

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.

| 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 | | | | | | | | | | | |
| Adrenal Mass Panel, 24 hour, Urine | ACC | No | OK | OK | No | No | No | No | No | No | No | No | No | Frozen preferred ≤ 90 days Refrig ≤ 14 days | Frozen OK |
| Albumin, 24 Hour, Urine | ALB24 | OK | Preferred | OK | No | OK | No | No | No | No | OK | No | OK | Refrig preferred ≤ 7 days Ambient OK ≤ 7 days Frozen OK ≤ 7 days | Ambient OK |
| 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 | No | OK | Refrig preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 28 days | Ambient OK |
| Ammonium, 24 Hour, Urine | AMMO | No | OK | OK | OK | OK | Preferred | OK | No | No | OK | 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 |
| Arsenic Speciation, 24 Hour, Urine | SPASU | No | Preferred | OK | OK | No | No | OK | No | No | No | No | No | Refrig preferred 28 days Frozen 28 days Ambient 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 |

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 | | | | | | | | | | | |
| Chloride, 24 Hour, Urine | CLU | OK | Preferred | OK | OK | OK | OK | No | No | No | OK | No | OK | Refrigerate 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 | Refrigerate preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 28 days | Ambient OK |
| Citrate Excretion, 24 Hour, Urine | CITR | No | OK | OK | No | OK | Preferred | No | No | No | OK | No | No | Refrigerate 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 | Refrigerate 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 | OK | Refrigerate 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 | Refrigerate 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 | Refrigerate 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 | OK | Refrigerate 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 | Refrigerate 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 Refrigerate ≤ 14 days Ambient NO | Ambient OK |
| 2, 3-Dinor-11 Beta-Prostaglandin F2 Alpha, Urine | 23BPG | No | Preferred | OK | OK | OK | OK | No | No | OK | No | No | No | Refrigerate 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 | Refrigerate 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 | No | OK | Refrigerate 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 | Refrigerate 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 | Refrigerate preferred ≤ 7 days Frozen OK ≤ 7 days Ambient NO | Ambient OK |
| Homovanillic Acid, 24 Hour, Urine | HVA | No | No | No | Preferred | No | No | OK | No | No | No | No | No | Refrigerate preferred ≤ 28 days Frozen OK ≤ 180 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 | | | | | | | | | | | |
| 5-Hydroxyindoleacetic Acid, 24 Hour, Urine | HIAA | No | OK | OK | Preferred | OK | No | OK | OK | OK | OK | OK | No | Refrig preferred ≤ 56 days Frozen OK ≤ 365 days Ambient NO | Ambient OK |
| 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 ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 28 days | Ambient OK |
| 3-Methoxytyramine, 24 Hour, Urine | 3MT | OK | OK | OK | Preferred | Preferred | No | OK | OK | OK | No | OK | OK | Refrig preferred ≤ 28 days Frozen OK ≤ 90 days Ambient OK ≤ 28 days | Ambient OK |
| N-Methylhistamine, 24 Hour, Urine | NMH24 | OK | Preferred | OK | OK | OK | No | OK | OK | OK | No | No | OK | Refrig preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 14 days | 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 |

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 | | | | | | | | | | | |
| Phosphorus, 24 Hour, Urine | POU | OK | Preferred | OK | OK | OK | OK | OK | OK | No | OK | No | OK | Refrig preferred ≤ 14 days Frozen OK ≤ 14 days Ambient OK ≤ 7 days | Ambient OK |
| 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 | OK | 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 | OK | 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 | No | 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 | Refrig preferred ≤ 28 days Frozen OK ≤ 28 days Ambient OK ≤ 48 hours | Refrig OK |
| Sodium, 24 Hour, Urine | NAU | OK | Preferred | OK | OK | OK | OK | OK | OK | No | OK | No | OK | 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 | No | 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, 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 | 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)

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.