

Urine Preservatives—Collection and Transportation for 24-Hour Urine Specimens

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	External Only			Boric Acid	50% Acetic Acid	Toluene	Na ₂ CO ₃	6N HCl	6N HNO ₃	Thymol	Ambient (Plain) Internal Only	External	Internal
		Ambient	Refrigerate	Frozen										
Aldosterone, 24 Hour, Urine	ALDU	OK	OK	OK	OK	Preferred	OK	No	No	No	OK	No	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient w/preservative OK ≤7 days	Ambient OK
Aldosterone with Sodium, 24 Hour, Urine	ALDNA	OK	OK	OK	OK	Preferred	OK	No	No	No	OK	No	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient w/preservative OK ≤7 days	Ambient OK
Alpha-1-Microglobulin, 24 Hour, Urine	A1M24	Preferred	OK	OK	OK	OK	OK	Yes	No	No	OK	Preferred	Refrig Preferred ≤7 days Ambient OK ≤7 days Frozen OK ≤7 days	Ambient OK
Aluminum, 24 Hour, Urine	ALU	OK	Preferred	OK	No	OK	OK	No	OK	OK	No	OK	Refrig Preferred ≤28 days Frozen OK ≤28 days Ambient OK ≤28 days	Ambient OK
Arsenic, 24 Hour, Urine	ASU	OK	Preferred	OK	No	OK	OK	No	OK	No	No	OK	Refrig Preferred ≤28 days Frozen OK ≤28 days Ambient OK ≤28 days	Ambient OK
Arsenic Fractionation, 24 Hour, Urine	ASFR	OK	Preferred	OK	No	OK	OK	No	OK	No	No	OK	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient OK ≤7 days	Ambient OK
Arylsulfatase A, 24 Hour, Urine	ARSU	No	Required	No	No	No	No	No	No	No	No	No	Refrig Preferred ≤14 days Ambient NO Frozen NO	Ambient OK
11 Beta-Prostaglandin F2 Alpha, 24 Hour, Urine	BPG2	No	OK	OK	OK	Preferred	OK	No	OK	OK	OK	No	Frozen Preferred ≤14 days Refrig OK ≤7 days Ambient NO	Refrig OK Ambient NO
Cadmium, 24 Hour, Urine	CDU	OK	Preferred	OK	No	OK	OK	No	OK	OK	No	OK	Refrig Preferred ≤28 days Frozen OK ≤28 days Ambient OK ≤28 days	Ambient OK
Calcium, 24 Hour, Urine	CAU	OK	Preferred	OK	OK	OK	OK	No	OK	OK	No	OK	Refrig Preferred ≤28 days Frozen OK ≤28 days Ambient OK ≤14 days	Ambient OK
Calcium/Creatinine, 24 Hour, Urine	CACU	OK	Preferred	OK	OK	OK	OK	No	OK	OK	No	OK	Refrig Preferred ≤28 days Frozen OK ≤28 days Ambient OK ≤14 days	Ambient OK
Catecholamine Fractionation, Free, 24 Hour, Urine	CATU	No	OK	OK	OK	Preferred	No	No	OK	OK	OK	No	Refrig Preferred ≤7 days Ambient w/preservative OK ≤7 days Frozen OK ≤14 days	Ambient OK
Chloride, 24 Hour, Urine	CLU	OK	Preferred	OK	OK	OK	OK	No	No	No	OK	Preferred	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient NO	Ambient OK

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		PRESERVATIVE OPTIONS											TRANSPORT TEMPERATURE	
Published Test Name	Test ID	External Only			Boric Acid	50% Acetic Acid	Toluene	Na ₂ CO ₃	6N HCl	6N HNO ₃	Thymol	Ambient (Plain) Internal Only	External	Internal
		Ambient	Refrigerate	Frozen										
Chromium, 24 Hour, Urine	CRU	OK	Preferred	OK	No	No	No	No	No	No	No	OK	Refrig Preferred ≤28 days Frozen OK ≤28 days Ambient OK ≤28 days	Ambient OK
Citrate Excretion, 24 Hour, Urine	CITR	No	OK	OK	OK	No	Preferred	No	No	No	OK	No	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient NO	Ambient OK
Cobalt, 24 Hour, Urine	COU	OK	Preferred	OK	No	OK	OK	No	OK	OK	No	OK	Refrig Preferred ≤28 days Frozen OK ≤28 days Ambient OK ≤28 days	Ambient OK
Copper, 24 Hour, Urine	CUU	OK	Preferred	OK	No	OK	OK	No	OK	OK	No	No	Refrig Preferred ≤28 days Frozen OK ≤28 days Ambient OK ≤28 days	Ambient OK
Cortisol/Cortisone, Free, 24 Hour, Urine	COCOU	No	OK	OK	Preferred	OK	OK	OK	No	No	OK	No	Refrig Preferred ≤7 days Frozen OK ≤14 days Ambient w/preservative OK ≤7 days	Ambient OK
Cortisol, Free, 24 Hour, Urine	CORTU	No	OK	OK	Preferred	OK	OK	OK	No	No	OK	No	Refrig Preferred ≤7 days Frozen OK ≤14 days Ambient w/preservative OK ≤7 days	Ambient OK
Creatinine, 24 Hour, Urine	CTU	Preferred	OK	OK	OK	OK	OK	OK	OK	OK	OK	Preferred	Refrig Preferred ≤30 days Ambient OK ≤30 days Frozen OK ≤30 days	Ambient OK
Creatinine Clearance, Serum and 24-Hour Urine	CRC	Preferred	OK	OK	OK	OK	OK	OK	OK	OK	OK	Preferred	Refrig Preferred Frozen OK Ambient OK - Urine	Ambient OK
Cystinuria Profile, Quantitative, 24 Hour, Urine	CYSQN	No	OK	OK	No	No	Preferred	No	No	No	No	No	Frozen Preferred ≤14 days Refrig with Toluene OK Ambient NO	Ambient OK
Electrophoresis, Protein, 24 Hour, Urine	EPU	OK	Preferred	OK	No	No	OK	No	No	No	OK	Preferred	Refrig Preferred ≤14 days Frozen OK ≤5 days Ambient OK ≤3 days	Ambient OK
Electrophoresis, Protein, 24 Hour, Urine INTERNAL ONLY	PEU	OK	Preferred	OK	No	No	OK	No	No	No	No	Preferred	Refrig Preferred ≤14 days Frozen OK ≤5 days Ambient OK ≤3 days	Ambient OK
Gadolinium, 24 Hour, Urine	GDU	OK	Preferred	OK	No	No	OK	No	OK	OK	No	OK	Refrig Preferred ≤28 days Frozen OK ≤28 days Ambient OK ≤28 days	Ambient OK
Glucose, 24 Hour, Urine	GLUR	No	OK	OK	Preferred	OK	OK	No	OK	OK	OK	No	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient NO	Ambient OK
Heavy Metals Screen, 24 Hour, Urine	HMSU	No	Preferred	OK	No	OK	OK	No	OK	No	No	No	Refrig Preferred ≤7 days Frozen OK ≤7 days	Ambient OK
Homovanillic Acid (HVA), 24 Hour, Urine	HVA	No	No	No	No	Preferred	No	No	OK	No	No	No	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient OK ≤7 days	Ambient OK
5-Hydroxyindoleacetic Acid (5-HIAA), 24 Hour, Urine	HIAA	No	OK	OK	OK	Preferred	OK	OK	OK	OK	OK	No	Refrig Preferred ≤56 days Frozen OK ≤365 days Ambient NO	Ambient OK

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Published Test Name	Test ID	External Only			Boric Acid	50% Acetic Acid	Toluene	Na ₂ CO ₃	6N HCl	6N HNO ₃	Thymol	Ambient (Plain) Internal Only	External	Internal
		Ambient	Refrigerate	Frozen										
Immunofixation, 24 Hour, Urine	IFXU	OK	Preferred	OK	No	No	OK	No	No	No	OK	Preferred	Refrig Preferred ≤14 days Frozen OK ≤5 days Ambient OK ≤3 days	Ambient OK
Immunoglobulin Total Light Chains, Urine	TLCU	OK <72 Hours	Preferred	OK	No	No	No	No	No	No	No	<72 Hours OK	Refrig Preferred ≤7 days Frozen OK ≤20 days Ambient OK ≤3 days	Ambient OK
Inherited Conjugated Hyperbilirubinemias, 24 Hour, Urine	CI	No	No	No	No	No	No	Required	No	No	No	No	Frozen Preferred ≤7 days Refrig NO Ambient NO	Ambient OK
Iodine, 24 Hour, Urine	UIOD	OK	Preferred	OK	No	OK	No	No	No	No	No	OK	Refrig Preferred ≤146 days Frozen OK ≤146 days Ambient OK ≤146 days	Ambient OK
Iron, 24 Hour, Urine	FEU	No	Preferred	OK	No	OK	OK	No	OK	OK	No	No	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient NO	Ambient OK
Lead, 24 Hour, Urine	PBU	OK	Preferred	OK	No	OK	OK	No	OK	OK	No	OK	Refrig Preferred ≤28 days Frozen OK ≤28 days Ambient OK ≤28 days	Ambient OK
Magnesium, 24 Hour, Urine	MGU	OK	Preferred	OK	OK	OK	OK	No	OK	OK	No	OK	Refrig Preferred ≤28 days Frozen OK ≤7 days Ambient OK ≤7 days	Ambient OK
Manganese, 24 Hour, Urine	MNU	OK	Preferred	OK	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	No	OK	OK	No	OK	OK	No	No	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient NO	Ambient OK
Metanephrines, Fractionated, 24 Hour, Urine	METAF	No	OK	OK	Preferred	Preferred	OK	OK	OK	OK	OK	OK	Refrig Preferred ≤7 days Frozen OK ≤14 days Ambient OK ≤7 days	Ambient OK
N-Methylhistamine, 24 Hour, Urine	NMHIN	OK	Preferred	OK	OK	OK	OK	OK	OK	OK	OK	OK	Refrig Preferred ≤8 days Frozen OK ≤14 days Ambient OK ≤2 days	Ambient OK
Microalbuminuria, 24 Hour, Urine	MA24	Preferred	OK	OK	OK	No	OK	No	No	No	OK	OK	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient OK ≤7 days	Ambient OK
Molybdenum, 24 Hour, Urine	MOLU	OK	Preferred	OK	No	OK	OK	No	OK	No	No	OK	Refrig Preferred ≤28 days Ambient OK ≤28 days Frozen OK ≤28 days	Ambient OK
Monoclonal Protein Study, 24 Hour, Urine	MPSU	OK	Preferred	OK	No	No	OK	No	No	No	OK	Preferred	Refrig Preferred ≤14 days Frozen OK ≤5 days Ambient OK ≤3 days	Ambient OK
Nickel, 24 Hour, Urine	NIU	OK	Preferred	OK	No	OK	No	No	No	OK	No	OK	Refrig Preferred ≤28 days Frozen OK ≤28 days Ambient OK ≤28 days	Ambient OK
Nitrogen, Total, 24 Hour, Urine	NITU	OK	OK	Preferred	No	OK	OK	OK	OK	No	OK	Preferred	Refrig Preferred ≤7 days Frozen OK Ambient OK ≤7 days	Ambient OK
NTX-Telopeptide, 24 Hour, Urine	NTXPR	No	OK <5 days	Preferred	OK	No	OK	No	No	No	No	No	Frozen Preferred ≤30 days Refrig OK ≤5 days Ambient NO	Ambient OK

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Published Test Name	Test ID	External Only			Boric Acid	50% Acetic Acid	Toluene	Na ₂ CO ₃	6N HCl	6N HNO ₃	Thymol	Ambient (Plain) Internal Only	External	Internal
		Ambient	Refrigerate	Frozen										
Oxalate, 24 Hour, Urine	OXU	No	OK	OK	No	No	Preferred	No	No	No	OK	No	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient NO	Ambient OK
Phosphorus, 24 Hour, Urine	POU	OK	Preferred	OK	OK	OK	OK	No	OK	OK	OK	Preferred	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient OK ≤7 days	Ambient OK
pH, 24 Hour, Urine	UPH24	No	OK	OK	No	No	Preferred	No	No	No	OK	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	Required	No	No	No	No	Refrig Preferred ≤7 days Protect from Light Frozen NO Ambient NO	Refrig OK Protect from Light
Potassium, 24 Hour, Urine	KUR	OK	Preferred	OK	OK	OK	OK	OK	OK	OK	OK	Preferred	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient OK ≤7 days	Ambient OK
Protein, Total, 24 Hour, Urine	PTU	OK	Preferred	OK	OK	No	OK	No	No	No	OK	Preferred	Refrig Preferred ≤7 days Frozen OK ≤14 days Ambient OK ≤7 days	Ambient OK
Retinol-Binding Protein, 24 Hour, Urine	RBP24	Preferred	OK	OK	OK	No	OK	No	No	No	OK	Preferred	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient NO	Ambient OK
Selenium, 24 Hour, Urine	SEU	OK	Preferred	OK	No	OK	OK	No	OK	OK	No	OK	Frozen Preferred ≤28 days Refrig OK ≤28 days Ambient OK ≤28 days	Ambient OK
Serotonin, 24 Hour, Urine	SERU	No	Preferred	OK	No	Preferred	OK	No	No	OK	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	No	OK	OK	OK	Preferred	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient OK ≤7 days	Ambient OK
Sulfate, 24 Hour, Urine	SULFU	No	Preferred	OK	OK	No	OK	OK	No	No	OK	Preferred	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient NO	Ambient OK
Supersaturation Profile, 24 Hour, Urine	SSAT	No	OK	OK	No	No	Preferred	No	No	No	No	No	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient NO	Ambient OK
Thallium, 24 Hour, Urine	TLU	OK	Preferred	OK	No	OK	OK	No	OK	OK	No	OK	Refrig Preferred ≤28 days Frozen OK ≤28 days Ambient OK ≤28 days	Ambient OK
Titanium, 24 Hour, Urine	TIU	OK	Preferred	OK	No	OK	No	No	OK	OK	No	OK	Refrig Preferred ≤28 days Ambient OK ≤28 days Frozen OK ≤28 days	Ambient OK
Urea, 24 Hour, Urine	URAU	No	OK	OK	Preferred	OK	OK	OK	OK	OK	OK	No	Refrig Preferred Frozen OK Ambient NO	Ambient OK
Uric Acid, 24 Hour, Urine	URCU	No	OK	OK	Preferred	No	OK	OK	No	No	OK	No	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient NO	Ambient OK

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		PRESERVATIVE OPTIONS											TRANSPORT TEMPERATURE	
Published Test Name	Test ID	External Only			Boric Acid	50% Acetic Acid	Toluene	Na ₂ CO ₃	6N HCl	6N HNO ₃	Thymol	Ambient (Plain) Internal Only	External	Internal
		Ambient	Refrigerate	Frozen										
Vanadium, 24 Hour, Urine	VU	OK	Preferred	OK	No	No	No	No	No	No	No	No	Refrig Preferred ≤28 days Frozen OK ≤28 days Ambient OK ≤7 days	Ambient OK
Vanillylmandelic Acid (VMA), 24 Hour, Urine	VMA	No	No	No	OK	Preferred	No	No	OK	OK	No	No	Refrig Preferred ≤7 days Frozen OK ≤7 days Ambient NO	Ambient OK
Xanthine and Hypoxanthine, 24 Hour, Urine	XAN	No	OK	Preferred	No	No	No	No	No	No	No	No	Frozen Preferred ≤7 days Refrig OK ≤7 days Ambient NO	Ambient OK
Zinc, 24 Hour, Urine	ZNU	OK	Preferred	OK	No	OK	OK	No	OK	OK	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

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

Ambient	Room temperature (21-25 degrees C)
Refrigerated	4 degrees C
Frozen	-20 degrees C
6N HCl	30 mL per 24-hour collection
50% Acetic Acid	25 mL per 24-hour collection
Na₂CO₃ (crystals)	5 g per 24-hour collection
Toluene	30 mL per 24-hour collection
6N HNO₃	15 mL per 24-hour collection
Boric Acid (crystals)	10 g per 24-hour collection
Thymol (10% in isopropanol)	10 mL per 24-hour collection

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