

## Specimen Collection Trace Elements

### Minimum Volume Requirements:

Matrix Type	Minimum Requirement	Preferred amount
Plasma	0.5 ml	3.0 ml
Serum	0.5 ml	3.0 ml
Erythrocyte	1.0 ml	3.0 ml
Whole Blood	1.0 ml	6.0 ml
Urine	5.0 ml	10.0 ml
Hair	0.04 g	0.2 g (or more)
Tissue	0.0003 g	0.001 g (or more)

### Collection Procedure for Red Cells:

- For blood collection for a Erythrocyte panel, with the use of:
  - Sodium Heparin Greiner Vacuette - Erythrocyte Potassium will be done
  - Potassium EDTA BD Vacutainer - Erythrocyte Potassium will not be done
- **Note:** If it is not clearly marked on the requisition which vacutainer was used, the Erythrocyte Panel will be performed without the Erythrocyte Potassium; this cannot be changed once the blood has been tested.
- Collect two tubes of blood using 6.0 ml Potassium EDTA Royal Blue Vacutainer tube by BD or two tubes Sodium Heparin Royal Blue Vacuette by Greiner
- Gently mix, then centrifuge with the stopper on for 15 minutes. Sample must be spun and separated within 30 minutes.
- Take off the plasma and the Buffy Coat from the tubes, and just a little of the red cells, using a polyethylene transfer pipette and discard this. Make sure there is no plasma left on the red cells.
- Pour the remaining red cells from the tube into an 8 ml Sarstedt polypropylene tube. Be sure to let all the blood drain into the tube.
- Store at 2 to 8 °C or –20 °C until mailing.
- Ship at room temperature if using one-day courier service. If longer than 1 day shipping use ice packs or dry ice to keep at 2 to 8 °C.

### Collection Procedure for Whole Blood:

- Collect one tube of blood using 6.0 ml Potassium EDTA Royal Blue Vacutainer tube by BD or one tube Sodium Heparin Royal Blue Vacuette by Greiner.
- Gently mix.
- Store at 2 to 8 °C until mailing.
- Ship at room temperature if using one-day courier service. If longer than 1 day shipping use ice packs or dry ice to keep at 2 to 8 °C.

**Collection Procedure for Antimony in Whole Blood and Erythrocytes:**

- Collect one tube of blood using 10.0 ml glass Sodium Heparin Green top Vacutainer tube by BD, follow the same procedure as outlined above for the Whole Blood and Erythrocytes.

**Collection Procedure for Plasma:**

- Collect one tube of blood using 6.0 ml Potassium EDTA Royal Blue Vacutainer tube by BD or one tube Sodium Heparin Royal Blue Vacutainer by Greiner
- Gently mix, then centrifuge with the stopper on for 15 minutes. Samples must be spun and separated within 30 minutes.
- Transfer the plasma, using a polypropylene transfer pipette into a 7 ml Sarstedt polypropylene tube.
- Store at 2 to 8 °C or –20 °C until mailing.
- Ship at room temperature if using one-day courier service. If longer than 1 day shipping use ice packs or dry ice to keep at 2 to 8 °C.

**Collection Procedure for Serum:**

- Collect one tube of blood using a plastic 7 ml non-additive, red label blue top Vacutainer tube. Becton Dickinson Ref# 368380. Suitable for all except for Aluminum and Antimony.
- Allow blood to clot for 20 minutes, then centrifuge with the stopper on for 15 minutes.
- Transfer the serum, using a polypropylene transfer pipette into a 7 ml Sarstedt polypropylene tube.
- Store at 2 to 8 °C or –20 °C until mailing.
- Ship at room temperature if using one-day courier service. If longer than 1 day shipping use ice packs or dry ice to keep at 2 to 8 °C.

**Note:** Concentrations of Chromium, Manganese, Selenium, Vanadium and Zinc are much higher in erythrocytes than in plasma. The results of these elements in plasma or serum may be falsely elevated if not separated within 30 minutes or hemolysis is present.

### **Collection Procedure for 24-hour urine:**

Use a wide mouthed 4 L polypropylene or polyethylene container. If needed use a beaker to collect urine, keep beaker in plastic bag during collection period.

### **Instructions to the Patient:**

It is recommended that collection be made early in the morning (e.g. 0700 h day 1), but may actually be started at any time.

- Patients voids urine to empty bladder completely. The time is noted at the start of the collection. This urine is discarded and is not part of the collection.
- All voidings are then collected into the 24 h urine container or in the beaker, as they are passed, up to and **including the last voiding at the 24<sup>th</sup> hour of the collection** (e.g. 0700h day 2). If using the beaker, place the beaker in the plastic bag in between collections.
- The urine container is kept in the refrigerator during the collection.
- Accurately label the requisition and container with the patient's ID, time urine started, time finished and dates.
- Read the total volume from the urine container; note the total volume on the requisition.
- Mix the urine container and fill one 13 ml Sarstedt polypropylene tube, make sure to fill it almost to the top. Label with patient name and date.
- Ship at room temperature if using one-day courier service. If longer than 1 day shipping use ice packs or dry ice to keep at 2 to 8 °C.
- Dietary restrictions:
  - Aluminum** – avoid fruit juices and tea 24 hours before beginning collection
  - Arsenic** - avoid seafood consumption five days prior to collecting sample
  - Mercury** – avoid seafood consumption five days prior to collecting sample.
  - Essential elements** – avoid mineral supplements for five days

**Note:** Containers do not need to be acid washed.

**No preservative** is needed for the collection of the 24-hour urine.

### **Random Urine collection**

- Collect midstream urine into a sterile 100 ml container. **Make sure the inside of the lid is without paper product.**
- If mailing back in small box, shake the container and fill one 13 ml Sarstedt polypropylene tube (make sure to fill it to the top), label with patient name and date.
- Ship at room temperature if using one-day courier service. If longer than 1 day shipping use ice packs or dry ice to keep at 2 to 8 °C.
- Dietary restrictions:
  - Aluminum** - avoid fruit juices and tea 24 hours before beginning collection
  - Arsenic** - avoid seafood consumption five days prior to collecting sample
  - Mercury** - avoid seafood consumption five days prior to collecting sample.
  - Essential elements** - avoid mineral supplements for five days

### **Test Restrictions:**

The ACGIH has noted that random urines <2.65 or >26.5 mmol/L Creatinine can result in the concentration of the analyte being overcorrected or under corrected. Suggest recollect to reassess.

**Note:** Containers do not need to be acid washed.

**Collection Procedure for Hair:**

- Hair should be collected closest to the scalp and cut at the nape of the neck.
- Collect in several places, from 6 to 8 spots.
- One heaping teaspoon is needed.
- For long hair, save 1 inch of hair from the scalp end, and place in the plastic envelope.
- For short hair, thinning shears can be used.
- The test should not be done if hair has been permed, bleached or dyed in the past two months.
- Be sure to fill out the requisition, put patient names, age, sex and date on the plastic envelope.

**Tissue collection:**

**Minimum weight 0.2 mg**

- Mount a paraffin block and send the whole block or part of.

**OR**

- Use only powder-free gloves. Use powder-free plastic gloves whenever possible, or rinse the exterior powder from surgical latex gloves with deionized water.
- If possible transfer the tissue with Teflon or plastic coated forceps.
- Rinse the tissue sample with deionized water after collection and immediately place it in a polypropylene test tube. Close the tube securely and transport to lab immediately.
- If immediate transport is not an option, the tissue can be frozen and then shipped to the laboratory in an insulated container using an ice pack or dry ice.
- Samples for analysis may include paraffin blocks, fresh or frozen tissue in saline or formalin.
- **Paraffin blocks are the preferred sample.**

**Nails Collection:**

- Use a clean pair of nail clippers or scissors.
- Nails should be free of polish, dirt and debris.
- Clip nails from all fingers and toes onto a clean piece of paper.
- Place into a clean mailing envelope.

**Catalogue information regarding collection items as listed below:**

**Suppliers:**

- Fisher Scientific at [www.fishersci.com](http://www.fishersci.com)
- VWR at [www.VWR.com](http://www.VWR.com)
- Sarstedt at [www.sarstedt.com](http://www.sarstedt.com)

**Catalogue Reference numbers:**

- **Becton Dickinson Non Additive Royal Blue Vacutainer Reference # 368380**
  - **USA** - Fisher Catalogue # 14-816-154, sold per 100 or 1000
  - **Canada** – Fisher Catalogue # 361-005-366
  - **USA** - VWR Catalogue # 89005-528, sold per 1000
  - **Canada** – VWR Catalogue # CA89005-528, sold per 100 or per 1000
- **Becton Dickinson Potassium EDTA Royal Blue Vacutainer Reference # 368381**
  - **USA** - Fisher Catalogue # 14-816-155, sold per 100 or 1000
  - **Canada** - Fisher Catalogue # 02-688-70
  - **USA** - VWR Catalogue # 89005-530, sold per 1000
  - **Canada** - VWR Catalogue # CA89005-530, sold per 100 or per 1000
- **Becton Dickinson Glass Sodium Heparin Green Vacutainer Reference # 366480**
  - **USA/Canada** - Fisher Catalogue # 02-685-313, sold per 100 or 1000
  - **Canada** - Fischer Catalogue # 02-685-3B
  - **USA** - VWR Catalogue # VT6480, sold per 100 or 1000
  - **Canada** - VWR Catalogue # CABD366480, sold per 100 or per 1000
- **Greiner Sodium Heparin Royal Blue Vacuette Reference # 456275**
  - **USA/Canada** Fisher Catalogue # 22040309, sold per 50 or 1200
  - **USA** - VWR Catalogue # 95057-259, sold per 50 or 1200
  - **Canada** - Not available
- **Sarstedt 8 ml polypropylene tube Ref# 60.542.024, sold per 1000**
  - **USA** - Fisher Catalogue # NC9691446
- **Sarstedt 13 ml polypropylene tube Ref# 60.540 sold per 500**
  - **USA** - Fisher Catalogue # NC9997187
- **Polyethylene transfer pipette**
  - **USA/Canada** - Fisher Catalogue # 13-711-20, sold per 500
  - **USA** - VWR Catalogue # 414004-043, sold per 500
  - **Canada** - VWR Catalogue # CA414004-043, sold per 500
- **Random Urine Collection Container, Starplex 90 ml**
  - **USA** - Fisher Catalogue # 02-883-25
  - **USA** - VWR Catalogue # 97035-688, sold per 400
  - **Canada** - VWR Catalogue # CA73240-109, sold per 400
- **24 Hour urine container, 4 liters**
  - **USA/Canada** - Fisher Catalogue # 11-888-2, sold per 30
  - **USA** - Catalogue # 60872-566, sold per 30
  - **Canada** - Catalogue # CA60872-566, sold per 30