asbestos fibres in human lung — 100 mg

The sample consists of at least 100 mg of homogenised and sterilised (gamma irradiated at 25 kGy) human lung tissue.

Type of fibre	number of fibres *
Amosite + crocidolite	49
Anthophyllite	1.8

* of more than 1 µm in length in million per g dry tissue

BCR-666 — Asbestos fibres in lung tissue — 100 mg

The sample consists of at least 100 mg of homogenised and sterilised (gamma irradiated at 25 kGy) human lung tissue.

Type of fibre	number of fibres *
Amosite + crocidolite	2.3
Anthophyllite	5.1

*of more than 1 µm in length in million per g dry tissue

Code	Product	Unit
BCR-397	Trace elements in human hair The material consists of 3 g of human hair powder in glass bottles provided with a polyethene insert and a screw cap. Mass fraction of dry mass basis Cd ..... 0.521 ± 0.024 µg/g; Se ..... 2.00 ± 0.08 µg/g; Cu ..... (110) µg/g Hg ..... 12.3 ± 0.5 µg/g; Zn ..... 199 ± 5 µg/g; Ni ..... (46.0) µg/g Pb ..... 33.0 ± 1.2 µg/g; As ..... (0.31) µg/g; ~oe	3 g
NCSZC81002B	Trace elements in human hair	7 g

Analytes	µg/g	Analytes	µg/g	Analytes	µg/g
Ag	0.037 ± 0.002	Cu	33.6 ± 2.3	Ni	(5.77)
Al	23.2 ± 2.0	Fe	160 ± 16	P	174 ± 43
As	0.198 ± 0.023	Hg	1.06 ± 0.28	S	(4.62 in %)
Ba	11.1 ± 1.3	I	0.96 ± 0.20	Pb	3.83 ± 0.18
Br	(0.59)	K	(14.4)	Sb	0.12 ± 0.02
Ca	1537 ± 68	La	(0.029)	Se	0.59 ± 0.04
Cl	(48.2)	Mg	284 ± 14	Sr	8.17 ± 0.69
Cd	0.072 ± 0.010	Mn	3.83 ± 0.39	V	(0.089)
Co	0.153 ± 0.015	Mo	1.06 ± 0.12	Zn	191 ± 16
Cr	8.74 ± 0.97	Na	445 ± 40		

NCS DC73347-20	Trace elements in human hair powder This materiel is intended primarily for use in trace element analyses of hair. It consists of powdered human hair (<80 Mesh) supplied in a glass bottle containing 20 g. Certified values, ranging from per cent to ng/g level, are provided for: Ag, As, Ba, Be, Bi, Ca, Cd, Ce, Co, Cr, Cu, Fe, Hg, La, Li, Mg, Mn, Mo, N, Na, Ni, P, Pb, S, Sb, Sc, Se, Si, Sr, Ti, Y, and Zn). Indicative values are given for: Au, B, Br, Dy, Eu, K, Sm.	20 g

Proteins

BCR-486	Alphafoetoprotein (AFP), human purified Each sample is in the lyophilised form and it contains purified AFP without additives. The material is kept under nitrogen gas in sealed glass ampoules. The protein mass per ampoule is equivalent to 100 ± 9 µg when the material is reconstituted. Carbohydrate mass of the molecule is not included. Protein mass per ampoule ..... 100 ± 9 µg	amp.
BCR-393	Apolipoprotein AI, human Each sample is in the lyophilised form of a 1.5 mL portion of Apo AI solution without additives. The material is kept under nitrogen gas in sealed glass ampoules. Mass concentration in the reconstituted material 1.06 ± 0.05 g/L	amp.
BCR-394	Apolipoprotein AII, human Each sample is in the lyophilised form of a 1.5 mL portion of Apo A II solution without additives. The material is kept under nitrogen gas in sealed glass ampoules. Mass concentration in the reconstituted material 0.321 ± 0.019 g/L	amp.
HEC JDS2	HbA1c in haemoglobin in buffer JDS HbA1c Lot 2 is primarily intended for use in the calibration and standardization of procedures for measurement of Haemoglobin A1c in clinical specimens. It can also be used for validating working or secondary reference materials. The material consists of a lysed solution (carbonate buffer) of erythrocytes originating from human whole blood. The material is free from plasma components and without stabilisers. A single set of JDS HbA1c Lot 2 consists of five vials (0.1 mL) with concentrations levels 4-13%. Certified values: Level ..... HbA1c (%) 1 ..... 4.04 ± 0.08 2 ..... 5.38 ± 0.05 3 ..... 7.32 ± 0.07 4 ..... 9.88 ± 0.10 5 ..... 12.63 ± 0.13	unit
BCR-273	Single cell protein The material consists of about 10 g single cell protein powder in a sealed argon filled ampoule. Certified values Ca ..... 11.97 g/kg; K ..... 2.22 g/kg; P ..... 26.8 g/kg Fe ..... 0.156 mg/kg; N ..... 121.6 g/kg Indicative values for Mg, N(Kjeldahl), Na, S	10 g
BCR-613	Prostate specific antigen (PSA) Each sample is in lyophilised form and it contains purified PSA without additives. The material is kept under argon gas in sealed glass ampoules. Carbohydrate mass of the molecule not included. Prostate specific antigen in the reconstituted material Protein mass / ampoule ..... 70.8 ± 6 µg The expanded uncertainty, taking into account the uncertainty of calibrators using a coverage factor k=2.	amp.
BCR-457	Thyroglobulin (Tg), human Each sample is in lyophylised form and equivalent to about 100 µl of purified Tg without additives. The material is kept under nitrogen in sealed glass ampoules. Mass concentration in the reconstituted material 0.324 ± 0.018 g/L	amp.

Proteins in blood

IRMM/IFCC-467	Haemoglobin HbA0 in whole blood isolate The intended use of this reference material is the calibration of the IFCC reference measurement procedure and those analogous methods targeting the N-terminal hexapeptide with a stable glycation. A unit of IRMM/IFCC-467 consists of a glass vial with deep frozen HbA0-containing buffered solution (50 mmol/L MES, 10 mmol/L KCN, 2 mmol/L EDTA, pH 6.2). It was prepared from whole blood obtained from healthy volunteers. The certified value, the amount-of-substance fraction of HbA_0 (defined as defined as the non-glycated haemoglobin), is traceable to the SI. An indicative value for total haemoglobin mass fraction (119.7 ± 3.7 mg/g) is also provided. Certified value $HbA_0/(HbA_0 + HbA_{1c})$ > 976 mmol/mol	vial

Code	Product	Unit
IRMM/IFCC-466	Glycated haemoglobin HbA1c in whole blood isolate The intended use of this reference material is the calibration of the IFCC reference measurement procedure and those analogous methods targeting the N-terminal hexapeptide with a stable glycation. A unit of IRMM/IFCC-466 consists of a glass vial with deep frozen HbA1c-containing buffered solution (50 mmol/L MES, 10 mmol/L KCN, 2 mmol/L EDTA, pH 6.2). It was prepared from whole blood obtained from diabetic volunteers. The certified value, the amount-of-substance fraction of HbA_{1c} (defined as beta-N-(1-deoxyfructos-1-yl) haemoglobin), is traceable to the SI. An indicative value for total haemoglobin mass fraction (26.2 ± 0.9 mg/g) is also provided. Certified value $HbA_{1c}/(HbA_0 + HbA_{1c})$ 934 ± 22 mmol/mol	vial
BCR-522	Haemiglobincyanide (HiCN) in bovine blood lysate Each sample is in the form of bovine blood lysate and a mass concentration of about 800.3 mg/L haemiglobincyanide with a volume of 10 mL. The material is kept in sealed brown neutral borosilicate glass ampoules. Molar mass and molar extinction coefficient of bovine haemoglobin and human haemoglobin have been shown to be equivalent. Absorbance at 540 nm HiCN ..... 0.5457 ± 0.0009 Mass concentration HiCN ..... 800.3 ±1.3 mg/L HiCN (Fe)..... 49.61 ± 0.08 µmol/L	amp.

Proteins in serum

	Seronorm Immunoprotein (serum controls for clinical chemistry) These materials are intended for use as control materials for clinical chemical work. They are provided at two relevant diagnostic levels and consist of freeze-dried human serum which should be reconstituted with water. The materials are suitable for analysis with electrophoresis. No preservatives or stabilisers are added. The materials are stable for three years at 2 - 8 °C in unopened vials. The content of opened vials is stable for seven days at 2 - 8 °C. The materials are characterised for the following proteins: Alfa1-acid-glycoprotein, Alfa1-antitrypsin, Alfa2-macroglobulin, Albumin, Apolipoprotein A1, ASL/ASO, β_2-microglobulin, C3c, C4, CCP, CDT (only in L-1), Ceruloplasmin, CRP, Digitoxin, Ferritin, Haptoglobin, IgA, IgE, IgG, IgM, Myoglobin, Prealbumin, Protein, total, RF, Transferrin	
SERO202805	Seronorm Immunoprotein Level 1 (serum control for clinical chemistry)	6 x 1 mL
SERO202905	Seronorm Immunoprotein Level 2 (serum control for clinical chemistry)	6 x 1 mL
SERO200905	Seronorm protein (serum control for clinical chemistry) The material is intended for accuracy control of the most frequently analysed serum proteins. It is a stable freeze-dried human serum where both ß- and pre ß- lipoproteins have been removed. Most values are traceable to ERM-DA470 and each batch is supplied with a data key providing analytical values for each protein. The levels of each protein are targeted to improve analytical quality where it is of greatest importance for clinical decision, just outside the reference intervals. By an inversion of Albumin, the Total Protein is almost identical in Seronorm™ Protein. Assayed or reference values are provided for the following proteins: albumin, α1-antitrypsin, β2-microglobulin*, C1q*, C3c, C4, ceruloplasmin, CRP*, ferritin, haptoglobin, IgA, IgG, IgE, IgM, α1-acid-glycoprotein (orosomucoid), α2-macroglobulin, total protein, transferrin, transthyretin (prealbumin)	6 x 1 mL
NIST-2921	Human cardiac Troponin complex This material is primarily intended for use in calibrating clinical procedures and devices for the determination of cardiac troponin I (cTnI) in human serum. It can also be used for value-assignment of calibrators and control materials. A unit of consists of five vials, each containing approximately 115 µL of a dilute solution of human cardiac troponin complex. Analyte cTnI ..... 31.2 mg/L ± 1.4 mg/L	unit (5x115 µL)
ERM-DA470	15 Plasma proteins in human serum Each sample is the lyophilised form of a 1.0 mL portion of serum with additives (sodium azide and aprotinin). The material is kept under nitrogen gas in threaded glass bottles with Chlorbutylcaoutchouc GT rubber stoppers and PP screw caps. The water mass fraction of the sample is below 0.008 g/g. Analyte — mass concentration in g/L Transthyretin (TTR) ..... 0.243 ± 0.18 Albumin (ALB) ..... 39.7 ± 0.8 Alpha1-acid Glycoprotein (A1AG) ..... 0.656 ± 0.005 Alpha1 Trypsin (A1AT) ..... 1.206 ± 0.011 Ceruloplasmin (CER) ..... 0.205 ± 0.011 Alpha1-anti-chymotrypsin (ACT) ..... 0.245 ± 0.015 Alpha2-Macroglobulin (A2M) ..... 1.64 ± 0.05 Haptoglobin (HPT) ..... 0.893 ± 0.009 Transferrin (TF) ..... 2.45 ± 0.06 Complement C3c (C3c) ..... 1.091 ± 0.027 Complement C4 (C4) ..... 0.151 ± 0.005 C-reactive protein (CRP) ..... 0.0392 ± 0.0019 Immunoglobulin G (IgG) ..... 9.68 ± 0.10 Immunoglobulin A (IgA) ..... 1.96 ± 0.04 Immunoglobulin M (IgM) ..... 0.797 ± 0.023	amp.

Code	Product	Unit
ERM-DA470K/IFCC	Proteins in human serum This reference material is intended to replace ERM-DA470. The ERM-DA470 in combination with special value transfer procedures constitute the basis for the values assigned to the new material. Initially, certified values will be provided for eleven proteins: A2M, AAG, AAT, ALB, C3c, HPT, IgA, IgG, IgM, TRF, and TTR. Information about other components may become available later. Each sample is the lyophilised form of a 1.0 mL portion of serum with additives (4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid (HEPES), sodium azide, bezamidine chloride and aprotinin). The material is kept under nitrogen gas in threaded glass bottles with rubber stoppers and polypropylene screw caps. The lyophilised material has to be reconstituted with (1.00 ± 0.01) mL of distilled water. Serum was produced from blood collected in blood collection centres according to a procedure ensuring healthy donors, and low lipid content. The serum was processed in five batches, pooled, spiked with B2M and CRP, and filled into vials (1 mL serum per vial) with screw caps. The serum was lyophilised in the vials and stored at -70 °C. Nephelometry, turbidimetry or spectrophotometry in different commercial platform/reagent combinations were used to measure protein concentrations. **Available during 2008**	amp.

Proteins in other matrices

BCR-405	Glycated haemoglobin (HbAIc) in human haemolysate (RM) Each sample is in lyophilised form and equivalent to about 0.5 mL of a solution of haemolysate of human erythrocytes without preservatives. The material is kept under carbon monoxide in sealed glass ampoules. HbA_{1c} in reconstituted material..... 6.29 %	amp.

Therapeutic drug monitoring

TRC-A105000	Abacavir sulfate	5 mg
TLCS-064	Acetylsildenafil	25 mg
TLCT-101	Aminotadalafil	25 mg
TRC-A632950	Amiodarone hydrochloride	5 g
TRC-A632952	Amiodarone hydrochloride-D4	2.5 mg
TRC-A633250	Amisulpride	1 mg
TRC-A633252	Amisulpride-D5	10 mg
TRC-A634400	Amprenavir	5 mg
TRC-A634402	Amprenavir-D4	1 mg
TRC-A790051	Atazanavir	5 mg
TRC-A790052	Atazanavir-D5	1 mg
TRC-B276580	Benzyl fentanyl	1 mg
TRC-B276582	Benzyl fentanyl-D3	1 mg
AL-01382	Brompheniramine maleate	100 mg
TRC-B689450	Buclizine dihydrochloride	50 mg
TRC-C379965	Chloroquine diphosphate salt	100 mg
EJ-C282-1411	Clozapine-D3	unit
EJ-C283-1421	Clozapine-D8	unit
TRC-C781502	Creatinine-D3	2.5 mg
TRC-D193500	Darunavir	5 mg
TRC-D193502	Darunavir-D9	1 mg
TRC-D230625	Delavirdine	10 mg
TRC-D230630	Delavirdine mesylate	10 mg
TRC-D288735	Desethylchloroquine	2.5 mg
TLCS-062	Desmethylsildenafil	25 mg
TRC-D440960	Didesethylchloroquine	1 mg
TRC-E425000	Efavirenz	10 mg
TRC-E425002	rac-Efavirenz-D4	1 mg
TRC-E525000	Emtricitabine	10 mg
TRC-E525002	Emtricitabine-13C,15N2	0.5 mg
TRC-F274990	Fentanyl citrate	10 mg
TRC-F588480	p-Fluoro fentanyl	1 mg
TRC-F588482	p-Fluoro fentanyl-D3	1 mg
TRC-F597950	cis-(Z)-Flupentixol bromide, dihydrobromide	1 mg
TRC-F598000	cis-(Z)-Flupentixol bromide, methanethiosulfonate	1 mg
TRC-F597960	trans-(E)-Flupentixol bromide dihydrobromide	1 mg
TRC-F598010	trans-(E)-Flupentixol bromide methanethiosulfonate	0.25 mg
TRC-F727250	Fosamprenavir calcium salt	1 mg
TRC-F727252	Fosamprenavir calcium salt-D4	1 mg
TLCS-065	Homosildenafil	25 mg
TRC-H916900	Hydroxychloroquine sulfate	10 mg
TRC-H924500	trans-3'-Hydroxycotinine	10 mg

Code	Product	Unit
TRC-H924510	trans-3'-Hydroxycotinine methyl-D3	1 mg
TRC-H941825	rac 8-Hydroxy efavirenz	1 mg
TRC-H941827	rac 8-Hydroxy efavirenz-D4	1 mg
TRC-H942400	Hydroxy fentanyl	1 mg
TRC-H942402	Hydroxy fentanyl-D3	1 mg
TLCS-067	Hydroxyhomosildenafil	25 mg
TRC-H948625	2-Hydroxy nevirapine	2.5 mg
TRC-H953225	7-Hydroxy quetiapine	1 mg
TRC-H953227	7-Hydroxy quetiapine-D3	1 mg
TRC-996495	Hydroxyzine	1 g
TRC-996497	Hydroxyzine-D8	1 g
TRC-I465200	Imipenem monohydrate	10 mg
TRC-I525000	Indinavir sulphate	5 mg
TRC-I525006	Indinavir sulphate-D6	1 mg
TRC-L172500	Lamivudine	10 mg
TRC-L172502	Lamivudine-15N2,13C	1 mg
TRC-L331500	Levetiracetam	100 mg
TRC-L469480	Lopinavir	10 mg
TRC-L469485	Lopinavir -metabolite M-1	1 mg
TRC-L469490	Lopinavir metabolite M-3/M-4	1 mg
TRC-L469482	Lopinavir-D8	1 mg
TRC-M205502	Mefentanyl	1 mg
TRC-M225620	Meropenem sodium salt	10 mg
TRC-M305310	alpha-Methyl fentanyl	1 mg
TRC-M305312	alpha-Methyl fentanyl D3	1 mg
TRC-M330725	alpha-Methythio fentanyl	1 mg
TRC-M330730	3-Methylthio fentanyl	1 mg
TRC-N389760	Nelfinavir hydroxy-tert-butylamide	1 mg
TRC-N389750	Nelfinavir mesylate	10 mg
TRC-N389752	Nelfinavir-D3	1 mg
TRC-N391275	Nevirapine	5 mg
TRC-N391277	Nevirapine-D5	1 mg
TLCS-066	Norneosildenafil	25 mg
TRC-D292145	O-Desmethyl Quinine	5 mg
TRC-O415000	Ohmefentanyl	1 mg
TRC-0415002	Ohmefentanyl-D3	1 mg
EJ-O139-0121	Olanzapine D3	unit
TRC-O695300	Orphenadrine citrate salt	5 g
TRC-O695302	Orphenadrine citrate salt-D3	1 mg
TRC-P755800	Prochlorperazine	10 mg
TLCV-051	Pseudovardenafil	25 mg
TRC-5100002	Quetiapine fumarate-D8	1 mg
TRC-Q510000	Quetiapine hemifumarate	1 g
TRC-Q694000	Quinine	1 g
EJ-Q646-0311	Quinine-D3	unit
TRC-CQ694017	Quinine N-oxide-D3	1 mg
TRC-Q694012	Quinine 1-oxide-D3	1 mg
TRC-694002	Quinine methoxy-D3	5 mg
TRC-Q694015	Quinine N-oxide	2.5 mg
TRC-Q694010	Quinine-1 oxide	2.5 mg
TRC-R142002	Reboxetine mesylate-D5	1 mg
TRC-R142000	Reboxetine mesylate	10 mg
TRC-RS143500	Remifentanyl HCl	5 mg
TRC-R525002	Risperidone-D4	2.5 mg
TRC-R535000	Ritonavir	10 mg
TRC-R535003	Ritonavir-13C3	0.5 mg
TRC-R535002	Ritonavir-D6	0.5 mg
TRC-S088127	Salicylic acid-D4	5 mg
TRC-S135000	Saquinavir mesylate	10 mg
TRC-S135002	Saquinavir-D9	1 mg

Code	Product	Unit
EJ-191-0631	Sildenafil-D8	unit
TLCS-063	Sildenafil-D8	25 mg
TLCS-061	Sildenafil citrate	25 mg
TRC-S685250	Stavudine	10 mg
TRC-S685252	Stavudine-D3	1 mg
TLCT-103	Tadalafil	25 mg
TRC-T018500	Tenofovir	5 mg
TRC-T018510	Tenofovir diphosphate	1 mg
TRC-T018502	Tenofovir-D6	1 mg
TRC-T345600	Thienyl fentanyl HCl	1 mg
TRC-T345602	Thienyl fentanyl-D3 HCl	1 mg
TRC-T444900	Tipranavir	1 mg
TRC-T444902	Tipranavir-D4	1 mg
TLCV-053	Vardenafil-D5	25 mg
TRC-Z140000	Zalcitabine	10 mg
TRC-Z145000	Zaleplon	100 mg
TRC-Z145002	Zaleplon-D5	1 mg
TLCX-011	Xanthoanthrafil	25 mg
	A wide variety of substances for Therapeutic Drug Monitoring available on request!	

Seronorm pharmaca
(serum controls for clinical chemistry)

The Seronorm Pharmaca materials are intended for checking precision of methods routinely used for therapeutic drug monitoring. It is available at two levels (L-1 and L-2), containing an animal-based matrix spiked with more than 30 drugs. No stabilisers or preservatives are added. Unopened vials can be stored for three years at 2-8 °C. After opening, the material is stable for seven days at 2-8 °C. The materials can be frozen in small portions.

Components:

Amikacin	Digoxin	Methotrexate	Quinidine
Amiodarone	Disopyramide	Netilmicin (only L-1)	Salicylate
Caffeine	Ethosuximide	Nortriptyline	Theophylline
Carbamezepine	Flecainide	Paracetamol	Tobramycin
Chloramphenicol	Gentamycin	Phenobarbital	Valproic Acid
Clonazepam	Haloperidol	Phenytoin	Vancomycin
Cyklosporine	Imipramine	Primidone	
Desipramine	Lidocaine	Procainamide	
Diazepam	Lithium	Propanolol	

SERO101405	Seronorm Pharmaca L-1 (serum control for clinical chemistry)	6 x 1 mL
SERO101505	Seronorm Pharmaca L-2 (serum control for clinical chemistry)	6 x 1 mL

Veterinary materials

BCR-386	Diethylstilboestrol (DES) in bovine urine, blank Diethylstilboestrol concentration in the reconstituted material < 0.1 µg/L The material consists of lyophilised bull urine obtained from animals which have never been treated with stilbenes. It is supplied in vials with a content equivalent to about 2.0 mL urine, sealed under nitrogen.	vial
BCR-389	Diethylstilboestrol (DES) in bovine urine, positive Diethylstilboestrol concentration in the reconstituted material 12.8 ± 2.5 µg/L The material consists of lyophilised bull urine mixed with friesian steer urine biologically incurred with diethylstilbestrol. It is supplied in vials with a content equivalent to about 2.0 mL urine, sealed under nitrogen.	vial
BCR-387	Dienoestrol (DE) in bovine urine, blank Diencestrol concentration in the reconstituted material < 0.1 µg/L The material consists of lyophilised calf urine obtained from animals which have never been treated with stilbenes. It is supplied in vials with a content equivalent to about 2.0 mL urine, sealed under nitrogen.	vial
BCR-390	Dienoestrol (DE) in bovine urine, positive The material consists of lyophilised calf urine mixed with friesian steer urine biologically incurred with dienoestrol. It is supplied in vials with a content equivalent to about 2.0 mL urine, sealed under nitrogen. Dienoestrol concentration in the reconstituted material 34 ± 7 µg/L.	vial
BCR-388	Hexoestrol (HEX) in bovine urine, blank Hexoestrol concentration in the reconstituted material < 0.1 µg/L The material consists of lyophilised cow urine obtained from animals which have never been treated with stilbenes. It is supplied in vials with a content equivalent to about 2.0 mL urine, sealed under nitrogen.	vial
BCR-391	Hexoestrol (HEX) in bovine urine, positive The material consists of lyophilised cow urine mixed with friesian steer urine biologically incurred with hexoestrol. It is supplied in vials with a content equivalent to about 2.0 mL urine, sealed under nitrogen. Hexoestrol concentration in the reconstituted material 13.3 ± 3.1 µg/L.	vial
NMIAD926	5(10)-Estrene-3b,17a-diol	1 mg

Vitamins and micronutrients

NIST-970 — Ascorbic acid in frozen human serum — set (4)

This material is intended primarily for use in validating methods for determine ascorbic acid in human serum and similar matrices. It can also be used for quality assurance when assigning values to in-house control materials. A unit consists of four ampoules of frozen human serum, two ampoules each of level I (high normal) and level II (low normal). Each ampoule contains approximately 2.2 mL of solution, a 1:1 mixture of human serum and 100 g/L (10 % mass concentration) aqueous metaphosphoric acid (MPA). The MPA is present to stabilize and preserve the ascorbic acid.

Certified concentration values for total ascorbic acid (TAA) (ascorbic acid + dehydroascorbic acid).

Levels	value	95 % confidence
level I, µmol/L of solution	8.41	7.75 to 9.07
level II, µmol/L of solution	28.05	27.56 to 28.54

NIST-968C — Fat soluble cholesterol and vitamins in human serum — set (2)

This material is intended for use in validating methods for determining fat-soluble vitamins, carotenoids, and cholesterol in human serum and plasma. It can also be used for quality assurance when assigning values to in-house control material for these constituents. A unit consists of two vials of lyophilised human serum, one vial at each of two different concentration levels.

Analytes	level I µg/mL	level II µg/mL
trans-retinol	0.841	0.484
δ-Tocopherol	0.131	0.527
γ-Tocopherol	3.90	1.56
α-Tocopherol	7.47	16.79
trans-β-carotene	0.157	0.391
Total β-carotene	0.171	0.436
Cholesterol	1335	1669

Various control materials

SERO203005 — Seronorm Human, high (serum control for clinical chemistry) — 10 x 5 mL

Freeze dried human serum control covering over 40 of the most frequently analysed components at levels of clinical interest. The human serum from which this product has derived is from thoroughly controlled voluntary, unpaid donors of Scandinavian blood centres. Each unit is tested negative to HB_sAg, HCV - HIV-I - HIV-II antibodies by approved tests.

Analytes:

ALAT	CK-MB	IgM	T3, free
Albumin	Copper	IgG	T3, total
ALP	Creatinine	Iron	T4, free
Amylase, pancreas	CRP	Lactate	T4, total
Amylase, total	Digoxin	LDH	Testosterone
ASAT	Estradiol	Lipase	Theophylline
Bile Acid	Ferritin	Lithium	TIBC
Bilirubin,direct	Folate	Magnesium	Transferrin
Bilirubin, total	GGT	Osmolality	Triglycerides
Calcium	GLDH	Phenylalanin	TSH
Chloride	Glucose	Phosphorus	UIBC
Cholesterol, HDL/LDL	HBDH	Potassium	Urea
Cholesterol, total	hCG, total	Progesterone	Uric acid
Cholinesterase	Homosysteine	Protein, total	Vitamin B_{12}
CK	IgA	Sodium	Zinc

Seronorm Immunoassay (serum controls for clinical chemistry)

Liquid human serum control. Immunoassay control combining hormones, cardiac, and tumour markers and covering over 40 of the most frequently analysed components at levels of clinical interest. The human based matrix has been produced with focus on compatibility with patient samples. No preservatives or stabilisers are added

Human serum, from which this product has derived, is from thoroughly controlled voluntary unpaid donors of Scandinavian Blood Centres.

Each unit is tested negative for Hb_sAgantigen, HCV - HIV-I - HIV-II antibodies by approved tests.

Three levels of clinical significance - each level available separately.

Freeze-dried (assayed values) or liquid control (approx values) available.

Analytes:

17-OH-Progesterone	C-peptide	IgE	T3 free
AFP	Cortisol	Insulin	T3 total
Aldosterone	DHEA-Sulphate	LH	T4 free
Androstendione	Digoxin	Metylmalonic acid	T4 total
Anti-TPO	Estradiol	Myoglobin	TBG
β2-microglobulin	Estriol,free	NT-pro-BNP	Testosterone
β-hCG, total	Ferritin	Progesterone	Theophylline
CA 125	Folate	Prolactin	Thyreoglobulin
CA 15-3	FSH	PTH (intact)	Troponin I
CA 19-9	hCG,total	PSA, free	Troponin T
CEA	hGH	PSA, total	TSH
CK-MB	Homocysteine	SHBG	Vitamin B_{12}

SERO207005 — Seronorm Immunoassay Liquid L-1 (serum control for clinical chemistry) — 12 x 3 mL

SERO207205 — Seronorm Immunoassay Liquid L-3 (serum control for clinical chemistry) — 12 x 3 mL

SERO206005 — Seronorm Immunoassay Lyo L-1 (serum control for clinical hemistry) — 12 x 3 mL

SERO206105 — Seronorm Immunoassay Lyo L-2 (serum control for clinical chemistry) — 12 x 3 mL

SERO206205 — Seronorm Immunoassay Lyo L-3 (serum control for clinical chemistry) — 12 x 3 mL

SERO203405 — Seronorm Immunoassay L-3 low (serum control for clinical chemistry) — 12 x 3 mL

Code	Product	Unit

SERO201505 — Trace elements in whole blood, level 1 — 10 x 5 mL

This reference material is produced from blood collected from thoroughly controlled voluntary blood donors of a Scandinavian blood bank. Each unit is separately controlled and found negative for HBS antigen and HIV I, II and hepatitis C antibodies. No preservatives are added to the samples. It contains all normal constituents which ensures the control and test samples to be analysed under the same conditions.

Certified values after reconstitution

Al	17.1 µg/L	I	12.0 µg/L	Sc	15 ng/L
Sb	1.6 µg/L	Ir	< 0.5 ng/L	Se	79.8 µg/L
As	1.8 µg/L	Fe	432 mg/L	Si	0.62 mg/L
Ba	52.6 µg/L	La	0.04 µg/L	Ag	0.13 µg/L
Be	< 0.01 µg/L	Pb	27.6 µg/L	Na	1313 mg/L
Bi	< 0.01 µg/L	Li	4.9 µg/L	Sr	27.8 µg/L
B	26.3 µg/L	Lu	0.8 ng/L	S	1223 mg/L
Br	1.1 mg/L	Mg	19.6 mg/L	Ta	18 ng/L
Cd	0.74 µg/L	Mn	10.6 µg/L	Te	0.03 µg/L
Ca	14.2 mg/L	Hg	2.2 µg/L	Tb	1.2 ng/L
Ce	0.05 µg/L	Mo	0.5 µg/L	Tl	< 0.01 µg/L
Cs	2.3 µg/L	Nd	0.04 µg/L	Th	< 0.01 µg/L
Co	0.15 µg/L	Ni	1.6 µg/L	Tm	1.0 ng/L
Cr	0.6 µg/L	Nb	0.05 µg/L	Sn	0.34 µg/L
Cu	564 µg/L	Pd	< 10 ng/L	Ti	2.3 µg/L
Dy	4.8 ng/L	P	239 mg/L	W	0.06 µg/L
Er	2.9 ng/L	Pt	< 1 ng/L	U	0.17 µg/L
Eu	2.7 ng/L	K	1101 mg/L	V	0.32 µg/L
Gd	50 ng/L	Pr	< 0.01 µg/L	Yb	2.3 ng/L
Ga	46 ng/L	Re	1.7 ng/L	Y	0.05 µg/L
Ge	< 0.1µg/L	Rh	< 0.01 µg/L	Zn	5.5 mg/L
Au	< 0.01 µg/L	Rb	1278 mg/L	Zr	0.28 µg/L
Hf	4.0 ng/L	Ru	< 0.02 µg/L		
Ho	1.1 ng/L	Sm	< 0.01 µg/L		

SERO201605 — Trace elements in whole blood, level 2 — 10 x 5 mL

This reference material is produced from blood collected from thoroughly controlled voluntary blood donors of a Scandinavian blood bank. Each unit is separately controlled and found negative for HBS antigen and HIV I, II and hepatitis C antibodies. No preservatives are added to the samples. It contains all normal constituents which ensures the control and test samples to be analysed under the same conditions.

Certified values after reconstitution

Al	58.9 µg/L	Ho	1.9 ng/L	Sm	10 ng/L
Sb	29.1 µg/L	I	27 µg/L	Sc	49 ng/L
As	13.2 µg/L	Ir	< 0.5 ng/L	Se	123 µg/L
Ba	64.5 µg/L	Fe	433 mg/L	Si	655 µg/L
Be	5.9 µg/L	La	61 ng/L	Ag	134 ng/L
Bi	5.1 µg/L	Pb	393 µg/L	Na	1329 mg/L
B	91 µg/L	Li	1.9 µg/L	Sr	31.4 µg/L
Br	574 mg/L	Lu	1.1 ng/L	S	1213 mg/L
Cd	5.1 µg/L	Mg	20.1 mg/L	Ta	6.4 ng/L
Ca	16.7 mg/L	Mn	13.3 µg/L	Te	30 ng/L
Ce	56 µg/L	Hg	7.8 µg/L	Tb	0.8 ng/L
Cs	2.1 µg/L	Mo	6.2 µg/L	Tl	5.2 µg/L
Co	6.1µg/L	Nd	42 ng/L	Th	8 ng/L
Cr	6.3 µg/L	Ni	5.3 µg/L	Tm	0.6 ng/L
Cu	666 µg/L	Nb	19 ng/L	Sn	0.35 µg/
Dy	7 ng/L	Pd	< 20 ng/L	Ti	1.7 µg/L
Er	3.8 ng/L	P	243 mg/L	W	95 ng/L
Eu	2.6 ng/L	Pt	1.4 ng/L	U	180 ng/L
F (*)	100 µg/l	K	1060 mg/L	V	4.3 µg/L
Gd	36 ng/L	Pr	12 ng/L	Yb	3.0 ng/L
Ga	28 ng/L	Re	1.5 ng/L	Y	40 ng/L
Ge	--	Rh	< 1 ng/L	Zn	5038 µg/L
Au	22 µg/L	Rb	1282 mg/L	Zr	136 ng/L
Hf	2.3 ng/L	Ru	< 15 ng/L	(*) added amount, not analyzed	

SERO102405 — Trace elements in whole blood, level 3 — 10 x 5 mL

These reference materials are produced from blood collected from thoroughly controlled voluntary blood donors of a Scandinavian blood bank. Each unit is separately controlled and found negative for HBS antigen and HIV I, II and hepatitis C antibodies. No preservatives are added to the samples. It contains all normal constituents which ensures the control and test samples to be analysed under the same conditions.

Certified values after reconstitution

Al	93.6 µg/L	Ho	3.8 ng/L	Sm	15 ng/L
Sb	82.7 µg/L	I	119 µg/L	Sc	75 ng/L
As	25 µg/L	Ir	< 0.2 ng/L	Se	146 µg/L
Ba	2371 µg/L	Fe	471 mg/L	Si	1.6 mg/L
Be	10.6 µg/L	La	95 ng/L	Ag	45 ng/L
Bi	10.2 µg/L	Pb	503 µg/L	Na	4157 mg/L
B	254 µg/L	Li	4.1 µg/L	Sr	214 µg/L
Br	9820 mg/L	Lu	0.9 ng/L	S	1368 mg/L
Cd	10.8 µg/L	Mg	21.9 mg/L	Ta	10 ng/L
Ca	72 mg/L	Mn	20.9 µg/L	Te	0.08 µg/L
Ce	59 ng/L	Hg	17.9 µg/L	Tb	15 ng/L
Cs	2.5 µg/L	Mo	21.5 µg/L	Tl	10.1 µg/L
Co	11 µg/L	Nd	48 ng/L	Th	5 ng/L
Cr	10.8 µg/L	Ni	10.1 µg/L	Tm	1 ng/L
Cu	1740 µg/L	Nb	44 ng/L	Sn	10.6 µg/L
Dy	7 ng/L	Pd	< 10 ng/L	Ti	13 µg/L
Er	4.3 ng/L	P	214 mg/L	W	0.14 µg/L
Eu	17 ng/L	Pt	4.1 ng/L	U	51 ng/L
F (*)	200 µg/L	K	451 mg/L	V	7.4 µg/L
Gd	13 ng/L	Pr	15 ng/L	Yb	3.2 ng/L
Ga	62 ng/L	Re	4.2 ng/L	Y	101 ng/L
Ge	--	Rh	< 50 ng/L	Zn	8157 µg/L
Au	10 ng/L	Rb	0.71 mg/L	Zr	84 ng/L
Hf	1.3 ng/L	Ru	< 200 ng/L	(*) added amount, not analyzed	

Code	Product	Unit

SERO201405 — Trace elements in serum, level 1 — 6 x 3 mL

This reference material is produced from serum collected from thoroughly controlled voluntary blood donors of a Scandinavian blood bank. Each unit is separately controlled and found negative for HBS antigen and HIV I, II and hepatitis C antibodies. No preservatives are added to the samples. Contains all normal constituents which ensure the control and test samples to be analysed under the same conditions.

Certified values after reconstitution

Al	7.6 µg/L	Hf	10 ng/L	Ru	< 100 ng/L
Ar	0.39 µg/L	Hg	1.1 µg/L	S	1043 mg/L
As	1.3 µg/L	Ho	7 ng//	Sb	51.6 µg/l
Au	526 µg/L	I	61.2 µg/L	Sc	27 ng/L
B	38 µg/L	Ir	< 10 ng/L	Se	59.2 µg/L
Ba	124 µg/L	K	112 mg/L	Si	465 µg/L
Be	< 0.02 µg/L	La	0.15 µg/L	Sm	62 ng/L
Bi	14 ng	Li	5.20 mg/L	Sn	1.24 µg/L
Br	456 µg/L	Mn	8.9 µg/L	Sr	25.4 µg/L
Ca	93.9 mg/L	Mg	18.3 mg/L	Ta	9 ng/L
Cd	0.50 µg/L	Mo	0.52 µg/L	Te	505 ng/L
Ce	0.13 µg/L	Na	3040 mg/L	Tb	9 ng/L
Cr	0.54 µg/L	Nb	78 ng/L	Th	25 ng/L
Cs	39 ng/L	Nd	126 ng/L	Ti	1.4 µg/L
Co	0.23 µg/L	Ni	4 µg/L	Tl	29 ng/L
Cu	1.17 mg/L	Os	< 20 ng/L	Tm	4.4 ng/L
Dy	24 ng/L	Pa	< 100 ng/L	U	0.21 µg/L
Er	29 ng/L	P	59 mg/L	Va	0.71 µg/L
Eu	19 ng/L	Pb	2.9 µg/L	W	0.15 µg/L
F	75 µg/L	Pr	33 ng/L	Y	0.19 µg/L
Fe	1.2 mg/L	Pt	12 ng/L	Yb	21 ng/L
Ga	19 ng/L	Rb	3.3 µg/L	Zn	1.22 mg/L
Gd	18 ng/L	Re	4.7 ng/L	Zr	0.47 µg/L
Ge	< 0.5 µg/L	Rh	<100 ng/L		

SERO203105 — Trace elements in serum, level 2 — 6 x 3 mL

This reference material is produced from serum collected from thoroughly controlled voluntary blood donors of a Scandinavian blood bank. Each unit is separately controlled and found negative for HBS antigen and HIV I, II and hepatitis C antibodies. No preservatives are added to the samples. Contains all normal constituents which ensure the control and test samples to be analysed under the same conditions.

Certified values after reconstitution

Al	111 µg/L	Hg	1.86 µg/L	Ru	< 15 ng/L
Ar	343 ng/L	Ho	9 ng//	S	1330 mg/L
As	< 1 µg/L	I	54 µg/L	Sb	21 µg/l
Au	1956 µg/L	Ir	1.2 ng/L	Sc	57 ng/L
B	41 µg/L	K	236 mg/L	Se	136 µg/L
Ba	271 µg/L	La	315 ng/L	Si	2.1 mg/L
Be	18 ng/L	Li	10.6 mg/L	Sm	45 ng/L
Bi	21 ng	Lu	3.4 ng/L	Sn	2.86 µg/L
Br	656 µg/L	Mn	19.1 µg/L	Sr	130 µg/L
Ca	117 mg/L	Mg	28.9 mg/L	Ta	3.2 ng/L
Cd	317 ng/L	Mo	1.31 µg/L	Te	19 ng/L
Ce	285 ng/L	Na	3783 mg/L	Tb	5.4 ng/L
Cr	5.2 µg/L	Nb	42 ng/L	Th	45 ng/L
Cs	22 ng/L	Nd	249 ng/L	Ti	3 µg/L
Co	3.2 µg/L	Ni	10.7 µg/L	Tl	34 ng/L
Cu	2.6 mg/L	Os	< 20 ng/L	Tm	3.1 ng/L
Dy	30 ng/L	Pa	< 100 ng/L	U	0.98 µg/L
Er	20 ng/L	P	42 mg/L	Va	1.12 µg/L
Eu	12 ng/L	Pb	3 µg/L	W	84 ng/L
F (added amount)	200 µg/L	Pd	< 10 ng/L	Y	243 ng/L
Fe	1.91 mg/L	Pr	69 ng/L	Yb	21 ng/L
Ga	41 ng/L	Pt	17 ng/L	Zn	0.92 mg/L
Gd	18 ng/L	Rb	7.2 µg/L	Zr	2.4 µg/L
Ge	< 400 ng/L	Re	6.3 ng/L		
Hf	33 ng/L	Rh	<100 ng/L		

SERO201305 — Trace elements in urine, level 1 — 10 x 5 mL

This reference material is produced from human urine from thoroughly controlled voluntary Norwegian donors. Each unit is controlled by official authorities and found negative for presence of HBS antigen and HIV I, II and hepatitis C antibodies. No preservatives are added to the samples. It contains all normal constituents which ensure the control and test samples to be analysed under the same conditions.

Certified values after reconstitution

Ag	10 ng/L	Fe	8.3 µg/L	S	706 mg/L
Al	5.1 µg/L	Hf	1.6 ng/L	Sb	19.4 µg/L
As	85 µg/L	Hg	0.22 µg/L	Se	21.7 µg/L
Au	38 ng/L	I	139 µg/L	Si	3.11 mg/L
B	1294 µg/L	Ir	0.3 ng/L	Sn	3.2 µg/L
Ba	17.5 µg/L	K	2349 mg/L	Sr	122 µg/L
Be	< 0.005 µg/L	La	14.5 ng/L	Ta	11 ng/L
Bi	2.0 ng/L	Li	15.8 µg/L	Te	0.38 µg/L
Br	3.2 mg/L	Mg	89 mg/L	Th	1.4 ng/L
Ca	116 mg/L	Mn	1.2 µg/L	Ti	4.6 µg/L
Cd	0.31 µg/L	Mo	61.4 µg/L	Tl	0.21 µg/L
Ce	28 ng/L	Na	2487 mg/L	U	37 ng/L
Cl	4396 mg/L	Ni	2.4 µg/L	V	0.53 µg/L
Co	0.28 µg/L	P	872 mg/L	W	0.14 µg/L
Cu	18.6 µg/L	Pb	0.75 µg/L	Zn	393 µg/L
Cr	0.56 µg/L	Pt	2.4 ng/L	Zr	53 ng/L
Cs	7.8 µg/L	Rb	1.8 mg/L		
F	--	Re	94 ng/L		

Code	Product	Unit
SERO201205	Trace elements in urine, level 2	10 x 5 mL

This reference material is produced from human urine from thoroughly controlled voluntary Norwegian donors. Each unit is controlled by official authorities and found negative for presence of HBS antigen and HIV I, II and hepatitis C antibodies. No preservatives are added to the samples. It contains all normal constituents which ensure the control and test samples to be analysed under the same conditions.

Certified values after reconstitution

Ag ..... 26 ng/L	I ..... 304 µg/L	Sm ..... 4.3 ng/L
Al ..... 100 µg/L	Ir ..... 0.16 ng/L	Sn ..... 54.6 µg/L
As ..... 142 µg/L	K ..... 1903 mg/L	Sr ..... 110 µg/L
Au ..... 24 ng/L	La ..... 31 ng/L	Ta ..... 9 ng/L
B ..... 869 µg/L	Li ..... 10.2 µg/L	Tb ..... 1.2 ng/L
Ba ..... 51 µg/L	Lu ..... 0.9 ng/L	Te ..... 25.3 µg/L
Be ..... 4.9 µg/L	Mg ..... 71 mg/L	Th ..... 2.5 ng/L
Bi ..... 20.1 µg/L	Mn ..... 12.3 µg/L	Ti ..... 17.8 µg/L
Br ..... 2 mg/L	Mo ..... 49.3 µg/L	Tl ..... 9.26 µg/L
Ca ..... 107 mg/L	Na ..... 2307 mg/L	Tm ..... 0.3 ng/L
Cd ..... 4.6 µg/L	Nb ..... 57 ng/L	U ..... 65.5 ng/L
Ce ..... 77 ng/L	Nd ..... 16.2 ng/L	V ..... 25.2 µg/L
Cl ..... 127 mmol/L	Ni ..... 50.4 µg/L	W ..... 0.17 µg/L
Co ..... 10 µg/L	P ..... 702 mg/L	Y ..... 15 ng/L
Cu ..... 72 µg/L	Pb ..... 40.3 µg/L	Yb ..... 1.1 ng/L
Cr ..... 19.7 µg/L	Pd ..... <10 ng/L	Zn ..... 1168 µg/L
Cs ..... 6.79 µg/L	Pr ..... 9.5 ng/L	Zr ..... 81 ng/L
Dy ..... 1.9 ng/L	Pt ..... 8.1 ng/L	Creatinine ..... 8663 µmol/L
Er ..... 2.2 ng/L	Rb ..... 1.17 mg/L	1-Hydroxypyrene ..... 55 µg/L*
Eu ..... 1.9 ng/L	Re ..... 78 ng/L	Formic acid ..... 10.8 mg/L*
F ..... 4 mg/L*	Rh ..... <50 ng/L	Phenol ..... 300 mg/L*
Fe ..... 12.3 µg/L	Ru ..... <200 ng/L	Mandelic acid ..... 490 µg/L*
Ga ..... 37 ng/L	S ..... 543 mg/L	Tetrachloroethylene .. 1000 µg/L*
Gd ..... 4.5 ng/L	Sb ..... 99.9 µg/L	TCA ..... 350 µmol/L*
Hf ..... 1 ng/L	Sc ..... 103 ng/L	(*) added amount, not analyzed
Hg ..... 40.7 µg/L	Se ..... 58.6 µg/L	
Ho ..... 4.6 ng/L	Si ..... 5.2 mg/L	

Blood cell size reference material

BCR-165	Latex spheres, nominal 2 µ	vial

Each vial contains 2 mL of an aqueous suspension of latex spheres at a mass concentration of about 0.2 g/L. About 0.5% of the particles are agglomerated doublets.

Average particle diameter ..... 2.223 ± 0.013 µm

BCR-166	Latex spheres, nominal 4.8 µ	vial

Each vial contains 2 mL of an aqueous suspension of latex spheres at a mass concentration of about 0.2 g/L. About 0.5% of the particles are agglomerated doublets.

Average particle diameter ..... 4.821 ± 0.019 µm

BCR-167	Latex spheres, nominal 9.6 µ	vial

Each vial contains 2 mL of an aqueous suspension of latex spheres at a mass concentration of about 1.4 g/L. About 0.5% of the particles are agglomerated doublets.

Average particle diameter ..... 9.475 ± 0.018 µm