



## Puritan Environmental Sampling Kit (ESK®)

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## Introduction

Swab surface and equipment sampling is one of the most common practices and often used in food, pharmaceutical and other industrial plants for microbial examination.

## Product Description

ESK is a simple, easy to use sampling kit recommended for environmental monitoring, hygiene control, sanitization program and bioburden determination. Swab samples taken by ESK from surfaces and equipment prior and after cleaning help to evaluate the effectiveness of cleaning practices and the sanitary agents used.

Each sterile ESK® kit is composed of a peel pouch pack containing a pre-moistened polyester tipped swab and a polypropylene vial containing specified volume of rinse solution. The pre-moistened swab is tightly secured inside the screw cap and designed to sample a variety of surfaces, equipment, and hard-to-reach areas.

## ESK® Product information

**Neutralizing Buffer** is recommended for use in microbiological examination of surfaces for food and dairy products. Its usage may vary depending on the method of sampling. A swab has been incorporated into the cap to facilitate sampling of surfaces and equipment with hard to reach places.

Neutralizing Buffer medium has the ability to inactivate the bacteriostatic effect of chlorine as well as quaternary ammonium compounds. After cleaning surfaces and food equipment with disinfectants, swab samples are taken and placed into Neutralizing Buffer to examine the effectiveness of the sanitation program. The ability of this buffer to inactivate such disinfectants in the sample will allow bacteria to survive and recovered if present.

The presence of bacteria after routine sanitization suggests that the sanitization program is not effective.

Staph aureus is commonly found in post food processing contamination, which is generally due to human contact or food contact with contaminated surfaces. The presence of large numbers of Staph aureus in food indicates poor food handling or poor sanitation program.

**Buffered Peptone Water** is a non-selective pre-enrichment broth that promotes the recovery of salmonella species that may be sub lethally injured by food processing techniques.

When salmonella species are present in food, certain food processing conditions such as heat, desiccation, preservatives and pH changes may injure bacteria cells. Therefore pre-enriched nonselective buffered peptone water medium allows for injured cells to repair and facilitate the recovery of salmonella species. Peptone in the medium contains carbon, nitrogen, vitamins and minerals which injured cells consume to recover. The preassembled swab in the cap allows for swabbing surfaces and facilitates sampling equipment with hard to reach places.

Healthy salmonella cells from the BPW can be inoculated onto a selective enriched medium for isolation and identification.

**Lethen Broth** is recommended for the neutralization of quaternary ammonium compounds when testing for effectiveness of disinfectants in food processing and cosmetic equipment. The addition of polysorbate 80 to the medium neutralizes the surface disinfectants. Lecithin is added to neutralize quaternary ammonium compounds.

In food and cosmetic industry all work stations, equipment and utensils used in daily processes are cleaned using different disinfectants. In order to determine the effectiveness of these disinfectants after each daily clean up, swabs are used to take sample of cleaned equipment and transferred into a tube containing Lethen Broth medium. The polysorbate 80 neutralizes the surface disinfectants and the lecithin neutralizes compounds such as chlorine or fluorides and facilitate for bacteria to grow.

The preassembled swab in the cap allows for swabbing surfaces and facilitates sampling equipment with hard to reach places.

Using Lethen Broth allows manufacturer to determine the effectiveness of their cleaning program.

**Butterfields Solution** is recommended by the Food and Drug Administration (FDA) for use as diluent in water, food, dairy and pharmaceutical industries. It is offered in 4 and 9 mL for easy 1/5 and 1/10 dilutions.

When the number of bacteria in a sample is too high and difficult to enumerate, serial dilutions are prepared in vials containing Butterfield Solution. A sample from each tube is transferred to a culture plate, incubated and read after 24 - 48 hours. The plate with bacteria count between 30 – 300 is selected, enumerated and multiplied by the corresponding dilution factor to obtain the number of bacteria in the original sample.

## **Attributes and Intended Uses**

### **Neutralizing Buffer**

- Has the ability to inactivate the bactericidal and bacteriostatic effect of chlorine, quaternary ammonium compounds.
- Recommended for use in microbiological examination of surfaces for dairy and food processing equipment disinfected with chlorine or quaternary ammonium compounds.

### **Buffered Peptone Water**

- Used for culturing of non-fastidious organisms for studying carbohydrate fermentation patterns.
- Used for performing the indole test.

### **Lethen Broth**

- Clear in appearance aiding in visual inspection for growth.
- Neutralizes quaternary ammonium compounds and phenols.
- AOAC International/ASTM recommended for use with disinfectants.
- Used for testing preservatives in water containing cosmetics.

### **Butterfield's Solution**

- A suitable diluent for plate count methods.
- It is used for enumeration of microorganisms in water, food and dairy processing and pharmaceutical plants.

### **Common Food and Water Borne Pathogens**

#### **E. coli**

- Found mostly in water, raw vegetable, soft cheese and dairy and raw meat (beef hamburger). Example: E. coli 0157

#### **Salmonella**

- Found mostly in seafood, milk and dairy, Poultry and eggs, fruits and vegetables, snacks.
- Example: Salmonella typhi

#### **Campylobacter**

- Carried by most domestic and wild animals. Consumption of food and water contaminated with untreated animal or human waste accounts for 70 % of Campylobacter related illnesses. Found mostly in unpasteurized milk, meats, poultry, shellfish, fruits and vegetables.
- Example: Campylobacter lari

#### **Vibrio**

- Found mostly in uncooked or undercooked shellfish.
- Example: Vibrio cholera

#### **Listeria**

- Mostly found in food processing environment including milk and dairy, meat, poultry, fruits and vegetable.
- Example: Listeria monocytogenes

### **Staphylococcus**

- Result of post food processing contamination, generally due to human contact or contaminated food contact surfaces. The presence of large number of Staph. aureus in food indicates poor handling or sanitation.
- Example: Staph. Aureus

### **Bacillus**

- Causes food poisoning when foods are prepared and held without adequate refrigeration for several hours. Found in cooked meat and vegetable, boiled or fried rice, vanilla sauce, custards, soups, vegetable sprouts.
- Example: Bacillus cereus

### **Clostridium**

- Causes food poisoning when foods such as meat or poultry are cooked and held without maintaining adequate heating or refrigeration before serving.
- Example: Clostridium perfringens

### **Yeast and mold**

- This large and diverse group of food borne microbes can attack many foods due to ability to survive under various environmental conditions. They can survive in conditions as low as pH 2 or as high as pH 9. They can survive temperatures ranging from 0°C to 40 °C.
- Both yeast and mold can invade and grow on virtually any type of food, invading crops such as grain, nuts, beans, fruits, processed foods and food mixtures.
- Certain yeast and mold can cause health hazard in human by producing toxins known as mycotoxins.

## **How to Use ESK®**

Samples can be collected using a variety of techniques depending on the sample type, size, and the site. Samples should be transported to the testing laboratory in an appropriate manner for optimum results.

1. Using aseptic technique to peel open the pouch.
2. Determine the surface to be sampled. Sterile square sampling templates are available commercially and may be used when sampling flat surfaces.
3. Carefully remove the cap with the pre-moistened swab attached from the vial.
4. Hold swab at a 30° angle and wipe over the sample area in a back and forth motion. Rotate swab while wiping.
5. Return the swab to the vial containing the rinse solution and screw on the cap until tightly secured.
6. Transfer the sample to the laboratory for analysis as soon as possible (within 4 hours). Samples that are not processed immediately should be refrigerated at 2-4°C, up to 24 hours until processed.