



## ANTIMICROBIAL EXECUTIVE SUMMARY

Antibacterial/Antimicrobial tests were conducted using AATCC Method 100 standard testing protocol for textiles, and/or AATCC Method 30 part 3 / ASTM G21 as required. Tested goods showed consistent performance against gram negative and gram positive organisms, consistently achieving 3-5 log (99.9% to >99.999%) efficacy. Robust and long-lasting performance is demonstrated by testing before and after laundering for consumer goods, and through shelf life testing conducted to FDA standards for medical textiles. Test data is shown for goods prepared using standard unmodified factory equipment.

- 3rd party test results generated from factory samples
- Bacterial Species and Incidence
- Internal lab testing data for wide spectrum of microbes
- Shelf life testing from FDA clearance of medical textile
- High durability laundering studies on treated samples
- Fungal and Yeasts testing

**FACTORY PRODUCED TEXTILE TEST RESULTS:  
3<sup>RD</sup> PARTY INDEPENDENT TEST DATA**

- Results shown indicate greater than 3 log (99.9%) reduction in growth
- No CFU found in testing of treated textiles indicating a complete kill
- Both gram-positive and gram-negative model organisms tested

	Avg. population recovered		Result: % reduction of bacteria
	0 hour	24 hours	
<b>Staphylococcus aureus, ATCC 6538</b>			
Untreated control sample	6.09 x 10 <sup>3</sup>	7.65 x 10 <sup>3</sup>	n/a
As received sample	/	<1	>99.98%
20x washed sample	/	<1	>99.98%

	0 hour	24 hours	
	<b>Klebsiella pneumoniae, ATCC 4352</b>		
Untreated control sample	6.46 x 10 <sup>3</sup>	2.14 x 10 <sup>5</sup>	n/a
As received sample	/	<1	>99.98%
20x washed sample	/	<1	>99.98%

Remarks:

- 1 Washing procedure:
- 2 Sterilization of samples by UV exposure
- 3 The number of 1 x 1 inch square used per jar: 6
- 4 Cell concentration of bacterial inoculum (cells/ml): 2.44 x 10<sup>5</sup>
- 5 Neutralizing solution: Modified Lethen broth
- 6 Volume of neutralizing solution added: 20ml
- 7 Number of replicate: 3

## BACTERIAL SPECIES AND THEIR INCIDENCE

### **SWEAT ASSOCIATED:**

Micrococcae

Aerobic diphtheroids

Propionibacterium acne

Corynebacterium xerosis

### **SKIN ASSOCIATED:**

Staph. aureus

Staph. epidermidis

K. pneumoniae

P. vulgaris

### **FOOT-ODOR ASSOCIATED:**

Staphylococci

and aerobic

Coryneform bacteria

### **FABRIC DISCOLORATION ASSOCIATED:**

Bacillus genera

Micrococcus genera

### **INCONTINENCE ASSOCIATED:**

E. coli

Salmonella

Enterococcus faecalis



## EFFICACY OF OXITEX AGAINST VARIOUS SPECIES, LAUNDERED AND UNLAUNDERED

	Bacteria	ATCC #	% Kill unlaundered	% Kill after 25x HL
Common pathogens	Staphylococcus aureus	6538	>99.999%	>99.999%
	Staphylococcus epidermidis	12228	>99.999%	>99.999%
	Enterococcus faecium	19434	>99.999%	>99.999%
	Escherichia coli	15597, 8739	>99.999%	>99.999%
	Pseudomonas aeruginosa	15442	>99.999%	>99.9%
	Klebsiella pneumoniae	4352	>99.999%	>99.999%
	Streptococci	10096	>99.999%	>99.99%
Resistant species	MRSA	BAA-44	>99.999%	>99.999%
	VRE	51299	>99.999%	>99.999%
Species associated with body odor	Corynebacterium diphtheriae	43145	>99.999%	>99.999%
	Micrococcus luteus	21102	>99.999%	>99.99%
	Proteus vulgaris	13115	>99.999%	>99.999%

### 3 YEAR SHELF-LIFE TEXTILE TEST RESULTS

- Greater than 4 log reduction (99.99%) maintained over 3 years
- Testing is from FDA clearance k121898 for a medical textile (polyester base fabric)
- No loss of physical properties of textile from antimicrobial application
- Both gram negative and gram positive model organisms shown (2 of each per submission)

PHYSICAL TESTING					ANTIBACTERIAL EFFICACY LOG REDUCTION			
	ABSORBENT CAPACITY	EVAPORATION RATE	WICKING	AVERAGE LOG REDUCTION				
UNIT	WT %	G/MIN	CM/MIN	TEST ORGANISM <sup>1</sup>				
TARGET	MINIMUM 200%	MINIMUM 0.004	MINIMUM 8.0 CM IN 5 MIN	MRSA	AB	EC	SE	
INITIAL	PB1	307.07%	0.0051	10.4	AT LEAST 5.95	AT LEAST 5.44	AT LEAST 5.70	AT LEAST 5.84
	PB2	306.11%	0.0054	10.2	AT LEAST 5.95	AT LEAST 5.43	AT LEAST 5.69	AT LEAST 5.89
	PB3	296.88%	0.0059	10.6	AT LEAST 6.00	AT LEAST 5.48	AT LEAST 5.61	AT LEAST 5.87
1 YEAR	PB1	305.50%	0.0117	10.3	AT LEAST 5.72	AT LEAST 5.22	AT LEAST 4.22	AT LEAST 5.00
	PB2	297.65%	0.0113	10.3	AT LEAST 5.69	AT LEAST 4.07	AT LEAST 4.35	AT LEAST 4.92
	PB3	296.94%	0.0117	10.5	AT LEAST 5.63	AT LEAST 5.18	AT LEAST 4.92	AT LEAST 4.97
2 YEARS	PB1	318.09%	0.008	10.0	AT LEAST 5.50	AT LEAST 6.00	AT LEAST 5.28	AT LEAST 5.56
	PB2	311.03%	0.007	9.3	AT LEAST 5.53	AT LEAST 5.27	AT LEAST 5.17	AT LEAST 5.52
	PB3	314.54%	0.008	10.3	AT LEAST 5.48	AT LEAST 5.15	AT LEAST 5.21	AT LEAST 5.57
3 YEARS	PB1	300.56%	0.009	9.9	AT LEAST 5.42	AT LEAST 4.22	AT LEAST 5.45	AT LEAST 5.71
	PB2	297.71%	0.009	9.1	AT LEAST 5.42	AT LEAST 4.16	AT LEAST 5.43	AT LEAST 5.68
	PB3	302.22%	0.009	9.8	AT LEAST 5.53	AT LEAST 4.65	AT LEAST 5.47	AT LEAST 5.75

MRSA = Methicillin Resistant *Staphylococcus aureus*; ATCC #BAA-44

AB = *Acinetobacter baumannii*; ATCC 19606

EC = *Escherichia coli*; ATCC 8739

SE = *Staphylococcus epidermidis*; ATCC 12228

## HIGHLY DURABLE FORMULATIONS TESTED AT EXTENDED NUMBERS OF WASH CYCLES

- Textiles were laundered by standard consumer laundering methods (not accelerated), as per care label instructions for the goods tested. HL = Home Laundering.
- Both gram negative and gram positive results show excellent efficacy after up to 100 cycles
- All products de-identified. Products are laundered to end point determined by customers' expected use life. This varies significantly by product.

Sample	Species tested	efficacy unlaundered	efficacy at X laundering cycles
Blue Polyester	Klebsiella pneumonia (Gram-)	>99.99%	>99.99% after 100x HL
Blue Polyester	Staphylococcus aureus (Gram+)	>99.99%	>99.99% after 100x HL
Whitewooljerseyw silicone softener	Klebsiella pneumonia (Gram-)	>99.99%	>99.99% after 75x HL
Whitewooljerseyw silicone softener	Staphylococcus aureus (Gram+)	>99.99%	>99.99% after 75x HL
White bamboo jersey with nonionic softener	Klebsiella pneumonia (Gram-)	>99.99%	>99.99% after 75x HL
White bamboo jersey with nonionic softener	Staphylococcus aureus (Gram+)	>99.99%	>99.99% after 75x HL
White 300 thread count sheets, 62% cotton / 36% polyester / 2% lycra	Klebsiella pneumonia (Gram-)	>99.99%	>99.99% after 50x HL
White 300 thread count sheets, 62% cotton / 36% polyester / 2% lycra	Staphylococcus aureus (Gram+)	>99.99%	>99.99% after 50x HL
Green 100% polyester medical scrubs fabric	Klebsiella pneumonia (Gram-)	>99.99%	>99.99% after 50x HL
Green 100% polyester medical scrubs fabric	MRSA: Methicillin Resistant Staphylococcus aureus (Gram+)	>99.99%	>99.99% after 50x HL

## ANTI-FUNGAL EXECUTIVE SUMMARY

Trichophyton testing used AATCC Method 30 Test 3 as testing protocol to identify efficacy, which is a qualitative observational test. This fungal species is relevant because it is identified as causing athlete’s foot infections. Antifungal samples were treated with a high concentration of OxiTex, which can be targeted to best protect specific problem areas, such as footbeds in shoes.

Candida results were generated based on AATCC Method 100, which gives numerical data for microbial kill.

**Candida tropicalis** | A yeast which is involved in yeast infections and thrush.

- Greater than 5 log reductions shown against infectious yeast strain
- Complete kill demonstrated
- Used a common fabric used for insole manufacturing

	AVERAGE	AVERAGE
AATCC METHOD 100, N=3; 5 LOG INOCULUM	LOG REDUCTION	% KILL
TEST ORGANISM CANDIDA TROPICALIS	T=0	T=0
BK MESH, polyester fabric.	5.06* ± 0.00	>99.999

\* INDICATES FULL KILL

**Candida albicans** | a yeast which is the primary cause of yeast infections and thrush.

- Greater than 3 log reductions shown against infectious yeast strain
- Used a common fabric used for insole manufacturing

	AVERAGE	AVERAGE
AATCC METHOD 100, N=3; 5 LOG INOCULUM	LOG REDUCTION	%KILL
TEST ORGANISM CANDIDA ALBICANS	T=0	T=0
BK MESH, polyester fabric.	3.60 ± 0.17	99.98%

\* INDICATES FULL KILL

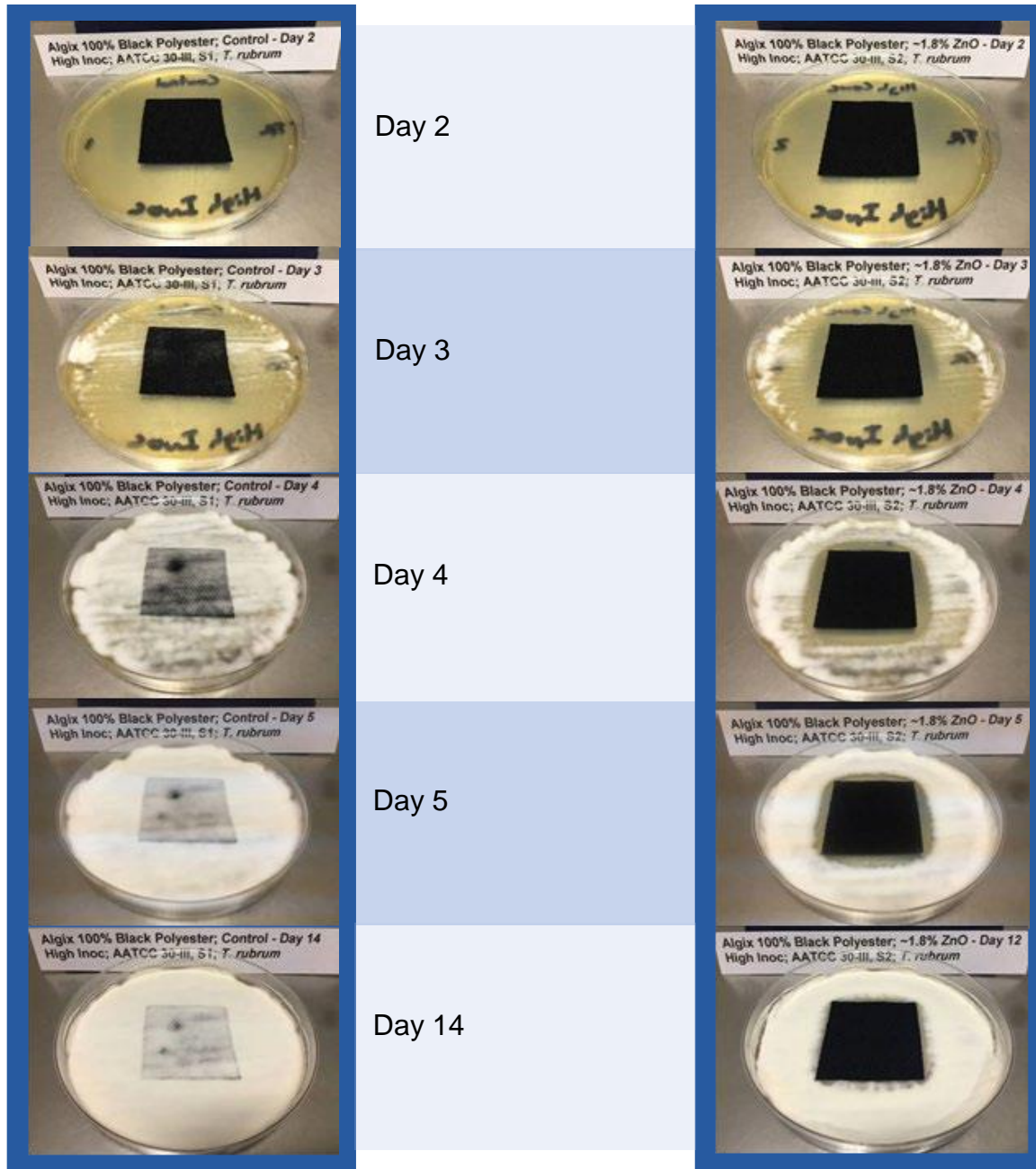


**Trichophyton rubrum** | The most common dermatophyte which causes Athlete's Foot.

- Completely protected for test period out to 14 days
- Control samples are infiltrated by Day 3
- Used a common fabric used for insole manufacturing
- Black fabric used to enhance identification of fungal invasion

**UNTREATED SAMPLES**

**TREATED SAMPLES**



Trichophyton mentagrophytes | A dermatophyte which causes Athlete's Foot.

- Completely protected for test period out to 14 days
- Control samples are infiltrated by Day 3
- Used a common fabric used for insole manufacturing
- Black fabric used to enhance identification of fungal invasion

UNTREATED SAMPLES

TREATED SAMPLES

