

The Department of Laboratory Medicine and Pathology at Mayo Clinic initiated a study to determine stability of analytes under different preservative conditions. This reference chart, built from that study, will enable you to select either temperature conditions or preservatives to maximize the number of tests that can be performed on a single 24-hour collection.

Note: See the Test Catalog for test-specific collection requirements.

		Preservative Options											Transport Temperature		
Published Test Name	Test ID	Temperature Preservation			50% Acetic Acid	Boric Acid	Diazolidinyl Urea	6M Hydrochloric Acid	6M Nitric Acid	Sodium Carbonate	Thymol	Toluene	Ambient (Plain) Internal Only	External	Internal
		Ambient	Refrigerate	Frozen											
Aldosterone, 24 Hour, Urine	ALDU	OK	OK	OK	Preferred	OK	No	No	No	No	No	No	OK	Refrig preferred ≤ 28 days Frozen OK ≤ 28 days Ambient with preservative OK ≤ 14 days	Ambient OK
Aldosterone with Sodium, 24 Hour, Urine	ALDNA	OK	OK	OK	Preferred	OK	No	No	No	No	No	No	OK	Refrig preferred ≤ 14 days Frozen OK ≤ 14 days Ambient with preservative OK ≤ 7 days	Ambient OK
Alpha-1-Microglobulin, 24 Hour, Urine	A1M24	OK	Preferred	OK	OK	OK	No	No	No	No	OK	No	OK	Refrig preferred ≤ 7 days Frozen OK ≤ 7 days Ambient OK ≤ 7 days	Ambient OK
Aluminum, 24 Hour, Urine	ALU	OK	Preferred	OK	OK	No	No	OK	OK	No	No	OK	OK	Refrig preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 28 days	Ambient OK
Ammonium, 24 Hour, Urine	AMMO	No	OK	OK	No	No	Preferred	No	No	No	No	No	No	Refrig preferred ≤ 14 days Frozen OK ≤ 14 days Ambient OK ≤ 72 hours	Ambient OK
Arsenic with Reflex, 24 Hour, Urine	ASU24	OK	Preferred	OK	OK	No	No	OK	OK	No	No	No	OK	Refrig preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 72 hours	Ambient OK
Arsenic Fractionation, 24 Hour, Urine	ASFR	OK	Preferred	OK	OK	No	No	OK	OK	No	No	No	OK	Refrig preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 72 hours	Ambient OK
Arylsulfatase A, 24 Hour, Urine	ARSU	No	Required	No	No	No	No	No	No	No	No	No	No	Refrig preferred ≤ 14 days Frozen NO Ambient NO	Ambient OK
Cadmium, 24 Hour, Urine	CDU	OK	Preferred	OK	OK	No	No	OK	OK	No	No	No	OK	Refrig preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 28 days	Ambient OK
Calcium, 24 Hour, Urine	CALU	OK	Preferred	OK	OK	OK	OK	OK	OK	No	OK	No	OK	Refrig preferred ≤ 14 days Frozen OK ≤ 14 days Ambient OK ≤ 72 hours	Ambient OK
Catecholamine Fractionation, Free, 24 Hour, Urine	CATU	No	OK	OK	Preferred	OK	No	OK	OK	No	No	No	No	Refrig preferred ≤ 7 days Frozen OK ≤ 14 days Ambient with preservative OK ≤ 7 days	Ambient OK
Chloride, 24 Hour, Urine	CLU	OK	Preferred	OK	OK	OK	OK	No	No	No	OK	No	OK	Refrig preferred ≤ 14 days Frozen OK ≤ 14 days Ambient NO	Ambient OK
Chromium, 24 Hour, Urine	CRU	OK	Preferred	OK	No	No	No	No	No	No	No	No	OK	Refrig preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 28 days	Ambient OK

Urine Preservatives—Collection and Transportation for 24-Hour Urine Specimens (continued)

Published Test Name	Test ID	Preservative Options											Transport Temperature		
		Temperature Preservation			50% Acetic Acid	Boric Acid	Diazolidinyl Urea	6M Hydrochloric Acid	6M Nitric Acid	Sodium Carbonate	Thymol	Toluene	Ambient (Plain) Internal Only	External	Internal
		Ambient	Refrigerate	Frozen											
Citrate Excretion, 24 Hour, Urine	CITR	No	OK	OK	No	OK	Preferred	No	No	No	OK	No	No	Refrigerated preferred ≤ 14 days Frozen OK ≤ 14 days Ambient NO	Ambient OK
Cobalt, 24 Hour, Urine	COU	OK	Preferred	OK	No	No	No	No	No	No	No	No	OK	Refrigerated preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 28 days	Ambient OK
Copper, 24 Hour, Urine	CUU	OK	Preferred	OK	OK	No	No	OK	OK	No	No	No	No	Refrigerated preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 28 days	Ambient OK
Cortisol/Cortisone, Free, 24 Hour, Urine	COCOU	No	OK	OK	OK	Preferred	No	No	No	No	No	No	No	Refrigerated preferred ≤ 14 days Frozen OK ≤ 28 days Ambient with preservative OK ≤ 72 hours	Ambient OK
Cortisol, Free, 24 Hour, Urine	CORTU	No	OK	OK	OK	Preferred	No	No	No	No	No	No	No	Refrigerated preferred ≤ 14 days Frozen OK ≤ 28 days Ambient with preservative OK ≤ 7 days	Ambient OK
Creatinine, 24 Hour, Urine	CTU	OK	Preferred	OK	OK	OK	OK	OK	OK	OK	OK	No	Preferred	Refrigerated preferred ≤ 30 days Frozen OK ≤ 30 days Ambient OK ≤ 30 days	Ambient OK
Creatinine Clearance, Serum and 24 Hour Urine	CRCL	Preferred	OK	OK	OK	OK	OK	OK	OK	OK	OK	No	Preferred	Refrigerated preferred Frozen OK Ambient OK	Ambient OK
Cystinuria Profile, Quantitative, 24 Hour, Urine	CYSQN	No	OK	OK	No	No	No	No	No	No	No	Preferred	No	Frozen preferred ≤ 70 days Refrigerated ≤ 14 days Ambient NO	Ambient OK
2, 3-Dinor-11 Beta-Prostaglandin F2 Alpha, Urine	23BPG	No	Preferred	OK	OK	OK	No	No	No	OK	No	No	No	Refrigerated preferred ≤ 14 days Frozen OK ≤ 30 days Ambient OK ≤ 8 hours	Ambient OK
Electrophoresis, Protein, 24 Hour, Urine	EPU PEU (internal)	OK	Preferred	OK	No	No	No	No	No	No	OK	No	OK	Refrigerated preferred ≤ 14 days Frozen OK ≤ 5 days Ambient OK ≤ 72 hours	Ambient OK
Gadolinium, 24 Hour, Urine	GDU	OK	Preferred	OK	No	No	No	OK	OK	No	No	OK	OK	Refrigerated preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 28 days	Ambient OK
Glucose, 24 Hour, Urine	GLUR	No	OK	OK	OK	Preferred	No	OK	OK	No	OK	No	No	Refrigerated preferred ≤ 7 days Frozen OK ≤ 7 days Ambient NO	Ambient OK
Heavy Metals Screen, with Reflex, 24 Hour, Urine	HMU24	No	Preferred	OK	OK	No	No	OK	No	No	No	OK	No	Refrigerated preferred ≤ 7 days Frozen OK ≤ 7 days Ambient NO	Ambient OK
Homovanillic Acid (HVA), 24 Hour, Urine	HVA	No	No	No	Preferred	No	No	OK	No	No	No	No	No	Refrigerated preferred ≤ 28 days Frozen OK ≤ 180 days Ambient NO	Ambient OK
5-Hydroxyindoleacetic Acid (5-HIAA), 24 Hour, Urine	HIAA	No	OK	OK	Preferred	OK	No	OK	OK	OK	OK	OK	No	Refrigerated preferred ≤ 56 days Frozen OK ≤ 365 days Ambient NO	Ambient OK

Urine Preservatives—Collection and Transportation for 24-Hour Urine Specimens (continued)

		Preservative Options											Transport Temperature		
Published Test Name	Test ID	Temperature Preservation			50% Acetic Acid	Boric Acid	Diazolidinyl Urea	6M Hydrochloric Acid	6M Nitric Acid	Sodium Carbonate	Thymol	Toluene	Ambient (Plain) Internal Only	External	Internal
		Ambient	Refrigerate	Frozen											
Immunofixation, 24 Hour, Urine	IFXU	OK	Preferred	OK	No	No	No	No	No	No	OK	No	OK	Refrig preferred ≤ 14 days Frozen OK ≤ 5 days Ambient OK ≤ 72 hours	Ambient OK
Immunoglobulin Total Light Chains, Urine	TLCU	OK < 72 hours	Preferred	OK	No	No	No	No	No	No	No	No	< 72 hours OK	Refrig preferred ≤ 7 days Frozen OK ≤ 20 days Ambient OK ≤ 72 hours	Ambient OK
Iodine, 24 Hour, Urine	UIOD	OK	Preferred	OK	OK	No	No	No	No	No	No	No	OK	Refrig preferred ≤ 146 days Frozen OK ≤ 146 days Ambient OK ≤ 146 days	Ambient OK
Lead, 24 Hour, Urine	PBU	OK	Preferred	OK	OK	No	No	OK	OK	No	No	OK	OK	Refrig preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 28 days	Ambient OK
Leukotriene E4, Urine	LTE4	OK	Preferred	OK	OK	OK	No	No	No	OK	No	No	OK	Refrig preferred ≤ 7 days Frozen OK ≤ 30 days Ambient OK ≤ 24 hours	Ambient OK
Magnesium, 24 Hour, Urine	MAGU	OK	Preferred	OK	OK	OK	OK	OK	OK	No	OK	No	OK	Refrig preferred ≤ 14 days Frozen OK ≤ 14 days Ambient OK ≤ 72 hours	Ambient OK
Manganese, 24 Hour, Urine	MNU	OK	Preferred	OK	No	No	No	No	No	No	No	No	OK	Refrig preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 7 days	Ambient OK
Mercury, 24 Hour, Urine	HGU	No	Preferred	OK	OK	No	No	OK	OK	No	No	OK	No	Refrig preferred ≤ 7 days Frozen OK ≤ 7 days Ambient NO	Ambient OK
Metanephrines, Fractionated, 24 Hour, Urine	METAF	No	OK	OK	Preferred	Preferred	No	OK	OK	OK	No	OK	No	Refrig preferred ≤ 7 days Frozen OK ≤ 14 days Ambient OK ≤ 7 days	Ambient OK
3-Methoxytyramine, 24 Hour, Urine	3MT	OK	OK	OK	Preferred	Preferred	No	OK	OK	OK	No	OK	No	Refrig preferred ≤ 28 days Frozen OK ≤ 90 days Ambient OK ≤ 28 days	Ambient OK
N-Methylhistamine, Urine	NMHIN	OK	Preferred	OK	OK	OK	No	OK	OK	OK	No	No	OK	Refrig preferred ≤ 8 days Frozen OK ≤ 14 days Ambient OK ≤ 24 hours	Ambient OK
Monoclonal Protein Study, 24 Hour, Urine	MPSU	OK	Preferred	OK	No	No	No	No	No	No	OK	No	OK	Refrig preferred ≤ 14 days Frozen OK ≤ 5 days Ambient OK ≤ 72 hours	Ambient OK
Nickel, 24 Hour, Urine	NIU	OK	Preferred	OK	OK	No	No	No	OK	No	No	No	OK	Refrig preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 28 days	Ambient OK
Nitrogen, Total, 24 Hour, Urine	NITU	OK	Preferred	OK	OK	No	No	OK	No	OK	OK	No	OK	Refrig preferred ≤ 7 days Frozen OK Ambient OK ≤ 7 days	Ambient OK
Oxalate, 24 Hour, Urine	OXU	No	OK	OK	No	No	Preferred	No	No	No	OK	No	No	Refrig preferred ≤ 14 days Frozen OK ≤ 14 days Ambient NO	Ambient OK
Phosphorus, 24 Hour, Urine	POU	OK	Preferred	OK	OK	OK	OK	OK	OK	No	OK	No	Preferred	Refrig preferred ≤ 14 days Frozen OK ≤ 14 days Ambient OK ≤ 7 days	Ambient OK

Urine Preservatives—Collection and Transportation for 24-Hour Urine Specimens (continued)

		Preservative Options											Transport Temperature		
Published Test Name	Test ID	Temperature Preservation			50% Acetic Acid	Boric Acid	Diazolidinyl Urea	6M Hydrochloric Acid	6M Nitric Acid	Sodium Carbonate	Thymol	Toluene	Ambient (Plain) Internal Only	External	Internal
		Ambient	Refrigerate	Frozen											
pH, 24 Hour, Urine	UPH24	No	OK	OK	No	No	Preferred	No	No	No	OK	No	No	Refrig preferred ≤ 7 days Frozen OK ≤ 7 days Ambient NO	Ambient OK
Porphyrins, Quantitative, 24 Hour, Urine	PQNU	No	No	No	No	No	No	No	No	Required	No	No	No	Frozen ≤ 7 days Refrig NO Ambient NO	Refrig OK Ambient NO Protect from light
Potassium, 24 Hour, Urine	KUR	OK	Preferred	OK	OK	OK	OK	OK	OK	OK	OK	No	Preferred	Refrig preferred ≤ 14 days Frozen OK ≤ 14 days Ambient OK ≤ 7 days	Ambient OK
Protein, Total, 12 Hour, Urine	12PTU	OK	Preferred	OK	No	OK	No	No	No	No	OK	No	Preferred	Refrig preferred ≤ 14 days Frozen OK ≤ 14 days Ambient OK ≤ 24 hours	Ambient OK
Protein, Total, 24 Hour, Urine	PTU	No	Preferred	OK	No	OK	No	No	No	No	OK	No	Preferred	Refrig preferred ≤ 14 days Frozen OK ≤ 14 days Ambient OK ≤ 24 hours	Ambient OK
Retinol-Binding Protein, 24 Hour, Urine	RBP24	Preferred	OK	OK	No	OK	No	No	No	No	OK	No	Preferred	Refrig preferred ≤ 7 days Frozen OK ≤ 7 days Ambient NO	Ambient OK
Serotonin, 24 Hour, Urine	SERU	OK	Preferred	OK	Preferred	No	No	No	OK	No	No	OK	OK	Frozen preferred ≤ 14 days Refrig OK ≤ 7 days Ambient NO	Frozen OK
Sodium, 24 Hour, Urine	NAU	OK	Preferred	OK	OK	OK	OK	OK	OK	No	OK	No	Preferred	Refrig preferred ≤ 14 days Frozen OK ≤ 14 days Ambient OK ≤ 7 days	Ambient OK
Sulfate, 24 Hour, Urine	SULFU	No	Preferred	OK	No	OK	OK	No	No	OK	OK	No	No	Refrig preferred ≤ 14 days Frozen OK ≤ 14 days Ambient NO	Ambient OK
Supersaturation Profile, 24 Hour, Urine	SAT24	No	OK	OK	No	No	Preferred	No	No	No	No	No	No	Refrig preferred ≤ 14 days Frozen OK ≤ 14 days Ambient NO	Ambient OK
Thallium, 24 Hour, Urine	TLU	OK	Preferred	OK	OK	No	No	OK	OK	No	No	OK	OK	Refrig preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 28 days	Ambient OK
Urea, 24 Hour, Urine	URAU	No	OK	OK	OK	Preferred	OK	OK	OK	OK	OK	No	No	Refrig preferred ≤ 14 days Frozen OK ≤ 14 days Ambient NO	Ambient OK
Uric Acid, 24 Hour, Urine	URCU	No	OK	OK	No	Preferred	OK	No	No	OK	OK	No	No	Refrig preferred ≤ 14 days Frozen OK ≤ 14 days Ambient NO	Ambient OK
Vanillylmandelic Acid (VMA), 24 Hour, Urine	VMA	No	No	No	Preferred	OK	No	OK	OK	No	No	No	No	Refrig preferred ≤ 28 days Frozen OK ≤ 180 days Ambient NO	Ambient OK
Zinc, 24 Hour, Urine	ZNU	OK	Preferred	OK	OK	No	No	OK	OK	No	No	OK	OK	Refrig preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 28 days	Ambient OK

Urine Preservatives—Collection and Transportation for 24-Hour Urine Specimens (continued)

The conditions and concentrations of urine preservatives are defined for 24-hour collections as follows:

Ambient	Room temperature (21–25 degrees C)
Refrigerated	4–8 degrees C
Frozen	-20 degrees C
50% Acetic Acid	25 mL per 24-hour collection
Boric Acid (crystals)	10 g per 24-hour collection
Diazolidinyl Urea (250 g/L)	5 mL per 24-hour collection
6M Hydrochloric Acid	30 mL per 24-hour collection
6M Nitric Acid	15 mL per 24-hour collection
Sodium Carbonate (crystals)	5 g per 24-hour collection
Thymol (10% in isopropanol)	10 mL per 24-hour collection
Toluene	30 mL per 24-hour collection

Preservative and condition guidelines have been evaluated specifically for Mayo Clinic Laboratories assays. If you have questions regarding the use of preservatives, contact Mayo Clinic Laboratories at 800-533-1710 or 507-266-5700.