

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.

*Protect from light.

| | | 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 ≤28 days Frozen OK ≤28 days Ambient w/preservative OK ≤14 days | Ambient OK |
| Aldosterone with Sodium, 24 Hour, Urine | ALDNA | OK | OK | OK | OK | Preferred | OK | No | No | No | OK | No | Refrig Preferred ≤14 days Frozen OK ≤14 days Ambient w/preservative OK ≤7 days | Ambient OK |
| Alpha-1-Microglobulin, 24 Hour, Urine | A1M24 | OK | Preferred | OK | OK | OK | OK | No | No | No | OK | OK | 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 |
| Ammonium, 24 Hour, Urine | AMMO | OK | Preferred | OK | No | No | Preferred | No | No | No | No | No | Refrig Preferred ≤14 days Ambient OK ≤72 hours Frozen OK ≤14 days | Ambient NO |
| 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 |
| 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 | CALU | OK | Preferred | OK | OK | OK | OK | No | OK | OK | OK | 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 | 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 ≤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 | 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

| | | 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 | | | | | | | | | | |
| Citrate Excretion, 24 Hour, Urine | CITR | No | OK | OK | OK | No | Preferred | No | No | No | OK | No | Refrig Preferred ≤14 days Frozen OK ≤14 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 | OK | Preferred | 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 | 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 |
| 2,3-Dinor-11Beta-Prostaglandin F2 Alpha, Urine | 23BPG | No | Preferred | OK | OK | OK | OK | OK | No | No | No | OK | Refrig Preferred ≤7 days Ambient OK ≤8 hours Frozen OK ≤30 days | Refrig OK Ambient NO |
| 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 ≤72 hours | 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 ≤72 hours | 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 NO | 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 NO | 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 |

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

| | | 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 | | | | | | | | | | |
| 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 ≤72 hours | 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 ≤72 hours | 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 Protect from light |
| 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 |
| 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 | MAGU | OK | Preferred | OK | OK | OK | OK | No | OK | OK | OK | 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 | 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 ≤24 hours | Ambient OK |
| Microalbuminuria, 24 Hour, Urine | MA24 | OK | Preferred | 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 ≤72 hours | 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 | OK | 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 | Refrig OK |
| Oxalate, 24 Hour, Urine | OXU | No | OK | OK | No | No | Preferred | No | No | No | OK | No | Refrig Preferred ≤14 days Frozen OK ≤14 days Ambient NO | Ambient OK |

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

| | | 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 | | | | | | | | | | |
| Phosphorus, 24 Hour, Urine | POU | OK | Preferred | OK | OK | OK | OK | No | OK | OK | OK | Preferred | 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 | 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 | Frozen ≤7 days Ambient NO Refrig NO | Refrig OK Ambient NO Protect from light |
| Potassium, 24 Hour, Urine | KUR | OK | Preferred | OK | OK | OK | OK | OK | OK | OK | OK | Preferred | Refrig Preferred ≤14 days Frozen OK ≤14 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 | Refrig Preferred ≤28 days Frozen 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 ≤14 days Frozen OK ≤14 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 ≤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 | Refrig Preferred ≤14 days Frozen OK ≤14 days Ambient NO | Refrig 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 |
| Urea, 24 Hour, Urine | URAU | No | OK | OK | Preferred | OK | OK | OK | OK | OK | OK | No | Refrig Preferred ≤14 days Frozen OK ≤14 days Ambient NO | Ambient OK |
| Uric Acid, 24 Hour, Urine | URCU | No | OK | OK | Preferred | No | OK | OK | No | No | OK | No | Refrig Preferred ≤14 days Frozen OK ≤14 days Ambient NO | Ambient OK |
| 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 |

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

| | | 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 | | | | | | | | | | |
| 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 |

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.