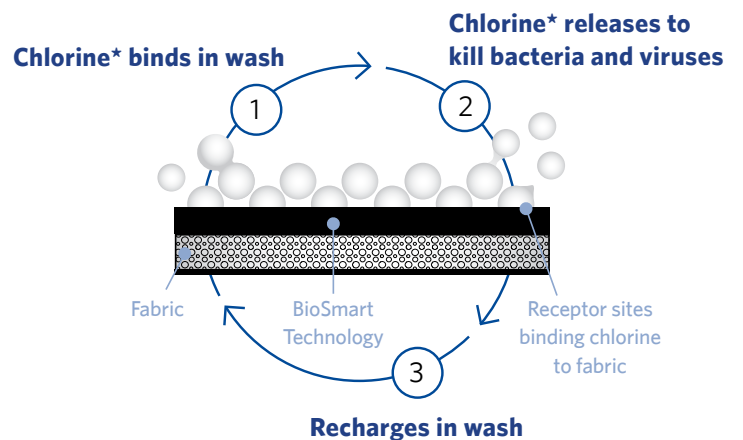


## Antimicrobial Technology

Milliken™ BioSmart™ technology makes it simple and practical to integrate antimicrobial protection into common medical garments and products. The patented, bleach-activated technology harnesses the proven power of readily-available chlorine bleach, turning otherwise passive textiles into an added layer of active defense against microbial exposure, contamination and infection.

## How BioSmart Works

1. When fabric made with BioSmart technology is washed with an EPA-registered chlorine bleach, the BioSmart technology binds chlorine to the fabric's surface.
2. When the fabric comes into contact with microbes, the chlorine is released to kill viruses and bacteria.
3. After each use, the technology is "recharged" simply by laundering the fabric with an EPA-registered chlorine bleach. BioSmart technology is proven to be durable through a minimum of 75 industrial or home washes.



## Proven Effectiveness

BioSmart technology leverages the power of chlorine bleach\*, proven to kill 99.9%† of many common bacteria and viruses, including:

- Salmonella choleraesuis
- Staphylococcus aureus
- Klebsiella pneumoniae
- Escherichia coli
- Hepatitis A

\* When used in accordance with EPA-registered label instructions

† Laboratory conditions using AATCC 100 test method



## Frequently Asked Questions

### **Do BioSmart™ Fabrics need to be charged in order to work?**

Yes, BioSmart™ fabrics are supplied “uncharged” and must be laundered with an EPA-registered chlorine bleach in order to have antimicrobial properties.

### **How is BioSmart charged?**

Garments made with BioSmart technology must be washed initially using EPA-registered chlorine bleach to charge the fabric. Every wash cycle must include EPA-registered chlorine bleach to recharge the fabric and maintain its antimicrobial activity.

### **How long is the fabric effective, or “charged,” after washing?**

BioSmart technology has been shown to be effective for a 12-week shelf life from charging until wearing. Garments must be washed with EPA-registered chlorine bleach after every use in order to properly recharge the BioSmart antimicrobial technology.

### **Will fabrics made with BioSmart technology work with peroxide bleach?**

No, BioSmart requires chlorine bleach. The chemistry does not bind to peroxide. Washing with peroxide will not harm BioSmart fabrics, but there will be no residual antimicrobial effect.

### **What if chlorine bleach is used that is not EPA-registered?**

EPA-registered bleach has been tested to be effective at the directed use levels. Use of non-registered bleach may not provide adequate charging of the fabric with chlorine.

### **Can I use color safe bleach?**

No, EPA-registered chlorine bleach must be used. The fabric is designed to work with EPA-registered chlorine bleach. Minimal fading will occur over time.

### **Are fabrics made with BioSmart technology rated to AAMI PB70 level 1, 2, 3, or 4?**

No, fabrics that meet AAMI PB70 are designed to be used as medical barrier fabrics. BioSmart is not currently designed for this use.

### **If BioSmart is used in a face mask, is it hazardous to breathe?**

No, the chemistry is not hazardous and is bound to the fabric. After charging according to instructions, the amount of chlorine that could be released is well below established exposure risk levels.

### **Can products made with BioSmart be put into the dryer?**

Products made with BioSmart technology can be dried according to any commercial method without harming the durability of the technology.

### **Will BioSmart cause skin irritation?**

No, fabrics made with BioSmart technology have been tested to ISO 10993-10 without evidence of skin irritation. In addition, fabrics with BioSmart technology have been tested for cytotoxicity according to ISO 10993-5 and no evidence of cell toxicity was observed.

### **Do BioSmart fabrics have a face or back? Do they need to be used in a certain orientation?**

No, the finish is impregnated into both sides of the fabric. Some styles may have a face or back for aesthetic reasons, but the BioSmart technology is on both surfaces.

### **Will BioSmart protect against all microbes?**

BioSmart, after charging with EPA-registered chlorine bleach, has performed well against multiple microbes in the laboratory including gram positive bacteria, gram negative bacteria and some viruses. However, the amount of microbe reduction in every use situation cannot be established. BioSmart should be used as one component of an overall infection prevention program. All standard hygiene and disinfection procedures should be followed.

## Activation and Care Instructions

BioSmart™ is a patented Milliken™ technology that binds chlorine to the fabric surface in the wash cycle.

NOTE: BioSmart garments must be laundered with an EPA-registered chlorine bleach to charge the fabric with chlorine initially, and to recharge during each wash.

The initial charge procedure and the recharge procedure for BioSmart are the same. In each case, EPA-registered chlorine bleach should be used.

### Home Washing

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- All EPA-registered chlorine bleach products have instructions for laundry on the label. Most of them indicate that the proper concentration is 1/2 cup per standard home washing machine load. Some of the products may vary in concentration and recommend a different level, so please check the label of the bleach you are using. Do not use color-safe bleach.
- Use a regular laundry cycle and be sure to include the rinse step. Failure to rinse the fabric can result in local concentrations of chlorine that may cause irritation to sensitive individuals. After the rinse, you may not be able to smell a bleach odor, but the chlorine is bound to the fabric.
- The fabric can be dried in any manner (tumble dry, line dry, etc.) without affecting performance.
- BioSmart is designed to be recharged during each laundry cycle. The technology is durable for at least 75 launderings.

### Industrial Laundering

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- In order to properly charge the fabric, 50-200 ppm concentration of EPA-registered chlorine bleach is required in the wash cycle. This is generally the concentration used for normal chlorine bleach loads, but please follow the recommendations of your wash chemistry supplier.
- Follow the regular wash and rinse steps for typical chlorine bleach loads. BioSmart will retain the chlorine on the fabric even when using “antichlor” rinses.
- BioSmart is designed to be recharged during each laundry cycle. The technology is durable for at least 75 cycles.
- The fabric can be dried in any manner (tumble dry, tunnel, etc.) without affecting performance.