



COOLMAX[®] freshFX[®] Fiber

Cooling and long-lasting Freshness in garments using engineered fiber technology



COOLMAX[®]



Brand Promise:

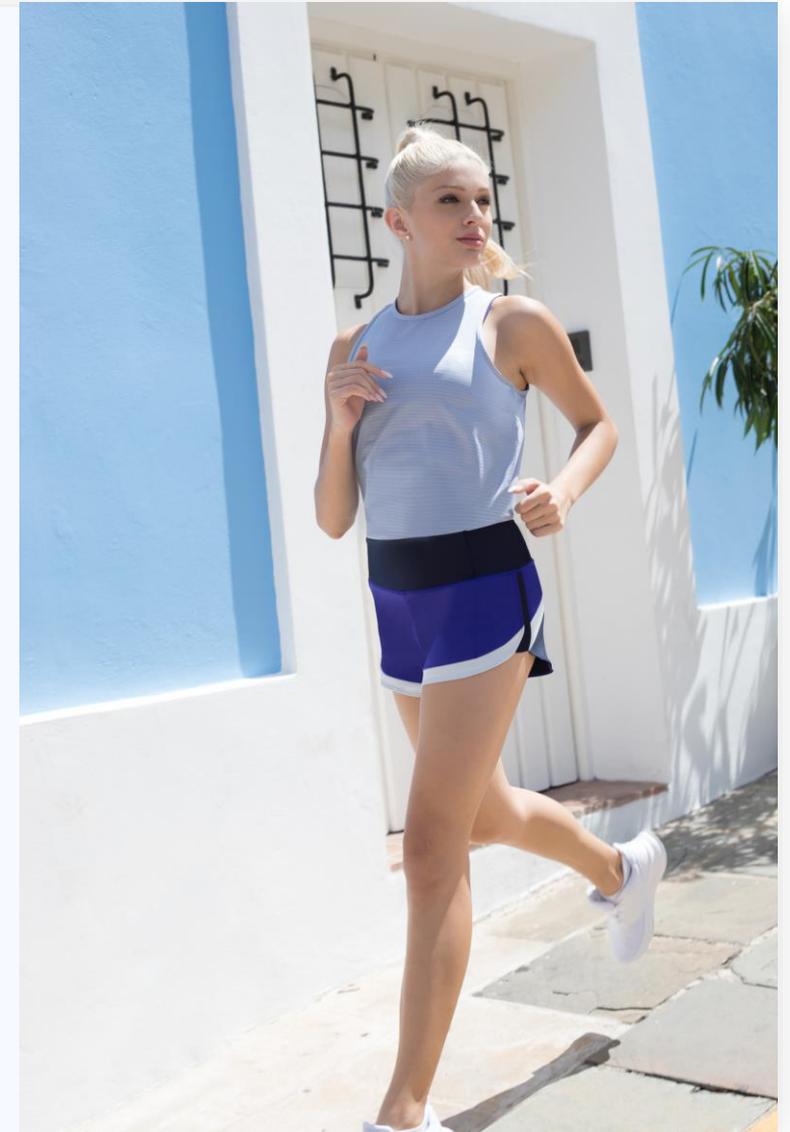
COOLMAX® freshFX® fiber technology is designed to keep you cool and dry, and to help garments stay fresher for longer.

Product Basis:

Engineered fibers move moisture and dry quickly, creating a cooling effect, whilst spun-in additives provide long lasting freshness

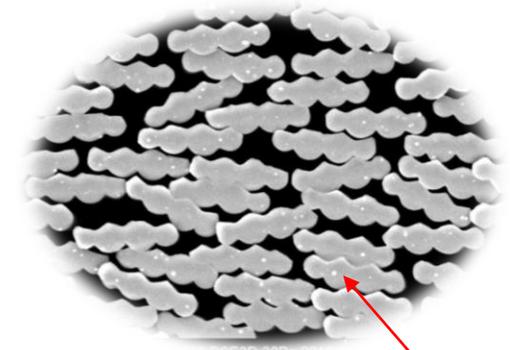
Benefits:

- Helps keep you cool and dry
- Uses a silver-based technology that helps your clothes stay fresher longer
- Permanent benefits engineered into the fiber
- Certified performance
- Supported by the high awareness of the COOLMAX® fiber brand.

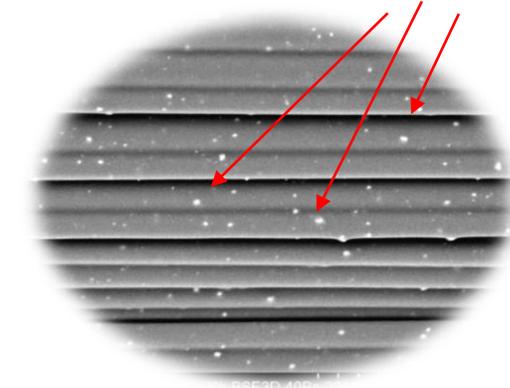


What is COOLMAX® freshFX® fiber & how does it work?

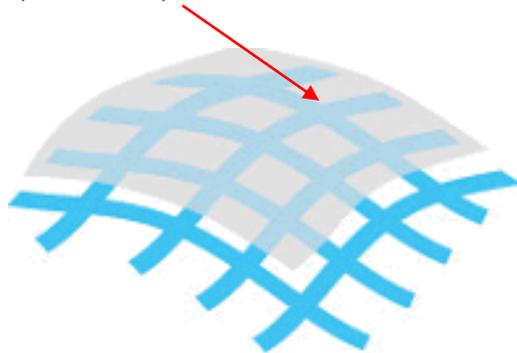
- The active ingredient in COOLMAX® freshFX® fiber is a durable silver based additive. This additive has been proven to be highly effective in the laboratory against a wide range of bacteria.
- The mechanism of action involves the slow release of silver ions from an inorganic 'cage' matrix through an ion-exchange process. The silver ions can then interact with bacteria on the fabric to disrupt their cellular functions, thereby inhibiting the growth of colonies.
- Bacteria can feed off of components in human sweat and body oil, resulting in odorous byproducts. The additive in COOLMAX® freshFX® fiber effectively suppresses the generation of these odorous byproducts by helping to inhibit bacterial growth on the fabric.



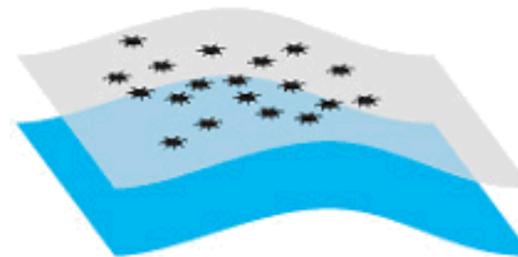
Cage structures containing Silver built into the fiber itself



Fabric with COOLMAX FreshFX® technology, is protected by an invisible freshness shield



The freshness shield helps inhibit the growth of odor-causing bacteria



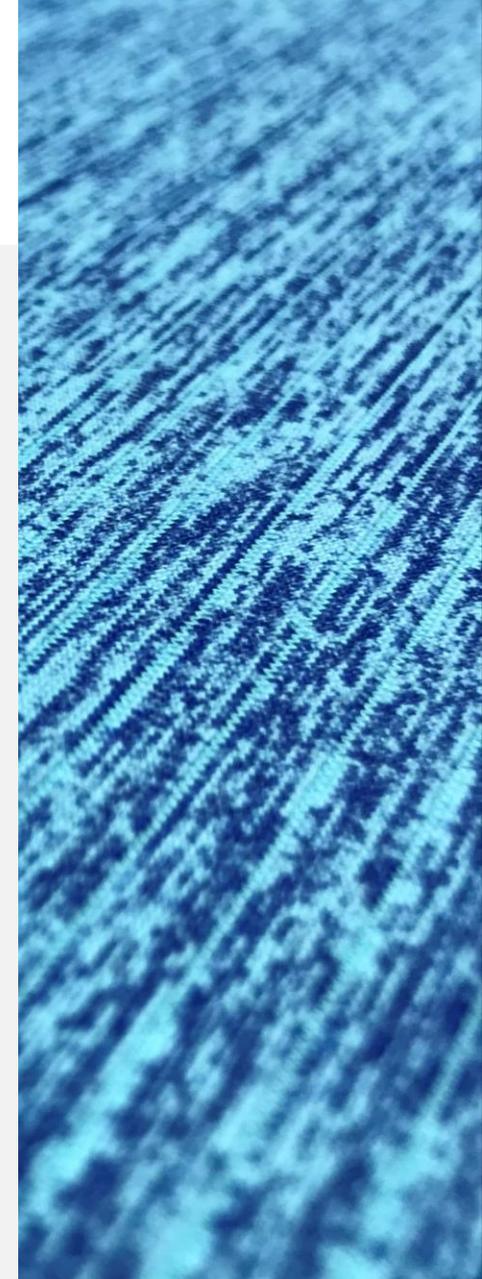
COOLMAX® freshFX® Fiber: *fiber product range*

COOLMAX® freshFX® fiber is available in staple, POY and textured filament forms, giving easy to use options for use in common fabric types.

Brand platforms include:

- COOLMAX® fiber:
 - *Helps keep you cool and dry*
- COOLMAX® fiber with All Season Technology
 - *Mixed cross section technology helps keep you cool and dry on hot days, and warmer on cold days, for year-round comfort*
- COOLMAX® EcoMade Fiber
 - *Made from recycled resources, helps keep you cool and dry.*

Product ID	Staple or Filament	Cross Section	Branding Option
729AW	staple	Scalloped oval	COOLMAX® CORE technology, COOLMAX® freshFX® technology
934DAM	Textured filament	mixed: hollow & "c"	COOLMAX® ALL SEASON technology, COOLMAX® freshFX® technology
934TAM	POY filament	mixed: hollow & "c"	COOLMAX® ALL SEASON technology, COOLMAX® freshFX® technology
934TAMEF	EcoMade filament	mixed: hollow & "c"	COOLMAX® EcoMade ALL SEASON technology, COOLMAX® EcoMade CORE technology, COOLMAX® freshFX® technology
988DAM	Textured filament	Six-channel	COOLMAX® CORE technology, COOLMAX® freshFX® technology
988TAM	POY filament	Six-channel	COOLMAX® CORE technology, COOLMAX® freshFX® technology
988TAMEF	EcoMade filament	Six-channel	COOLMAX® CORE technology, COOLMAX® EcoMade CORE technology COOLMAX® freshFX® technology



COOLMAX® freshFX® Fiber:

Minimum content and performance requirements

In order to qualify for COOLMAX® freshFX® branding, fabrics must contain a minimum content of qualifying fiber, **and** meet minimum performance standards.

Minimum fiber content requirements:

Minimum fiber content requirement
With Natural Fibers in Fabric 40%
With 100% Synthetic Fabric 40%

Cool Comfort and Bacterial Reduction requirements:

	Knit fabrics	Woven fabrics	Socks
Vertical wicking	≥ 3 in	≥ 3 in	≥ 3 in
Planar wicking	≥ 2 in ²	≥ 2 in ²	-
Air Permeability	≥ 60 cfm	-	-
Anti-bacterial performance	Minimum content requirements, adherence to dying and finishing guidelines, 3 rd party antibacterial testing by customers*		

**AATCC 100 (or similar industry recognised) test of fabric as-received and again after 30 washes: the fabric must exhibit a bacterial reduction rate of 90% in both tests*

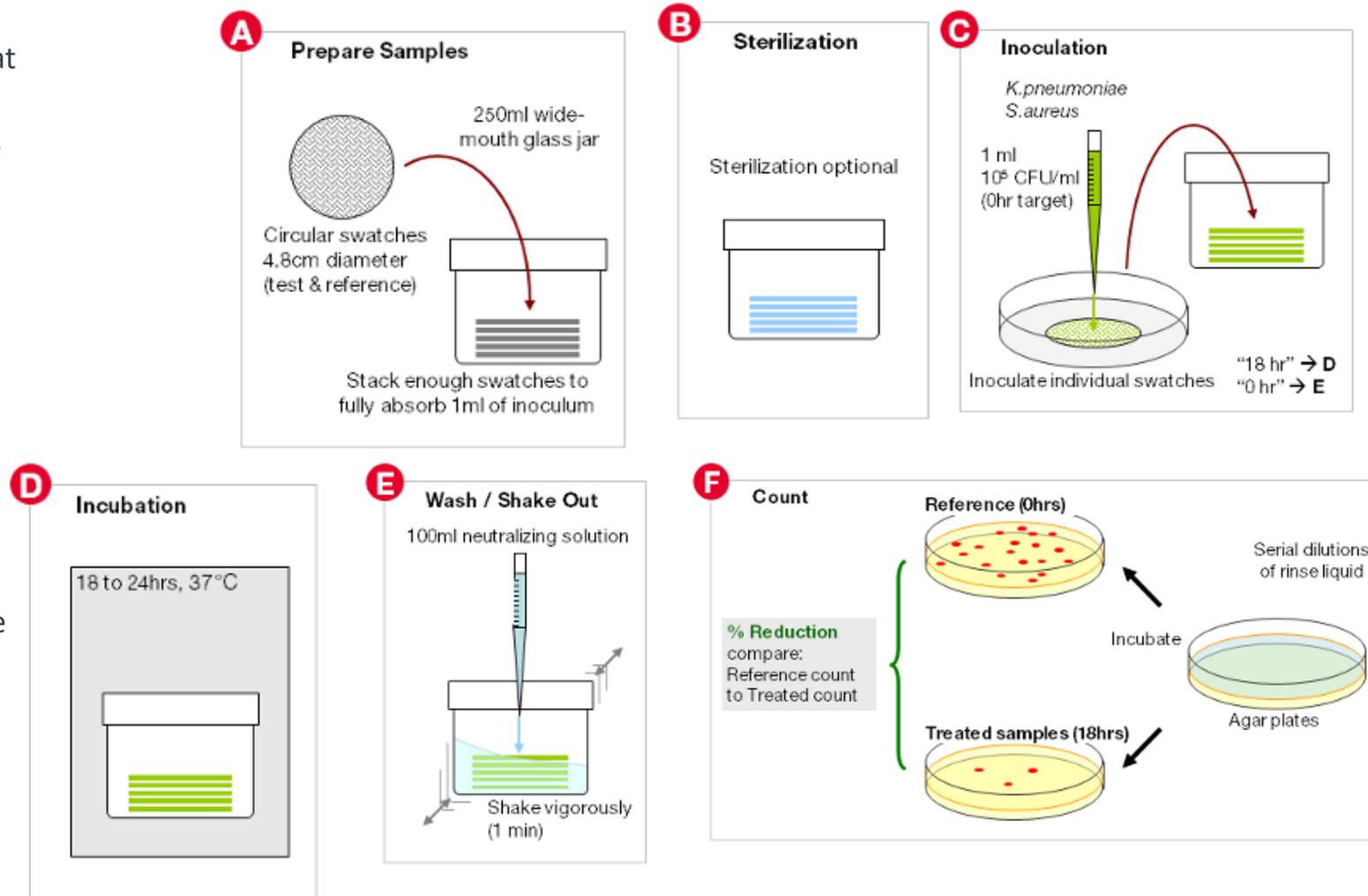
COOLMAX® freshFX® Fiber: What causes clothes to smell?

- Odors are caused by bacteria – such as *Corynebacterium* and some *Staphylococcus* species – that break down sweat and produce volatile products that include ammonia, hydrogen sulfide and short chain fatty acids. These substances cause clothes to smell

How is bacterial growth inhibition tested?

Tests that are used to verify effectiveness of anti-bacterial ingredients in textile products, such as AATCC 100, use common bacteria found on the skin and in mouth or nose. Examples include *Staphylococcus Aureus* that can be the source of many common skin infections and *Klebsiella Pneumoniae* that can be the cause of skin and lung infections. Additional/alternative bacteria and organisms are also used in some tests such as *E. Coli* and *Candida albicans* in the China standard FZ/T 73023 test.

Typical Fabric antibacterial test method (AATCC 100)



Sources:

Dr John Dean, Elsevier Connect
Denawaka et al, *Journal of Chromatography A*, vol. 1438, March 2016
<https://www.microbe-investigations.com/testing-methods/aatcc-100>

COOLMAX® freshFX® Fiber

Demonstration of performance benefits in fabric

- **Case 1: 40% COOLMAX® freshFX® fiber (staple fiber type 729AM) with 60% Cotton**
 - After 50 washes, fabrics pass China Standard FZ/T 73023-2006 (Antibacterial knitwear) as tested by the China National Textiles Testing Center

cttc 检验报告 TEST REPORT		MA AL		ILAC-MRA		CNAS 中国认可 国际互认 检测 TESTING CNAS L0783	
No.: AG20000087E		170011110366 (2017) 资质认定字(014)号				Page 2 of 2	
	Requirement	Results	Judgement				
Bacteriostatic activity percentage of Staphylococcus aureus (ATCC 6538)(%) -After washing 50times FZ/T 73023-2006 附录 D	≥80	>99	Pass				
Bacteriostatic activity percentage of Candida albicans (ATCC 10231)(%) -After washing 50times FZ/T 73023-2006 附录 D	≥60	95	Pass				
Bacteriostatic activity percentage of escherichia coli(8099)(%) -After washing 50times FZ/T 73023-2006 附录 D	≥70	>99	Pass				

COOLMAX® freshFX® Fiber

Demonstration of performance benefits in fabric

- **Case 2: 50% COOLMAX® freshFX® fiber (staple fiber type 729AM) with 50% Cotton**
 - After 50 washes, fabrics pass China Standard FZ/T 73023-2006 (Antibacterial knitwear) as tested by the China National Textiles Testing Center

CLTC 检验报告 TEST REPORT		MA AL		ILAC-MRA		CNAS 中国认可 国际互认 检测 TESTING CNAS L0783	
No.: AG20000084E				170011110366 (2017) 图认准认字(018)号		Page 2 of 2	
	Requirement	Results	Judgement				
Bacteriostatic activity percentage of Staphylococcus aureus (ATCC 6538)(%)-After washing 50times FZ/T 73023-2006 附录 D	≥80	>99	Pass				
Bacteriostatic activity percentage of Candida albicans (ATCC 10231)(%) -After washing 50times FZ/T 73023-2006 附录 D	≥60	99	Pass				
Bacteriostatic activity percentage of escherichia coli(8099)(%) -After washing 50times FZ/T 73023-2006 附录 D	≥70	97	Pass				

COOLMAX® freshFX® Fiber

Demonstration of performance benefits in fabric

- **Case 3: 50% COOLMAX® freshFX® fiber (filament type 934TAM) with 50% polyester**
- *After 50 washes, fabrics pass China Standard FZ/T 73023-2006 (Antibacterial knitwear) as tested by the China National Textiles Testing Center*

No.: AG20000085E Page 2 of 2

Requirement	Results	Judgement
Bacteriostatic activity percentage of Staphylococcus aureus (ATCC 6538)(%) -After washing 50times FZ/T 73023-2006 附录 D	≥80	>99
Bacteriostatic activity percentage of Candida albicans (ATCC 10231)(%) -After washing 50times FZ/T 73023-2006 附录 D	≥60	94
Bacteriostatic activity percentage of escherichia coli(8099)(%) -After washing 50times FZ/T 73023-2006 附录 D	≥70	>99

COOLMAX® freshFX® fiber – Product Stewardship

USA considerations

- The active ingredient used in COOLMAX® freshFX® conforms with the standards of the Environmental Protection Agency (EPA) and can be used in textile garments.

European Union considerations

- Silver ion active ingredient used in COOLMAX® freshFX® fabrics is regulated under the EU Biocidal product regulation – EU BPR.
- The active substance is currently being reviewed as part of the EU BPR and can therefore continue to be used in garments placed on the EU market.

Other key country considerations

- Korea will implement a new regulation in 2021 that will be similar to EU BPR
- China and Japan currently have no comparable regulations in place for garments

Approved marketing claims for COOLMAX® freshFX® fabrics do not make (and must not make) claims that would require registration of the treated article as pesticide with the U.S. EPA or as a biocidal product under EU BPR.

The active component used in COOLMAX® freshFX® fabrics is on the Oeko-Tex® list of active chemical products and may be used as certified in textiles with Oeko-Tex® STANDARD 100.

COOLMAX® freshFX® fiber - Common Questions

- Is COOLMAX® freshFX® fiber independently laboratory tested?
 - Yes, all batches produced are tested by independent laboratories
- Is COOLMAX® freshFX® fiber durable?
 - Yes, anti-bacterial effectiveness in fabric after 50 washes has been observed
- What special care should be taken in fabric processing?
 - Care is needed in the manufacture of fabrics using this technology. Please see our technical data sheet for details.
- Do consumers need to treat their garments in any special way?
 - No, but garment care instructions should always be followed.
- What is the active ingredient in COOLMAX® freshFX® fiber?
 - The technology is Silver based.
- Does COOLMAX® freshFX® use nanoparticles?
 - No, it is not a nanomaterial.
- Is the technology safe?
 - The technology is compliant with key regulations and is safe for intended use.
- Does COOLMAX® freshFX® fiber give bacterial protection in everyday or in medical applications?
 - We have only tested the anti-bacterial performance of COOLMAX® freshFX® fiber vs. common odor-forming bacteria on garments and have not tested its performance on other types of micro-organisms.
 - COOLMAX® freshFX® fibers have not been tested for use in any medical or health and wellness applications.
 - COOLMAX® freshFX® technology is designed to help keep garments fresher for longer
- Does COOLMAX® freshFX® fiber have antiviral characteristics?
 - We have not tested for antiviral activity and have no evidence that it is effective.