

A Material Difference

**Dryflex<sup>®</sup>**

Antimicrobial Thermoplastic  
Elastomer (TPE) Materials



 **HEXPOL<sup>®</sup>**  
**TPE**

# Contents

Introduction →

How Does it Work? →

Performance →

Typical Applications →

Compounds or Masterbatch? →

Antimicrobial Testing →

Results : E.Coli →

Results : MRSA →

# Introduction

Hygiene is a growing concern in today's society. Preventing the spread of harmful bacteria and the safe protection of everyday products, in hospitals, public places or at home is highly valued by customers.

Dryflex Antimicrobial TPEs attack micro-organisms at source, helping prevent problems before they occur. Samples made from Dryflex Antimicrobial TPEs have been independently tested and proven to kill >99.9% of gram positive and negative bacteria when tested by the recognised ISO 22196 test method.

Dryflex Antimicrobial TPEs are effective against MRSA, E-Coli, Pseudomonas Aeruginosa and Salmonella and many other harmful bacteria.

Some bacteria can also adversely affect everyday products causing stains, embrittlement, odours and product deterioration. Using Dryflex Antimicrobial TPE can help to prevent these issues and extend the service life of the finished product. They can add value to your product by addressing the health image desired by end-users.

# How Does it Work?

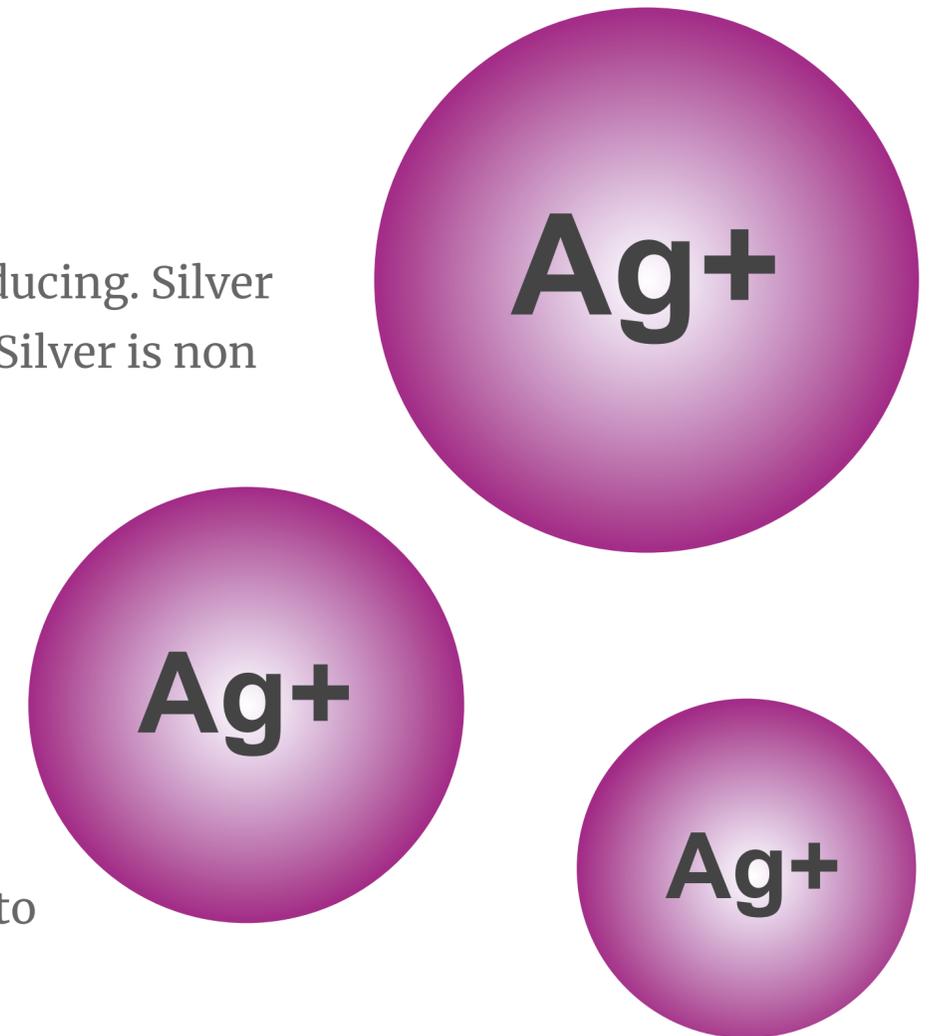
Atmospheric moisture triggers the gradual release of silver ions in the material.

These ions interact with the micro-organisms to prevent a wide spectrum of bacteria from reproducing. Silver does not deteriorate and this controlled release of silver ions lasts for the lifetime of the product. Silver is non toxic and safe for humans.

As the antimicrobial treatment is formulated into the material at the time of manufacture; the antimicrobial activity is consistent throughout the TPE and not solely on the surface.

Performance is not affected by external stresses, scratches, and wear and tear.

The additive system is suitable for transparent articles and has a high degree of thermal stability to withstand industrial processing.



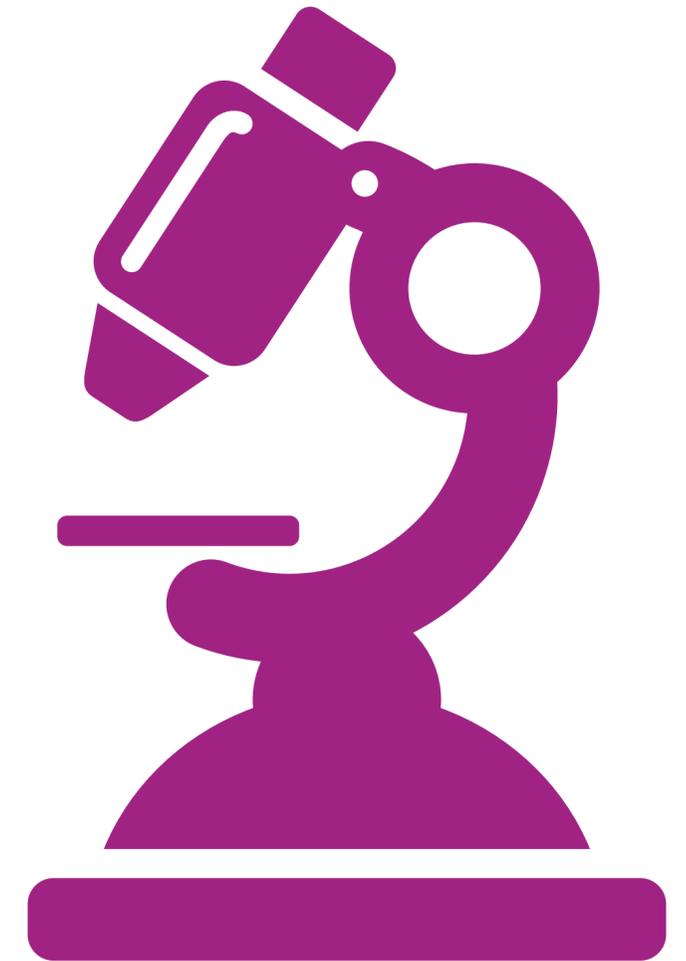
# Performance

Articles manufactured from Dryflex Antimicrobial TPEs have been independently tested and proven to exhibit reductions in bacterial viable counts by more than 99.9%.

We will submit customer finished articles made from Dryflex for free external micro-biological testing and report on the findings.

Samples are tested according to international recognised test protocols such as JIS Z 2801 and ISO 22196:2007, a quantitative antibacterial test, and other variants applicable to the end-use requirement.

The active ingredient is included in the EFSA guidelines, it is EPA registered and complies with the European Biocidal Products Directive (BPD).



# Typical Applications

Cross-contamination is of concern for multi-use articles, and especially those frequently used by different people. Dryflex Antimicrobial TPEs can add value to applications found in public and domestic environments, including:

- Consumer goods
- Sports equipment
- Furniture trimming, flooring and wall protection
- Hand held devices
- Public transport
- Healthcare and clinical environments
- Areas with a heavy footfall such as gyms, schools and educational institutions and shopping centres
- Packaging

# Compound or Masterbatch?

There are many benefits to using a compound over a masterbatch in antimicrobial applications.

The accuracy of the dosing equipment is vital to the performance of the material. Addition rates are typically in the 1 to 2% range and the antimicrobial active ingredient must be dispersed perfectly to ensure the properties are not compromised and the efficacy of each part.

If your product requires third party certifications, such as UL listing, then the addition of a masterbatch can make the material certifications invalid.

If you need to add more than one masterbatch to include other properties such as colour or UV, the costs can quickly rise.

A fully compounded Dryflex TPE gives a dispersed, consistent antimicrobial activity with a correct and reproducible addition level.

Dryflex Antimicrobial TPEs are custom formulated for your application, they are ready for use, with no additional steps.

# Antimicrobial Testing

Five Dryflex TPE samples, three of which had been compounded with antimicrobial additive, were independently tested. The samples were leached and tested for activity using a quantitative test method.

## **Procedure - Quantitative Antibacterial Assessment:**

ISO 22196:2007 was used to quantitatively test the specimen for antibacterial activity. In brief:

The sample was placed into a container with a lid.

1. A 0.1mL inoculum of *Escherichia coli* (ATCC #8739) or Methicillin resistant *Staphylococcus aureus* (ATCC #33591) was placed, in microdroplets, on the surface of the samples. Sterile films were placed over the inoculum to encourage good contact.
2. The specimen was incubated 24 hours at 37°C.
3. 20mL of Letheen broth was added to the container and shook. The liquid was plated using dilution techniques.
4. The “Value of Antimicrobial Activity” was carried out using the formula

$R = [\log (B/C)]$  (where R: value of antimicrobial activity)

B = Average of the number of viable cells of bacteria on the untreated test piece / inoculum control after 24 hours

C = Average of the number of viable cells of bacteria on the antimicrobial piece after 24 hours.

# Results of Antimicrobial Testing

## E.coli after 1hour leach

Concentration of starting inoculum  $3.88 \times 10^5$  CFU/mL

Sample Description	No. Bacteria Recovered	Log Value	R = [log (B/C)]	% Reduction
1. Dryflex 500000 TPE	$8.26 \times 10^2$	2.9	-	-
2. Dryflex 500000 TPE + 0.6% Antimicrobial Additive	$< 2.00 \times 10^1$	$< 1.3$	$> 1.7$	$> 98.0$
3. Dryflex 500400 TPE	$8.52 \times 10^4$	4.9	-	-
4. Dryflex 500400 TPE + 0.5% Antimicrobial Additive	$< 2.00 \times 10^1$	$< 1.3$	$> 3.6$	99.9
5. Dryflex 600400 TPE + 0.5% Antimicrobial Additive	$< 2.00 \times 10^1$	$< 1.3$	$> 3.6$	99.9
Inoculum Control	$1.70 \times 10^7$	7.2	-	-

# Results of Antimicrobial Testing

## MRSA after 1hour leach

Concentration of starting inoculum  $1.67 \times 10^5$  CFU/mL

Sample Description	No. Bacteria Recovered	Log Value	R = [log (B/C)]	% Reduction
1. Dryflex 500000 TPE	$1.52 \times 10^5$	5.2	-	-
2. Dryflex 500000 TPE + 0.6% Antimicrobial Additive	$8.13 \times 10^2$	2.9	2.3	99.5%
3. Dryflex 500400 TPE	$2.75 \times 10^2$	2.4	-	-
4. Dryflex 500400 TPE + 0.5% Antimicrobial Additive	$2.27 \times 10^2$	2.4	0.1	17.5%
5. Dryflex 600400 TPE + 0.5% Antimicrobial Additive	$1.24 \times 10^3$	3.1	-0.7	0.0%
Inoculum Control	$1.14 \times 10^5$	5.1	-	-

The level of treatment stated in the results tables indicate theoretical levels only. For further information please contact us.

# More Dryflex TPE Ranges

Click for more information

**Dryflex® 2K**  
2K

**Dryflex® AM**  


**Dryflex® C**  


**Dryflex® Circular**  


**Dryflex® CS**  


**Dryflex® DW**  

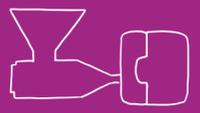

**Dryflex® Flam**  


**Dryflex® Green**  


**Dryflex® HiF**  


**Dryflex® Interior**  
VOC  


**Dryflex® PS**  


**Dryflex® SE**  


**Dryflex® T**  


**Dryflex® Touch**  


**Dryflex® TPV**  
TPV

# ABOUT US



[info@hexpolTPE.com](mailto:info@hexpolTPE.com) | [www.hexpolTPE.com](http://www.hexpolTPE.com)

**80,000+**  
T/P.A. CAPACITY

Across our Sweden, UK, German, China & North America operations. [Our companies](#)

**50+**  
YEARS HISTORY

We've a proud history in flexible polymer compounding & were among the **1st to produce TPEs** in Europe. [About us](#)

**34,795+**  
FORMULATIONS

A comprehensive portfolio in TPE, TPS, TPO, TPU, TPV, soft PVC & Biobased technologies. Learn more about [Our products](#)

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