



## Urine Products

For collection, storage, and transport of urine specimens.

Read product circular carefully before use. Sterile except as noted.

For In Vitro Diagnostic Use.

### BD Vacutainer® Urine Products

Specimen Collection Cups  
Transfer Straws  
16 x 100mm Plus Conical UA Tubes  
16 x 100mm Plus Round Bottom UA Tubes  
16 x 100mm Plus Conical UA Preservative Tubes  
16 x 75mm Glass C&S Preservative Tubes  
16 x 100mm Glass C&S Preservative Tubes\*  
13 x 75mm Plus C&S Preservative Tubes

\*Only available in kit format.

### BD Vacutainer® Urine Specimen Kits

Combinations of BD Vacutainer® Urine Products are available in various kit formats.

- Urine Transfer Straw Kit - A kit composed of a transfer straw with a C&S Preservative Tube or UA Tube.
- Urine Cup Kit - A kit composed of a specimen collection cup with either a C&S Preservative Tube and a castile soap towelette, or a UA Tube.
- Urine Complete Kit - A kit composed of a C&S Preservative Tube, a UA Tube, a specimen collection cup, and a castile soap towelette.

Kits containing BD Vacutainer® Specimen Collection Cups and C&S Preservative Tubes have castile soap towelettes. These towelettes are supplied for cleansing the genitourinary area prior to collecting a clean-catch midstream urine specimen. Follow recommended hospital procedures for collection.

### BD Vacutainer® Urine Collection Products

#### Product Descriptions:

• The BD Vacutainer® Specimen Collection cup is a plastic cup graduated to indicate a volume of 4.5 oz or 120 mL of urine. It is closed with a screw cap containing an integrated sampling device and has a sterile interior which is maintained provided the cup lid is tightly secured.

The cannula sleeve on the cup contains dry natural rubber. Store cup at 4-35° C.

• The BD Vacutainer® Transfer Straw is a holder device that contains a needle with a straw attachment that can be used with most specimen cups to fill evacuated tubes. This product is not sterile.

#### Intended Use of BD Vacutainer® Urine Collection Products

1. Urine collected into the BD Vacutainer® Specimen Collection Cup (cup) may be transferred via the integrated sampling device into an evacuated tube for transport and storage. In addition, the cup may be used to transport the entire specimen, provided adequate packaging and labeling is used.
2. Urine collected into an alternate vessel may be transferred via the BD Vacutainer® Transfer Straw into an evacuated tube for transport and storage.

#### Limitations of Urine Collection Products:

1. There is no preservative present in the cup. Specimens not tested or preserved within 1-2 hours of collection should be refrigerated.
2. Due to the deadspace in the BD Vacutainer® Specimen Collection Cup with integrated sampling device, approximately 2.25 ml of the urine sample is unavailable in a cup resting on a flat surface. The cup may be tilted to fill the tube, and approximately 0.6 ml of the urine sample will be unavailable. If the sample volume in the cup is insufficient to fill the urine tube, remove the stopper of the tube and pour the urine into the tube. Tubes containing additives must be filled to the minimum fill lines. Refer to UA Preservative Tube and C&S Preservative Tube directions concerning mixing.

### BD Vacutainer® Urine Tubes for Culture and Sensitivity

#### Product Descriptions:

• The 16 x 75mm BD Vacutainer® Glass C&S Preservative Tube has a 5 mL draw volume, a lyophilized maintenance formula and a gray stopper. A minimum fill line of 4 mL is indicated on the label. The product is stable when stored at temperatures of 4-35° C.

• The 16 x 100mm BD Vacutainer® Glass C&S Preservative Tube has a 10 mL draw volume, a lyophilized maintenance formula and a gray stopper. A minimum fill line of 9 mL is indicated on the label. The product is stable when stored at temperatures of 4-35° C.

The mean concentration of the preservative in the urine sample in the glass C & S Preservative Tube is:  
Boric acid: 6.70 mg/mL  
Sodium formate: 3.35 mg/mL

• The 13 x 75mm BD Vacutainer® Plus C & S Preservative Tube has a 4 mL draw volume, a lyophilized maintenance formula and a light gray and cherry red stopper. A minimum fill line of 3 mL is indicated on the label. The product is stable when stored at temperatures of 4°-25° C.

The mean concentration of the preservative in the urine sample in the plastic C & S Preservative Tube is:  
Boric acid: 2.63 mg/mL  
Sodium formate: 1.65 mg/mL  
Sodium borate: 2.08 mg/mL

All tubes have sterile interiors. Do not use tubes after their expiration date.

#### Intended Use of BD Vacutainer® Urine Tubes for Culture and Sensitivity

Bacteria quantification of clean-voided midstream collected urine is widely used as an aid in evaluating a patient for urinary tract infections.<sup>1,2,3,4</sup> Colony forming units of 100,000 microorganisms or greater per milliliter of urine are generally considered indicative of infection.<sup>4</sup> Urine frequently supports the proliferation of bacteria, which may multiply at the same rate as in

the nutrient broth.<sup>5</sup> Therefore, a urine sample delayed in transit and left at room temperature for an extended period of time may give an erroneous result.<sup>6,7</sup>

As a means of preventing growth of the microorganisms from sources exogenous to the bladder, refrigeration or culturing within two hours of micturition is recommended.<sup>4,6,7</sup> It is not always within the control of the laboratory to maintain the parameters necessary for accurate results.

All BD Vacutainer® Urine C&S Preservative Tubes are intended for the collection and transport of urine samples for culture and sensitivity testing of bacteria.

The tubes are filled with lyophilized urine maintenance formula and evacuated to draw approximately 4 to 10 ml (depending on tube size) of urine. The lyophilized urine maintenance formula can maintain the bacterial population in the urine specimen for a period of 48 hours at room temperature at levels comparable to those urine specimens without additive, held under refrigeration for the same period of time.

The tubes provide a safe method for direct sampling of urine specimens from the BD Vacutainer® Specimen Collection Cup.

#### Limitations of Urine C&S Preservative Tubes

1. The quantity of specimen drawn varies with altitude, ambient temperature, barometric pressure, tube age, and filling technique.
2. The maintenance fluid will not inactivate antibiotics.
3. The microbial load in urine from a given patient may be influenced by the time of collection and fluid intake. Symptomatic patients may have counts below 10<sup>5</sup> microorganisms/mL if specimens are collected late in the day or if diuresis is occurring.<sup>3</sup>
4. Do not use specimen if urine sample volume is below minimum fill line. Failure to add urine to minimum fill line on tube label could result in a reduction of microorganisms over a 24-hour period.

### BD Vacutainer® Urine Tubes for Urinalysis

#### Product Descriptions:

• The 16x100mm BD Vacutainer® Plus Conical UA Tube has an 8 mL draw volume, no additive and a yellow stopper. The product is stable when stored at temperatures of 4-25° C.

• The 16x100mm BD Vacutainer® Plus Round Bottom UA Tube has a 10 mL draw volume, no additive and a yellow stopper. The product is stable when stored at temperatures of 4-25° C.

• The 16x100mm BD Vacutainer® Plus Conical UA Preservative Tube has an 8 mL draw volume, a urinalysis preservative and a yellow and cherry red stopper. A minimum fill line of 7 ml and maximum fill line of 8 ml is indicated on the label. The product is stable when stored at temperatures of 4-25° C.

The mean concentration of the preservative is: Chlorhexidine 0.4%  
Ethyl Paraben 5.6%  
Sodium Propionate 94%

The tubes have sterile interiors. Do not use tubes after their expiration date.

#### Intended Use of BD Vacutainer® Urine Tubes for Urinalysis:

• The 16x100mm Plus Conical UA Tubes are provided for automated chemistry dipstick urinalysis and to obtain sediment for examination. One notable feature of the 16x100mm Plus Conical UA Tube is its fit with the KOVA® petter thereby providing standardization of the microscopic sediment analysis.

• The 16x100mm Plus Round Bottom UA Tubes are provided for automated chemistry dipstick urinalysis and sediment analysis.

• The 16x100mm Plus Conical UA Preservative Tubes are provided for automated chemistry dipstick urinalysis and to obtain sediment for examination. One feature of the conical tube is its fit with the KOVA® petter thereby providing standardization of the microscopic sediment analysis. The preservative tube allows storage and testing of the specimen up to 72 hours at room temperature.

The urinalysis preservative is intended to inhibit the metabolism of or render non-viable the bacteria normally present in urine while maintaining cellular integrity. Without the presence of a preservative, the bacteria continue to metabolize and reproduce causing changes in the urine chemistry components measured in a routine urinalysis. This additive will allow the end user to collect, store and transport samples without refrigeration up to 72 hours.

The tubes provide a safe method for direct sampling of urine specimens from the BD Vacutainer® Specimen Collection Cup for routine urinalysis and may be used to store and transport specimens to the laboratory for diagnostic examination.

#### Limitations of Urinalysis Tubes

1. The quantity of specimen drawn varies with altitude, ambient temperature, barometric pressure, tube age, and filling technique.
2. Due to the instability of bilirubin and urobilinogen in urine when exposed to room temperature and light, testing should be performed as soon as possible or specimens should be stored in darkness.
3. The urinalysis tubes that contain no preservative, should be transported without delay to the laboratory for processing or properly refrigerated to prevent erroneous results due to bacterial growth and/or specimen deterioration<sup>8</sup>.

#### Equipment Required But Not Supplied for Urine Testing

1. Equipment for urinalysis, sediment examination, or for general laboratory specimens.
2. Media and supplies for culturing and identification.
3. Gloves, eye protection, coats or gowns, and other appropriate apparel for protection from exposure to bloodborne pathogens or other potentially infectious materials.

## Methods of Collection

### Using BD Vacutainer® Specimen Collection Cup:

1. Nurse or designated healthcare worker obtains a cup for the patient and cautions patient not to remove the cap label to protect against needlestick from the "sharp" contained in the integrated sampling device. If a kit is used, the nurse should remove the BD Vacutainer® Tube(s) and place them in a protected location before giving the cup to the patient for urine collection.
2. If kits are used, the patient should be directed to follow instructions on the bag for proper collection of a clean-voided, midstream urine specimen.
3. Patient is instructed to give the urine specimen to the nurse immediately after collection.
4. To transfer the specimen into evacuated tube(s):
  - a. Place cup upright on clean, flat surface. Container may be tipped at an angle if specimen volume is limited.
  - b. Peel back label on cap to expose the integrated sampling device.
  - c. Place evacuated tube into cavity on cap, stopper down. Advance the tube over puncture point to pierce stopper. The Urine C&S Preservative Tube should be filled first when collecting multiple specimens.
  - d. Hold tube in position until filled.
  - e. Remove tube from device.
  - f. For C&S Preservative Tubes, shake tubes vigorously to ensure complete dissolution of the preservative. If using UA Preservative Tube, mix tube 8-10 times by inversion.
  - g. Repeat steps c - f if another tube is to be collected.
  - h. Replace label over hole and reseal.
5. Label evacuated tube or cup for transport to laboratory.
6. Treat the screw cap of the specimen container as a contaminated sharp and discard in a biohazard container approved for sharps disposal.

### Using Transfer Straw:

1. After collecting urine into an alternate vessel, the patient gives the specimen to the nurse or designated healthcare worker.
2. To transfer the specimen into evacuated tube(s):
  - a. Place vessel on a clean, flat surface.
  - b. Submerge transfer straw into urine specimen. Container may be tipped at an angle if volume of urine is limited.
  - c. Place evacuated tube into holder, stopper down. Advance the tube over puncture point to pierce stopper. The Urine C&S Preservative Tube should be filled first when collecting multiple specimens.
  - d. Hold tube in position until filled.
  - e. Remove tube from device.
  - f. For C&S Preservative Tubes, shake tubes vigorously to ensure complete dissolution of the preservative. If using UA Preservative Tube, mix tube 8-10 times by inversion.
  - g. Remove tube from holder and set aside, leaving transfer straw in container.
  - h. Repeat steps c - g if another tube is to be collected.
3. Lift transfer straw from cup and allow specimen to drain. Discard transfer straw in a biohazard container approved for sharps disposal.
4. Label the tube(s) for transport to the laboratory.

### For BD Vacutainer® Conical UA Preservative Tube Only

The tube can be opened allowing the urine specimens to be poured into the tube.

1. Hold UA Preservative Tube upright and tap bottom of tube on counter a minimum of three times.
2. Remove closure and place upside down on counter.
3. Pour urine into tube filling between the max. and min. fill line on label.
4. Replace closure securely and mix tube 8-10 times by inversion.
5. Label tube for transport to laboratory.

## Centrifugation of Urine Tubes for Sediment Analysis

Recommended Relative Centrifugal Force (RCF) for centrifugation of BD Vacutainer® Tubes with a urine sample is 600 g for 5 minutes in a swing head centrifuge. Always use appropriate centrifuge carriers or inserts for the specific tube size. Use of tubes with cracks, chips, excessive centrifugation speed or inappropriate carriers may cause tube breakage, with release of sample, droplets, or an aerosol into the centrifuge bowl. Release of these potentially hazardous materials can be avoided by using specially designed sealed containers in which tubes are held during centrifugation. Centrifuges should be balanced and properly calibrated. Revolutions per minute (R.P.M.) can be converted to the relative centrifugal force by the following formula:

$$\text{rpm} = \sqrt{\frac{\text{RCF} \times 10^5}{1.12 \times r}} \quad \text{where,}$$

R.C.F. = Relative Centrifugal Force

r = radial distance from center of centrifuge head to bottom of tube in centimeters.

**CAUTION:** Do not exceed recommended speeds. BD Vacutainer® Plus Tubes will withstand up to 10,000 g in a balanced centrifuge.

## Transport of Specimen

1. For transport of cup to the laboratory, provide adequate warning using labeling and packaging to protect against inadvertent needlesticks caused by sharp located under label.
2. Properly label tubes with patient name, i.d., collection date and time and any additional information required by hospital policy.
3. Properly label and package any container used to transport specimen to alternate location in accordance with applicable local, state and federal requirements.

## Analytic Equivalency

Evaluations of BD Vacutainer® Tubes have been performed for an array of analytes over a variety of test methods. The BD Vacutainer Technical Service Department is available to answer questions regarding these tubes. Please contact them at 1-800-631-0174 to obtain references and any other information regarding the use of BD Vacutainer® Tubes.

Whenever changing any manufacturer's collection tube type or size or storage condition for a

particular laboratory assay, the laboratory personnel should review the tube manufacturer's data and their own previously generated data to establish/verify the reference range for a specific instrument reagent system. Based on such information, the laboratory can then decide if changes are appropriate.

## Precautions

1. Caution should be used in handling the screw cap lid of the specimen collection cup, which contains a needle under the label. The screw cap should be disposed of as a sharp after use.
2. Caution should be used in handling the transfer straw that contains a needle and should be disposed of as a sharp after use.
3. All clinical specimens and devices used to collect or store clinical specimens should be carefully handled and disposed of in accordance with the "Universal Precautions" recommendations of the CDC and NCCLS.
4. If urine sample contains blood, specimen collection devices must be classified as biohazardous for handling and disposal purposes.
5. Do not squeeze cup excessively.

### Caution:

1. Practice Standard Precautions. Use gloves, gowns, eye protection, other personal protective equipment, and engineering controls to protect from potential exposure to bloodborne pathogens.
2. Handle all biologic samples according to the policies and procedures of your facility. Obtain appropriate medical attention in the event of any exposure to biologic samples, since they may transmit viral hepatitis, HIV (AIDS), or other infectious diseases.
3. Discard all biologic samples in containers approved for their disposal.
4. Transferring a sample collected using syringe and needle to a tube is not recommended. Additional manipulation of sharps such as hollow bore needles increases the potential for needlestick injury.
5. Transferring samples from syringe to an evacuated tube using non-sharps devices should be performed with caution for the reasons described below • Depressing the syringe plunger during transfer can create a positive pressure, forcefully displacing the stopper and sample, causing splatter and potential exposure • Using a syringe for specimen transfer may also cause over or under filling of tubes • Evacuated tubes are designed to draw the volume indicated. Filling is complete when vacuum no longer continues to draw, though some tubes may partially fill due to plunger resistance when filled from a syringe. The laboratory should be consulted regarding the use of these samples.

## References

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4. Barry AL, et al. Laboratory diagnosis of urinary tract infections. *Cumitech 2*, Washington, DC: American Society for Microbiology, 1975.
5. O'Grady F, Catell WR. Kinetics of urinary tract infections. *Br J Urol.* 1966;38:149-151.
6. Hendman R, et al. Effect of delay on culture of urine. *J Clin Microbiol.* 1976;4:102-103.
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8. National Committee for Clinical Laboratory Standards, Routine Urinalysis and collection, transportation, and preservation of urine specimens; approved guideline GP16-A, Wayne, PA:NCCLS,1995.

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You may write to BD Vacutainer Systems for information at:

Technical Service  
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## Symbol & Mark Key

	Do Not Reuse		Authorized Representative
	Use By		In Vitro Diagnostic Medical Device
	Batch Code		Consult Instructions For Use
	Method of Sterilization Using Irradiation		Fragile, Handle With Care
	Sterile		Keep Away from Sunlight
	Method of Sterilization Using Ethylene Oxide		This End Up
	Method of Sterilization Using Steam or Dry Heat		Recyclable
	Catalog Number		Temperature Limitation
	Caution, Consult Accompanying Documents		Lower Limit of Temperature
	Manufacturer		Upper Limit of Temperature