

Systeme International (SI) Conversion Factors for Selected Laboratory Components*

Component	Conventional Unit	Conversion Factor	SI Unit
Acetaminophen	µg/mL	6.62	µmol/L
Acetoacetic acid	mg/dL	0.098	mmol/L
Acetone	mg/dL	0.172	mmol/L
Acid phosphatase	units/L	1.0	U/L
Alanine	mg/dL	112.2	µmol/L
Alanine aminotransferase (ALT)	units/L	1.0	U/L
Albumin	g/dL	10	g/L
Alcohol dehydrogenase	units/L	1.0	U/L
Aldolase	units/L	1.0	U/L
Aldosterone	ng/dL	0.0277	nmol/L
Alkaline phosphatase	units/L	1.0	U/L
Aluminum	ng/mL	0.0371	µmol/L
Aminobutyric acid	mg/dL	97	µmol/L
Amitriptyline	ng/mL	3.61	nmol/L
Ammonia (as NH ₃) (Dual report)†	µg/dL	0.587	µmol/L
Amylase	units/L	1.0	U/L
Androstenedione	ng/dL	0.0349	nmol/L
Angiotensin I	pg/mL	0.772	pmol/L
Angiotensin II	pg/mL	0.957	pmol/L
Anion gap	mEq/L	1.0	mmol/L
Antidiuretic hormone	pg/mL	0.923	pmol/L
Antithrombin III	mg/dL	10	mg/L
α ₁ -Antitrypsin (Dual report)†	mg/dL	0.184	µmol/L
Apolipoprotein A	mg/dL	0.01	g/L
Apolipoprotein B	mg/dL	0.01	g/L
Arginine	mg/dL	57.4	µmol/L
Asparagine	mg/dL	75.7	µmol/L
Aspartate aminotransferase (AST)	units/L	1.0	U/L
Bicarbonate	mEq/L	1.0	mmol/L
Bilirubin (Dual report)†	mg/dL	17.1	µmol/L
Blood gases (arterial)			
Paco ₂	mm Hg	1.0	mm Hg
pH	pH units	1.0	pH units
PaO ₂	mm Hg	1.0	mm Hg
Bromide	mg/dL	0.125	mmol/L
C-peptide	ng/mL	0.333	nmol/L
C1 esterase inhibitor	mg/dL	10	mg/L
C3 complement	mg/mL	0.01	g/L
C4 complement	mg/mL	0.01	g/L
Calcitonin	pg/mL	1.0	ng/L
Calcium (Dual report)†	mg/dL	0.25	mmol/L
	mEq/L	0.50	mmol/L
Carbon dioxide	mEq/L	1.0	mmol/L
Carboxyhemoglobin	% of hemoglobin saturation	0.01	Proportion of hemoglobin saturation
Carotene	µg/dL	0.0186	µmol/L
Ceruloplasmin	mg/dL	10	mg/L
Chloride	mEq/L	1.0	mmol/L
Cholesterol (Dual report)†	mg/dL	0.0259	mmol/L
Citrate	mg/dL	52.05	µmol/L
Copper	µg/dL	0.157	µmol/L
Coproporphyrins (urine)	µg/24 hr	1.527	nmol/d
Corticotropin (ACTH)	pg/mL	0.22	pmol/L
Cortisol	µg/dL	27.59	nmol/L
Cotinine	ng/mL	5.68	nmol/L
Creatine	mg/dL	76.26	µmol/L
Creatine kinase (CK)	units/L	1.0	U/L
Creatinine (Dual report)†	mg/dL	88.4	µmol/L

Component	Conventional Unit	Conversion Factor	SI Unit
Creatinine clearance (Dual report)†	mL/min	0.0167	mL/s
Cyanide	mg/L	23.24	µmol/L
Dehydroepiandrosterone (DHEA)	ng/mL	3.47	nmol/L
Desipramine	ng/mL	3.75	nmol/L
Diazepam	µg/mL	3.512	µmol/L
Digoxin (Dual report)†	ng/mL	1.281	nmol/L
Epinephrine	pg/mL	5.46	pmol/L
Erythrocyte sedimentation rate	mm/h	1.0	mm/h
Estradiol (Dual report)†	pg/mL	3.671	pmol/L
Estriol	ng/mL	3.467	nmol/L
Estrone	ng/dL	37	pmol/L
Ethanol (ethyl alcohol)	mg/dL	0.217	mmol/L
Ethylene glycol	mg/L	16.11	µmol/L
Ferritin	ng/mL	2.247	pmol/L
α-Fetoprotein	ng/mL	1.0	µg/L
Fibrinogen	mg/dL	0.0294	µmol/L
Fluoride	µg/mL	52.6	µmol/L
Folate	ng/mL	2.266	nmol/L
Follicle-stimulating hormone	mIU/mL	1.0	IU/L
Fructose	mg/dL	55.5	µmol/L
Galactose	mg/dL	55.506	µmol/L
Glucagon	pg/mL	1.0	ng/L
Glucose (Dual report)†	mg/dL	0.0555	mmol/L
Glutamine	mg/dL	68.42	µmol/L
γ-Glutamyltransferase (GGT)	units/L	1.0	U/L
Glycerol (free)	mg/dL	108.59	µmol/L
Glycine	mg/dL	133.3	µmol/L
Glycosylated hemoglobin (glycated hemoglobin A _{1c} , A _{1c})	% of total hemoglobin	0.01	Proportion of total hemoglobin
Haptoglobin	mg/dL	0.10	µmol/L
Hematocrit	%	0.01	Proportion of 1.0
Hemoglobin (whole blood) Mass concentration	g/dL	10.0	g/L
High-density lipoprotein cholesterol (HDL-C) (Dual report)†	mg/dL	0.0259	mmol/L
Histidine	mg/dL	64.45	µmol/L
Homocysteine (total)	mg/L	7.397	µmol/L
Human chorionic gonadotropin (HCG)	mIU/mL	1.0	IU/L
Hydroxybutyric acid	mg/dL	96.05	µmol/L
Hydroxyproline	mg/dL	76.3	µmol/L
Immunoglobulin A (IgA)	mg/dL	0.01	g/L
Immunoglobulin D (IgD)	mg/dL	10	mg/L
Immunoglobulin E (IgE)	mg/dL	10	mg/L
Immunoglobulin G (IgG)	mg/dL	0.01	g/L
Immunoglobulin M (IgM)	mg/dL	0.01	g/L
Insulin	µIU/mL	6.945	pmol/L
Iron, total (Dual report)†	µg/dL	0.179	µmol/L
Iron binding capacity, total (Dual report)†	µg/dL	0.179	µmol/L
Isoleucine	mg/dL	76.24	µmol/L
Isopropanol	mg/L	0.0166	mmol/L
Lactate (lactic acid)	mg/dL	0.111	mmol/L
Lactate dehydrogenase	units/L	1	U/L
Lactate dehydrogenase isoenzymes (LD ₁ -LD ₅)	%	0.01	Proportion of 1.0
Lead (Dual report)†	µg/dL	0.0483	µmol/L

Component	Conventional Unit	Conversion Factor	SI Unit
Leucine	mg/dL	76.237	μmol/L
Lipase	units/L	1.0	U/L
Lipids (total)	mg/dL	0.01	g/L
Lipoprotein(a)	mg/dL	0.0357	μmol/L
Lithium	mEq/L	1.0	mmol/L
Low-density lipoprotein cholesterol (LDL-C) (Dual report)†	mg/dL	0.0259	mmol/L
Luteinizing hormone (LH, leutropin)	IU/L	1.0	IU/L
Lysine	mg/dL	68.5	μmol/L
Magnesium (Dual report)†	mg/dL	0.411	mmol/L
	mEq/L	0.50	mmol/L
Manganese	ng/mL	18.2	nmol/L
Methanol	mg/L	0.0312	mmol/L
Methemoglobin	% of total hemoglobin	0.01	Proportion of total hemoglobin
Methionine	mg/dL	67.02	μmol/L
Myoglobin	μg/L	0.0571	nmol/L
Nicotine	mg/L	6.164	μmol/L
Nitrogen, nonprotein	mg/dL	0.714	mmol/L
Norepinephrine	pg/mL	0.00591	nmol/L
Ornithine	mg/dL	75.67	μmol/L
Osmolality	mOsm/kg	1.0	mmol/kg
Osteocalcin	μg/L	0.171	nmol/L
Oxalate	mg/L	11.1	μmol/L
Parathyroid hormone	pg/mL	1.0	ng/L
Phenobarbital	mg/L	4.31	μmol/L
Phenylalanine	mg/dL	60.54	μmol/L
Phenytoin	μg/mL	3.96	μmol/L
Phosphorus (Dual report)†	mg/dL	0.323	mmol/L
Plasminogen	mg/dL	0.113	μmol/L
	%	0.01	Proportion of 1.0
Plasminogen activator inhibitor	mIU/mL	1.0	IU/L
Platelets (thrombocytes)	×10 ⁹ /μL	1.0	×10 ⁹ /L
Potassium	mEq/L	1.0	mmol/L
Pregnanediol (urine)	mg/24h	3.12	μmol/d
Pregnanetriol (urine)	mg/24 h	2.97	μmol/d
Progesterone	ng/mL	3.18	nmol/L
Prolactin	μg/L	43.478	pmol
Proline	mg/dL	86.86	μmol/L
Prostate-specific antigen	ng/mL	1.0	μg/L
Protein, total	g/dL	10.0	g/L
Prothrombin	g/L	13.889	μmol/L
Prothrombin time (protime, PT)	s	1.0	s
Protoporphyrin, erythrocyte	μg/dL	0.01777	μmol/L
Pyruvate	mg/dL	113.6	μmol/L
Quinidine	μg/mL	3.08	μmol/L
Red blood cell count	×10 ⁶ /μL	1.0	×10 ¹² /L
Renin	pg/mL	0.0237	pmol/L
Reticulocyte count	% of RBCs	0.01	Proportion of 1.0
Salicylate	mg/L	0.00724	mmol/L
Serine	mg/dL	95.2	μmol/L
Serotonin (5-hydroxytryptamine)	ng/mL	0.00568	μmol/L
Sodium	mEq/L	1.0	mmol/L

Component	Conventional Unit	Conversion Factor	SI Unit
Somatomedin-C (insulinlike growth factor)	ng/mL	0.131	nmol/L (coagulation factor II)
Somatostatin	pg/mL	0.611	pmol/L
Taurine	mg/dL	79.91	μmol/L
Testosterone (Dual report)†	ng/dL	0.0347	nmol/L
Theophylline	μg/mL	5.55	μmol/L
Thiocyanate	mg/L	17.2	μmol/L
Threonine	mg/dL	83.95	μmol/L
Thyroglobulin	ng/mL	1.0	μg/L
Thyrotropin (thyroid-stimulating hormone, TSH)	mIU/L	1.0	mIU/L
Thyroxine, free (T ₄) (Dual report)†	ng/dL	12.87	pmol/L
Thyroxine, total (T ₄) (Dual report)†	μg/dL	12.87	nmol/L
Transferrin	mg/dL	0.01	g/L
Triglycerides (Dual report)†	mg/dL	0.0113	mmol/L
Triiodothyronine			
Free (T ₃) (Dual report)†	pg/dL	0.0154	pmol/L
Resin uptake	%	0.01	Proportion of 1.0
Total (T ₃) (Dual report)†	ng/dL	0.0154	nmol/L
Troponin I (cardiac)	ng/mL	1.0	μg/L
Troponin T (cardiac)	ng/mL	1.0	μg/L
Tryptophan	mg/dL	48.97	μmol/L
Tyrosine	mg/dL	55.19	μmol/L
Urea nitrogen (Dual report)†	mg/dL	0.357	mmol/L
Uric acid	mg/dL	59.48	μmol/L
Valine	mg/dL	85.5	μmol/L
Vasoactive intestinal polypeptide	pg/mL	1.0	ng/L
Vitamin A (retinol)	μg/dL	0.0349	μmol/L
Vitamin B ₆ (pyridoxine)	ng/mL	4.046	nmol/L
Vitamin B ₁₂ (cyanocobalamin)	pg/mL	0.738	pmol/L
Vitamin C (ascorbic acid)	mg/dL	56.78	μmol/L
Vitamin D			
1,25-Dihydroxyvitamin D	pg/mL	2.6	pmol/L
25-Hydroxyvitamin D	ng/mL	2.496	nmol/L
Vitamin E	mg/dL	23.22	μmol/L
Vitamin K	ng/mL	2.22	nmol/L
Warfarin	μg/mL	3.247	μmol/L
White blood cell count	×10 ³ /μL	1.0	×10 ⁹ /L
White blood cell differential count (number fraction)	%	0.01	Proportion of 1.0
Zinc	μg/dL	0.153	μmol/L

*SI units are the preferred method of reporting. To convert values from conventional units to SI units, multiply by the conversion factor. The information in this table is from the following sources: Iverson C, Flanagan A, Fontanarosa PB, et al. *American Medical Association Manual of Style: A Guide for Authors and Editors*. 9th ed. Baltimore, Md: Williams & Wilkins; 1998; Tietz NW, ed. *Clinical Guide to Laboratory Tests*. 3rd ed. Philadelphia, Pa: WB Saunders Co; 1995; Jacobs DS, Demott WR, Grady HJ, et al, eds. *Laboratory Test Handbook*. 4th ed. Hudson, Ohio: Lexi-Comp Inc; 1996; Young DS, Huth EJ. *SI Units for Clinical Measurement*. Philadelphia, Pa: American College of Physicians; 1998; Kratz A, Lewandowski KB. Normal reference laboratory values. *N Engl J Med*. 1998;339:1036-1042.

†Because of the continued use of conventional units in many laboratories in the United States, some of the more common analytes currently are dual reported (identified as "Dual report" in this table), with the SI value and unit listed first, followed by the conventional value and unit. Analytes with a 1-to-1 conversion between SI and conventional units or with a conversion factor that is a multiple of 10 usually are not dual reported. Information on how to convert from SI units to conventional units may be given in the text, in a table footnote, or in a figure legend (eg, to convert ethanol from millimoles per liter to milligrams per deciliter, divide millimoles per liter by 0.217).