



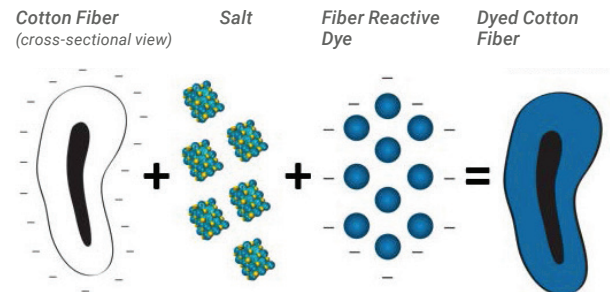
## WHAT IS CATIONIC COTTON?

In the textile dyeing process, there are significant challenges related to dye affinity, colorfastness, color flexibility, and quick replenishment based on consumer demand. The cationization chemistry is REACH registered and the application of cationic reagent chemistry to cotton can transform your dyeing routine into an environmentally responsible and efficient process, all while increasing capabilities for you to create subtle heathered effects, bold stripes, tonal patterns and unique textures. Although the concept of cationic treated cotton has been available for many years, this innovative technology has continued to grow in popularity among companies exploring ways to reduce water, energy and chemical consumption in the development of their products, while also seeking ways to increase responsiveness to consumer fashion demands with more versatile and on-trend fashion offerings.

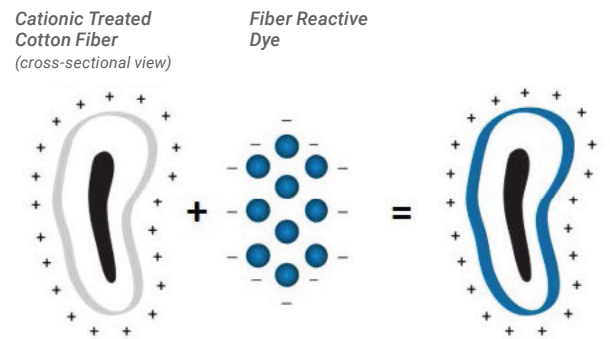
Cationic cotton is cotton that has been chemically modified to possess a permanent cationic, or positive, charge.

When immersed in water, cotton naturally possesses a neutral or mildly negative charge. Common dyes used for cotton also possess a negative charge. Like common poles of magnets, same charges repel each other. Therefore, in typical dyeing of cotton, salt and alkali are used in the dyebath to reverse the charge on cotton so that it has a positive charge, allowing the dyes to react and bond to the cotton. Cationic treated cotton is chemically modified to possess a permanent cationic, or positive charge, making cotton “friendlier” to dye and increasing dye utilization. This in turn creates a shorter and more efficient dyeing process that utilizes less water, energy and chemicals. Cotton can be treated with the cationic process in fiber, yarn or fabric form.

## TRADITIONAL COTTON DYEING



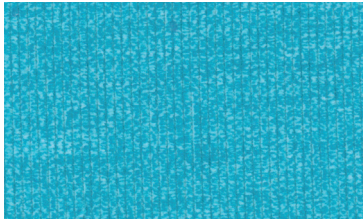
## CATIONIC COTTON DYEING



## CATIONIC DESIGN POSSIBILITIES

Cationic cotton technology prepares the fabric to accept a greater variety of dyes and provides for greater flexibility in the color offerings. Unique designs can be achieved by altering the level of cationization (higher = deeper color) and creating fabrics using both cationized and conventional cotton in the same fabric. Altering the level of cationization can help create tonal effects in the fabric, while blending with non-cationized yarn creates areas that do not take the dye, yielding clean crisp lines. Yarn dye effects can also be created with alternating cationic and non-cationic yarns. Cationic cotton can be used for 100% cotton or blended yarns.

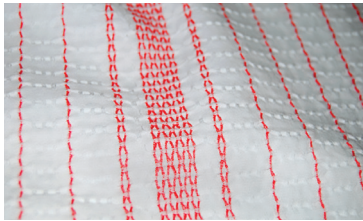
### CATIONIC COTTON FABRICS FROM COTTON INCORPORATED'S FABRICAST™ FABRIC COLLECTION



Heathers and melange



Solids and stripes



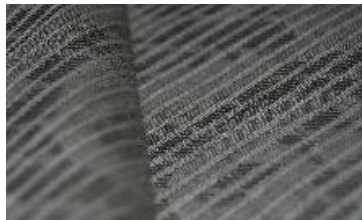
Color and white



Tonal effects



Texture



Jacquards



Colored warps



Print effects

Please contact a Cotton Incorporated executive account manager to see the full cationic cotton FABRICAST™ collection.

## ENVIRONMENTAL BENEFITS

While cationic cotton helps address market demands and improve inventory and cost efficiencies, the greatest benefit of this technology is the reduction in water, energy and chemicals in the dyeing process.



### Water

- Almost 100% dye utilization significantly reduces wastewater and the need for rinsing the fabric to remove unfixed dye
- Dyebath looks clear



### Energy

- Reduced dye time because color adheres to fabric more quickly



### Chemicals

- Overall less dyestuffs needed to achieve same color
- Eliminates the need for salt and alkali in dyeing process

## SUSTAINABLE FASHION WITH CATIONIC COTTON

### Less dye needed to achieve same color

Compared to traditional reactive dyeing (A), cationic reactive dyeing (B), can save anywhere from one-third (for low depth shades) to one-half the amount of dye needed.

A	1.5 %	0.75 %	0.7 %	0.32 %	1.125 %
B	0.819 %	0.385 %	0.409 %	0.236 %	0.517 %

### Less effluent left in dye bath

The resulting dyebaths demonstrate almost 100% dye utilization. Cationic reactive dyeing significantly reduces wastewater and the washing required to remove the unfixed dye.





## BOTTOM LINE BENEFITS

### Cost

Fabrics can be dyed utilizing as little as one-third to one-half the typical amount of dye required in traditional dyeing. Reduced dye inputs and outputs not only reduce the overall fabric environmental footprint, but also have positive impacts on the bottom line, making the overall dyeing process more cost effective. Even darker shades, which often require increased chemistry, use significantly less dye in this process.

### Inventory

Cationic cotton makes it possible for one single base cloth to produce many colors, therefore reducing product SKUs and finished inventory. If a SKU's color is not selling, the product can easily be shifted to the color that is needed. The ability to quickly react to shifts in market and consumer demand also allow for quicker replenishment and minimized forecasting risk. Because cationic cotton can be achieved in both fabric and garment form, there is also reduced need and reliance upon package-dyed yarn inventories.

### Quality

Cationic treated cotton accepts dyes more efficiently, therefore, less agitation is needed during the dyeing process for the dye to adhere to the fabric. This in turn produces a cleaner, less abraded fabric with a better appearance. Improved colorfastness and crocking offers flexibility with development of highly-saturated shades.

## THE FUTURE OF CATIONIC COTTON

Cotton Incorporated is committed to research investments to continue to expand knowledge about cationic cotton technology. The following topics are currently being explored:

- Achieving deep black shades
- Improving dyeing processes to produce more level and uniform dyeing
- Developing a cationization level that is custom formulated for the dye formula
- Achieving new cationic chemistries to add new functionalities to cotton fabrics



## CATIONIC COTTON SUPPLIERS

### FIBERS & YARNS

**BROS®**

**COLORZEN** THE POWER OF LESS™

**HILL SPINNING MILL**  
"GENERATIONS OF QUALITY  
CARDED AND COMBED  
COTTON YARNS"

**TINTORIA PIANA US**

### KNITS

**恒亮纺织**  
HENG LIANG TEXTILE

**SJ PTE LIMITED (VIETNAM)**

**Textil Océano**

**THAI SIN DEE CO. LTD.**

**TG**  
TOPGAIN TEXTILES

**W**

Well Dyeing Factory Limited

**GT**  
G-TECH

G Tech Material Co. Ltd.

### WOVENS

**CONE DENIM®**

**INMAN**  
MILLS

**KİPAŞ MENSUCAT**

**鲁泰纺织**  
LUTHAI TEXTILE

**N**

**Nien Hsing**

**tiange**

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