

# ***LABORATORY PROCEDURE***

## ***BBL® SEPTI-CHEK™ Blood Culture Bottle For Use in the Culture of Microorganisms***

### **I. INTENDED USE**

A qualitative test for the detection of microorganisms in blood.

### **II. SUMMARY AND EXPLANATION**

Blood culture is one of the most important and critical procedures performed in the microbiology laboratory. Since blood is normally sterile, the isolation and identification of an organism has great diagnostic significance. Blood cultures are of great importance in diagnosing such conditions as endocarditis, typhoid fever, pneumonia and other disease characterized by bacteremia.

The growth of microorganisms in a blood culture may be delayed or prevented if an anticoagulant is not used in the culture medium since the organisms may become trapped in the fibrin clot.<sup>1</sup> However, some anticoagulants may be toxic for certain pathogens.<sup>1-3</sup> In addition, blood per se contains antibodies, complement,  $\beta$ -lysin and phagocytes which are natural bacterial inhibitors.<sup>4,5</sup> Antibiotics in the blood also may greatly reduce, if not completely eliminate, the chances of obtaining a positive culture.<sup>6</sup>

These obstacles may be overcome by the use of sodium polyanetholsulfonate (SPS), a nontoxic anticoagulant which enables bacterial growth by obstructing the natural bacterial inhibitors of blood.<sup>3,7-11</sup> Since SPS inhibits the activity of streptomycin,<sup>12</sup> polymyxin B,<sup>13</sup> kanamycin and gentamicin,<sup>14</sup> therapy with these antibiotics should not interfere with microbial growth in blood cultures containing this anticoagulant.

The usefulness of SPS in blood culture media was first demonstrated by Van Haebler and Miles<sup>9</sup> in 1938. This was later confirmed in a study<sup>10</sup> which demonstrated that both aerobic and anaerobic bacteria survived longer when SPS was added to blood culture media. In 1968, investigators compared the effects of various anticoagulants on bacterial growth in blood cultures. SPS was shown to be the most effective agent for inhibiting the bactericidal activity of blood and the least toxic to the organisms involved.<sup>3</sup> SPS has, therefore, been incorporated into the liquid culture media to provide a convenient blood culture system with an effective but noninhibiting anticoagulant.

All **BBL® SEPTI-CHEK™** Blood Culture media (Brain Heart Infusion, Brain Heart Infusion-Supplemented, **Trypticase®** Soy Broth, **Trypticase** Soy Broth with 10% Sucrose, Columbia Broth, Thioglycollate Broth, and Schaedler Broth) will support the growth of a wide variety of clinically important pathogenic microorganisms, including fastidious organisms. All of these media are manufactured under CO<sub>2</sub> and nitrogen, and if used for the recovery of aerobic microorganisms should be vented following specimen addition and prior to incubation. Venting (addition of oxygen) may be performed either through the process of attaching a **BBL® SEPTI-CHEK™** Slide, or by using a sterile venting needle.

BHI and TSB media are generally recommended for the recovery of aerobic and facultative microorganisms, and in this application should be vented as explained above. Columbia Broth can be used vented to recover aerobic and facultative microorganisms, or used unvented for the recovery of anaerobic and facultative organisms. Thioglycollate Broth and Schaedler Broth are recommended primarily for the recovery of anaerobic and facultative microorganisms and should not be vented.

The use of a biphasic blood culture system has been shown to improve the sensitivity of blood culture over traditional broth media.<sup>15-17</sup> When affixed to **BBL® SEPTI-CHEK™** Blood Culture Bottles after their inoculation with blood, the agar surfaces on the slide allow the subculture of aerobic, facultative and capnophilic microorganisms present in the specimen after the bottle with the slide attached is tilted and further incubated. The presence of both nonselective and selective differential agar media on the slide allows a pre-differentiation of the microorganisms present in the liquid medium of the blood culture bottle.

### III. PRINCIPLE OF THE PROCEDURE

Blood is collected from the patient (preferably before antibiotic therapy is initiated) by venipuncture with a needle and syringe (or blood collecting set) and immediately transferred aseptically to **BBL® SEPTI-CHEK™** Blood Culture bottle containing the desired growth medium. The bottle is then incubated and can be observed for turbidity, color change, hemolysis, gas formation or other evidence of microbial growth. Appropriate conventional subculturing methods should be used.

For optimum recovery, **BBL® SEPTI-CHEK™** Slide is attached and inverted 4-6 h post inoculation. The slide/bottle unit is incubated without agitation at  $35 \pm 2$  C for a 7-day period. The slide is examined daily for growth and inverted periodically. Because venting occurs when a slide is added, bottles with the slides attached are not recommended for use in anaerobic culturing.

#### IV. REAGENTS

**BBL® SEPTI-CHEK™** 70 ml and 20 ml blood culture bottles: 20 ml bottle for small sample volume (pediatric) use.

Approximate Formulae\* per L of Processed Water

##### **BHI (Brain Heart Infusion), 70 ml and 20 ml**

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Pancreatic Digest of Gelatin.....	17.5g	Meat Peptone.....	2.0g
Brain Heart, Infusion from (Solids).....	17.5	SPS.....	0.5
Yeast Extract.....	4.0	Sodium Chloride.....	0.39
Disodium Phosphate.....	2.5	Dextrose.....	0.16

##### **BHI-Supplemented, 70 ml**

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Modified Gelatin.....	20.0g	Meat Peptone.....	2.0g
Brain Heart, Infusion from (Solids).....	17.5	Dextrose.....	2.0
Sodium Chloride.....	5.0	SPS.....	0.25
Yeast Extract.....	4.0	Pyridoxal HCl.....	0.10
Pancreatic Digest of Gelatin.....	3.5	Menadione Sodium Bisulfite.....	0.005
Dipotassium Phosphate.....	2.5		

##### **TSB (Trypticase® Soy Broth), 70 ml and 20 ml**

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Casein Peptone.....	17.0g	Dextrose.....	2.5g
Sodium Chloride.....	5.0	Dipotassium Phosphate.....	2.5
Soy Peptone.....	3.0	SPS.....	0.5
Yeast Extract.....	2.5	Hemin.....	0.005

##### **TSB, with 10% Sucrose, 70 ml**

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Sucrose.....	100.0g	Dextrose.....	2.5g
Casein Peptone.....	17.0	Dipotassium Phosphate.....	2.5
Sodium Chloride.....	5.0	SPS.....	0.5
Soy Peptone.....	3.0	Hemin.....	0.005
Yeast Extract.....	2.5		

##### **Columbia Broth, 70 ml**

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Casein Peptone.....	10.0g	Dextrose.....	2.5g
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Meat Peptone.....	8.0	L-Cysteine Hydrochloride.....	0.5
Yeast Extract.....	5.0	SPS.....	0.5
Sodium Chloride.....	5.0	Magnesium Sulfate.....	0.5
Tris Buffer.....	3.7	Ferric Ammonium Citrate.....	0.02

**Thioglycollate Broth, 70 ml**

Casein Peptone.....	15.0g	L-Cystine.....	0.5g
Dextrose.....	5.0	Sodium Thioglycollate.....	0.5
Yeast Extract.....	5.0	SPS.....	0.5
Sodium Chloride.....	2.5	Magnesium Sulfate.....	0.2

**Schaedler Broth, 70 ml**

Casein Peptone.....	7.5g	Soy Peptone.....	1.0g
Dextrose.....	6.5	SPS.....	0.5
Yeast Extract.....	5.0	L-Cystine.....	0.4
Tris Buffer.....	3.0	Dipotassium Phosphate.....	0.2
Meat Peptone.....	2.5	Hemin.....	0.01
Sodium Chloride.....	1.6		

*\*Adjusted and/or supplemented as required to meet performance criteria.*

Each culture bottle contains an atmosphere of CO<sub>2</sub> and N<sub>2</sub>.

**Precautions:** For In Vitro Diagnostic Use.

Do not use bottles that exhibit any cracks or defects. Discard bottles in the appropriate manner.

Before sampling a presumptively positive bottle, it is necessary to release gas which often builds up due to microbial metabolism. See Item 8 in “Performance of Test” section for instructions on venting bottle prior to sampling.

Inoculated bottles should be decontaminated prior to discarding.

Observe aseptic techniques and use established precautions against microbiological hazards, including the use of gloves, throughout all procedures. All specimens should be handled according to CDC/NIH (Centers for Disease Control and Prevention/National Institutes of Health) recommendations, NCCLS (National Committee for Clinical Laboratory Standards) guidelines or local institution guidelines, for any potentially infectious human serum, blood or other body fluids. Prior to discarding, sterilize specimen containers and other contaminated materials by autoclaving.

**Storage:** Store at 15-25 C. Protect from light.

**Physical Indications of Instability:** Indications of deterioration in an uninoculated bottle are the development of turbidity and/or a change in color. Do not use after the expiration date shown on the bottle label.

**BBL® SEPTI-CHEK™ Slides:** Approximate Formula\* Per L of Processed Water.

Agar 1: Chocolate Agar	Agar 2: MacConkey Agar	Agar 3: Malt Agar
GC Agar Base.....36.0 g	Peptones.....20.0 g	Malt Extract.....30.0g
Hemoglobin Powder.....15.0	Agar.....18.0	Agar.....18.0
<b>BBL® IsoVitaleX®</b> Enrichment...10.0 ml	Lactose.....10.0	
Granulated Agar..... 4.0 g	Sodium Chloride.....5.0	
	Bile Salts.....1.5	
	Neutral Red.....0.03	
	Crystal Violet.....0.001	

\*Adjusted and/or supplemented as required to meet performance criteria.

**Storage:** Store slides at 2-8 C. Protect from light; avoid temperature fluctuations during storage as this may cause excessive condensation in the tube of the slide.

**Physical Indications of Instability:** During inspection of the inoculated (sealed) slides, any colonies in or on the agar surfaces are indications of contamination. Shrunken agar surfaces separated from the tray, or strong color differences of the agar surfaces are signs of deterioration. Slides showing any of the signs mentioned previously should not be used and should be disposed of appropriately. Do not use after the expiration date.

## V. SPECIMEN COLLECTION AND HANDLING

Blood samples should be obtained prior to initiating antibiotic therapy. If this is not possible, blood should be drawn immediately before administering the next dose.

Samples should also be obtained before meals, since hyperlipemia may obscure visible evidence of growth in the liquid media.

Because bacteremia is intermittent and may precede episodes of fever and chills by about one hour, it is recommended that the collection of blood cultures should be performed at intervals, with samples being obtained at the first sign of fever.<sup>5</sup>

In order to detect septicemia with sufficient accuracy, it may be necessary to set up one to three blood cultures at designated time intervals, depending on the clinical situation.

**Skin preparation:** To avoid the potential for false positive blood cultures (e.g., with *Staphylococcus epidermidis*), the puncture site must be cleaned thoroughly and disinfected. Cleanse the venipuncture site with a swab soaked in 70% isopropyl or ethyl alcohol and disinfect the site with a 2% iodine solution. Let the skin dry before the venipuncture. The venipuncture site, once disinfected, should not be touched to avoid renewed contamination. After veinpuncture, any residual iodine should be removed.

**Collection of blood:** Using a needle and syringe or the **BBL® SEPTI-CHEK™** Blood Collection Adaptor (see “Availability”), obtain approximately 8-10 ml of patient’s blood when using the 70 ml

**BBL® SEPTI-CHEK™** Blood Culture Bottle. Obtain approximately 1-3 ml of patient's blood when using the 20 ml (pediatric) **BBL® SEPTI-CHEK™** Blood Culture Bottle. Due to the concern about contracting infectious disease, consult CDC or NCCLS recommendations on blood collection.<sup>18,19</sup>

## VI. PROCEDURE

**Materials Provided:** **BBL® SEPTI-CHEK™** Blood Culture Bottle (See "Availability").

**Materials Not Provided:** **BBL® SEPTI-CHEK™** Slides (see "Availability"), needle and syringe (or appropriate blood collection unit), isopropyl or ethyl alcohol (70%), iodine solution (2%), incubator (35-37 C), sterile venting units (see "Availability"), inversion rack (see "Availability"), disposable absorbent pads and autoclave.

### Performance of Test

1. Prepare and label the appropriate blood culture bottle.
2. **DO NOT UNSCREW CAP.** Remove the protective top of the screw cap on the blood culture bottle.
3. Disinfect the visible part of the rubber stopper with isopropyl or ethyl alcohol (70%) and allow to dry.
4. Obtain approximately 8-10 ml patient's blood per bottle (70 ml) with a needle and syringe or a blood collecting unit (1-3 ml of patient's blood when using the 20 ml bottle).
5. Transfer the blood immediately into the culture bottle under aseptic conditions.
6. For anaerobic cultures, do **NOT** vent the bottle or use the **BBL® SEPTI-CHEK™** Slide.
7. If using the **BBL® SEPTI-CHEK™** Slide (recommended use), perform the following: Use aseptic technique throughout. It is recommended that these steps be performed in a biosafety cabinet (class II).

After the inoculated blood culture bottle is incubated for 4-6 h at  $35 \pm 2$  C:

- A. Prepare and label one **BBL® SEPTI-CHEK™** Slide; attach the label in such a way that the agar surfaces are still visible.
- B. Unscrew the cap of the **BBL® SEPTI-CHEK™** Blood Culture Bottle.

- C. Unscrew the unlabelled cap of the **BBL® SEPTI-CHEK™** Slide and screw the slide unit onto the thread of the culture bottle. **FINGER TIGHTEN ONLY. CHECK THAT THE CAP OF THE SLIDE IS FIXED TIGHTLY.** Place bottles with slides into an inversion rack, if desired (see “Instructions for 70 ml Bottle Inversion Rack”).
  - D. Tip the whole system (combined bottle and slide) and rotate it 180° around the longitudinal axis to allow complete flooding of the agar surfaces. **DO NOT HOLD THE SYSTEM INVERTED FOR MORE THAN 15 SEC, AND DO NOT SHAKE. ALSO, DO NOT PLACE THE SYSTEM INVERTED ON THE BENCH SURFACE.** Revert into an upright position (slide up, bottles down).
  - E. Incubate the system for 18-24 h at  $35 \pm 2$  C.
8. If the **BBL® SEPTI-CHEK™** Slide is NOT used, the culture bottle must be transiently vented, using a sterile venting unit. Venting should be performed in a biological safety cabinet, if possible, and appropriate protective clothing should be worn. Place the bottle in an upright position and place an alcohol wipe over the septum. Insert a sterile needle with an appropriate filter or pledget through the alcohol wipe and septum. This should allow for adequate venting of the bottle prior to incubation. The insertion and withdrawal of the needle should be done in a straight line, avoiding any twisting motions. Discard the needle in an appropriate sharps container.
  9. Mix contents 2 or 3 times by gentle inversion, using an inversion rack, if desired (see “Instructions for 70 ml Bottle Inversion Rack”). The blood must be dispersed evenly throughout the medium.
  10. Incubate for 18-24 h at  $35 \pm 2$  C.

**Instructions for 70 ml Bottle Inversion Rack:** The rack holds up to 12 bottles with or without **BBL® SEPTI-CHEK™** Slides. The bottle restraining piece of the rack is moved up and down with a hinged action.

1. Place the rack on bench with hinged piece on top.
2. Grasp the hinged piece at the unhinged end of the frame and pull up, forcefully if necessary.
3. Place each bottle into an individual compartment.
4. Close the hinged piece over the bottles and push down, forcefully if necessary, until the hinged piece is fully closed and secured at the unhinged end of the rack.
5. Invert the rack as described above.

**Subculturing Using the BBL® SEPTI-CHEK™ Slide:** Subculturing from the slide should be done in a biosafety cabinet class II. Examine the agar surfaces on both sides of the **BBL® SEPTI-CHEK™** Slide for colonies. If transparency of the slide is inhibited by condensing water, carefully remove the slide from the tube as follows: If growth has occurred on one or several surfaces of the slide, while using aseptic techniques, carefully unscrew the cap with colored label and remove the tray from the slide. Without touching the agar surfaces, hold the slide on the cap with colored label and remove enough colony mass from the agar surface(s) with an inoculating loop to perform appropriate

procedures for subculturing, identification and susceptibility testing of the isolates(s). Alternatively, the tray can be inverted and placed with the labeled cap on the bench surface. After subculturing return the tray into the tube, close and finger tighten.

Once colonies have appeared on the slide, further inversion of the system is not recommended, as it may wash away the colonies from the agar surfaces.

**Subculturing Using the Conventional Methods:** Subculturing from the culture bottle should be done in a biosafety cabinet class II. Following inoculation and incubation of the blood culture bottle, observe daily for turbidity, hemolysis, gas formation, color changes and other evidence of microbial growth. If growth is detected in either the aerobic or anaerobic bottle, a Gram-stained smear should be prepared and appropriate subculture methods used. Before sampling a presumptively positive bottle, it is necessary to release gas which often build up due to microbial metabolism. See Item 8 in “Performance of Test” section for instructions on venting bottle prior to sampling.

## VII. QUALITY CONTROL

**Quality Control:** The following list of suggested microorganisms may be used for the quality control testing of the **BBL® SEPTI-CHEK™** Blood Culture Bottle.

	Aerobic Media	Anaerobic Media
Inoculate the broth with a bacterial inoculum containing approximately 300 CFU/ml.	<i>Streptococcus pneumoniae</i> (ATCC® 6305)	<i>Streptococcus pneumoniae</i> (ATCC 6305)
Observe bottles for evidence of microbial growth.	<i>Pseudomonas aeruginosa</i> (ATCC 27853)  Broth should appear turbid within 48 h or inoculation	<i>Bacteroides fragilis</i> (ATCC 25285)
To check for purity of results, subculture all positive growths from the bottle on the following media.	<i>Streptococcus pneumoniae</i> TSA with 5% sheep blood  <i>Pseudomonas aeruginosa</i> TSA with 5% sheep blood	<i>Streptococcus pneumoniae</i> TSA with 5% sheep blood  <i>Bacteroides fragilis</i> Pre-reduced blood agar

**BBL® SEPTI-CHEK™ Slide:** For the quality control testing of the slide, inoculate a Chocolate Agar or TSA with 5% sheep blood plate with the test strains. Incubate 18-24 h aerobically in a CO<sub>2</sub>-enriched atmosphere at 35 ± 2 C. Using TSA Broth, prepare serial dilutions of the test strains. Inoculate a **BBL® SEPTI-CHEK™** bottle with a bacterial inoculum of 500-1000 CFU/ml. Mix gently. Affix a **BBL® SEPTI-CHEK™** Slide to the bottle. Tip the system to inoculate the slide completely. Revert the system and incubate for 24 h. After incubation, growth of the following suggested test organisms should be visible on the slides:

Microorganism	Agar 1	Agar 2	Agar 3
<i>Streptococcus pneumoniae</i> ATCC 6305	Growth	--	--
<i>Neisseria meningitidis</i> * ATCC 13090	Growth	--	--
<i>Enterococcus faecalis</i> ATCC 29212	Growth	--	--
<i>Escherichia coli</i> ATCC 25922	Growth	Growth	--
<i>Candida albicans</i> ATCC 60193	Growth	--	Growth

\*May require 48 h for visible growth.

Properly dispose of all units used in quality control testing.

## VIII. RESULTS AND INTERPRETATION

If present, bacterial growth usually becomes evident within 48 h; however, cultures should be incubated for at least 7 days before results are reported as negative. If a **BBL® SEPTI-CHEK™** Slide is NOT used, the presence of microorganisms must be further confirmed by subculturing on suitable media and by performing appropriate identification procedures.

If a **BBL® SEPTI-CHEK™** Slide is used, growth on the agar surfaces usually becomes visible when organisms in the blood culture have reached approximately 500 CFU/ml. If the concentration of organisms at the time of the first slide subculture (tipping of the system) is above 10<sup>6</sup> CFU/ml, the growth on the slide may be confluent. Typical colony morphology will not be observed with confluent growth, which may appear as a thin film on the agar surface.

The three different agar media in the slide in many cases allow a pre-differentiation of the isolate, provided the specimen is a pure culture.

**Agar 1** (Chocolate Agar) is an optimal medium for the recovery of a broad range of microorganisms, including gram-negative and gram-positive bacteria, fastidious organisms such as *Neisseria* and *Haemophilus* spp., and yeasts.

**Agar 2** (MacConkey Agar) is a selective differential medium for *Enterobacteriaceae* and certain nonfermenters such as *Pseudomonas aeruginosa*. Gram-positive bacteria are inhibited.

**Agar 3** (Malt Agar) is a selective medium for fungi and yeasts. Bacterial growth is usually inhibited.

Terminal subculture of the broth onto chocolate agar and incubation for 2 days may be performed to confirm low levels of growth on the slide or to evaluate an unusual appearance of the broth; however, it is not required.

Growth from the slides should be subcultured onto appropriate media, such as Chocolate Agar and TSA Agar with 5% sheep blood, incubated in an aerobic atmosphere enriched with CO<sub>2</sub>. Also, a smear with subsequent Gram stain and microscopy can be performed directly from growth on the surface of the slide agar(s). Microscopic examination is also recommended to assure the presence of a pure culture. Appropriate identification tests and usually a susceptibility test of the isolate(s) should be performed according to laboratory protocol.

## IX. LIMITATIONS OF THE PROCEDURE

Various factors may affect the recovery of clinically significant microorganisms. These include: antimicrobial therapy prior to blood collection, transitory bacteremias or contamination of patient's blood by exogenous flora. Other factors which influence recovery are the volume of blood drawn, frequency or timing of cultures and selection of medium. Although this system does support the growth of organisms which cause most clinically significant bacteremias, special handling of the specimens may be required in certain disease states. SPS inhibits the growth of certain mycoplasmas and should not be used for their isolation.<sup>14</sup>

Premature discarding of apparently negative blood cultures or infrequent observations may result in failure to detect the presence of pathogenic microorganisms or in loss of viability.

Culture media sometimes contain small numbers of nonviable organisms derived from medium constituents, which may be visible in smears of uninoculated blood culture media. Other sources of nonviable organisms visible upon Gram staining include staining reagents, immersion oil, glass slides and the specimens used for inoculation. If there is uncertainty about the validity of the Gram stain, the culture should be reincubated for an additional hour or two and the smear and staining procedure repeated before a report is issued.

## X. PERFORMANCE CHARACTERISTICS

The **BBL® SEPTI-CHEK™** Blood Culture Bottle permits the recovery of aerobic, anaerobic and facultative microorganisms. When used together with the **BBL® SEPTI-CHEK™** Slide, the system permits the isolation of aerobic and facultative microorganisms.

## XI. AVAILABILITY

<i>Cat. No.</i>	<i>Description</i>
4343551	<b>BBL® SEPTI-CHEK™</b> BHI (Brain Heart Infusion Broth), Blood Culture Bottles, 10 x 20 ml.
4343553	<b>BBL® SEPTI-CHEK™</b> BHI, Blood Culture Bottles, 10 x 70 ml.
4343188	<b>BBL® SEPTI-CHEK™</b> BHI, Blood Culture Bottles, 10 x 70 ml ( <b>without banding collars</b> ).
4372645	<b>BBL® SEPTI-CHEK™</b> BHI-S (Supplemented), Blood Culture Bottles, 10 x 70 ml.
4343185	<b>BBL® SEPTI-CHEK™</b> Columbia Broth, Blood Culture Bottles, 10 x 70 ml.
4343186	<b>BBL® SEPTI-CHEK™</b> Columbia Broth, Blood Culture Bottles, 10 x 70 ml ( <b>without banding collars</b> ).
4371580	<b>BBL® SEPTI-CHEK™</b> TSB ( <b>Trypticase®</b> Soy Broth), Blood Culture Bottles, 10 x 20 ml.
4343178	<b>BBL® SEPTI-CHEK™</b> TSB, Blood Culture Bottles, 10 x 70 ml.
4343187	<b>BBL® SEPTI-CHEK™</b> TSB, Blood Culture Bottles, 10 x 70 ml ( <b>without banding collars</b> ).
4373126	<b>BBL® SEPTI-CHEK™</b> TSB + 10% Sucrose, Blood Culture Bottles, 10 x 70 ml.
4373127	<b>BBL® SEPTI-CHEK™</b> Thio (Thioglycollate Broth), Blood Culture Bottles, 10 x 70 ml.
4373284	<b>BBL® SEPTI-CHEK™</b> Schaedler Broth, Blood Culture Bottles, 10 x 70 ml.
4372647	<b>BBL® SEPTI-CHEK™</b> BHI-S/Schaedler (Brain Heart Infusion Broth - Supplemented and Schaedler Broth), Blood Culture Bottles, 10 x 70 ml.
4372648	<b>BBL® SEPTI-CHEK™</b> BHI-S/Thio (Brain Heart Infusion Broth - Supplemented and Thioglycollate Broth), Blood Culture Bottles, 10 x 70 ml.
4372649	<b>BBL® SEPTI-CHEK™</b> BHI-S/TSB (Brain Heart Infusion Broth - Supplemented and <b>Trypticase®</b> Soy Broth), Blood Culture Bottles, 10 x 70 ml.
4373264	<b>BBL® SEPTI-CHEK™</b> BHI/Thio (Brain Heart Infusion Broth and Thioglycollate Broth), Blood Culture Bottles, 10 x 70 ml.
4373265	<b>BBL® SEPTI-CHEK™</b> TSB/BHI ( <b>Trypticase®</b> Soy Broth and Brain Heart Infusion Broth), Blood Culture Bottles, 10 x 70 ml.
4343228	<b>BBL® SEPTI-CHEK™</b> TSB/Columbia ( <b>Trypticase®</b> Soy Broth and Columbia Broth), Blood Culture Bottles, 10 x 70 ml.
4373282	<b>BBL® SEPTI-CHEK™</b> BHI/Schaedler (Brain Heart Infusion Broth and Schaedler Broth), Blood Culture Bottles, 10 x 70 ml.
4373283	<b>BBL® SEPTI-CHEK™</b> TSB/Schaedler ( <b>Trypticase®</b> Soy Broth and Schaedler Broth), Blood Culture Bottles, 10 x 70 ml.
4343231	<b>BBL® SEPTI-CHEK™</b> TSB/Thio ( <b>Trypticase®</b> Soy Broth and Thioglycollate Broth), Blood Culture Bottles, 10 x 70 ml.
4343500	<b>BBL® SEPTI-CHEK™</b> Slide (Chocolate Agar, MacConkey Agar and Malt Agar), Blood Culture/Subculture Slide, 50 slides.
4343181	<b>BBL® SEPTI-CHEK™</b> Slide (Chocolate Agar, MacConkey Agar and Malt Agar), Blood Culture/Subculture Slide, 10 slides.
4343563	<b>BBL® SEPTI-CHEK™</b> Blood Collection Adaptor, Box of 50.
4343556	Inversion Rack, 20 ml Bottle, Pkg. of one.
4343247	Inversion Rack, 70 ml Bottle, Pkg. of one.
4371056	Sub/Venting Units for Culture Bottles, Box of 100.

## XII. REFERENCES

1. Wright, H.D., *J. Pathol.* 28:541, 1925.
2. Rammell, C.G., *J. Bacteriol.* 84:1123-1125, 1962.
3. Evans, G.L., T. Cekoric Jr., R.I. Searcy, *Am. J. Med. Technol.* 34:103-112, 1968.
4. Myrvik, Q.N., R.S. Weiser, *J. Immunol.* 74:9-16, 1955.
5. Skarnes, R.C., D.W. Watson, *Bacteriol. Rev.* 21:273-294, 1957.
6. Shaffer, J.G., M. Goldin, in *Clinical Diagnosis by Laboratory Methods*, Chapter 17, 13th Edition, edited by I. Davidsohn, B.B. Wells, Philadelphia, W.B. Saunders Company, 1963, p. 710-751.
7. Evans, G.L., *et al.*, *Clin. Res.* 14:484, 1966.
8. Rosner, R., *Am. J. Clin. Pathol.* 49:216-219, 1968.
9. Van Haebler, T., A. A. Miles, *J. Pathol.* 46:245, 1938.
10. Ellner, P.D., C.J. Stoessel, *J. Infect. Dis.* 116:238-242, 1966.
11. Garrod, P.R., *J. Pathol.* 91:621-623, 1966.
12. May, J.R., A.E., Voureka, A. Fleming, *Br. Med. J.* 1:627-630, 1947.
13. Jackson, D.M., E.J.L. Lowbury, E. Topley, *Lancet* 2:137-147, 1951.
14. Evans, G.L., *et al.*, *Antimicrob. Agents Chemother.* 1967:687-691, 1968.
15. Pfaller, M.A., *et al.*, *J. Clin. Microbiol.* 16:525-530, 1982.
16. Weinstein, M.P., *et al.*, *J. Clin. Microbiol.* 21:626-629, 1985.
17. Weinstein M.P., *et al.*, *J. Clin. Microbiol.* 21:815-818, 1985.
18. Centers for Disease Control. *Guidelines for Prevention of Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Health-Care and Public-Safety Workers.* Morbid. Mortal. Weekly Report 38:(S-6): 1-37, 1989.
19. National Committee for Clinical Laboratory Standards. *Protection of Laboratory Workers From Infectious Disease Transmitted by Blood, Body Fluids, and Tissue*, 2nd Edition: Tentative Guideline. NCCLS Document M 29-T2. NCCLS, Villanova, Pa 1991.

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