

Summary of Antimicrobial Efficiency Test - Medical Textile

TEST #: 022012-1

SUBJECT COMPOSITION: MEDICAL TEXTILE: Blue Polyester Microfibre 45%; Polyester Spun 35%; Cotton 20%

MICROBIOLOGY TEST PROTOCOL: ASTM E2149

WASHING TEST PROTOCOL: AATCC Test Method AATCC 61-4A

TEST Microorganisms: Klebsiella pneumonia (Kleb)

Chemicals Used (if known): some finish solution - unknown composition

Test Requested: Determine optimal level of 2915 - 1916141125 for antimicrobial effectiveness after treatment and residual effectiveness after 50, 75 and 100 commercial wash equivalents per AATCC Accelerated Test Method 61-4A

Testing Procedure:

First, an overnight culture of *KLEB* (ATCC-4352) that had been adjusted in concentration to an absorbance of 0.28 at 475nm was generated. (This absorbance is typical for a 10^8 CFU/ml concentration of bacteria.)

Next, 0.5mL of the measured broth are diluted into 500 ml of Nutrient Broth to produce a 10^5 inoculum (working solution).

Then 50mL of working solution transferred into 250ml Erlenmeyer flask, shaken 1 minute as 0 contact time. Immediately transfer 1mL solution to test tube, serially dilute and plate out to determine the amount of surviving bacteria in each sample container.

They used 2 grams of a test sample.

At this point they put each sample into each individual flask shake for 1 hour. After that they immediately transferred 1mL of the solution for testing to a test tube, serially diluted and plated out to determine the amount of surviving bacteria in each sample container

The plates were incubated overnight at 35°C and colonies are counted the next day.

Results Summary

Results are listed in the following data tables. Samples with bacterial reduction rate greater than 85% are

considered pass. Samples treated at 10% showed excellent antimicrobial efficacy before and after washing up to 75 commercial launderings. **NOTE: (Each commercial wash is equivalent to 5 domestic washings).**



Treatment of Samples

1. NOTE: All samples (except those treated at factory) were treated by Exhausting method
2. Weight out samples to be treated.
3. Weight out antimicrobial solution (2915-1916141125) by the amount of 0.25% a.i. (active ingredient) of w.o.f (weight of fabric) OR 0.15% A.I. as the screening experiments determine.
4. Dissolve antimicrobial in water to form treatment bath. The weight of water is 8 times of weight of fabric material to be treated.
5. Soak fabric in bath for at least 20 minutes.
6. Either air or oven dry. (For oven dry, the drying temperature should not exceed 350 degree F)
7. Samples are a MEDICAL TEXTILE: Blue Polyester Microfibre 45%; Polyester Spun 35%; Cotton 20%
8. All samples will be tested for antimicrobial efficacy before washing and after washing 30 times
9. Washing was performed according to protocol AATCC Test Method 61 - 4A.

Summary of Antimicrobial Efficiency Test - Medical Textile

Detailed Result in Data Table

Sample ID	022012-1	022012-1	022012-1
Costumer	"BRAND" Medical Textile	"BRAND" Medical Textile	"BRAND" Medical Textile
Specifications	Blue Polyester Microfibre 45%; Polyester Spun 35%; Cotton 20%	Blue Polyester Microfibre 45%; Polyester Spun 35%; Cotton 20%	Blue Polyester Microfibre 45%; Polyester Spun 35%; Cotton 20%
Results After Washes	Initial	75 Washes	100 washes
Concentration	xx	10%	10%
0 Time			
Dilution Factor	Inoculum Only	T3	T1
1	xx	xx	xx
1	xx	xx	xx
10	xx	xx	xx
10	xx	xx	xx
100	259	115	195
100	269	112	210
60 Minute			
Dilution Factor	Inoculum Only	T3	T1
1	xx	110	xx
1	xx	110	xx
10	xx	4	xx
10	xx	0	xx
100	144	0	75
100	136	0	65
Reduction	34%	>99%	65%
CONCLUSION		Pass	Fail

Summary of Antimicrobial Efficiency Test - Military Uniform

TEST #:112011"47

SUBJECT COMPOSITION: MILITARY UNI FORM 60% COTTON, 40% POLYESTER MICROBIOLOGY TEST PROTOCOL: ASTM E2149

WASHING TEST PROTOCOL: AATCC Test Method 188-2003

TEST Microorganisms: *Klebsiella pneumonia* (Kleb)

Testing Procedure:

First, an overnight culture of *KLEB* (ATCC-4352) that had been adjusted in concentration to an absorbance of 0.28 at 475nm was generated. (This absorbance is typical for a 10^8 CFU/ml concentration of bacteria.)

Next, 0.5mL of the measured broth are diluted into 500 ml of Nutrient Broth to produce a 10^5 inoculum (working solution).

Then 50mL of working solution transferred into 250ml Erlenmeyer flask, shaken 1 minute as 0 contact time. Immediately transfer 1mL solution to test tube, serially dilute and plate out to determine the amount of surviving bacteria in each sample container.

They used 2 grams of a test sample.

At this point they put each sample into each individual flask shake for 1 hour. After that they immediately transferred 1mL of the solution for testing to a test tube, serially diluted and plated out to determine the amount of surviving bacteria in each sample container

The plates were incubated overnight at 35°C and colonies are counted the next day.

Results Summary

Results are listed in the following data tables. Samples with bacterial reduction rate greater than 85% are considered pass.

The samples treated at 0.5% OWG showed EXCELLENT Initial antimicrobial efficacy of >99%. The samples treated at 1.0% on weight of goods (OWG) showed EXCELLENT initial antimicrobial efficacy of >99%.



Treatment of Samples

1. NOTE: All samples (except those treated at factory) were treated by Exhausting method
2. Weight out samples to be treated.
3. Weight out antimicrobial solution (2915-1916141125) by the amount of 0.25% a.i. (active ingredient) of w.o.f (weight of fabric) OR 0.15% A.I. as the screening experiments determine.
4. Dissolve antimicrobial in water to form treatment bath. The weight of water is 8 times of weight of fabric material to be treated.
5. Soak fabric in bath for at least 20 minutes.
6. Either air or oven dry. (For oven dry, the drying temperature should not exceed 350 degree F)
7. Samples are from a MILITARY UNIFORM (60% COTTON, 40% POLYESTER)
8. All samples will be tested for antimicrobial efficacy before washing and after washing 30 times
9. Washing was performed according to protocol AATCC Test Method 188 - 2003.

The samples washed 50 times at 0.5% OWG showed excellent antimicrobial efficacy of >99%.

Summary of Antimicrobial Efficiency Test - Military Uniform

Detailed Result in Data Table

102012 - 48.2	102012 - 48.2	102012 - 48.1
"BRAND" Military Uniform	"BRAND" Military Uniform	"BRAND" Military Uniform
60% Cotton, 40% Polyester	60% Cotton, 40% Polyester	60% Cotton, 40% Polyester
DETERMINE OPTIMAL LEVEL OF (2915 - 1916141125) FOR ANTIMICROBIAL EFFECTIVENESS AFTER TREATMENT AND RESIDUAL EFFECTIVENESS AFTER 20 WASHES.	DETERMINE OPTIMAL LEVEL OF (2915 - 1916141125) FOR ANTIMICROBIAL EFFECTIVENESS AFTER TREATMENT AND RESIDUAL EFFECTIVENESS AFTER 20 WASHES.	AFTER 50 WASHES
5%	10%	10%
T2 (0.5% OWG)	T1	T1
XX	XX	XX
XX	XX	XX
XX	XX	XX
XX	XX	XX
77	57	74
72	69	79
60 Minutes		
T1	T1	T1
XX	7	23
XX	6	16
XX	0	3
XX	0	3
61	0	0
58	0	0
20%	>99%	>99%
FAIL	PASS	PASS

Antimicrobial Efficiency Test of 100% Polypropylene

TEST #:112011-47

SUBJECT COMPOSITION: 100% POLYPROPYLENE /
SERIES 101

MICROBIOLOGY TEST PROTOCOL: ASTM E2149

WASHING TEST PROTOCOL: AATCC Test Method
188-2003

TEST Microorganisms: *Klebsiella pneumonia* (Kleb)

Testing Procedure:

First, an overnight culture of KLEB (ATCC-4352) that had been adjusted in concentration to an absorbance of 0.28 at 475nm was generated. (This absorbance is typical for a 10^8 CFU/ml concentration of bacteria.)

Next, 0.5mL of the measured broth are diluted into 500 ml of Nutrient Broth to produce a 10^5 inoculum (working solution).

Then 50mL of working solution transferred into 250ml Erlenmeyer flask, shaken 1 minute as 0 contact time. Immediately transfer 1 mL solution to test tube, serially dilute and plate out to determine the amount of surviving bacteria in each sample container.

They used 2 grams of a test sample.

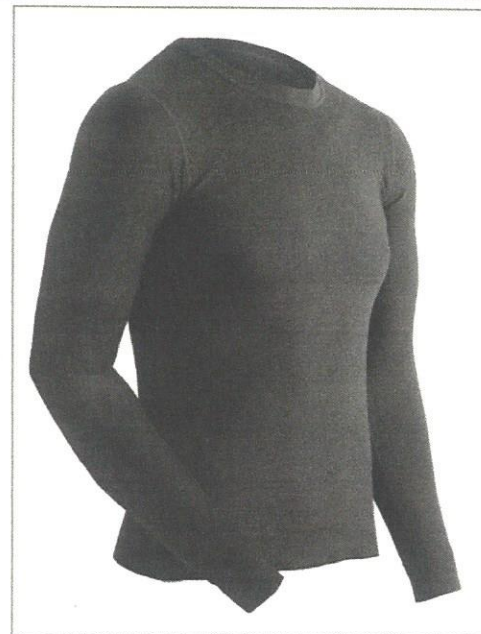
At this point they put each sample into each individual flask shake for 1 hour. After that they immediately transferred 1mL of the solution for testing to a test tube, serially diluted and plated out to determine the amount of surviving bacteria in each sample container

The plates were incubated overnight at 35°C and colonies are counted the next day.

Results Summary

Results are listed in the following data tables. Samples with bacterial reduction rate greater than 85% are considered pass.

The samples treated at 0.5% OWG showed EXCELLENT Initial antimicrobial efficacy of >99%. The samples treated at 1.0% on weight of goods (OWG) showed EXCELLENT initial anti-microbial efficacy of >99%. **The samples washed 50 times at 0.5% OWG showed excellent antimicrobial efficacy of >99%.**



Treatment of Samples

1. NOTE: All samples (except those treated at factory) were treated by Exhausting method
2. Weight out samples to be treated.
3. Weight out antimicrobial solution (2915-1916141125) by the amount of 0.25% a.i. (active ingredient) of w.o.f (weight of fabric) OR 0.15% A.I. as the screening experiments determine.
4. Dissolve antimicrobial in water to form treatment bath. The weight of water is 8 times of weight of fabric material to be treated.
5. Soak fabric in bath for at least 20 minutes.
6. Either air or oven dry. (For oven dry, the drying temperature should not exceed 350 degree F)
7. Samples are 100% Polypropylene
8. All samples will be tested for antimicrobial efficacy before washing and after washing 30 times
9. Washing was performed according to protocol AATCC Test Method 188 - 2003.

Antimicrobial Efficiency Test of 100% Polypropylene

Detailed Result in Data Table

102012 - 48.2	102012 - 48.2	102012 - 48.1
"BRAND" Military Textile	"BRAND" Military Textile	"BRAND" Military Textile
2. 100% Polypropylene Series 101	2. 100% Polypropylene Series 101	1. 100% Polyester
DETERMINE OPTIMAL LEVEL OF (2915 - 1916141125) FOR ANTIMICROBIAL EFFECTIVENESS AFTER TREATMENT AND RESIDUAL EFFECTIVENESS AFTER 20 WASHES.		AFTER 50 WASHES
5%	10%	5%
T1 (0.5% OWG)	T3 (1.0% OWG)	T1
XX	XX	XX
XX	XX	XX
XX	XX	XX
XX	XX	XX
68	77	79
59	69	81
T1	T3	T1
15	5	2
14	3	1
1	4	0
0	0	0
0	0	0
0	0	0
>99%	>99%	>99%
Pass	Pass	Pass

Summary of Antimicrobial Efficiency Test - Fuchsia Textile

TEST #: 102011-22

SUBJECT COMPOSITION: FUCHSIA PATTERN PRINTED, LYCRA AND NYLON,(85% polyamide; 15% Elastane)

MICROBIOLOGY TEST PROTOCOL:ASTM E2149

WASHING TEST PROTOCOL: AATCC Test Method 188-2003

TEST Microorganisms: Klebsiella pneumonia (Kleb)

Chemicals Used (If known): some finish solution-unknown composition

Test Requested: Determine optimal level of 2915-1916141125 for antimicrobial effectiveness after treatment and residual effectiveness after 20 washes

Testing Procedure:

First, an overnight culture of *KLEB* (ATCC-4352) that had been adjusted in concentration to an absorbance of 0.28 at 475nm was generated. (This absorbance is typical for a 10^8 CFU/ml concentration of bacteria.)

Next, 0.5mL of the measured broth are diluted into 500 ml of Nutrient Broth to produce a 10^5 inoculum (working solution).

Then 50mL of working solution transferred into 250ml Erlenmeyer flask, shaken 1 minute as 0 contact time. Immediately transfer 1 mL solution to test tube, serially dilute and plate out to determine the amount of surviving bacteria in each sample container.

They used 2 grams of a test sample.

At this point they put each sample into each individual flask shake for 1 hour. After that they immediately transferred 1mL of the solution for testing to a test tube, serially diluted and plated out to determine the amount of surviving bacteria in each sample container

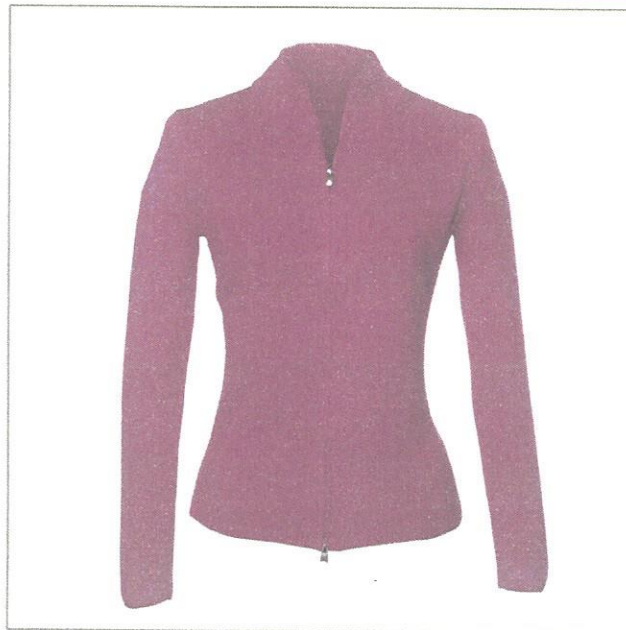
The plates were incubated overnight at 35°C and colonies are counted the next day.

Results Summary

Results are listed in the following data tables. Samples with bacterial reduction rate greater than 85% are considered pass.

Samples showed excellent anti-microbial efficacy before and after washing.

Sample 22 was treated at 0.5% on weight of goods (OWG) showed 94% after 20 washes.



Treatment of Samples

1. NOTE: All samples (except those treated at factory) were treated by Exhausting method
2. Weight out samples to be treated.
3. Weight out antimicrobial solution (2915-1916141125) by the amount of 0.25% a.i. (active ingredient) of w.o.f (weight of fabric) OR 0.15% A.I. as the screening experiments determine.
4. Dissolve antimicrobial in water to form treatment bath. The weight of water is 8 times of weight of fabric material to be treated.
5. Soak fabric in bath for at least 20 minutes.
6. Either air or oven dry. (For oven dry, the drying temperature should not exceed 350 degree F)
7. Samples are from 85% polyamide; 15% Elastane FUCHSIA PATTERN PRINTED, LYCRA AND NYLON
8. All samples will be tested for antimicrobial efficacy before washing and after washing 30 times
9. Washing was performed according to protocol AATCC Test Method 188 - 2003.

Summary of Antimicrobial Efficiency Test - Fuchsia Textile

Detailed Result in Data Table

Sample ID	102011 - 22	102011 - 22
Specifications	FUCHSIA PRINTED. LYCRA AND NYLON	FUCHSIA PRINTED. LYCRA AND NYLON
Comments and/or Conditions	WITHOUT FINISHING AND WITHOUT THERMOSITTING OR THERMOFIXING	WITHOUT FINISHING AND WITHOUT THERMOSITTING OR THERMOFIXING
Contact Results		96% AT 0.5% OWG
Result After Washes		AFTER 20 WASHES
		PASS
0 Time		10%
Dilution Factor	Inoculum Only	T1
1	xx	xx
1	xx	xx
10	xx	xx
10	xx	xx
100	50	50
100	55	60
60 Minute		24 hours
Dilution Factor	Inoculum Only	T1
1	xx	239
1	xx	179
10	xx	21
10	xx	17
100	64	4
100	60	1
Reduction		96%
CONCLUSION		Pass

Antimicrobial Efficiency Test of White Cotton Towel Summary

TEST #:112011-40

SUBJECT COMPOSITION: .White Cotton Towel

MICROBIOLOGY TEST PROTOCOL: ASTM E2149

WASHING TEST PROTOCOL: AATCC Test Method 188 - 2003

TEST Microorganisms: *Klebsiella pneumonia (KLEB)*

Chemicals Used (if known): some finish solution -unknown composition

Test Requested: Determine optimal level of Product #2915 - 1916141125 for antimicrobial effectiveness after treatment and residual effectiveness after 20 washes

Testing Procedure:

First, an overnight culture of *KLEB* (ATCC-4352) that had been adjusted in concentration to an absorbance of 0.28 at 475nm was generated. (This absorbance is typical for a 10^8 CFU/ml concentration of bacteria.)

Next, 0.5mL of the measured broth are diluted into 500 ml of Nutrient Broth to produce a 10^5 inoculum (working solution).

Then 50mL of working solution transferred into 250ml Erlenmeyer flask, shaken 1 minute as 0 contact time. Immediately transfer 1mL solution to test tube, serially dilute and plate out to determine the amount of surviving bacteria in each sample container.

They used 2 grams of a test sample.

At this point they put each sample into each individual flask shake for 1 hour. After that they immediately transferred 1mL of the solution for testing to a test tube, serially diluted and plated out to determine the amount of surviving bacteria in each sample container

The plates were incubated overnight at 35°C and colonies are counted the next day.

Results Summary

Results are listed In the following data tables. Samples with bacterial reduction rate greater than 85% are considered pass.

Samples showed excellent antimicrobial efficacy before and after washing 50 times.

Samples were treated at 0.25% AND 0.5% on weight of goods (OWG) showed more than 99% efficacy initially and more than 91% after 50 washes.

Treatment of Samples

1. NOTE: All samples (except those treated at factory) were treated by Exhausting method
2. Weight out samples to be treated.
3. Weight out antimicrobial solution (2915-1916141125) by the amount of 0.25% a.i. (active ingredient) of w.o.f (weight of fabric) OR 0.15% A.I. as the screening experiments determine.
4. Dissolve antimicrobial in water to form treatment bath. The weight of water is 8 times of weight of fabric material to be treated.
5. Soak fabric in bath for at least 20 minutes.
6. Either air or oven dry. (For oven dry, the drying temperature should not exceed 350 degree F)
7. Samples are from 100% white cotton towel
8. All samples will be tested for antimicrobial efficacy before washing and after washing 30 times
9. Washing was performed according to protocol AATCC Test Method 188 - 2003.

Summary of Antimicrobial Efficiency Test - White Cotton Towel

Detailed Result in Data Table

Sample ID	112011 - 40	112011 - 40	112011 - 40	112011 - 40	112011 - 40	112011 - 40	112011 - 40	112011 - 40	112011 - 40
Costumer	"BRAND" Textile	"BRAND" Textile	"BRAND" Textile	"BRAND" Textile	"BRAND" Textile	"BRAND" Textile	"BRAND" Textile	"BRAND" Textile	"BRAND" Textile
Specifications	White Bath Towel	White Bath Towel	White Bath Towel	White Bath Towel	White Bath Towel	White Bath Towel	White Bath Towel	White Bath Towel	White Bath Towel
Comment/ Conditions	Hydrophilic Silicone Finishing	Hydrophilic Silicone Finishing	Hydrophilic Silicone Finishing	Hydrophilic Silicone Finishing	Hydrophilic Silicone Finishing	Hydrophilic Silicone Finishing	Hydrophilic Silicone Finishing	Hydrophilic Silicone Finishing	Hydrophilic Silicone Finishing
Results After Washes	passed at 0.25 OWG and 0.5% OWG after 50 washes	passed at 0.25 OWG and 0.5% OWG after 50 washes	passed at 0.25 OWG and 0.5% OWG after 50 washes	passed at 0.25 OWG and 0.5% OWG after 50 washes	passed at 0.25 OWG and 0.5% OWG after 50 washes	passed at 0.25 OWG and 0.5% OWG after 50 washes	passed at 0.25 OWG and 0.5% OWG after 50 washes	passed at 0.25 OWG and 0.5% OWG after 50 washes	passed at 0.25 OWG and 0.5% OWG after 50 washes
Description	1/10/2012	1/13/2012	No Washing	No Washing	No Washing	50 Washes	50 Washes	50 Washes	50 Washes
0 Time	Inoculums Only	Control	T1 (0.25%) OWG	T2 (0.50%) OWG	T3 (0.75%) OWG	Inoculums Only	Control	T1 (0.25%) OWG	T2 (0.50%) OWG
Dilution Factor	xx	xx	xx	xx	xx	xx	xx	xx	xx
1.00	xx	xx	xx	xx	xx	xx	xx	xx	xx
1.00	88	34	88	51	111	xx	xx	xx	xx
10.00	68	64	78	42	79	xx	xx	xx	xx
10.00	9	8	11	5	9	88	100	215	191
100.00	12	9	12	6	11	80	181	225	201
100.00	xx	xx	xx	xx	xx	xx	xx	xx	xx
60 Minute Dilution Factor	Inoculums Only	Control	T1 (0.25%) OWG	T2 (0.50%) OWG	T3 (0.75%) OWG	Inoculums Only	Control	T1 (0.25%) OWG	T2 (0.50%) OWG
1	xx	xx	0	0	0	xx	xx	xx	xx
1	xx	xx	0	0	0	xx	xx	xx	xx
10	71	205	0	0	0	xx	xx	xx	135
10	65	170	0	0	0	xx	xx	xx	196
100	6	20	0	0	0	98	182	20	14
100	9	16	0	0	0	72	171	16	18
Reduction	xx	xx	99%	99%	99%	xx	xx	91%	91%
CONCLUSION	na	na	Pass	Pass	Pass	na	na	Pass	Pass

Summary of Antimicrobial Efficiency Test - Underwear

TEST #: 072011 - 6

SUBJECT COMPOSITION: Military Underwear (95% polyamide: 5% Elastane)

MICROBIOLOGY TEST PROTOCOL: ASTM E2149

WASHING TEST PROTOCOL: AATCC Test Method 188 - 2003

TEST Microorganisms: *Klebsiella pneumonia* (KLEB)

Testing Procedure:

First, an overnight culture of KLEB (ATCC-4352) that had been adjusted in concentration to an absorbance of 0.28 at 475nm was generated. (This absorbance is typical for a 10^8 CFU/ml concentration of bacteria.)

Next, 0.5mL of the measured broth are diluted into 500 ml of Nutrient Broth to produce a 10^5 inoculum (working solution).

Then 50mL of working solution transferred into 250ml Erlenmeyer flask, shaken 1 minute as 0 contact time. Immediately transfer 1mL solution to test tube, serially dilute and plate out to determine the amount of surviving bacteria in each sample container.

They used 2 grams of a test sample.

At this point they put each sample into each individual flask shake for 1 hour. After that they immediately transferred 1mL of the solution for testing to a test tube, serially diluted and plated out to determine the amount of surviving bacteria in each sample container

The plates were incubated overnight at 35°C and colonies are counted the next day.

Results Summary

Results are listed in the following data tables. Samples with bacterial reduction rate greater than 85% are considered pass. **Samples showed excellent antimicrobial efficacy before and after washing 50**

times. Sample 6 with a Silicon Softener was treated at 0.5% on weight of goods (OWG) showed >99%, antimicrobial efficacy after 30 washes..



Treatment of Samples

1. NOTE: All samples (except those treated at factory) were treated by Exhausting method
2. Weight out samples to be treated.
3. Weight out antimicrobial solution (2915-1916141125) by the amount of 0.25% a.i. (active ingredient) of w.o.f (weight of fabric) OR 0.15% A.I. as the screening experiments determine.
4. Dissolve antimicrobial in water to form treatment bath. The weight of water is 8 times of weight of fabric material to be treated.
5. Soak fabric in bath for at least 20 minutes.
6. Either air or oven dry. (For oven dry, the drying temperature should not exceed 350 degree F)
7. Samples are from 95% Polyamide 5% Elastane Underwear
8. All samples will be tested for antimicrobial efficacy before washing and after washing 30 times
9. Washing was performed according to protocol AATCC Test Method 188 - 2003.

Summary of Antimicrobial Efficiency Test - Underwear

Detailed Result in Data Table

Sample ID	072011-6	072011-6
Costumer	"BRAND" Military Underwear	"BRAND" Military Underwear
Specifications	95% Polyamide, 5% Elastane	95% Polyamide, 5% Elastane
Comments and/or Conditions	Untreated. Chemicals Used: Some Finish Solution	Untreated. Chemicals Used: Some Finish Solution
Contact Results	Effective Antimicrobial Action Reduction 98% in 60 Minutes	Effective Antimicrobial Action Reduction 98% in 60 Minutes
Result After Washes	Effective Antimicrobial Action	Effective Antimicrobial 100% After 10 Washes
	Initial Treatment	10 Washes
	95% Polyamide, 5% Elastane	95% Polyamide, 5% Elastane
0 Time		
Dilution Factor	T4	T3
1	xx	xx
1	xx	xx
10	xx	xx
10	xx	xx
100	102	98
100	97	69
60 Minute		24 hours
Dilution Factor	T4	T1
1	XX	XX
1	xx	xx
10	55	0
10	31	0
100	3	0
100	2	0
Reduction	98%	>99%
CONCLUSION	Pass	Pass

Summary of Antimicrobial Efficiency Test - TALL Socks

TEST #: "TALL" Brown Socks

SUBJECT COMPOSITION: Production socks as provided

MICROBIOLOGY TEST PROTOCOL: ASTM E2149

WASHING TEST PROTOCOL: AATCC Test Method 188-2003

TEST Microorganisms: *Klebsiella pneumonia* {Kleb}

Testing Procedure:

First, an overnight culture of *KLEB* (ATCC-4352) that had been adjusted in concentration to an absorbance of 0.28 at 475nm was generated. (This absorbance is typical for a 10^8 CFU/ml concentration of bacteria.)

Next, 0.5mL of the measured broth are diluted into 500 ml of Nutrient Broth to produce a 10^5 inoculum (working solution).

Then 50mL of working solution transferred into 250ml Erlenmeyer flask, shaken 1 minute as 0 contact time. Immediately transfer 1 mL solution to test tube, serially dilute and plate out to determine the amount of surviving bacteria in each sample container.

They used 2 grams of a test sample.

At this point they put each sample into each individual flask shake for 1 hour. After that they immediately transferred 1mL of the solution for testing to a test tube, serially diluted and plated out to determine the amount of surviving bacteria in each sample container

The plates were incubated overnight at 35°C and colonies are counted the next day.

Results Summary

Results are listed in the following data tables. Samples with bacterial reduction rate greater than 85% are considered pass.

Samples showed excellent anti-microbial efficacy before and after 30 washes.



Treatment of Samples

NOTE: Samples were treated at factory by Exhausting method. Samples are "TALL" Brand Name Brown Socks. All samples were tested for antimicrobial efficiency before washing and after washing 30 times. Washing was performed according to protocol **AATCC Test Method 188-2003**.

Summary of Antimicrobial Efficiency Test - TALL Socks

Detailed Result in Data Table

Brand Costumer			
Specifications	"TALL" Brand Brown Sock	"TALL" Brand Brown Sock	"TALL" Brand Brown Sock
Results After Washes	Untreated Control	initial	30 washes
0 Time	0 Time	0 Time	24 Hours
Dilution Factor	Inoculum Only	T1	Inoculum Only
1	xx	xx	xx
1	xx	xx	xx
10	xx	xx	xx
10	xx	xx	xx
100	139	148	84
100	151	148	96
60 Minute			
Dilution Factor	Inoculum Only	T1	T3
1	xx	xx	xx
1	xx	xx	xx
10	xx	24	64
10	xx	20	77
100	144	3	7
100	136	0	5
Reduction		>99%	93%
CONCLUSION		Pass	Pass

Summary of Antimicrobial Efficiency Test - Black Army Socks

Test #: 001-072011- 4

Sample Information: Black Acrylic: Elastane 90/10 (approx) dress socks: Untreated

Quantity: 6 pairs of socks

Chemicals Used (if known): some finish solution -may need to strip with IPA first

Test Requested: Determine optimal level of Product 2915-1916141125 for antimicrobial effectiveness after treatment and residual effectiveness after 20 washes

MICROBIOLOGY TEST PROTOCOL: ASTM E2149

TEST Microorganisms: *Klebsiella pneumonia* (Kleb)

Testing Procedure:

First, an overnight culture of *KLEB* (ATCC-4352) that had been adjusted in concentration to an absorbance of 0.28 at 475nm was generated. (This absorbance is typical for a 10^8 CFU/ml concentration of bacteria.)

Next, 0.5mL of the measured broth are diluted into 500 ml of Nutrient Broth to produce a 10^5 inoculum (working solution).

Then 50mL of working solution transferred into 250ml Erlenmeyer flask, shaken 1 minute as 0 contact time. Immediately transfer 1 mL solution to test tube, serially dilute and plate out to determine the amount of surviving bacteria in each sample container.

They used 2 grams of a test sample.

At this point they put each sample into each individual flask shake for 1 hour. After that they immediately transferred 1mL of the solution for testing to a test tube, serially diluted and plated out to determine the amount of surviving bacteria in each sample container

The plates were incubated overnight at 35°C and colonies are counted the next day.

Results Summary

Results are listed in the following data tables. Samples with bacterial reduction rate greater than 85% are considered pass. Exhaust treatment at a level of 0.5% of 2915-1916141125 Antimicrobial Protector active by weight of fabric showed effective anti-microbial results (96%).



Treatment of Samples

1. NOTE: All samples (except those treated at factory) were treated by Exhausting method
2. Weight out samples to be treated.
3. Weight out antimicrobial solution (2915-1916141125) by the amount of 0.25% a.i. (active ingredient) of w.o.f (weight of fabric) OR 0.15% A.I. as the screening experiments determine.
4. Dissolve antimicrobial in water to form treatment bath. The weight of water is 8 times of weight of fabric material to be treated.
5. Soak fabric in bath for at least 20 minutes.
6. Either air or oven dry. (For oven dry, the drying temperature should not exceed 350 degree F)

Summary of Antimicrobial Efficiency Test - Black Army Socks

Detailed Result in Data Table

Sample ID	072011 - 5	072011 - 5
Specifications	Black Army Socks. Elastane 90/10	Black Army Socks. Elastane 90/10
0 Time	Control	
Dilution Factor	Inoculum Only	T1
1	xx	xx
1	xx	xx
10	xx	xx
10	xx	xx
100	106	136
100	95	146
60 Minute		24 hours
Dilution Factor	Inoculum Only	T1
1	xx	xx
1	xx	xx
10	xx	36
10	xx	37
100	158	5
100	145	4
Reduction		96%
CONCLUSION		Pass